**Adoption and Benefits of Standardized IT Management Processes:**

**IT Executives' Perceptions of ITIL and CobiT**

**Dissertation**

**zur Erlangung des wirtschaftswissenschaftlichen Doktorgrades**

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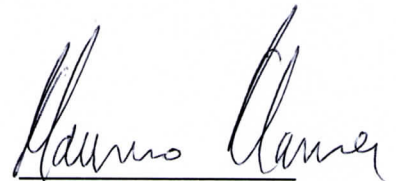**Mauricio Alberto Marrone Burgoa**

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"Ich versichere an Eides Statt, dass ich die eingereichte Dissertation "**Adoption and Benefits of IT Operational Process Improvement Frameworks: IT Executives' Perceptions of ITIL and CobiT**" selbstständig verfasst habe. Anderer als der von mir angegebenen Hilfsmittel und Schriften habe ich mich nicht bedient. Alle wörtlich oder sinngemäß den Schriften anderer Autorinnen und/oder Autoren entnommenen Stellen habe ich kenntlich gemacht."

Mauricio Marrone

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# Abstract

The aim of this research is to understand how IT executives of different countries implement and perceive IT operational process improvement frameworks. We examine if IT operational frameworks, such as ITIL and CobiT, have an effect on the IT organization and on the relations between the IT organization and the business. While the implementation of such frameworks has been on the rise, limited research sets out to understand how the benefits of implementation evolve as organizations implement these frameworks.

To answer this, two surveys were conducted to understand the perception of IT executives, one focusing on ITIL and the other on CobiT. Over 680 survey responses were collected and analysed. A total of 490 responses were received from companies that had implemented ITIL. We are interested in knowing the perceived benefits realized due to the ITIL implementation, the perceived maturity of the business-IT alignment, and the maturity of the ITIL processes implemented. Responses were used to compare how the benefits, challenges and maturity of the business-it alignment would evolve as the implementation maturity increases. Additional to these, further data was gathered from Australia and DACH (Austria, Germany and Switzerland) countries.

A study is conducted to compare companies using ITIL in Australia, DACH countries, United Kingdom and United States, and shows that inter-organisational factors such as country, size and industry sector contribute to the variation in adoption of ITSM. Additionally, insights provide evidence that organizations implementing ITIL are concentrating on operational processes more than on tactical and strategical processes.

Findings from this thesis also show that as the overall maturity of the ITIL implementation increases, so do the number of perceived realized benefits. When it comes to the challenges of implementation, results show that these decrease as the overall maturity of ITIL implementation increases. Findings also show that as the maturity of the implementation increases, so does the business-IT alignment. Further, a logistic model is completed to provide an understanding of which processes of ITIL are able to predict the realization of benefits. Processes which are likely to provide benefits are access management and financial management.

The study was then replicated for IT organizations using CobiT. The focus is on understanding if the implementation of CobiT has an impact on business-IT alignment. As well the study concentrates on understanding if a positive impact is perceived due to the implementation of CobiT. In this survey, 190 usable responses were received from organizations using CobiT. Findings show that as the maturity of the CobiT implementation increases, so does the perceived business-IT alignment, especially in the later stages. Findings indicate that as maturity of implementation increases so does the perceived impact for all focus areas of IT governance.

Using the approach developed from the Knowledge-Based View of the firm, we then explain why IT operational process improvement frameworks have an impact on the IT organization. We show that CobiT and ITIL contain characteristics of knowledge integration as proposed by Grant (1996).

The thesis contributes to a better understanding of the benefits that IT operational process improvements, such as ITIL and CobiT, can provide to the organization.

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# Acronyms

| | |
|---|---|
| CEO | Chief Executive Officer |
| CCTA | Central Computer and Telecommunications Agency |
| CIO | Chief Information Officer |
| CMMI | Capability Maturity Model Integration |
| CobiT | Control Objectives for Information and Related Technology |
| CSI | Continual Service Improvement |
| CSF | Critical Success Factor |
| DACH | Abbreviation for German-speaking European Countries (in this research it is comprised of the countries Germany, Austria and Switzerland) |
| ISACA | Information Systems Audit and Control Association |
| ISO | International Organization for Standardization |
| ITGI | IT Governance Institute |
| ITIL | IT Infrastructure Library |
| ITSM | IT Service Management |
| itSMF | IT Service Management Forum |
| KPI | Key Performance Indicator |
| OGC | Office of Government Commerce |
| SAM | Strategic Alignment Model |
| SAMM | Strategic Alignment Maturity Model |
| SeD | Service Design |
| SeO | Service Operation |
| SeS | Service Strategy |
| SeT | Service Transition |
| SEI | Software Engineering Institute |
| SLA | Service Level Agreement |
| SLM | Service Level Management |
| SOX | Sarbanes Oxley Act |
| SPSS | Statistical Packages of Social Sciences |
| Std. dev. | Standard deviation |
| TQM | Total Quality Management |

# Publications from research

While pursuing the research described in this thesis, a total of eleven refereed scholarly articles closely related to this research have been published in conference proceedings, edited books and journals. The following list provides an overview of the scholarly articles.

- Impact of IT Service Management frameworks on the IT Organization: An Empirical Study on Benefits, Challenges and Processes, Business and Information Systems and Engineering, 2011. (Marrone, M., Kolbe, L. M.) Volume 3, Number 1.

- Einfluss von IT-Service-Management-Frameworks auf die IT-Organisation: Eine empirische Studie zu Vorteilen, Herausforderungen und Prozessen, WIRTSCHAFTSINFORMATIK, 2011. (Marrone, M., Kolbe, L. M.) Volume 53, Number 1. *Translated version of publication for Business and Information Systems and Engineering journal.*

- Uncovering ITIL Claims: IT Executives' Perception on Benefits and Business-IT Alignment, Information Systems and e-Business Management, 2010. (Marrone, M., Kolbe, L. M.)

- IT Executives' Perception of CobiT: Satisfaction, Business-IT Alignment and Benefits, in Proceedings of the 16th Americas Conference on Information Systems (AMCIS 2010), August 12-15, 2010, Lima, Peru, Association of Information Systems (AIS), 2010, (Marrone, M., Hoffmann, L., Kolbe, L. M.)

- Mapping Improvements Achievable through the Adoption of IT Governance, in Proceedings of the 14th Pacific Asia Conference on Information Systems (PACIS 2010), July 9-12, 2010, Taipei, Taiwan, Association of Information Systems (AIS), 2010, (Marrone, M., Kolbe, L. M.)

- Are We Really Innovating? An Exploratory Study on Innovation Management and Service Management, In IEEE International Conference on Management of Innovation and Technology (ICMIT 2010), June 2-5, 2010, Singapore, 2010 (Marrone, M., Kießling, M., Kolbe, L. M.)

- ITIL and the creation of benefits: An empirical study on benefits, challenges and processes, In European Conference on Information Systems (ECIS 2010), June 6-9, 2010, Pretoria, South Africa, 2010 (Marrone, M., Kolbe, L. M.)

- ITIL - Providing More than Just Operational Benefits: An Empirical Research, In Multikonferenz Wirtschaftsinformatik (MKWI 2010), February 23-25, 2010, Göttingen, Germany, 2010 (Marrone, M., Kolbe, L. M.)

- Influence of IT Service Management on Innovation Management: First insights from exploratory studies, In A. D'Atri et al., eds. Management of the Interconnected World: ItAIS:The Italian Association for Information Systems, Springer, 2010, (Kießling, M., Marrone, M., Kolbe, L. M.)

- Business-IT Alignment and IT Best Practices: Key elements for IT Performance Measurement Implementation, in itAIS 2009 VI Conference of the Italian Chapter of AIS, October 2-3, 2009, Costa Smeralda, Italy, Association of Information Systems (AIS), 2009, (Marrone, M., Woertman, A., Kolbe, L. M.)

- Influence of IT Service Management on Innovation Management: First insights from exploratory studies, in itAIS 2009 VI Conference of the Italian Chapter of AIS, October 2-3 , 2009, Costa Smeralda, Italy, Association of Information Systems (AIS), 2009, (Kießling, M., Marrone, M., Kolbe, L. M.)

This research, being of high importance to practitioners has lead to various invitations to expose the findings at diverse conferences. The following list provides an overview of the conferences presentations held.

- Achieving Value through IT Service Management Transformation: An International Perspective, IT Service Management Forum (itSMF) Queensland Seminar, Brisbane, Australia, 2010 (Cater-Steel, A.,  Marrone, M., Kolbe, L. M., Gacenga, F.)

- Benefits and Challenges Attribute to ITIL Implementation: An Empirical Study, itSMF Annual Conference, Melbourne, Sydney, 2010 (Marrone, M.)

- Can Certain ITIL Processes Lead to Particular Benefits?, PacRim IT Service Management Conference, Sydney, Australia, 2010, (Marrone, M.)
- Measuring the Performance of IT, IT Service Management Forum (itSMF) for Lower Saxony, Germany, Hannover, Germany, 2009, (Marrone, M.)

# 1. Introduction

## *1.1    Motivation of Research*

It has become a rarity not to find Information Technology (IT) embedded as a critical part of the business. Over 90% of CEOs and CIOs view IT as a crucial contributor to the success of the business (IT Governance Institute 2008). Yet, the IT organization has been synonymous for failed projects and rising expenses. Over the past three decades academic researchers and business press have referred to it as the "productivity paradox". The "productivity paradox" is the acknowledgement, that in spite of enormous investments in IT, the technology has not proven to provide a significant increase in productivity. In this topic, the Nobel Prize winner Robert Solow's (1987) famous remark is often cited: "you can see the computer age everywhere but in the productivity statistics".

A review of literature completed by Brynjolfsson and Yang (1996) led to the examination of around 150 articles on IT and productivity concluding that studies on the topic from 1970s through to the first half of the 1990s had found little evidence of productivity increase due to IT. More recent studies show similar conclusions. The Standish Group (2009), who have been doing research on IT project success rates since 1994, found that 44% of projects were challenged (late, over budget, and/or with less than the required features and functions) and 24% of projects failed (cancelled prior to completion, or delivered and never used). An Oxford University survey reported that merely 16% of IT projects were successful, close to 74% were 'challenged' and 10% were abandoned (Sauer & Cuthbertson 2003).  Tata Consulting Services (2007) quoted that 62% of organizations experienced IT projects that failed to meet their schedules and that 49% suffered budget overruns. They conclude that senior management considers IT failures to be a routine occurrence, and management appears to feel unable of improving the situation.

IT management may view the usage of IT operational process improvement frameworks as an opportunity to improve the success rate of IT projects. The IT organization has been seen as a department with lack of processes and structure, which serves and follows a technical perspective. IT Services, IT governance, Service Management, and many other similar concepts have developed over the past years to overcome these issues.

The focus of IT Services has been initially on the delivery of high-quality, low costs services. However, it has been theorized that they also have the potential to become relevant strategic assets that have an impact on the integration between the business and the IT organization. The issue of business-IT alignment is often been cited as the key issue by IT executives (Luftman & Ben-Zvi 2010). Consequently, duties of the Chief Information Office have evolved from a technical perspective to a strategic role. As argued by Sutton and Arnold (2005) the role of the CIO is now shifting its focus to risk management, and more specifically IT governance.

Possibly due to these factors, the usage of IT Service Management and IT governance frameworks has been on the rise. A 2010 survey by PricewaterhouseCoopers and the IT Governance Institute (2010) found that 33% of companies had implemented IT governance frameworks. The survey shows that usage has doubled steadily increased over the last four years. IT Service Management frameworks (specifically in this survey ITIL and ISO 20,000), were implemented by 28% of the organizations. The usage of IT Service Management frameworks went from 13% in 2005 to 28% in 2011. These frameworks have achieved worldwide recognition.

The main research objective of this dissertation is to investigate the impact that IT operational process improvement frameworks have on the organization. In order to investigate this, we will study the most widely accepted frameworks for IT Service Management and IT governance: ITIL and CobiT. While the interest ultimately lies on the impact that these frameworks have on the business performance, for practical reasons, the focus of this study will be on the perception

which IT executives, who have implemented these frameworks, have on the effect that the frameworks have on their IT organization.

The justification for carrying out this research stems from the fact that the usage of IT operational process improvement frameworks has been on the rise, and the impact that these frameworks have on the organization has hardly been investigated in the academic literature. At the same time, the essence of the research problem is that firms are uncertain if their organizations would obtain any benefits from implementing these frameworks. Therefore, there is a need, in both research and practise, to understand the impact that ITIL and CobiT have on the IT organization.

## *1.2    Research Objectives and Questions*

IT organizations are challenged in this environment with the effort to provide better service to their customers, develop an appropriate inter-organizational governance framework, integrate the business, and improve their success rates of IT project.

At the same time the disconnection between IT and the business has been a key issue for IT executives constantly over the past years. Luftman and associates carry out a survey to understand the key issues of IT executives. Over the past years business-IT alignment has ranked on the top five (Luftman & McLean 2004; Luftman, Kempaiah & Nash 2006; Luftman 2008; Luftman, Kempaiah & Rigoni 2009; Luftman & Ben-Zvi 2010).  IT operational process improvement frameworks, such as ITIL and CobiT, are believed to allow for a better strategic focus of the organization adopting these.

More than business-IT alignment, IT executives are attempting to bridge the gap between control requirements, technical issues and business risks, and it has been suggested that guidelines established in IT governance frameworks may be useful (Lainhart IV 2000; Hardy 2006). IT governance frameworks, specifically CobiT, have been acclaimed to be vital for companies that endeavor to comply with the regulations and requirements of the Sarbanes-

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Oxley (SOX) Act and others similar regulations like Basel II, DCGK (Der Deutsche Corporate Governance Kodex), and CLERP9 (Corporate Law Economic Reform Program). Failing to meet compliance requirements can cause a negative impact for those companies. The usage of governance frameworks has also been theorized to allow for IT executives to improve the success rate of IT projects. On the other hand, IT Service Management frameworks have been positioned as tools which allow for IT executives to deliver high-quality, low-cost, and customer oriented services.

The question then arises if these frameworks are able to be as useful as they claim to be, and if their benefits can be statistically shown. At the moment, IT executives are uncertain of what would be achieved if they implement such IT operational process improvement frameworks. The costs of implementing such frameworks are generally high, and their effect on the IT organization has not been thoroughly studied.

The objectives of this dissertation specially aim to explore if firms realize benefits due to the implementation of the frameworks. The research aims to understand if there are any perceived benefits realized within the IT organization as well as in the maturity of their business-IT alignment. It also wishes to understand if frameworks, sometimes considered 'best practices' can be applied universally, regardless of the organizations country, size, and industry in which it exists in.

The major research objective is to gain an understanding of the benefits that may be achieved when implementing the framework. The previously described objective demonstrates the need to find answers to the following research question:

- How do IT executives perceive the impact that the adoption of IT operational process improvement frameworks has on the IT organization?

To gain more insight into how IT operational process improvement frameworks affect the IT organization, we develop more specialized research questions tailored to support the research question and thereby the objective. Each of the five published papers aims to provide insights into answering the main research question. Table 1 shows the papers that are included in the dissertation, the paper objective and the questions of each paper.

Table 1. Papers' Objectives and Research Questions

|  | Paper Objective | Paper's Research Questions |
|---|---|---|
| Paper 1 | Empirically explore how a service innovation such as ITIL is adopted in today's global economy | 1. Are more operational level ITIL processes adopted than tactical and strategic level ITIL processes? 2. Do factors such as country, size and industry sector contribute to variation in adoption of ITIL processes? |
| Paper 2 | Provide an understanding of the benefits that the IT organization may realize when implementing ITIL. | 1. Which effect does the total number of implemented processes have on the maturity of the ITIL implementation? 2. How are challenges perceived at different levels of maturity of the ITIL implementation? 3. How does the total number of realized benefits develop as the |

| | | maturity of the ITIL implementation increases? |
|---|---|---|
| Paper 3 | List ITIL processes which predict the realization of benefits. | 1. Can certain factors predict the realization of benefits? If so, which factors are these? |
| Paper 4 | Understand if the maturity of the business-IT alignment can be influenced by the implementation of ITIL. | 1. How is the Business-IT alignment perceived at different levels of maturity of the ITIL implementation? |
| Paper 5 | Comprehend IT governance frameworks, such as CobiT, are also able to provide benefits to the IT organization and have an impact on the maturity of the business-IT alignment. | 1. Is there a relationship between the size of the company and their CobiT implementation maturity?<br>2. How is business-IT alignment affected as the CobiT implementation matures?<br>3. How do companies perceive realized benefits as the CobiT implementation matures? |

## 1.3   Research Methodology

To understand the impact that IT operational process improvement frameworks have on the organization, the following approach has been taken.

In the area of ITIL, case studies have been executed at six German companies. Interviews on the subject of IT Service Management were carried out with key IT executives. Two conference papers which contain the findings were published (see Appendix One for one of these papers). Using the constructs identified in the case study, a pilot survey was created. This pilot survey was then strengthened by adding constructs gathered from the academic literature. The survey was piloted at the CeBIT fair in Hannover, Germany in 2009 (see Appendix Two for pilot survey). Using the feedback gathered from the pilot survey, a web-survey was then conducted. (see Appendix Three for copy of survey). This survey was then replicated for companies using CobiT. Attached is a copy of the survey which was conducted (see Appendix Five)

There are specific characteristics of a web-based questionnaire that need to be considered. The self-administered and web-based questionnaires have specific characteristics. The advantages and disadvantages of web-based questionnaires are similar to those from the self-administered paper questionnaire (Brace 2004). This kind of questionnaire produces almost no costs and gives the chance to reach people everywhere in the world. As well, the respondents have as much time as necessary to answer the questions and can collect further material to answer all questions correctly. There is no influence from the interviewer on the respondent, so the questions are answered independently.

Disadvantages are a comparatively low response rate and that it is not possible to give further explanations to the respondents and correct them if they misunderstood any questions (Oppenheim 1992). English is selected as the language of the questionnaire, considering the fact that English is the common language in business, this does not result in limitations of the population (Kuiper 2007).

The process of a quantitative survey discussed by Czaja and Blair (1995) was followed in this dissertation. They propose that the process is to be separated into five phases: Survey design

and planning, pretesting, final survey design, data collection and data analysis and reporting. Figure 1 shows this process.

| Survey Design and Planning | → | Pretesting | → | Final Survey Design | → | Data Collection | → | Data Analysis and Reporting |

**Figure 1: Process of Quantitative Web-Based Survey (Czaja & Blair 2005)**

## 1.4  *Scope of Research*

Whilst it is acknowledged that there are several IT operational process improvement frameworks in this area, the scope of the research is restricted to the ITIL and CobiT frameworks. A collection of other IT Service Management frameworks has been developed on the basis of ITIL. Examples include Hewlett-Packard ITSM Reference model, IBM's IT Process Model, Microsoft Operation Framework (MOF), and many others. As well, the IT Service Management standard ISO 20,000 is also based on ITIL. These variations are not considered in the study. The IT governance standard ISO 38,500 and CobiT are both based on the same principles of corporate IT governance. The scope of this research will only include CobiT.

The focus of this research is on companies using these frameworks, and only the positive impact that these frameworks have on the IT organization are studied. We will concentrate on surveying one person per company.  We understand that many different views on the benefits that these frameworks provide may exist within one organization. The research aim is to ask the champion of these frameworks, and that their views would represent a holistic picture of the impact which these frameworks have had on the organization.

We intend to ask only the IT executives about the impact of these frameworks. Users of the services will not be considered when attempting to understand the impact that the frameworks have.

It is also understood that there are several contributing areas of literature, such as manufacturing, however, these are beyond the scope. The thesis covers only those benefits of challenges of the implementation of ITIL and CobiT which have been explored in the academic literature. As well, this research does not investigate the impact of IT operational process improvement frameworks from an accounting nor economic perspectives. It also does not focus on finding causality.

## *1.5    Anticipated Contributions*

The dissertation equally addresses scientists, lecturers, students, and IT executives, who are engaged in understanding the impact that these frameworks have on the IT organization. The contributions for research and practice are described in the following.

### 1.5.1  Research

The research outcomes provide a structure and synthesis to the academic literature in the fields of IT Service Management and IT governance, by creating streams of research for both research areas. As well, this research presents through a multi-method approach a comprehensive and empirically validated conceptualization of the factors pertaining to benefits of the ITIL and CobiT implementation. Furthermore, the research introduces promising theoretical grounding to the area of IT Service Management and IT governance frameworks. On the whole, the research offers an overall sound basis for further research.

### 1.5.2  Practice

With regards to practical contribution, the research aims to obtain guidance on which benefits, if any, IT organizations may realize from the implementation of these frameworks. Moreover, it aspires to provide an understanding of which processes of the frameworks are more likely to allow for an impact on the realization of benefits. It will provide an understanding of the potential degree of benefits realizable due to the implementation of the frameworks and

identifying the challenges which may be encountered at different levels of implementation. As well, it will show a comprehensive overview of the implementation status of these frameworks from results of a global survey, which will enable organizations to benchmark their own implementation activities.

## *1.6    Chapter Conclusions and Overview of the Thesis*

This chapter illustrates the importance of IT operational process improvement frameworks. The research questions were presented followed by an overview of the applied research design. The chapter concludes by looking into the study contributions and the scopes of research.

This research follows the structure of a "Thesis by articles". A compilation of articles which have been accepted at various Information Systems journals and conferences are presented here. Each article is included in its original journal article format and will have its own enumeration and references. Published papers are included in their published form.

The chapter's structural logic and relationships are as follows:

- **Chapter One** delineates the problem, research objectives and research questions. Furthermore, it outlines the approach to addressing these.
- **Chapter Two** includes a review of IT Service Management, IT governance, ITIL and CobiT.
- **Chapter Three** presents Paper 1 titled "IT Service Management Innovation: A Cross-National Study of ITIL Adoption Using Institutional Theory". The manuscript provides insights into the universality of ITIL and if it is being adopted in the same manner by organizations of different countries, sizes and industries.
- **Chapter Four** presents Paper 2 titled "Impact of IT Service Management frameworks on the IT Organization". In this manuscript operational benefits due to the implementation of ITIL are explored.

- **Chapter Five** presents Paper 3 titled "Impact of Selective ITIL v3 Processes on the Realization of Benefits- An Empirical Study". The ITIL processes which are likely to act as a predictor of benefits are studied in this manuscript.

- **Chapter Six** presents Paper 4 titled "Uncovering ITIL claims: IT executives' perception on benefits and Business-IT alignment". In this manuscript an empirical study is conducted to understand if ITIL has the potential to impact the relationship between the business and IT organization.

- **Chapter Seven** presents Paper 5 titled "Fulfilling its Promises - a Perspective of IT Executives on the benefits of implementing CobiT". This manuscript looks at the impact that CobiT has on the IT organization and its alignment with the business.

- **Chapter Eight** establishes a theoretical framework for the study. The chapter looks at how the Knowledge-Based View of the firm approach fits in with the findings of the research.

- **Chapter Nine** summarizes this study, highlights key contributions, and displays limitations and research paths.

# 2. Literature Review

Taylor's (1911) proposal of standardizing operational procedures involved selecting the best worker for a planned task and creating their methods as a standard to be replicated with all other workers. In the area of IT, Davenport (2005) pointed out that standards and standardization have played a decisive role. It has been shown that process standardization has a positive impact on process performance and market success (Ramakumar & Cooper 2004; Swaminathan 2001). The usage of them has also been shown to decrease risk, reduce cost, and improve effectiveness and transparency.

The remainder of this chapter flows as follows. First, due to the importance of standards and standardization, this chapter commences with the definitions of these terms. Secondly, we introduce the terms of process standardization and then discuss the two popular areas of IT process standardization: IT Service Management and IT governance. In each of these sections we cover the main frameworks for process standardization. In IT Service Management we will cover ITIL framework and in the area of IT governance we will review the CobiT framework.

The aim of this chapter is to provide an overview on the area under investigation, namely IT operational process improvement frameworks, such as ITIL and CobiT, with the main goal of providing a holistic view of the current status of research in this domain to assist in positioning this study. The objective of this chapter is to propose a logical structure for an existing literature in the two fields of the research.

The objectives of this chapter are:
- Synthesize and summarise the concepts and issued discussed by academic researchers around the topic of IT Service Management, ITIL, IT governance and CobiT
- Identify prominent and emerging concepts, arising from literature, which researchers have focused on and deemed important

- Delimitate the boundaries of this research
- Identify gaps, distinctions, patterns in literature and deal with this with the appropriate methodology

The review begins with definitions of Standards and Standardizations to provide a foundation for the rest of the literature review. We then delve into IT Service Management and ITIL, the de-facto IT Service Management framework. This is followed by an in-depth exploration of this operational framework. The research then concentrates on IT governance and CobiT. Using as basis previous literature reviews on this topic we further synthesis new research done in this area.   The chapter is tied together by understanding how these two IT operational process improvement frameworks relate. An introduction into Knowledge-based view approach as an appropriate theoretical foundation is provided. A conclusion of the review and gaps are then shown.

## *2.1 Standard and Standardization*

To provide an overview of the area of research, we first define the term standard. The International Organization for Standardization (ISO) (2007) defines a standard as:

*A document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context (page 8).*

Standardization, as expressed by the ISO (2007), can be defined as:

*Standardization is the activity of establishing, with regard to actual or potential problems, provisions for common and repeated use, aimed at the achievement of the optimum degree of order in a given context* (page 8).

Both of these definitions are widely accepted and authoritative. Therefore for this thesis we accept and utilize these definitions.

Weill and Ross (2004) argue that there are three types of IT standardization:

- Technology – designed to produce economies of scale through shared services
- Data – makes possible process integration with e.g. customer or supplier or employee data
- Processes – assist in process excellence and reusability

In the research undertaken for this thesis, we concentrate on process standardization. Wuellenweber, Beimborn Weitzel, Koenig (2008) argue that the objective of process standardization is "to make process activities transparent and achieve uniformity of process activities". Standardized IT management processes provide a basis for IT Service Management and IT governance. Both areas are discussed in the next sections as well as the frameworks that are most popular in their respective domains.

## *2.2 IT Service Management*

The basic aspects of IT Service Management (ITSM) are services and processes. Service can be seen as the delivery of value to the business by providing hardware, applications and human resources (Conger, Winniford & Erickson-Harris 2008). At the same time, it is necessary for ITSM to require a process-oriented structure rather than a functional structure (Zarnekow, Hochstein & Brenner 2005). This process-oriented structure may lead to a "flexible, cost effective and service oriented IT organization" (Pollard & Cater-Steel 2009).

ITSM can be defined as the management and delivery of IT services with a focus on customer needs (Conger et al. 2008). Satisfying the needs of the customers regarding IT through the IT resources is considered to be the primary task of ITSM (Hochstein, Zarnekow & Brenner 2005).

Many frameworks have been developed using as foundations the concepts from ITSM. These include Microsoft Operations Framework (MOF), HP's ITSM model, IBM's IT Process Model and

ITIL (IT Infrastructure Library). While different approaches exist for the adoption of IT Service Management, the most common and widely used approach is the ITIL (which will be described below) (Kumbakara 2008).

There are several studies considering the implementation of ITSM and its related and commonly used approach ITIL. An indicative survey with 364 participants in the US showed that 45% of the respondents are using ITSM in their company, while 15% are planning on using it (Winniford, Conger & Erickson-Harris 2009).

According to the survey of Winniford et al. (2009), of those using ITSM, 66% were familiar with the concept of ITIL. The ITIL framework has gained more and more importance throughout the world and is now accepted in over 30 countries as a *de-facto s*tandard for IT Service Management (Hochstein, Zarnekow & Brenner 2004). Therefore, in the next section we further explore ITIL, its history and its processes.

## *2.3    ITIL*

ITIL is a collection of 'best practices' developed by the United Kingdom's Office of Government Commerce (OGC) in cooperation with IT experts and consultants (Zarnekow et al. 2005). It sets guidelines for the management of IT including its processes and organizational structures. This infrastructure library is a set of books which are copyrighted by the OGC.

The Central Computer and Telecommunications Agency (CCTA) originally published the first volume of ITIL in 1991 in Great Britain and 1993 in the Netherlands. Now the CCTA is a part of the Office of Government Commerce (OGC), which is a division of the UK Treasury. Therefore, the OGC is the current owner of ITIL and has published the fundamental literature on ITIL (Van Bon, Jong, Kolthof, Pieper, Tjassing & Veen 2007). ITIL was intended to improve the CCTA's own processes in delivering IT Services as well as to collect and document gained experience (Köhler 2006). Between 2000 and 2005, eight books were published on Version 2 of ITIL. These

demonstrate a maturing of the process with more structure and consistency than the initial 31 books on Version 1.

In 2007, an enhanced and consolidated version of ITIL was published, consisting of five core books. Version 3 is referred to as an upgrade of Version 2. Wheeldon and Cannon (2007) refrain from introducing Version 3 as a perfectly new idea: "This refreshed version is an evolution of the framework rather than a complete rewrite; materials, training and projects implemented with previous versions are still valid. It is more likely to be a revision of Version 2". While some processes are still the same, perhaps renamed, and others are newly introduced, the overall view of ITSM has changed from a mostly operational approach to a business lifecycle view. According to the five core publications, ITIL provides an overall framework that makes it possible to implement ITSM best practices irrespective of the underlying IT infrastructure. Once IT processes are identified, it provides the opportunity to formalize, coordinate and optimize them (Van Bon et al. 2007).

Nowadays, the majority of adopters of ITIL use either Version 2 or Version 3. The main processes within these two versions are covered in detail in the following sections.

### 2.3.1 ITIL Version 2 Processes

ITIL Version 2 consisted of eight modules, published as separated books. Table 2 contains the title of the books and the year the book was published.

**Table 2. ITIL Version 2 Books**

| Book Title | Year Published |
| --- | --- |
| Service Support | 2000 |
| Security Management | 2000 |
| Service Delivery | 2001 |
| Application Management | 2002 |
| ICT Infrastructure Management | 2002 |
| Planning to Implement Service Management | 2002 |
| Software Asset Management | 2003 |
| The Business Perspective | 2005 |

Figure 2 shows that the processes in these books in ITIL Version 2 are intended to bridge the gap between "business" on the left side and "technology" (e.g. infrastructure) on the right side.
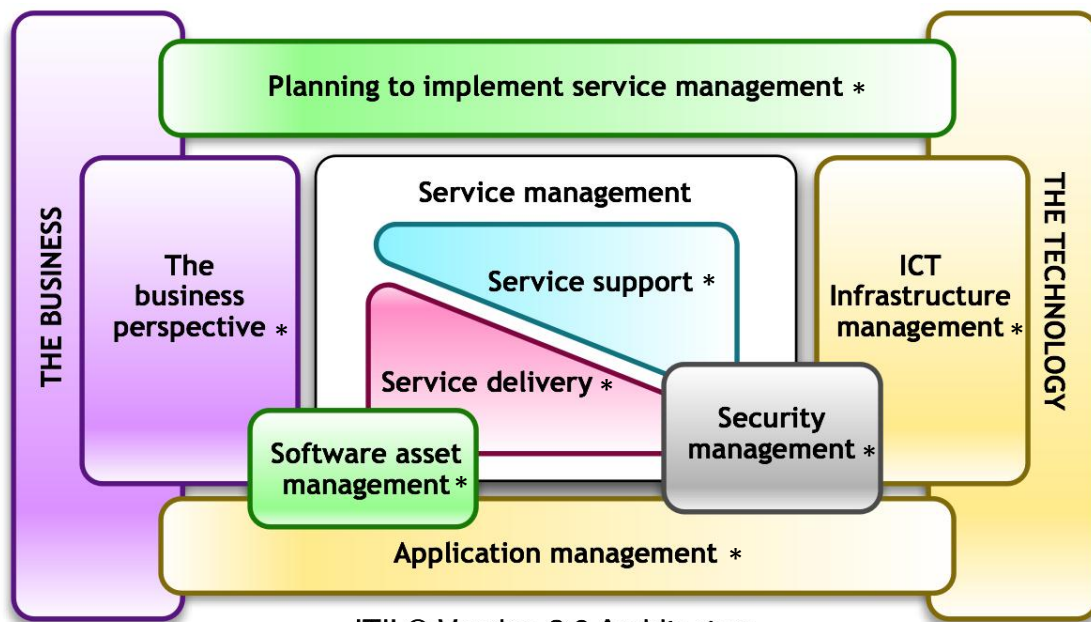


**ITIL® Version 2.0 Architecture**

***Volumes of the ITIL Collection**

**Figure 2. ITIL Version 2 Model (2010)**

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The books 'Service Delivery' and 'Service Support' describe the core of ITIL Version 2. Although there are other ITIL Version 2 books, these two are considered to be the central part of ITIL Version 2.  Processes within the Service Delivery and Service Support are described below:

*Service Delivery*

The aim of Service Delivery is to allow the user to understand the services needed to support the business and what is required to deliver these services. The topics are included in this book are Service Level Management, Financial Management, Capacity Management, Availability Management, IT Service Continuity Management with each of them described by best-practice processes. It focuses on the business as customer of the IT services. Service Delivery demonstrates the relationship between Service Management and other Infrastructure Management processes.

- **Service Level Management (SLM)**

  This covers the negotiation of SLM agreements and documentation of the service requirements. It outlines the other tasks of planning, coordinating, monitoring and reporting on the Service Level Agreements (SLA).  Additionally it covers the SLM reviews, which should be completed on a continuous basis to ensure that they are being met at the desired service level.

- **Financial Management**

  Financial Management deals with the IT service provider's budgeting, accounting and charging of services. The process ensures the cost effective stewardship of the IT assets.

- **Capacity Management**

  This process ensures that an appropriate capacity is available within the organization to deliver the agreed service levels of IT service and IT infrastructure. It deals with IT capacity and performance levels and how they agree with to the needs of the business.

This includes the sizing of hardware, software, and support staff. Previous experience and future requirements are considered when establishing the requirements of the business.

- **Availability Management**

    Availability Management defines the process of: defining, monitoring, analysing, planning, measuring and reviewing aspects of the availability of IT services or the service catalogue. This process brings various disciplines such as: security, responsiveness, service risk mitigation and serviceability into consideration.

- **IT Service Continuity Management**

    IT Service Continuity Management focuses on the identification and management of risks that could critically impact the IT Services. The process focuses on the creation of recovery plans designed to bring IT services back to the required agreed levels. The plan must ensure that in the event of a major disaster, IT services are restored with the least amount of interruption for the business. Coordination with the customer's business continuity plan is required.

### *Service Support*

The other volume of Service Management is titled Service Support. The Service Support volume focuses on the user of the IT services. It ensures that the user would have access to the appropriate services to support the business functions. This volume includes; incident management, problem management, change management, release management and configuration management. These are explained in subsections below.

- **Incident Management**

    An incident can be defined as "An unplanned interruption to an IT Service or a reduction in the Quality of an IT Service" (Cannon & Wheeldon 2007, p.46). Incident Management

involves activities required for restoring the services when an incident takes place. This process ensures that the levels of availability and service are maintained.

- **Problem Management**

  Problem Management aims to find the cause of an incident to prevent its recurrence. Problem Management also is responsible for the minimization of the impact of incidents that cannot be prevented. This processed collects information of all 'work-around' and known 'error of problems'. The data is provided to the change management process. This process ensures that resources are correctly prioritized with regards to the business needs.

- **Change Management**

  This process controls the lifecycle of all changes, from initiation through recording, assessment, categorization, authorization, scheduling, building, testing, implementing, and closure. The process coordinates approval, authorization and communication of changes.

- **Release Management**

  The process of Release Management deals with the implementation of IT changes. Release management look after the live IT environment when a new release is to be launched into production. This process requires the coordination of many levels including project management, development, service desk, change management, technical staff and the customer. The process ensures that all aspects, technical and non technical, of a release are considered.

- **Configuration Management**

  Configuration Management maintains information on logging, tracking, controlling, and verifying asset information about the IT infrastructure components. The Configuration Management Database (CMDB) is used to maintain information about configuration

items. The database also contains the inter-connectedness and interdependence with other items. Essentially, the CMDB would include the hardware, software, associated documentation, related agreements, contracts, and services.

For many companies that implemented ITIL V2 it became difficult to understand how the different books and ideas linked together. The different books of ITIL V2 did not feature the same levels of maturity and acceptance in operational practice. In an attempt to bring together all of the publications of ITIL, and to extend the principles and processes of ITIL V2 a new version, Version 3 was released. The ten core processes of ITIL V2, described above, are still present in ITIL V3 even though a minority of ITIL V2 processes may have been renamed in V3. Each of the lifecycle and their corresponding processes are then explained below.

## 2.3.2  ITIL Version 3 Processes

The current ITIL V3 consists of five books each representing one of the core processes. These five lifecycle processes are: Service Strategy, Service Design, Service Transition, Service Operations and Continual Service Improvement.

The books are recommended to be used as a guideline for maintaining order throughout the phases of the IT lifecycle. The Service Strategy is both the main and central component of the ITIL framework. From there, the surrounding components i.e. Service Design, Service Transition and Service Operation should be implemented in a step by step process. The outmost component Continual Service Improvement surrounds the framework and ensures the continuous development of the processes. The model is shown on Figure 3.
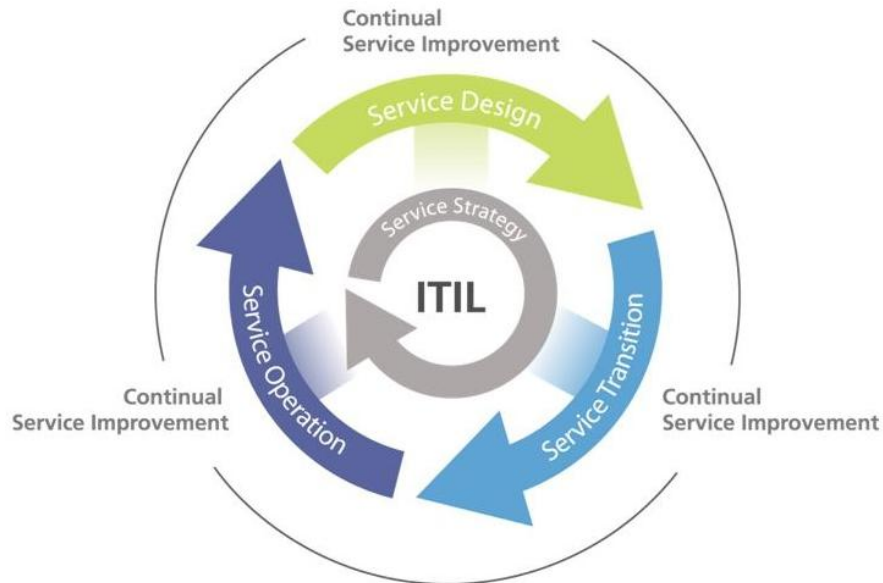
**Figure 3. ITIL Version 3 Model (Iqbal & Nieves 2007, p.8)**

These processes interact with other processes and may even have interaction with other lifecycle phases. How the five lifecycle phases and the processes connect to these is explained in Figure 4. In the middle of the figure is the ITIL lifecycle Service Strategy. This is connected to Service Design, Service Transition and Service Operations. Surrounding all processes is Continual Service Improvement. Each of the processes is then explained below.
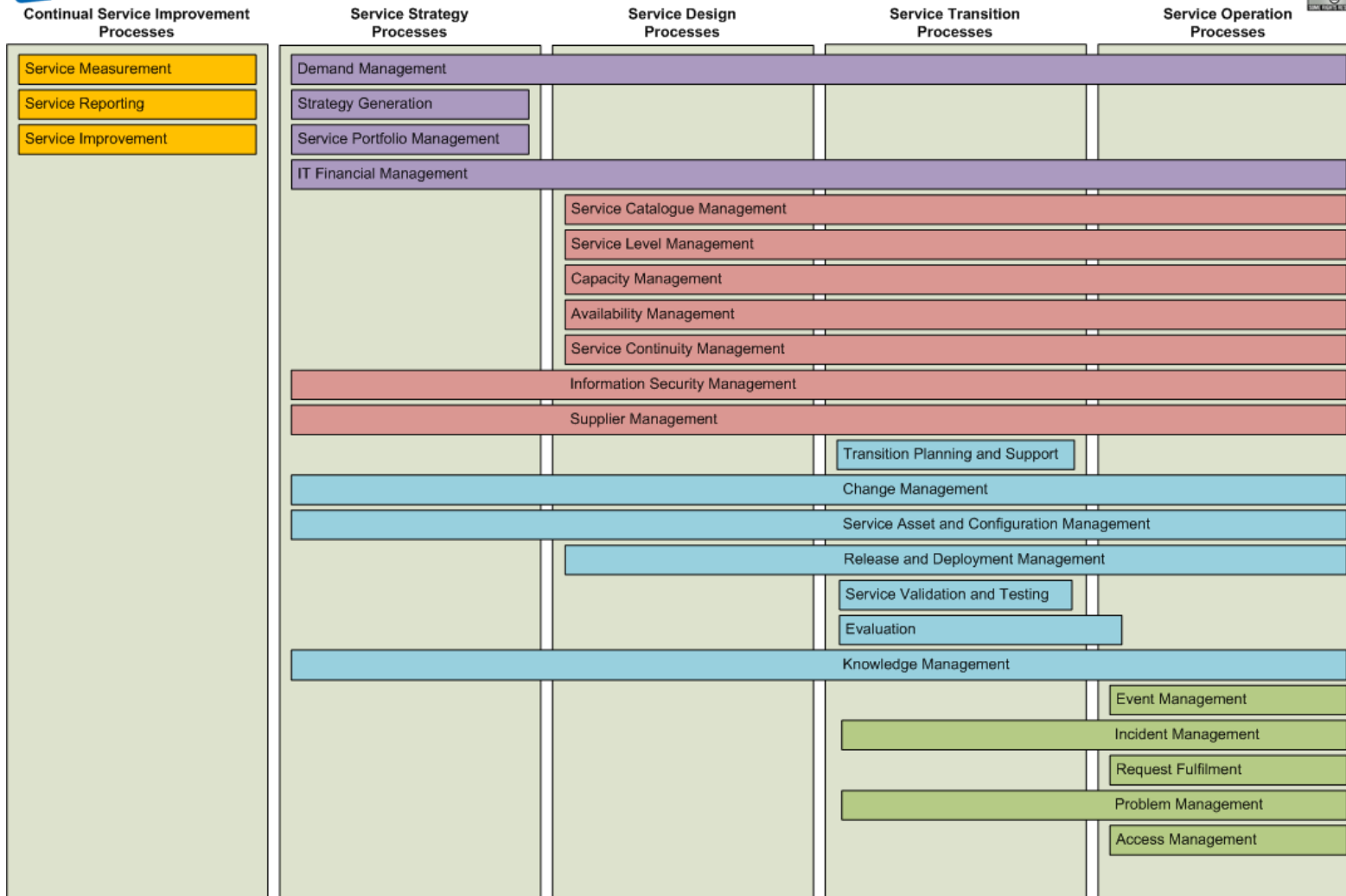
**Figure 4. ITIL Version 3 Lifecycle Phases and Processes (Soares 2010)**

## *Service Strategy*

Service Strategy forms the core of the ITIL V3 framework and its lifecycle. It plays a central role compared to other services. This book establishes strategic thinking in the coordination between the core business of a company and its IT. It also creates a definition of a strategy for the whole IT service management. In other words, in this process strategic targets and decisions concerning the services are made which includes assessing the market and customers.

The main idea is that "customers do not buy products; they buy the satisfaction of particular needs" (Cartlidge & Lillycrop 2007, p.12). The existing or the potential customers should comprehend the value when purchasing services. However, one should understand the needs of the customer, either existing or potential. The result is that during the implementation of the ITIL framework the company must not lose sight of the overall strategy. Since ITIL can be used to secure a competitive advantage it is critical that the organisation defines "the objectives that will differentiate the value of what you do or how you do it" (Cartlidge & Lillycrop 2007, p.12). An organisation's service offer will be judged across a range of perspectives by customers and stakeholders, each having different expectations and different methods of measuring quality. For instance, to enable the IT organization to understand how customers make decisions on service sourcing, a differentiated view of service value is required.

After the IT organization has generated a strategy, it is ready to begin implementing other processes of the Service Strategy lifecycle such as Financial, Demand and Service Portfolio Management.

- **Financial Management**

  This process mainly focuses on the budget, accounting as well as charging requirements (Cartlidge & Lillycrop 2007), which ensure that the business and its IT organization can provide the resources (human and physical) when required. In essence, the processes outlined in V2 are similar to those found in V3. Financial transparency and the decision

support processes are critical to the organisation in normal financial terms but also provide evidence of successful implementation of ITIL.

- **Service Portfolio Management**

  Service Portfolio Management concentrates on the establishment of a strategy to assist customers and users. It also focuses on developing the service provider's offerings and capabilities. It includes detailed descriptions of "those services in the concept, design and transition pipeline, as well as live ... and retired services" (Cartlidge & Lillycrop 2007, p.16). It requires a proactively involved management and an exact understanding of business needs and how to meet them. Developing and presenting a Service Portfolio at an early stage of ITIL implementation may be considered difficult, however, in regards to the long-term enterprise objectives it is strongly recommended. Iqbal and Nieves (2007) argue that a Service Portfolio is critical in the early stages because at time organisations are "often missing constructs for driving service strategies and managing service investments". This is particularly the case for Service Portfolio Management as the operational function is responsible for tracking investments across the service lifecycle and managing them for value (Iqbal & Nieves 2007).

- **Demand Management**

  Demand Management deals with "understanding and influencing customer demand for services" (Cartlidge & Lillycrop 2007, p.17) and provides the necessary capacity to accommodate this demand. It functions at both tactical and strategic levels. The tactical level involves the "use of differential charging to encourage customers to use IT services at less busy times" (Iqbal & Nieves 2007, p.201), while the strategic level is concerned with patterns of business activities and connected user profiles.  It is not recommended to disregard Demand Management even if customer demand is uncertain.  Planning and forecasting the capacity amount is even more difficult considering that service production and consumption are simultaneous, and storing services is impossible.

*Service Design*

After the Service Strategy phase, Service Design follows. The main purpose of Service Design is where services and service processes are designed and developed. The design is based on the strategic targets defined in the Service Strategy. The objective of this phase is to create and develop service management processes, assuring a service offering meets the respective requirements. This includes IT processes, suitable documentation, architecture and guidelines. This phase accentuates the importance of implementing a holistic design approach, as well as to assure consistency and integration along the complete service portfolio. According to Rudd and Lloyd (2007, p.23) Service Design is defined as "the design of appropriate and innovative IT services, including their architectures, processes, policies and documentation, to meet current and future agreed business requirements". Before a Service Design is adopted, some underlying conditions need to be fulfilled. For example, the need for appropriate interfaces and efficient communication channels need to create the possibility of involving other lifecycle phases within the service design process. Generally, Service Design aims to provide a Service Design Package through new or changed service solutions, which pass through the Service Transition phase later on. The processes within Service Design are Service Catalogue Management, Service Level Management, Availability Management, Capacity Management, IT Service Continuity Management, Information Security Management and Supplier Management. These processes are explored further below.

- **Service Catalogue Management**

  The Service Catalogue gathers accurate information of all IT services offered, as well as reference details, interfaces, status and dependencies (Van Bon et al. 2007). It provides essential information to all other Service Management processes. The more accurate the catalogue is the more consistent the picture of the available IT services for all areas across the business will be.  Appropriate communication channels are helpful to make the Service Catalogue widely available for all internal and external IT Service customers.

- **Service Level Management**

  Service Level Management (SLM) "negotiates, agrees and documents appropriate IT service targets with the business, and then monitors and produces reports on delivery against the agreed level of service" (Rudd & Lloyd 2007, p.65). For this purpose metrics for performance measurement should be introduced. Service Level Agreements, Service Improvement Plan and Service Quality Plan are the main outputs of the SLM process (Cartlidge & Lillycrop 2007).

- **Availability Management**

  The objective of Availability management is to analyze, plan, measure and improve all aspects of the availability of IT services (Cartlidge & Lillycrop 2007). In addition to this costs must be taken into account for all Availability Management activities (Van Bon et al. 2007). The process is responsible for the achievement of the agreed service level targets of IT infrastructure, processes, roles, tools, etc.  It is supposed to continuously optimize and proactively improve the availability of the underlying IT infrastructure and services (Rudd & Lloyd 2007).

- **Capacity Management**

  Capacity Management ensures that the IT service provider is able to deliver the agreed service level targets of its IT Infrastructure and capacity of IT services in a way that is cost effective and timely. It achieves a balanced proportion between the business needs and the assisting IT infrastructure under financial constrains. Capacity Management should be adopted to produce a Capacity Plan which includes coherent and meaningful data (Cartlidge & Lillycrop 2007). This way, it may be easier to determine the desired service levels to meet the customer demands.

- **IT Service Continuity Management**

  This process ensures that the IT service provider is always able to meet the agreed service levels. In addition, it manages risks which could critically impact IT services. IT

Service Continuity Management has to "cover unexpected IT service losses" (Harris, Herron & Iwanicki 2008, p.87), by assuring that provisions for risk reduction and recovery options have to be established (Cartlidge & Lillycrop 2007). Regular recording of all possible capabilities as well as a recovery plan are likewise recommended. For a coherent implementation of ITIL, these plans should agree with the Business Continuity Plan (Van Bon et al. 2007).

- **Information Security Management**

  The Information Security Management (ISM) ensures that information, data and IT services remain confidential, integral and available (Cartlidge & Lillycrop 2007). Additionally, it established security levels which should be met. In ITIL V2, this process was found on the book titled "IT Security Management".

- **Supplier Management**

  Supplier Management concern itself with the management of business-supplier-relationships, specifically, with all contracts with suppliers. IT ensures that these contracts support the needs of the business and that all suppliers meet their contractual obligations (Van Bon et al. 2007). Administering contracts is supported by the Supplier and Contract Database.

## *Service Transition*

Following the service lifecycle approach, Service Transition is the phase where changes of services are managed and a prevention of incidents is realized. A particular consideration is required since the timeliness of the service provisioning, its efficiency and its security can be of vital relevance for the Business-IT alignment.. Service Transition consists of the following processes: Change Management, Service Asset and Configuration Management, Transition Planning and Support, Evaluation, Release and Deployment Management, Service Validation and Testing, and Knowledge Management. Each of these processes is described further below.

- **Change Management**

  Change Management's major assignments concern the "recording, evaluating, authorizing, prioritizing, planning, testing, implementing, documenting and reviewing" (Lacy & Macfarlane 2007, p.43) of all undertaken changes. It is to control the lifecycle of all changes. Its main task is to complete these changes with the minimal disruption of IT services. Additionally, the Configuration Management System (CMS) supports the overall process by administering and recording changes across the whole lifecycle. As Change Management is an ongoing process it interfaces with the business and suppliers at strategic, tactical and operational levels (Lacy & Macfarlane 2007).

- **Service Asset and Configuration Management**

  Mainly, this process can be regarded as a supportive function with regards to precise implementation. Service Asset and Configuration Management (SACM) define the service and infrastructure components (Van Bon et al. 2007) and prepare related information for the business. Additionally, those baselines also extend to non-IT assets (Cartlidge & Lillycrop 2007) as well as to shared assets between business partners. This process is supported by a central database, named the Configuration Management System.

- **Transition Planning and Support**

  According to the literature, the Transition Planning and Support process is recommended as the starting point of the Service Transition phase. Corresponding to Service Transition as the intersection between the Service Design and the Service Operation phase, exact plans are needed to cope with the ITIL implementation successfully.

- **Evaluation**

  Often, it is hard to evaluate current performance; however, it is possible to define what goals should be met. Various key performance indicators can be introduced to verify the

effect of service change (Lacy & Macfarlane 2007) and service quality. This process provides important details for the Continual Service Improvement phase.

- **Release and Deployment Management**

  The main goal of Release and Deployment management is to make certain that the integrity of the life environment is protected and that only the correct components are released. Components which are to be handled over to the Service Operation phase have to be built, tested and delivered, to assure the transition of the specified services into the operational stage with the required characteristics (Van Bon & Pieper 2008).

- **Service Validation and Testing**

  Service Validation and Testing ensures that customer's expectations are met when services are released into the live environment. It also examines whether the compiled Service Design packages are capable of meeting business requirements in the full range of expected situations (Cartlidge & Lillycrop 2007). It also makes sure that IT operations are able to provide support for the new service.

- **Knowledge Management**

  Knowledge Management is a new process in ITIL V3. Its responsibilities include the gathering, analysis, storing and transforming of knowledge and information within the entire organization. This is done to improve the quality of the decision-making process (Van Bon & Pieper 2008) as well as to ensure that consistent data are available across the lifecycle. Its purpose is to improve efficiency by a reduction of knowledge rediscovery.

## Service Operation

The fourth lifecycle, Service Operation is characterized by the management of the operating services including the delivery and a support for the customer. The aim is a stable use of the

services. It is concerned with the operation delivery and control processes. At this stage technical objectives become increasingly important due to the supporting role of IT in terms of service quality. Users and customers need to be satisfied with the services offered and the agreed service levels. This requires an up-to-date management of the underlying technology in day-to-day business. Conflicting goals, like the cost of services on the one hand and the quality of services after implementing ITIL in an ever-changing environment on the other hand, collide in the Service Operation phase and, thus, have to be balanced (Cannon & Wheeldon 2007). Service Operations contain the processes: Event Management, Incident Management, Request Fulfilment, Problem Management, and Access Management. We delve into each of these processes in the next subsection.

- **Event Management**

  Event Management is considered to be one of the main activities of Service Operations. It is responsible for any detectible and discernible occurrence that intrudes in the day-to-day business of an IT organization and its service delivery (Cannon & Wheeldon 2007). Hence, Event Management attempts to understand the underlying infrastructure and to detect any difference from the usual functioning.

- **Incident Management**

  Incidents generally cause "unplanned interruption to an IT service, or a reduction in the quality of an IT service" (Van Bon & Pieper 2008, p.77). Its objective is to manage the lifecycle of all incidents. It is accountable for the rectification of the defect in order to restore the status quo. In essence, this process has remained similar in both ITIL V2 and ITIL V3.

- **Request Fulfilment**

  Minor standard changes which are requested by customers are dealt by the Request fulfilment team (Cartlidge & Lillycrop 2007). Such changes include  request for information.

- **Problem Management**

  Problem Management's main objective is to prevent incidents from reoccurring and to decrease the impact that incidents have on the users. Incident Management deals with sudden occurrences until these incidents accumulate. Afterwards, Problem Management comes into action, recording and investigating in order to "prevent recurring incidents and to minimize the impact of incidents that cannot be prevented" (Cartlidge & Lillycrop 2007, p.31).

- **Access Management**

  Access Management is a new component, not found in ITIL V2. It focuses on granting access rights and assures rights availability for authorized users. In terms of "confidentiality, availability and integrity of data and intellectual property" (Cartlidge & Lillycrop 2007, p.31), Access Management plays a strong supportive role that includes, amongst others, verification tasks as well as access provision to services.

### *Continual Service Improvement*

The process Continual Service Improvement (CSI) forms the outer ring of the ITIL lifecycle.

In this lifecycle services are continually monitored and, if required, they are modified and adapted to the changing situations based on service measurement and service reporting. This continual improvement of the quality of the processes is done to deliver a greater value to the customers. The improvement process includes definition of goals, collection and analysis of management ratios and the implementation of respective improvement measures. This lifecycle phase consists of the Seven Level improvement Process, Service Measurement and Service Reporting processes. We explore these processes in the following subsection.

- **Seven Level Improvement Process**

  Similar to Deming's Cycle, the Seven Level Improvement Process starts with a definition phase to identify necessary measurements irrespective of the available data. The second step involves detecting measurable items. In the next steps, the data needs to be gathered and processed for strategic, tactical and operational use. The next step covers the results of data analysis that are presented and used for decision-making in all lifecycle phases (Spalding & Case 2007). The last step strives "to optimize, improve and correct services, processes, and all other supporting activities and technology" (Cartlidge & Lillycrop 2007, p.38) by implementing corrective action in terms of meeting the overall business requirements.

- **Service Measurement**

  As mentioned above, measurements need to be identified and its results monitored. In this context, Service Measurement maintains the Seven Level Improvement process embedded in the general service lifecycle. Spalding and Case (2007) propose the development of a measurement framework, which includes monitoring technology, process and service metrics, in order to improve the end-to-end service.

- **Service Reporting**

  With regarding to the collected data, clear reports focusing on the essentials are necessary. Merely concentrating on the past, present or forecast, will not provide sufficient results; however, both approaches should be balanced by establishing an appropriate reporting ethos, which keeps the agreed service levels in mind. Lay-out, contents and frequency of the reports (Spalding & Case 2007) should be aligned with the business.

## *2.4 ITSM and ITIL Literature Review*

In an attempt to structure of the accumulated knowledge on the topics of ITSM and ITIL, we have arranged this section of the literature review into two distinct streams. While related in terms of a common overall research objective, they cover two interesting research streams. One stream deals with the introduction of ITSM into academia while the other refers to the implementation and integration of ITSM in the IT organization. Both streams contribute to providing the foundation for the ITSM research. The following sections cover the research in these two streams.

### 2.4.1 Stream 1: Academia

The importance of ITSM is highlighted by the considerable quantity of research done in this area of ITSM teaching. Research in this area explores how the topics of ITSM can be introduced in the curriculum and specific classes. It also examines the need for future graduates to acquire knowledge or certificates in ITSM frameworks.

Galup, Quan, Dattero and Conger (2007) argue the transformation of the world from an agricultural and manufacturing economy to a service economy. The paper reviews research on ITSM and emerging pedagogical developments in this field.

Conger, Galup, Hernandez, Probst, Venkataraman and Beachboard (2007) suggest methods of how to incorporate ITSM concepts into business schools' MIS/IS/CIS curricula. As well, Bentley (2006) explores ways to integrate ITIL into the undergraduate curriculum and options for students to gain the ITIL Foundations Certificate. In a more specific research, Pollard, Gupta and Satzinger (2010) explore how ITSM can be introduced to the teaching field of Systems Development.

Rudd and Lloyd (2007) show an existing market for at least 15,000 hires per year in the U.S. for undergraduate and graduate students possessing ITSM skills. In Australia, Cater-Steel and

Toleman (2007) establish and consider the need for university-level students to gain certification in the topic of ITSM.

## 2.4.2 Stream 2: Implementation and Integration

This second stream considers the implementation and integration of research done at the post-adoption stage of ITSM frameworks. It also looks at research in the fields of ITIL and ITSM. In our literature review, we have identified the following sub-streams within the research: Critical Success Factors (CSF) and Challenges, Benefits, Overview and Framework Development, and Knowledge Management.

***Sub-stream: Critical Success Factors (CSF) and Challenges***

Listed below are various researchers who have focused on the important elements of the successful implementation of ITIL. Other researchers have focused on factors which impede a successful implementation.

In a study completed in Norway, Iden and Langeland (2010) identified important factors for a successful adoption of ITIL. These are: management support, competence and training, information and communication, stakeholder involvement and ability to change organizational culture.

Through case studies in Australia, Tan, Cater-Steel and Toleman (2009) shed light on the challenge of implementation and focus on CSF. The researchers conclude that senior management, an appropriate Change Management strategy, a close relation with multiple vendors and effective project governance are important factors for implementation.

Pollard and Cater-Steel (2009), using results form case studies in Australia and United States, identify the following CSF: executive management support, Interdepartmental communication and collaboration, use of consultants, training and careful software selection, creating an ITIL-friendly culture, process as priority, and customer-focused metrics.

Cater-Steel (2009) determines six factors which are critical in achieving a service-oriented philosophy: support from senior management, the threat or opportunity to outsource IT services, integration of processes to provide end-to-end service, involvement of business stakeholders, culture change of IT staff to service excellence, and the redesign of processes prior to investing in tools. Additionally, Cater-Steel, Tan and Toleman (2006) observe that many organizations that have adopted ITIL have also adopted CobiT, CMMI and ISO 9001.

Hochstein, Tamm and Brenner (2005) list six success factors when implementing ITSM frameworks: demonstrating "quick wins", strive for continuous improvement, market campaigns in order to create acceptance and understanding, management support, training, and formation of virtual teams so that "new" processes would be developed simultaneously with operational activities.

By collecting data on the barriers of implementation, Shang and Lin (2010) list the following challenges: incongruence between quality improvements and customer's expectations, inefficiency in meeting customer's needs, conflicts between standardization and unanticipated requests, lack of autonomy and calcified learning scope, and people lacking integrative capabilities.

Iden (2009) discusses success factors and the impediments for successful implementation of ITIL. The study finds that for the ITIL implementation to be effective organizational and cultural aspects must be addressed.

In summary, researchers demonstrate that the challenges of the implementation are:
- Lack of executive sponsorship
- Business understanding ITIL objectives
- Lack of resources (time or people)
- Lack of internal skills / Knowledge relating to ITIL

- Lack of funding / Cost of adoption

- Organizational / Cultural resistance to change

- Maintaining momentum / Progress stagnation

Table 4 (Page 42) groups these challenges and identifies the authors who have acknowledged these factors to be central.

***Sub-stream: Benefits***

Research programs have searched for the benefits achieved through the implementation of ITSM frameworks and ITIL.  Cervone (2008) provides an overview of ITIL and suggests the following three benefits: cost reduction, improving customer satisfaction, and improving the productivity of the IT department.

In their case study, Cater-Steel, Toleman and Tan (2006) find that organizations in Australia which have implemented ITIL are realizing benefits such as: more rigorous control of testing and system changes, more predictable infrastructure, improved consultation with IT groups within the organisation, reduced server faults, seamless end-to-end service, documented and consistent IT service management processes across the organisation, and consistent logging of incidents.  The survey also points out that CSF provide effective engagement of personnel and management support. They also conduct a survey at the IT Service Management Forum (itSMF) annual conference in Australia. Questions range from adoption reasons to perceived effectiveness of the ITSM framework. Motivations to adopt ITIL factors were found to be: improve IT service, improve IT/Business process integration, internal compliance, reduce costs, and external compliance. Success factors studied were: senior management commitment, involvement of business, ITSM champion, adaptability of IT staff to change, and understanding business needs (Cater-Steel 2007; Cater-Steel, Tan & Toleman 2007). Another study that shows preliminarily that an impact with the business could be made was from Kasshanchi and Toland. Through findings of their case studies, Kasshanchi and Toland (2006) propose that the implementation of ITIL has an impact on the business-IT Alignment.

Cater-Steel and McBride (2007) illustrate the impact that the Actor Network theory has on explaining and structuring the activities of managers in their practice of service improvement. They identify that ITIL may have an impact on service quality, customer satisfaction, on the infrastructure and resource management.

A key study is conducted by Spremic, Zmirak and Kraljevic (2008), since they monitor an IT Service provider in Croatia and apply various Key Performance Indicator (KPI) metrics before and after the implementation of a number of ITIL processes. The study concludes that the IT service provider undergoes improvements which are attributable to the implementation of ITIL. Similarly, Potgieter, Botha and Lew (2005) using metrics, determine that usage of the ITIL framework would provide benefits in the areas of service quality and customer satisfaction.

Hochstein et al. (2005) completed a case study of four German companies and listed four benefits that these companies had achieved through the implementation of IT Service Management frameworks: improvement in quality of IT services, efficiency and optimization of processes and transparency, comparability through process documentation, and process monitoring.

Cartlidge and Lillycrop (2007, p.26) identify six factors considered benefits of an ITIL adoption: improvement in customer satisfaction, improvement in internal processes, standardization of processes, improvement in service quality, increase in efficiency, and improvement in return on investment.

From the literature shown above we are able to collect and identify the main benefits achieved due to the implementation of IT Service Management frameworks. These are improvements in:

- Service Quality
- Standardization of Services

- Customer Satisfaction

- Return on Investment

- Business-IT Alignment

- Reduction of IT Downtime

- Operations through implementation of a best practice

- Financial Contribution Control

- Call Fix Rate

- Morale of IT Staff

Table 3 (Page 42) groups these benefits and identifies the authors who have acknowledged these factors to be central.

### *Sub-stream: Overview and Framework Building*

Authors in this area provide an overview of ITSM frameworks and complete initial investigations into the adoption of these frameworks. Other research in this area concentrates on developing and expanding the ITSM frameworks and on integrating existing or new processes inside the IT organization.

Studies have reported the adoption of ITSM and specifically ITIL in Australia (Cater-Steel, Tan & Toleman 2008), China (Zhen & Xin-yu 2007), Malaysia (Ayat, Sharifi, Sahibudin & Ibrahim 2009), Norway (Iden & Langeland 2010), Thailand (Lawkobkit 2008), UK (Shwartz, Ayachitula, Buco, Surendra, Ward & Weinberger 2007) and USA (Pollard & Cater-Steel 2009).

Galup, Dattero, Quan and Conger (2009) introduce ITSM as operations that involve service delivery and service support.

Cater-Steel and Pollard (2008) report on a survey of U.S. IT managers to understand the comprehension of terms and frameworks. They argue that there is a conceptual confusion

about what constitutes ITSM, and that its adoption is lower than what has been previously reported. They also suggest that ITSM is used by 60% of companies in the U.S.

Black, Draper, Lococo, Matar and Ward (2007) develop a framework which organizes the assets constituting an ITSM design. Using the proposed integration framework, the organizations can document the available set of IT services offered. Brenner (2006) focuses on the issues of supporting ITIL with process-oriented tools such as workflow management systems. The research recommends using of these systems to achieve service level compliance.

In the search for theoretical grounding for this topic, Wagner (2006) explores whether ITIL can be seen under a Resource-Based View lens based on learning loops to master the use of resources.

### Sub-stream: Knowledge Management

Research into ITSM frameworks and Knowledge Management is collected in this section. Specifically, the research in this area aims at either expanding the knowledge management process in ITSM or at proposing that through the focus on knowledge management organizations can achieve improvements in a range of areas.

Mohamed, Ribière, O'Sullivan and Mohamed (2008) argue that through leveraging knowledge, improvements of core competencies and development of customer orientation ITIL is able to provide benefits.  The research concentrates on the knowledge management activities.

So and Bolloju (2005) look into knowledge sharing and reusing of IT professionals through the usage of IT service operations. They highlight the importance of IT service operations and study knowledge management in this concept.

da Costa Cordeiro, Machado, Andreis, dos Santos, Both, Gaspary, Granville, Bartolini and Trastour (2009) propose a solution to support designing and planning of IT changes through

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knowledge management. Similarly, Galup and Dattero (2010) focus on knowledge management to develop a five step method to tune ITSM processes.

Research in the area of ITSM is broad. Research has been carried out describing and incorporating ITSM frameworks into the IT organization. Nonetheless, the core of the research in this field looks at understanding the benefits and the CSF of the implementation of ITSM frameworks, specifically ITIL. Additionally, other research examines the incorporation of knowledge and knowledge management into ITSM frameworks as important players in the implementation.

Of interest is the research of ITSM and ITIL in the area of academia. The incorporation of such topic underlines the importance of the research area.

**Table 3. Benefits of Implementation Found in Literature**

| Improvement of… | Hochstein et al., 2005 | Potgieter et al., 2005 | Cater-Steel & McBride 2007 | Marrone et al. 2010 | Cater-Steel et al., 2007, 2008 | Kashanchi & Toland 2006 | Cater-Steel et al. 2006b | Cervone, 2008 |
|---|---|---|---|---|---|---|---|---|
| Service Quality | X | X | X | X | X | | | X |
| Standardization of Services | X | | | X | X | | X | |
| Customer Satisfaction | | X | X | X | X | | | |
| Return on Investment | | | | X | X | | | X |
| Business-IT Alignment | | | | | X | X | | |
| Reduction of IT Downtime | | | X | | X | | X | X |
| Operations through implementation of a best practice | X | | | | | | | |
| Financial Contribution Control | | | | | X | | | |
| Call Fix Rate | | | | | X | | | |
| Morale of IT Staff | | | | | | | X | |

**Table 4. Challenges of Implementation Found in Literature**

| | Hochstein et al., 2005 | Cater-Steel et al. 2006b | Cater-Steel et al., 2007, 2008 | Iden & Langeland 2010 | Iden 2009 | Tan et al. 2009 | Pollard and Cater-Steel, 2009 | Shang & Lin 2010 |
|---|---|---|---|---|---|---|---|---|
| Lack of executive sponsorship | X | X | X | X | X | X | X | X |
| Business understanding ITIL objectives | | X | X | X | | | | |
| Lack of resources (time or people) | | | | | | | X | X |
| Lack of internal skills / knowledge relating to ITIL | X | | X | X | X | X | X | X |
| Lack of funding / Cost of adoption | X | X | X | | X | | | X |
| Organizational / Cultural resistance to change | X | X | X | X | X | X | X | X |
| Maintaining momentum / Progress stagnates | | | | | | X | X | |

## *2.5   IT Governance*

The field of IT governance has been derived from the discipline of corporate governance and has become a discipline in its own. There are different definitions of IT governance, many of which are too vague, general or even ambiguous. These variations in defining IT governance occur because of the multitude of internal and external factors and problems integrating multiple stakeholders (Bowen, Cheung & Rohde 2007). The following definitions prevail:

According to the Japanese Ministry of International Trade and Industry (1999), IT governance is the

> "organizational capacity to control the formulation and implementation of IT strategy and guide to proper direction for the purpose of achieving competitive advantages for the corporation".

Peterson (2003, p.8) has analysed different definitions and developed his own definition by stating that the task of IT governance is;

> "the distribution of IT decision-making rights and responsibilities among enterprise stakeholders, and the procedures and mechanisms for making and monitoring strategic decisions regarding IT".

According to Weill and Ross (2005, p.8) IT governance specifies the

> "decision rights and accountability framework to encourage desirable behaviour in using IT".

According to this point of view, IT governance is not necessarily a task of the management and the board of directors. It does not clarify the type of decisions which are made about IT, but rather who makes and executes these decisions and that these decisions support certain behaviour. This view is shared by the IT Governance Institute, which states that;

> "Governance is the responsibility of executives and the board of directors, IT governance is an integral part of enterprise governance and consists of the leadership,

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organizational structures and processes that ensure that the enterprise's IT sustains and extends the organization's strategies and objectives" (IT Governance Institute 2007a, p.10).

Van Grembergen (2003, p.5) bases his definition of IT governance on that of the ITGI by saying that IT governance is driven by the top management and is used to "control the formulation and implementation of IT strategy" in order to link business and IT.

Webb et al. (2006) have previously addressed the lack of a standardized definition in the field of IT governance and have also suggested their own definition. They argue that

"IT governance is the strategic alignment of IT with the business such that maximum business value is achieved though the development and maintenance of effective IT control and accountability, performance management, and risk management".

Their definition is derived from the literature; however, the method to achieve this remains unclear and the definition is based on a limited number of articles. To establish a consensus among prevailing IT governance definitions, Simonsson and Johnson (2006) offer the following definition based on a consolidated review of the literature, specifically 60 different articles on IT governance.

"IT governance is about IT decision-making: The preparation for, making of and implementation of decisions regarding goals, processes, people and technology on a tactical and strategic level" (Simonsson & Johnson 2006, p.1).

The similarity between the definitions listed above lies in the focus on the strategic alignment between business and IT and in pursuing the question related to how can IT support the achievement of business goals. Most authors agree that the responsibility of IT governance, as a top management process, is to control IT's strategic impact and the value delivered to the business (Weill & Ross 2005; IT Governance Institute 2007; Van Grembergen 2003). Disagreement lies on whether the core of IT governance consists of a set of structures,

processes and relational mechanisms (De Haes & Van Grembergen 2005, 5) or bundled performance metrics designed to aid IT process monitoring (IT Governance Institute 2007a) or cascaded balanced scorecards (van Grembergen 2004). There is a lack of consensus in the numerous definitions of IT governance.

The definitions outlined by Simonsson and Johnson (2006) and Webb et al. (2006) will be the definition used in this paper.   As the paper evolves from a broader literature review and takes into account the views of researchers as well as practitioners and standardization institutions. Both definitions are explored further in the next paragraphs.

Simonsson and Ekstedt (2006) developed a framework taking into consideration the different definitions of IT governance and the different opinions between researchers and practitioners. This model is shown in Figure 5, to define IT governance.   These authors placed greater emphasis on decision-making as the central aspect of IT governance.

The proposed framework of IT governance is divided into three dimensions; Domain, Decision-making Phase and Scope. The Domain dimension specifies the aspects to consider when making decisions in relation to: processes, goals, technology and people. The Decision-making Phase consists of three different steps that need to be undertaken in any decision making: understanding, deciding and monitoring. The Scope dimension clarifies the focus of the decisions, whether it is of a tactic or strategic nature. Researchers and practitioners place emphasis within the Domain dimension on people and processes and within the Scope dimension on the strategic decisions.  The principal difference lies in the Decision-making Phase with researchers viewing the Monitor sub-phase as the central aspect while practitioners focusing on the Understand sub-phase.

| **Domain**<br><br>- Process<br>- Goal<br>- Technology<br>- People | → | **Decision-making Phase**<br><br>- Understand<br>- Decide<br>- Monitor | → | **Scope**<br>- Strategy<br>- Tactic |
|---|---|---|---|---|
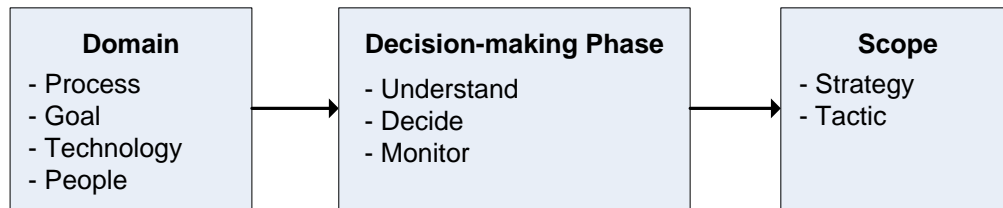
**Figure 5. Simonsson's Framework for IT Governance (Simonsson & Johnson 2006)**

Alternatively, the definition from Webb et al. (2006) brings together all the focus areas of IT governance. The IT governance focus areas as suggested by ITGI (2007) are:

- **Strategic Alignment** is concerned with the alignment of IT and business.

- **Value Delivery** encompasses how IT adds value to the business and how the expenses and the return on investment are optimized.

- **Risk Management** assures a continuous operation of IT and deals with operational IT risks, mostly technological risks.

- **Performance Measurement** monitors and controls the performance of IT towards the business goals.

- **Capability (Resource) Management** manages all resources including people, data and technology.

These five different areas can be seen in Figure 6 below. In the middle, *Stakeholder Value Drivers* build the beginning of the life cycle leading to other areas of IT governance.
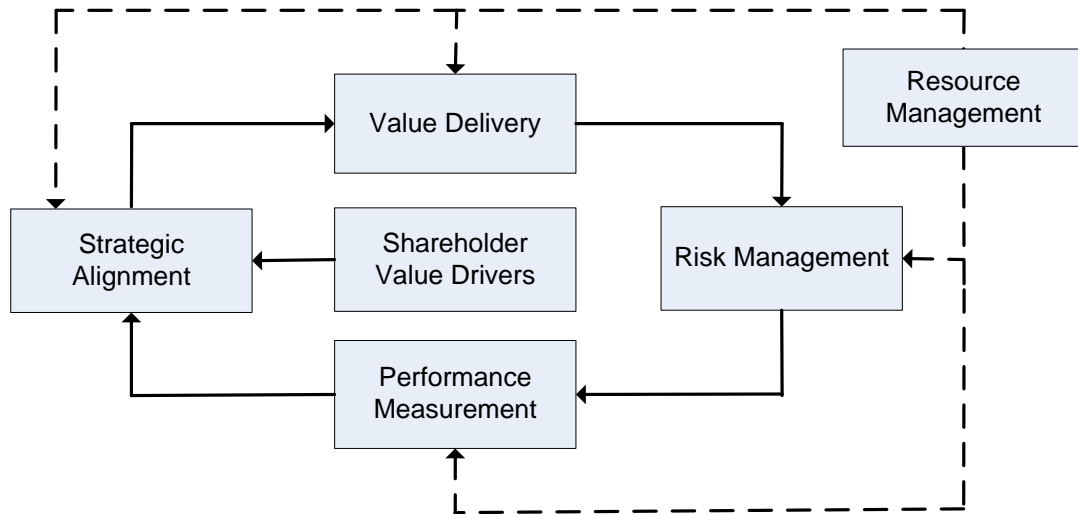
**Figure 6. Lifecycle Approach of IT Governance (IT Governance Institute 2007a, 20)**

These focus areas are also a focal point of IT governance frameworks. The de-facto IT governance framework is CobiT, which is introduced in the next section.

## 2.6 CobiT

Control Objectives for Information and related Technology (CobiT) is a framework to support IT governance by providing practices developed by experts regarding domains and processes. It helps an organization to align its business goals with IT through statements about control objectives. It is an IT governance framework, which is increasingly being adopted by a range of organizations worldwide (Zarnekow, Brenner & Grohmann 2004). CobiT aligns IT with the needs of the business where the tasks and activities of IT are designed as processes. Furthermore, metrics and maturity models are parts of the CobiT framework (IT Governance Institute 2007).

CobiT was originally developed by the Information Systems Audit and Control Foundation (ISACF), which is the research institute for the Information Systems Audit and Control Association (ISACA). The development of CobiT began in 1994, with the first version being published in 1996 and subsequent versions following in 1998 and 2000. In 2003 ISACF changed its name to IT Governance Institute (ITGI), holding all formal copyrights.

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While the first and the second version of CobiT focused on audit and control IT, the third version added guidelines for management. The latest version of CobiT, version 4, was released in 2007. It improved by consolidating most of the former separate books into a single volume (Olbrich 2006; Brand & Boonen 2004). The current CobiT version 4.1 is composed of:

**Table 5 . Componets of CobiT Version 4.1**

| Topics | Description |
| --- | --- |
| Executive Summary | Provides a brief overview of the CobiT framework and introduces some basic definitions (Brand & Boonen 2004). |
| Framework | Describes high-level control objectives for each process. |
| Control Objectives | Define what needs to be done to implement an effective control structure (Brand & Boonen 2004). |
| Management Guidelines | Offers advice to management in directing and managing IT activities (Brand & Boonen 2004). |
| Implementation Guide | Explains how CobiT can practically be applied within an organization (Blomer & Bernhard 2006). |
| IT Assurance Guide | Provides management assurance and/or advice for improvement by enabling the review of IT processes against the recommended detailed control objectives (Brand & Boonen 2004). |

The basic principle of the CobiT framework is managing IT resources through processes in order to achieve IT goals, which respond to the business requirements. The conceptual CobiT framework can be approached from three perspectives: IT Processes, Business Requirements and IT Resources, as shown in Figure 7. These concepts are explored further in the following three subsections.
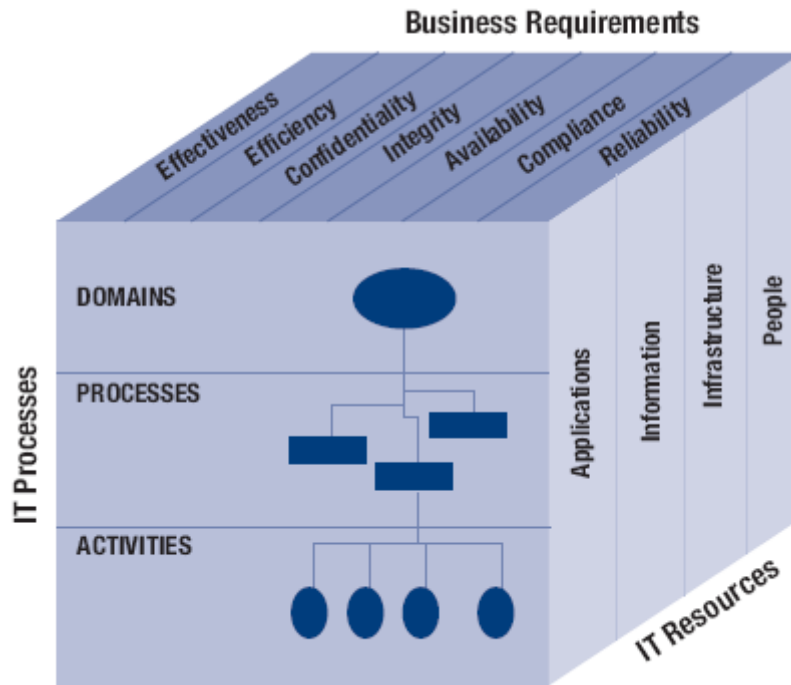


**Figure 7. CobiT Cube (IT Governance Institute 2007a)**

## 2.6.1 IT Processes

Incorporating an operational model and a common language for every division of the business involved in IT is the most critical steps towards proper governance. A framework for measuring and monitoring IT performance, communicating with service providers and integrating best management practices needs to be at the centre of all organisations government processes. The advantages of a process model are that it encourages the process of ownership as well as enabling responsibilities and defining accountability (IT Governance Institute 2007). CobiT identifies 34 IT processes with tasks divided across four domains: (1) planning & organization,

(2) acquisition & implementation, (3) delivery & support and (4) monitoring & evaluation. IT activities are defined and managed within each domain. Each of the four domains is described below.

- **Planning & Organization**

    This domain contains 11 control objectives dealing primarily with IT strategy and how it supports the business objectives. In addition, it describes organizational and infrastructural needs that IT has to implement in order to attain the optimal results and to generate the most benefits from utilizing IT. Typical management topics for this domain cover 'successful IT and business alignment', the 'optimal use of IT resources', and an 'appropriate quality of IT' (Olbrich 2006; IT Governance Institute 2007a). Figure 7 lists all of the Plan and Organize processes and their titles.

| PO1 | Define a strategic IT plan |
|------|------------------------------|
| PO2 | Define the information architecture |
| PO3 | Determine technological direction |
| PO4 | Define the IT processes, organization and relationships |
| PO5 | Manage the IT investment |
| PO6 | Communicate management aims and direction |
| PO7 | Manage IT human resources |
| PO8 | Manage quality |
| PO9 | Assess and manage IT risks |
| PO10 | Manage projects |

**Figure 8. CobiT Processes (PO) (IT Governance Institute 2007a)**

- **Acquisition & Implementation**

    This area covers the strategy issues by identifying the IT requirements for the acquisition of technology and the implementation of the acquired technology. In order to realize the IT strategy, IT solutions have to be identified, developed or acquired, implemented and integrated into the business process. This domain covers changes in and maintenance of existing systems, to ensure the continuum of the life cycle for these systems (IT Governance Institute 2007a, 13). It includes the maintenance, testing,

certification and identification of any changes needed to ensure the continued availability of existing and new systems. The successful implementation of new systems and the delivery of new projects on time, within budget and with desired solutions that meet business needs are typical management topics for this domain (IT Governance Institute 2007a; Olbrich 2006). Figure 8 details the processes within the Acquire and Implement domain.

| AI1 | Identify automated solutions |
| AI2 | Acquire and maintain application software |
| AI3 | Acquire and maintain technology infrastructure |
| AI4 | Enable operation and use |
| AI5 | Procure IT resources |
| AI6 | Manage changes |
| AI7 | Install and accredit solutions and changes |

**Figure 9. CobiT Processes (AI) (IT Governance Institute 2007a)**

- **Delivery & Support**

This domain addresses the delivery aspect of IT applications, taking into consideration the necessities for a continuous service and manages problems that may occur. Service delivery, service support for users, management of data and operational facilities and management of security and continuity are included in this field. The control objectives of this domain address the management of IT systems such as change, incident and problem management. Typical management topics for this domain include 'optimized IT costs', 'IT service delivery in line with business priorities' (Olbrich 2006). Figure 9 specifies the processes within the Deliver and Support domain.

| DS1 | Define and manage service levels |
|------|----------------------------------|
| DS2 | Manage third-party services |
| DS3 | Manage performance and capacity |
| DS4 | Ensure continuous service |
| DS5 | Ensure systems security |
| DS6 | Identify and allocate costs |
| DS7 | Educate and train users |
| DS8 | Manage service desk and incidents |
| DS9 | Manage the configuration |
| DS10 | Manage problems |
| DS11 | Manage data |
| DS12 | Manage the physical environment |
| DS13 | Manage operations |

**Figure 10. CobiT Processes (DS) (IT Governance Institute 2007a)**

- **Monitoring & Evaluation**

This domain deals with the company's strategy regarding the assessment of quality and compliance. It covers both areas of an audit, internal and external. From a control perspective, the functionality of IT systems has to be verified to make sure that the systems are functioning as intended. In addition, this domain addresses management's supervision of the organization's control process and independent assurance supplied by either an internal and external audit or attained from other sources. Typical management topics for this domain are to 'link performance to business goals', to 'ensure an efficient internal control by management', and to 'measure IT's performance in detecting problems' (IT Governance Institute 2007a; Olbrich 2006). Figure 10 contains the four processes inside the Monitor and Evaluate domain.

| ME1 | Monitor and evaluate IT performance |
|------|-------------------------------------|
| ME2 | Monitor and evaluate internal control |
| ME3 | Ensure compliance with external requirements |
| ME4 | Provide IT governance |

**Figure 11. CobiT Processes (ME) (IT Governance Institute 2007a)**

## 2.6.2 Business Requirements

A key perspective of the CobiT framework is the Business Requirements. An organisation's information needs to conform to certain control criteria to be able to satisfy business objectives. This perspective defines the information criteria which are based on quality, fiduciary control and security requirements (IT Governance Institute 2007a; Moeller 2009). CobiT lists seven information criterions which are: effectiveness, efficiency, confidentiality, availability, integrity, compliance and reliability. These criterions are defined in Table 6.

**Table 6. Definitions of Information Criteria**

| Information Criteria | Definition |
|---|---|
| Effectiveness | Information is relevant and pertinent to the business as well as being delivered in a manner that is correct, timely, consistent and usable |
| Efficiency | Provision of information through the most advantageous (most productive and economical) use of resources |
| Confidentiality | Protection of sensitive information from unauthorized disclosure |
| Availability | Accuracy and completeness of information |
| Integrity | Information is available when required, for present and future |
| Compliance | Complying with laws, contractual arrangements and regulations |
| Reliability | Provision of correct information for the organization to operate the entity and implement its fiduciary and governance responsibilities |

### 2.6.3 IT Resources

The final perspective of the CobiT framework is IT Resources. IT organizations need to invest in the required resources to respond to the business requirements. An investment must be made in the creation of technical capabilities, both people skills and technology infrastructure, to be able to leverage business information. The CobiT framework identifies the following IT resources: application systems, technology, facilities, people and data (IT Governance Institute 2007a; Moeller 2009). Definitions for the IT Resources are shown on Table 7.

**Table 7. Definitions of IT Resources**

| IT Resource | Definition |
| --- | --- |
| Application Systems | Manual and automated procedures to process information |
| Technology | Databases, operating systems, middleware, networking |
| Facilities | Environmental resources that house and support technology (buildings, power, water) |
| People | Personnel required for planning, organizing, acquiring, implementing, delivering, supporting, monitoring and evaluating the information systems and services |
| Data | Objects in the widest sense (text, graphics, sound) |

### 2.6.4 CobiT Conceptual Model

The CobiT Conceptual Model integrates the IT Processes, Business Requirements, IT Resources and Information Criteria. This model is developed to satisfy business needs concerning the structure of information and the provision of IT resources. Information has to fulfil seven information criteria (as previously shown on Table 6). Information criteria can be allocated to every CobiT process. For instance, the process PO1 (Plan and Organize) covers only the information criteria effectiveness and efficiency, while PO2 (Define the information architecture) also involves confidentiality and integrity. Adequate investments in the IT

resources are needed to meet business requirements. These IT resources consider applications, information, infrastructure and people. Aside from the information criteria, the four different kinds of IT resources are also assigned to the CobiT processes. Therefore, the requirements of information and resources regarding the implementation of the CobiT processes are defined in the conceptual model of CobiT (Tuttle & Vandervelde 2007).

Figure 12 summarizes the general principle and structure of CobiT. The information is delivered to the business according to the requirements of the business and the information criteria. Then IT resources are assigned to IT processes, which provide management of IT activities (IT Governance Institute 2007a).
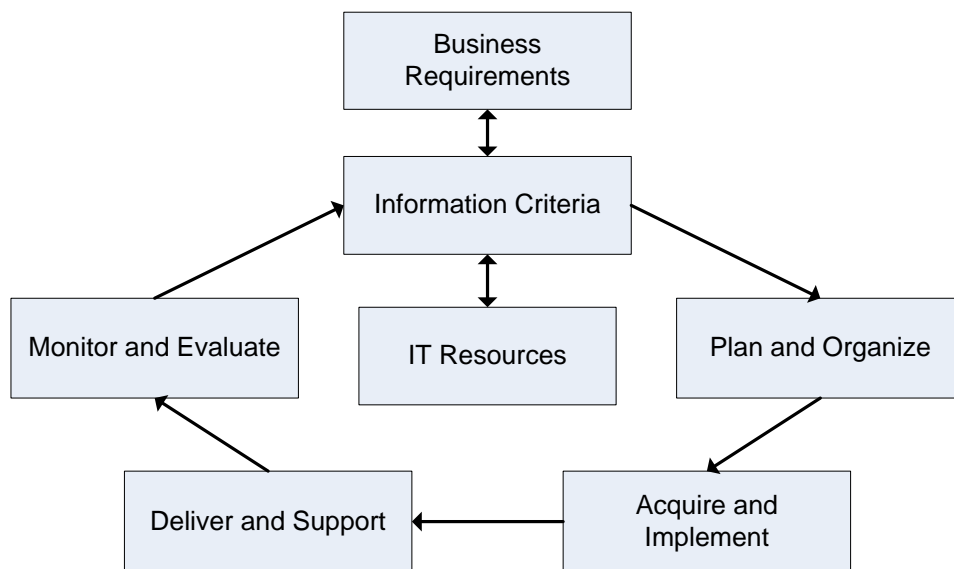


**Figure 12. CobiT Conceptual Model (IT Governance Institute 2007a)**

## 2.7 IT Governance and CobiT Literature Review

There have been a number of researches who have attempted to create a structure for existing literature on IT governance and CobiT. Brown and Grant (2005) provide a sound logical structure of IT governance research in their literature review. The researchers classify the research done in two streams: IT governance forms and IT governance contingency analysis. The IT governance form stream focuses on the decision making structure and basic structural

options. The other stream, named the IT governance contingency analysis, deals with the "why and how" of IT governance fit. The main papers found in the two streams are shown on Table 8. This table provides an overview of the type of research completed by the specific authors.

**Table 8. Primary Sources and Key Ideas from Stream (Brown and Grant, 2005, 701)**

| **Stream One – IT governance Forms** | | |
|---|---|---|
| Basic Locus of IT Decision Making | Thompson, 1957, Jelinek, 1977, Burlingame, 1961, Golub, 1975, Olson and Chervany, 1980, Keen, 1981, Jenkins and Santos, 1982, Wetherbe, 1988, Von Simson, 1990 | Research on traditional IT organizational structures |
| Expanded IT Decision Making Structures | Ein-Dor and Segev, 1978, Rockart et al., 1978, King, 1983, Zmud et al., 1986, Boynton and Zmud, 1987 | Research on vertical and horizontal expansion of the traditional IT organizational structures |
| **Stream Two – IT governance Contingency Analysis** | | |
| Individual and Multiple Contingencies for Uniform Governance Frameworks | Olson and Chervany, 1980, Ein-Dor and Sege,v 1982, Tavakolian, 1987, Dixon and John,, 1989 Ahituv et al., 1989, Allen and Boynton, 1991, Boynton et al., 1992, Henderson and Venkatraman, 1992, Clark 1992, Venkatraman, 1997 | Research on the individual and multiple contingencies affecting traditional IT organizational structure decisions |
| Complex Analysis For Non-Uniform Governance Frameworks | Brown, 1997, Brown and Magill, 1998, Brown, 1999, Sambamurthy and Zmud, 1999 | Research on the individual and multiple contingencies affecting expanded (vertically and horizontally) IT organizational structure decisions |

As shown in Figure 13, Brown and Grant also suggest in their conceptual framework for IT governance research a Contemporary IT governance framework stream of research.
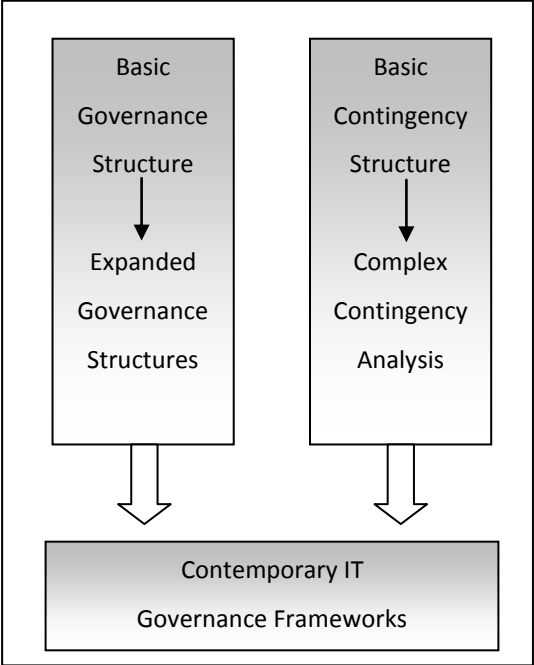


**Figure 13. Conceptual Framework for IT Governance Research (Brown & Grant 2005, p700)**

Using as basis the framework proposed by Brown and Grant (2005), we explore the stream of Contemporary IT governance Framework. Relevant research found on the topic is therefore included in this stream. Mainly, research in this area concentrates in the understanding of CobiT, the analysis of the impact that CobiT can have on the IT organization, on the business, and on conceptual expansions or additions to the framework.

Winniford et al. (2009) suggest that CobiT is a term that has minor recognition amongst U.S. IT executives. However, ITSM and IT governance were particularly familiar terms to those surveyed.

Tuttle and Vandervelde (2007) study the extent to which the CobiT framework fits within the auditing setting, particularly for operational, compliance and financial audits. They conclude that the CobiT framework has significant internal convergence and consistency. They find the framework valid and useful for the purpose of auditing.

Mishra and Weistroffer (2007) argue that Sarbanes-Oxley Act establishes new set of requirements into software development. The authors develop a conceptual map of CobiT control objectives linked to the workflows of system development to integrate requirements from the Sarbanes-Oxley Act.

Von Solms (2005) investigates the coexistence and complimentary use of CobiT and ISO 17799 in the area of information security governance. Lainhart (2000) concludes from expert interviews that CobiT is a framework for managing and controlling the risks and vulnerabilities of Information and Information Technology.

Ridley, Young and Carroll (2008) discuss that there is little academically-focused work on the CobiT framework. The authors suggest that there is considerable potential for academic research in this area that evaluates the effectiveness of CobiT.

Bernroider and Ivanov (2010) explore usage, value and structure of CobiT in the field of Project Management. Results from the survey indicate that the metrics suggested by CobiT are seen as feasible and important by project managers and are frequently used. Researchers find that the CobiT framework is useful for program performance management.

Buckby, Best and Stewart (2008) complete a literature review on IT governance literature across the key focus areas. Dahlberg and Kivijarvi (2006) develop an assessment tool designed to measure the effectiveness of IT governance frameworks. It does so by looking at the key focus areas of IT governance.

Gomes and Ribeiro (2009) establish that through the use of CobiT improvements in the areas of the resource management could be achieved. The improvements which were realized by were: improved service quality, reduction of execution time of tasks and a reduction on the number of incidents.

Nicho and Cusack (2007) build a model for the generation of metrics that would measure the key performance indicators and goals of the CoBIT control objectives. Webb et al. (2006) attempt to make a "definite" definition of IT governance. This definition includes the key focus areas of IT governance. Sohal and Fitzpatrick (2002) explore IT governance and management in Australian organizations and show that most IT governance activities occur at the corporate level.

Van Grembergen (2004) provides an overview of IT governance, specifically its structures, processes and relational mechanisms. De Haes and Van Grembergen (2009) determine that business-IT alignment maturity is higher when organizations have mature IT governance practices.

Weill and Ross (2005) estimate that organizations with high levels of IT governance could increase their profits by up to 20% compared to those organizations with low implementation of IT governance practices.

Bowen et al. (2007) consider that more effective IT governance performance outcomes are associated with a shared understanding of business and IT objectives; active involvement of IT steering committees; a balance of business and IT representatives in IT decisions; and

comprehensive and well-communicated IT strategies and policies. The study also concludes that IT governance plays a vital role in delivering business value.

Peterson (2004) develops the IT Governance Assessment Process (ITGAP) Model which assesses the effectiveness of the organization's value realization, capabilities, decision-making authority, and value drivers. The author considers that all structural processes and capabilities are crucial aspects for effective IT governance.

Rau (2004) argues that effective IT governance takes a considerable amount of time to achieve. The author describes the key roles and relationships in the best-practice design. The research lists organizational readiness and stakeholder participation as critical success factors for the effective implementation of IT governance.

A further analysis of these papers demonstrates their applicability to the six key areas of IT governance. We have grouped the research of IT governance and CobiT into the six key areas of IT governance. These can be found in Table 9.

**Table 9. Research on CobiT Grouped by the IT Governance Focus Areas**

| Strategic Alignment | Value Delivery | Risk Management | Performance Measurement | Control and Accountability | Capability Management |
|---|---|---|---|---|---|
| De Haes & Van Grembergen 2009 | Weill & Ross 2005 | Von Solms 2005 | Bernroider & Ivanov 2010 | Tuttle & Vandervelde 2007 | Gomes & Ribeiro 2009 |
| Sohal & Fitzpatrick 2002 | Bowen et al. 2007 | Lainhart 2000 | Nicho & Cusack 2007 | Mishra & Weistroffer 2007 | |

## *2.8   Relation between IT Governance and IT Service Management*

As proposed by Coelho and da Cunha (2009) "from the several IT management models currently used, IT Infrastructure Library (ITIL) and Control Objectives for Information and related Technology (CobiT) seem to be the most well known frameworks that support the implementation of effective IT processes". While these are very popular frameworks, one must examine the similarities and differences between IT governance and IT Service Management as well as CobiT and ITIL. It should be mentioned that explicit definitions of these concepts are currently under discussion in the academic literature and there are no clear definitions (Winniford et al. 2009).

Winniford et al. (2009) determine IT Service Management as the global term for the key IT concepts of Governance, CobiT, ITIL or SLM (Service Level Management). However, this paper highlighted that IT governance concentrates on strategic aspects and strategic alignment rather than IT's daily business processes. Results of the survey by Winniford et al. (2009) show confusion about the definitions, terms and concepts. The researchers found that IT executives had little familiarity with the 'IT Service Management frameworks or concepts' unless the organization had adopted IT Service Management. The authors add that even for those IT executives who pertained to an organization who had adopted IT Service Management; there was confusion in what constitutes IT services and other terms surrounding this field. Therefore, practitioners may find it difficult to differentiate between the terms ITSM and IT governance.

Researchers may also face the same problems. Kumbakara (2008) supports the view that both ITIL and CobiT are frameworks for IT Service Management, however, emphasizes the relation of CobiT to IT governance. Rüter et al. (2006, 32) and Goeken and Reimann (2007, 12) also mention ITIL is a relevant framework for IT governance, given that the ITIL book "Service Strategy" explicitly covers the topic of IT governance.

In contrast, Cater-Steel et al. (2006) defines ITIL as a framework for IT Service Management and CobiT as a framework for IT governance, saying that both frameworks are concerned with IT process improvement. Using this criterion Cater-Steel et al. point out that ITIL targets the IT service provider, while CobiT is usable for different types of organizations. Moreover, the authors of this work explored the adoption of multiple frameworks, concluding that ITIL and CobiT are complementing each other, creating the proposition that all companies should adopt both concepts in the future.

Van Grembergen (2004) argues that there have been inaccuracies in the use of the terms IT governance and IT management. The goal of IT management is to provide IT in the most efficient and effective manner. IT governance is identified as a more general concept that considers future demands as well as the external and internal views and processes of the business. Further, the author argues that IT governance should be a part of the Corporate Governance, providing a broader view compared to IT management. Contrarily, Wessels and Loggerenberg (2006) argue that IT governance and IT management are both parts of Corporate Governance.

Essentially, ITSM is concerned with the efficient operation of IT, effective supply of IT services, and the development and planning of applications. IT governance in turn is much broader and differentiates from IT management in terms of business orientation and time horizon. It is not limited with regards to current requirements but addresses future needs for transformation and adaption of the IT coming from the business side. In addition, IT governance can be differentiated from IT management by taking into account that IT governance encompasses a strong business view and regards IT as a "value centre", meaning it is run like a business itself.

Even though CobiT and ITIL are process oriented, CobiT lacks the process steps and tasks which are present in ITIL. While CobiT focuses on *strategic* needs, ITIL focuses on *operational and tactical* requirements. Table 10 exhibits the key differences between these frameworks.

**Table 10. Key Differences of ITIL and CobiT**

|  | ITIL | CobiT |
|---|---|---|
| Scope | Operations | Audit and Control |
| Plans | Tactical and Operation with some Strategic | Strategic and Tactical with some Operation |
| Focus | Mainly on Service Delivery and Service Support | Strategic Alignment, Risk Management, Resource Management, Value Delivery and Performance Measurement |
| Perspective | Service Lifecycle | IT to Business Alignment |
| Time orientation | Present (day-to-day) | Future |
| Business Orientation | Internal | External |
| Market | IT Managers | Business Managers, Auditors, IT Managers (C-level) |

In conclusion, it is clear from the literature that there is no consensus. However, as we have pointed out, there are some differences between the ITIL and CobiT frameworks. ITIL, on the one hand focuses, on the processes in detail and tells "how" things should be done, which leads to better process outcomes that are reflected in the benefits mentioned above. CobiT, on the other hand, tells "what" has to be done (Van Grembergen 2004), and how to measure the outcome by using Control Objectives. Both frameworks overlap in terms of covered processes but the degree of detail is different. Nevertheless, they provide an effective combination assisting an organization in managing their IT organization from a business perspective. CobiT

and ITIL should not be seen as competitive frameworks, but their strengths complement each other, and should be used in combination (Buchsein, Victor, Günther & Machmeier 2007).

## *2.9    Establishing a Theoretical Foundation*

In the fields of IT Service Management and IT Governance frameworks there has been a lack of theoretical foundation. In this section we introduce and propose the Knowledge Base View (KBV) of the firm approach as an appropriate theoretical foundation. This will permit further development of the research question, by attempting to generalize the impact that IT operational process improvement frameworks have on the IT organization.

A theoretical framework that is often used in the field of information management and other management fields is the Resource-Based View (RBV) of the firm. Furthermore, Wagner (2006) attempts to provide theoretical grounding to the field of IT Service Management and ITIL by linking the RBV to ITIL.

The RBV refers to resources such as physical (e.g. machines, plant, etc.), human (e.g. know-how) and organisational capital (e.g. the firm's reputation) (Barney 1991). The RBV sees knowledge as a generic source for sustainable competitiveness but fails to realise the different types of knowledge-based capabilities such as acknowledging the significance of human resources, competences and intellectual capital for competitiveness. Some researchers perceive that this constitutes a weakness of the RBV since it does not emphasize sufficiently the importance of learning and innovating of the firm, neither does it look at interfaces between individuals. Drucker (1969) believes that having useful knowledge resources, such as expertise and know-how, are as critical as other economic resources. Similarly, as pointed out by Kaplan and Norton (2001), knowledge should be distinguished from other resources due to its several dimensions. In recent years, a different perspective building on RBV has originated. This approach is known as the Knowledge-Based View of the firm (KBV). The KBV is grounded in the strategic management literature and carries forward the RBV which was initially supported by

Penrose (1959) and expanded by researchers such as Wernerfelt (1984), Barney (1991) and Corner (1991).

Particularly in service industries, the primary source of competitive advantage is the continuous process of knowledge creation (Nonaka & Takeuchi 1995; Colurcio 2009). Therefore, applying the KBV seems justified.

In the next sections, we will introduce the KBV and show why it is perceived as a better fit as a theoretical framework than the RBV. This approach has been applied to other process improvement frameworks such as Total Quality Management, Six Sigma and ISO 9000. Therefore, in the following section we display findings from research on knowledge management and process improvement frameworks.

### 2.9.1 Knowledge-Based View of the firm

Dixon (2000) views knowledge as "the meaningful links people make in their minds between information and application in action in a specific context". While there are arguments about the correct definition of knowledge, for the research the definition above is relevant. The idea of knowledge economy, or economy of knowledge, was first introduced by Drucker in his book The Age of Discontinuity, first published in 1969. He views knowledge to be the most valuable asset of companies.

Due to the importance of knowledge in the organization, Grant (1996b), building on works of Conner (1991), Kogut and Zander (1992), and Nonaka (1994) proposes the KBV using the RBV as a foundation. According to Scopus, tool which shows the number of citations an article has had, this seminal work from Grant has been cited in over 1690 articles.

Theories in knowledge management propose different characteristics of knowledge, such as tacit and explicit knowledge (Polanyi 1966). Explicit knowledge can be codified, articulated and transmitted to others through formal language or communication systems. Tacit knowledge is

difficult to transfer and involves both cognitive and technical elements. The interaction of the two types of knowledge results in new knowledge (Nonaka & Takeuchi 1995).

According to Nonaka (1994) knowledge creation is a continuous process of spiralling interaction between explicit and tacit knowledge. It involves four different patterns of interaction which are socialization (tacit to tacit), externalization (tacit to explicit), combination (explicit to explicit), and internalization (explicit to tacit). These four patterns are shown in Figure 14.

|  | Tacit Knowledge | Explicit Knowledge |
|---|---|---|
|  | *To* | |
| **Tacit Knowledge** | Socialization (Sympathized Knowledge) | Externalization (Conceptual Knowledge) |
| *From* **Explicit Knowledge** | Internalization (Operational Knowledge) | Combination (Systematic Knowledge) |

**Figure 14. Modes of Knowledge Conversion (Nonaka 1994, Nonaka & Takeuchi 1995)**

Grant (1997) suggests that knowledge is a strategically valuable input in production while creating additional value. According to him, tacit knowledge is integrated widely in an organisation and replicated internally.

KBV supporters propose that having diverse levels of knowledge and competences renders the companies more competitive and allows for better performance. Knowledge-based resources have proved to be of social complexity and are neither imitable nor replaceable (Patton 2007). As suggested by Roos and Von Krogh (1999) and Nonaka and Takeuchi (1995), the ability to manage and organize procedures in a way that facilitates the generation and application of knowledge within the organization allows for a sustainable competitive advantage. Saarenketo et al. (2009) believe that the growth of a firm is not sustainable without continuous redevelopment of knowledge based resources and capabilities because the organization would be less able to discover new opportunities.

In the next section, we explore completed research which applies the KBV to other process improvement frameworks such as Total Quality Management (see Besterfield, Besterfield-Michna, Besterfield & Besterfield-Sacre 2002), Six Sigma (see Pyzdek & Keller 2009) and ISO 9000 (see Hoyle 2009).

## 2.9.2  KBV and Process Improvement Frameworks

Various studies have linked knowledge management to other process improvement frameworks. Bénézech, Lambert, Lanoux, Lerch and Loos-Baroin (2001) conclude that the implementation of ISO 9000, a standard for quality management systems, promotes the knowledge codification, formalization and accumulation within the firm. Anand, Ward and Tatikonda (2010) argue in the context of Six Sigma, a business management strategy which seeks to improve the quality of process outputs, that "the underlying principle for process improvement projects is looking beyond reactive corrections of processes to root causes for problems and opportunities for enhancement. Thus, knowledge creation provides an appropriate lens through which we can study process improvement projects". Martinez-Costa and Jimenez-Jimenez (2009) argue that "an organization requires learning for improvement because without learning it simply repeats old practices." Total Quality Management (TQM), a management concept which seeks to improve quality by ensuring conformance to internal

requirements, is another process improvement which has been viewed under the KBV. Barrow (1993) argues that knowledge acquisition through organizational learning should be the "most compelling reasons for undertaking a TQM effort." Additionally, Stata (1994) argues that attention on quality improvement is a means to increase organizational learning. Ford (1991) considers that TQM harvests an environment necessary for knowledge management.

In this section, we see that the application of the KBV is an appropriate path for understanding how process improvements affect the organization. We propose that the KBV and its knowledge integration mechanisms may provide substantial insight into why IT operational process improvement frameworks may provide the bases of the realization of benefits within the IT organization.

## 2.10  Research Gaps

In this chapter, we concentrate on the literature of IT operational process improvement frameworks, such as ITIL and CobiT. The literature review completed showed that in the area of ITIL several streams can be noted. These streams are on Challenges of Implementation, Benefits of Implementation, and Knowledge Management.

While the frameworks have been developed using the collective knowledge and experience of IT executives around the world, no research compares how its implementation may vary from country to country. Other environmental and organizational factors, such as company size and industry are also not investigated thus far.

When exploring the stream of Challenges of implementation, we can observe that no research has amalgamated the factors from previous research and that the majority of the research completed in this area is qualitative. Therefore, a gap exist in understanding how these challenges, observed in various organizations, are perceived as companies' progress in their implementation of ITIL.

In a very similar manner, many researchers have looked into the benefits that ITIL provides to companies. However, research in this area is generally qualitative. No insight is given on when the benefits of the implementation are noticed. Additionally, since the implementation of ITIL would focus on the business perspective, one would assume that it would have an impact on the business-IT alignment. Various researchers have theorized that this may be the case, however, no research has been carried out to understand if this happens.

When looking at CobiT, similar issues are brought forward. Many researchers look into the benefits that the implementation of CobiT may bring to those implementing the framework. However, most of the research is qualitative. The areas of research, which are of interest, are focused on understanding if CobiT has an impact on the business-IT Alignment and if CobiT provides benefits.

Also, from a theoretical point of view, there is virtually no literature attempting to use a theory to explain why these IT operational frameworks are able to provide these benefits.

As a synopsis, there are important research gaps offered to the academic community, and our goal for this dissertation is to fill at least some of these gaps. By facing these gaps, we would be making a contribution by setting down a major piece of new information for the first time. We are also able to carry out empirical work and add knowledge in a way that has not previously been done before.

## 2.11  Summary of Literature Review

Standards and standardization have played a decisive and important role in IT. This research aims to understand if process improvement frameworks such as ITIL and CobiT can also have an impact on the IT organizations that have adopted the frameworks. This chapter begins by introducing the term IT Service Management. We then cover the de-facto standard for IT Service management, ITIL. We explore both of the most recent versions, ITIL V2 and ITIL V3 and their processes. Through our literature research we are able to arrange and group existing

literature to create two research streams. One stream focuses on research done on the introduction of the topic to academia and the other stream focuses on the implementation of ITSM. This is the first attempt to collect and synthesize ITSM and ITIL related literature as a single source of reference.

We then explore IT governance and the widely used IT governance framework CobiT. Using as basis the literature review structure of Brown and Grant (2005), we expand the stream of Contemporary IT governance Frameworks and subdivide the research being completed into the focus areas of IT governance.

Lastly, we explore the relations between IT governance and IT Service Management and attempt to differentiate these two process improvement frameworks. We also introduce the Knowledge-based view approach, which will be examined in the Discussion chapter (Chapter 7), to provide a logical structure and theoretical grounding to the research area and findings of this thesis.

This chapter provides a snap shot of the current research trends in the area, reporting on different publication outlets, with detailed analysis of the specific content and applied research methods. The content and style of this literature review may be considered to be of a descriptive nature. The author understands that a literature review is expected to indicate relatedness, in other words, how past work directly influences the research questions and is often structured as an analytical critique on how past work has evolved (Leedy & Ormrod 2009). However, this type of approach can only be applied when the area under investigation has a certain degree of maturity and previous studies build upon previous work. This was not the case for the field of IT operational process improvement framework, a field which may be considered to be in its infancy in terms of its research outputs.

In the next following chapters we will present a set of five manuscripts that we have written to address the research gaps illustrated in this chapter. The first of the manuscripts follows, and is

titled "IT Service Management Innovation: A Cross-National Study of ITIL Adoption Using Institutional Theory".

# 3. Paper 1: IT Service Management Innovation: A Cross-National Study of ITIL Adoption Using Institutional Theory

Chapter Three presents Paper 1. This paper (Marrone, Gacenga, Cater-Steel, Kolbe, 2011) has been submitted for review to the Management Information Systems Quarterly Journal.

For this paper I collected the data of the DACH countries, United Kingdom and United States of America. I also wrote the Methodology, Results and Discussion sections. Gacenga and Cater-Steel collected the data from Australia and wrote the Introduction and Literature Review.

Kolbe is the supervisor of this thesis at the University of Goettingen. Having the overview of the research, providing ideas of research paths, providing detailed feedback and verifying that the manuscripts are worthy of publication has been his major task, and therefore appears as co-author for the papers in this thesis. As well, for this paper he wrote the Abstract and Conclusion sections.

**Overview of Paper 1**

The process by which an organization adopts and implements a technological innovation is influenced by various contexts such as organization, technology, and environmental. The objective of this paper is to gain an insight on the effect that factors such as country of operation, size of organization, and industry in which the organization operates in have on the organization's implementation of ITIL. As well, the study compares the adoption of operational process to the adoption of tactical and strategical processes.

Three surveys were conducted and data was collected from Australia, DACH (Austria, Germany and Switzerland) countries, United Kingdom, and United States. A total of 623 organizations answered our survey.

Results suggest that organisations adopting ITIL have implemented more operational level ITIL processes adopted than tactical and strategic level ITIL processes. Additionally, DACH countries exhibit higher adoption than the UK, USA and Australia. Factors such as industry sector and to a lesser extent, size, do contribute to variation in adoption of ITIL processes

A major contribution of this paper is that it unveils characteristics of the organisation, such as size, industry sector and country, which play an important role in determining the adoption of the ITIL processes. While ITIL is considered a "best practice", created by amalgamating the knowledge of IT executives worldwide, its adoption may not homogeneous across all IT organisations. Institutional theory may provide an appropriate lens through which we can study the adoption of ITIL.

# IT SERVICE MANAGEMENT INNOVATION: A CROSS-NATIONAL STUDY OF ITIL ADOPTION USING INSTITUTIONAL THEORY

## ABSTRACT

IT Service Management (ITSM) is being transformed on a global scale with dramatic changes in work practices in IT service innovation. The intent of this study is to empirically explore how service innovation such as IT service management is adopted in today's global economy. The paper examines the adoption of ITSM processes as defined in the IT Infrastructure Library (ITIL®). The adoption of operational processes is compared to that of tactical and strategic level processes and the contribution of country, size and industry sector to variation in adoption of ITIL processes is assessed. Institutional theory is used as a foundation for the study. Three surveys were conducted in the UK, USA, DACH (German speaking countries) and Australia providing 623 responses.

The study found organisations adopting ITIL have implemented more of the operational level processes than the tactical and strategic level processes. Also, the DACH countries exhibit higher adoption than the UK, USA and Australia. Adoption was found to vary depending on industry sector, and in part on organisation size. Based on a discussion of theoretical and practical reasons, the paper derives insights for research and practice when introducing service innovation in the IT function. It concludes with limitations and suggestions for future research.

**Keywords:** Globalisation, IT service management, ITIL, Service Innovation, Service Adoption, Institutional Theory.

# INTRODUCTION

The contribution of Information Technology (IT) to the service economy is vital. As well as being constituents in the service sector, IT's total contribution can be grasped by considering that private businesses in the USA spend in excess of 50 percent of all invested capital on IT (Laudon and Laudon 2010). This significant investment has necessitated innovation in managing IT as a service. Specifically within the service sector, IT plays an important role in helping organisations provide better customer service, create new products and services, enhance relationships with suppliers, and improve decision making. IT is considered to be the "critical enabler" for transforming service industries (Chesbrough and Spohrer 2006). As IT systems become more powerful and cost-effective they provide the potential to more efficiently gather and analyse data, and to codify and transmit knowledge to the far corners of the globe (Chesbrough and Spohrer 2006). Businesses are demanding more from their IT organisations than ever before: as well as "better and more disciplined provisioning of IT services to ensure smooth operation" (Johnson, Hately, Miller and Orr 2007). In response to these business demands, IT organisations are adopting service improvement initiatives such as the IT Infrastructure Library (ITIL®). IT is expected to respond with speed in light of new business opportunities, to demonstrate responsible financial management and to satisfy internal staff and external customers. This level of service can only be achieved with effective relationships and communication between IT and business.

Transformations to and within the economy are occurring on a global scale in consumer as well as business-to-business activities, across all sectors and in developed as well as emerging economies (Bryson and Daniels 2004). The IT function is also being transformed internationally with innovative changes in work practices in managing IT as a service. The

majority of the existing innovation definitions in literature are based on the views of Schumpeter (1934) that an innovation describes a new product or process which is different from a previous version. Rogers (1995) defines innovation as "the application of new ideas to the products, processes or any other aspect of a firm's activities". Gopalakrishnan and Damanpour (1997) state that besides a differentiation between product and process, innovations can be categorised as administrative, organisational or social. Usually product or process innovations lead to organisational innovations which can be defined as "the adoption of an idea or behaviour that is new to the organisation adopting it" (Daft 1978). Organisational innovations aim to improve the structure or procedures of the company. In this context it is not important that the new product or process is a market revolution. A perceived novelty in the adopting organisation can be considered as an innovation as well (Lyytinen and Rose 2003; Rogers 1995). Innovation means creating new ideas and practices (Newell, Swan and Robertson 1998). In IT service management (ITSM), service improvement frameworks such as ITIL introduce innovation in work practices for both the IT service provider and customer parties engaged in a service exchange. ITIL delivers a new set of job roles and processes around managing IT functions/departments.

Traditional views of IT operations are being challenged, for instance the differentiation between products and services. ITSM best practice frameworks have helped IT functions and vendors change from a product (hardware/application) focus to a service focus. Since the 1980s, and with increased enthusiasm in the last ten years, we have witnessed dramatic innovation in ITSM business models, standards, collaborations, and work practices. In addition, ITSM frameworks present processes that transform the focus and work practices in service provision. ITSM frameworks can provide organisations with a means to exploit their capabilities and resources, service innovation and transformation of business processes.

Although the exact number of organisations adopting ITIL is not known, there are many indicators of the growing awareness and adoption. For example, there are now 53 national chapters of the IT Service Management Forum (itSMF) with in excess of 100,000 members worldwide (itSMFI); itSMF conferences report robust attendances each year; and the demand for ITIL-qualified staff is increasing, accompanied by an increase in the number of ITIL Foundation certificates granted to individuals. Over 500 organisations in at least 40 countries have become certified to the international standard for ITSM which is based on ITIL (APMG International 2011).

Beulen, Fenema and Currie identified the need for research into IT infrastructure management (2005). Much of the IT research to date fails to consider variation across industry sectors (Chiasson and Davidson 2005) and is biased towards large corporations, ignoring issues relating to small organisations (Attewell and Rule 1991).We need to better understand how ITIL is adopted globally across various industry sectors and in small as well as large organisations. We recognise the importance of the role played by IT in service innovation and value (co)creation especially in information-intensive industries such as the finance and education sectors.

The objective of this paper is to examine the adoption of ITIL processes raising two research questions:

*(RQ1) Are more operational level ITIL processes adopted than tactical and strategic level ITIL processes?*

*(RQ2) Do factors such as country, size and industry sector contribute to variation in adoption of ITIL processes?*

The study uses data from 623 questionnaire responses collected from three surveys. The first survey included respondents from the United States of America (USA) and the United Kingdom (UK). The USA and UK were treated as one sample as this was how the annual research by Hornbill was conducted based on their client base. The second survey attracted responses from Germany, Austria and Switzerland. In Europe these three countries are commonly referred to as *DACH,* an acronym representing countries that predominantly use the German language. The term DACH is based on the official automobile license plate abbreviations for Germany (D for *Deutschland*), Austria (A for *Austria*) and Switzerland (CH for *Confoederatio Helvetica*). The third survey was conducted in Australia.

In the next section, we explain institutional theory, present a review of relevant literature and provide a brief introduction to ITIL. Based on theory and recent research we articulate a model including a set of hypotheses. Following this we describe the methodology and present and discuss the results. We conclude with implications of these empirical findings for the practice of ITSM and make suggestions for further research.

## THEORIES

The need for service to be better theorised has been highlighted by Vargo and Lusch as a consequence of recent developments in marketing and operations research (2008). This need also applies to ITSM. We aim to contribute to ITSM theory by applying institutional theory.

### Institutional Theory

We draw on institutional theory to provide a theoretical framework to explore service-oriented transformation based on ITIL. The rapid adoption of ITIL within IT functions and

service providers suggests that ITIL processes have become institutionalised. Although now more than 30 years old, the work of Meyer and Rowan (1977) is still relevant to the application of institutional theory today. Meyer and Rowan explain that "many of the positions, policies, programs, and procedures of modern organisations are enforced by public opinion, by the views of important constituents, by knowledge through the educational system, social prestige, laws, and definitions of negligence and prudence" (1977). As a result, these products, services, techniques, policies, and programs become institutionalised, and then gain even greater acceptance. In time, they function as "powerful myths and many organisations adopt them ceremonially" (1977).

DiMaggio and Powell (1983) observed the "startling homogeneity of organisational forms and practices" and contend that this results in *isomorphism*. Institutional norms derive from many sources such as public opinion, educational systems, ideologies, professions, and accreditation bodies, and act as unstated policies which organisations must follow. These norms are "rules of procedures that actors employ flexibly and reflexively to assure themselves and those around them that their behaviour is reasonable" (Powell and DiMaggio 1991). Therefore, institutional theory focuses on "the process by which societal expectations of 'proper' behaviour influence the structure and practices of organisations" (Handelman and Arnold 1999).

The apparent success by an early adopter of the innovation in an inter-organisational network can have an effect on other organisations to imitate the early adopters to replicate the success or being perceived as innovative (Markus 1987). This is because the communication of perceived realised benefits that arise from the innovation may persuade non-adopters to adopt. The focal point of institutional theory is on the legitimacy of innovative organisational

structures and deliberately overlooks productivity and efficiency (Liu, Sia and Wei 2008). This approach proposes that the structure and actions of the organisation are significantly impacted by the institutional environment in which the organisation is situated (Burns and Wholey 1993).

Institutional theory attempts to answer the question: "Why do organisations of the same type, such as schools and hospitals, located in widely scattered locales so closely resemble one another?" (Scott 2008). Based on this, our research focuses on which environmental factors play a role in the way ITIL is adopted? How can organisations of the same type be clustered? Does geographic location play a role in the way ITIL is adopted?

Institutional theory has been previously applied in IS research. Rowlands (2008) considered systems development methodologies. Currie (2004) used institutional theory as a lens to examine the adoption of application service providers, and a national IT healthcare programme (Currie and Guah 2007). Institutional theory was used by Magnusson and Oskarrson (2008) to explore the behaviour of CIOs in relation to IT governance, and by Hu and Quan (2006) to consider IT budgeting. Orlikowski and Barley (2001) also acknowledged the contribution of institutional theory to IT literature.

Using institutional theory, DiMaggio and Powell (1983) developed two sets of predictors to explain isomorphic change; one set relates to organisational-level predictors and the other to field-level predictors. The organisational-level predictors refer to the adoption of an innovation (intra-organisational), whereas the field-level predictors focus on dissemination across the industry sector (inter-organisational). This research covers factors related to the

adoption and dissemination of ITIL, perspectives from both inter-organisational and intra-organisational levels.

**Previous Research on ITIL Adoption and Diffusion**

Based on advice from Webster and Watson (2002), we use three main sources to formulate the reasoning for the hypotheses: theoretical explanations for "why"; past empirical findings; and practice or experience. As the "why" or logical reasoning is the most important component of the explanation, it is part of the justification for the hypotheses.

Adoption of ITSM frameworks such as the ITIL has increased globally. ITIL is a set of books documenting "best practice" concepts, models and frameworks that can be used by organisations in IT service provision and is defined as a "cohesive best practice framework, drawn from the public and private sectors internationally. It describes the organisation of IT resources to deliver business value, and documents processes, functions and roles in ITSM" (OGC 2011).

Internationally, previous studies have reported the adoption of ITSM and specifically ITIL in Australia (Cater-Steel, Tan and Toleman 2009a), China (Wang and Zhang 2007), Malaysia (Ayat, Sharifi, Sahibudin and Ibrahim 2009), Norway (Iden and Langeland 2010), Thailand (Lawkobkit 2008), UK (Shwartz, Ayachitula, Buco, Surendra, Ward and Weinberger 2007) and USA (Pollard and Cater-Steel 2009). Institutional theory is used by Cater-Steel, Tan and Toleman (2009b) to examine the increasing global diffusion of ITIL and the motivation of individual organisations adopting the framework. They conclude that ITIL processes have become "fashionable and institutionalised; they have travelled through time and space".

One of the key questions for organisations considering ITIL adoption is "Why adopt?" For some IT Managers, adoption is a matter of legal compliance, for others, a risk management strategy, a cost saving measure, or a means to satisfy customers more effectively (Cater-Steel et al. 2009b). Ayat et al. (2009) found "the most popular reasons or factors which are influencing adoption of ITIL in the target organisations include technology, organisational issues, environment and effort to achieve alignment of business with IT services". Previous studies have considered benefits and challenges of ITIL adoption.

Recent research has identified benefits from ITIL adoption (Galup, Dattero, Quan and Conger 2009; Iden and Langeland 2010; Marrone and Kolbe 2010; Potgieter, Botha and Lew 2005). For example, based on interviews with five Australian IT service managers, the benefits realised by ITIL adoption include improved focus on ITSM, more rigorous control of testing and system changes, more predictable infrastructure, improved consultation with IT groups within the organisation, smoother negotiation of service level agreements, reduced server faults, seamless end-to-end service, documented and consistent IT processes across the organisation, an effective change advisory board, and consistent logging of incidents (Cater-Steel et al. 2009b).

Researchers have however also identified barriers or challenges that impede ITIL adoption. Sharifi, Ayat, Rahman and Sahibudin (2008) explored the reasons for failure of ITIL adoptions and identified the following causes of failure: "lack of management commitment, spending too much time on complicated process diagrams, not creating work instructions, not assigning process owners, concentrating too much on performance, being too ambitious, failing to maintain momentum and allowing departmental demarcation". In studying the most important factors for successful ITIL adoption, Iden and Langeland (2010) used a Delphi

study of the Norwegian armed forces to rank the factors important to successful ITIL adoption. They validated the findings of Hochstein et al. (2005a) and Pollard and Cater-Steel (2009) concluding with a ranked list of the most important factors: managers at all levels must have ownership in the introduction of ITIL; senior management must formally make the decision to introduce ITIL; and key personnel should be identified and involved in the design and improvement of processes.

**Selective Adoption of ITIL Processes**

In the next sections past empirical findings are reviewed to develop the hypotheses to answer the research questions: *(RQ1) Are more operational level ITIL processes adopted than tactical and strategic level ITIL processes? and (RQ2) do factors such as country, size and industry sector contribute to variation in adoption of ITIL processes?*

Previous studies on ITIL adoption indicate wide variation in both awareness and application of ITIL processes. Although most of Hochstein et al.'s (2005b) respondents indicated they intended to adopt all the ITIL processes, priority was given to adopting operational processes. A similar pattern was observed in surveys conducted at itSMF Australian National Conferences (Cater-Steel et al. 2009a). This indicates that managers appear to be selecting specific processes rather than adopting all processes: while some of the processes are widely adopted, others are rarely used. However, despite evidence that many organisations have shown a preference for operational processes, some organisations have successfully adopted both operational and tactical sets of processes. To achieve certification to the International ITSM Standard (ISO/IEC 20000) organisations are required to achieve both operational and tactical level processes. Since the international standard was ratified in 2005, 579 organisations in over 50 countries have become certified to the standard (APMG International 2011).

Certain barriers to adoption highlighted in earlier studies may explain this selective adoption behaviour: some innovations are more complex and impose a knowledge burden requiring training as well as investment in software tools (Wang 2010). Furthermore, the perceived relevance of processes affects their adoption rate or the priority given to their adoption. In considering software development, Fitzgerald (1997) found developers were aware of methodologies and practices but "uniquely enact" a "methodology-in-action" as deemed appropriate. The same may apply to IT service managers. The practices used by firms may originate from the methods and techniques taught in the curriculum of local colleges and universities, or individual government purchasing policies promoting various methodologies. These factors may foster standardisation within the local industry, but may be the source of variation when comparing diverse geographical groups of IT service managers.

The interdependence of the processes may provide a theoretical justification why managers select the operational processes in preference to the tactical processes. Previous research indicates that most organisations commence their ITIL adoption with the incident management process. Why incident first? "Incident management helps CIOs focus on restoring normal service levels as quickly as possible with minimal disruption to the business. Incident management can also reduce service interruptions in the future, increase efficiency of in-house IT staff communications and systems in general, and improve user satisfaction" (Lange 2007). We have observed that along with incident management other operational-level processes such as change and configuration management are then selected.

In ITIL V2, the processes and functions were presented in two groups: service delivery and service support. Service support processes apply to the operational-level of the organisation

whereas the service delivery processes are tactical in nature. In the latest version (V3) a lifecycle structure is used: service strategy, service design, service transition, service operation and continual service improvement. Although the ITIL V3 books have been available since 2007, many organisations have not transitioned from V2. Therefore, for the purpose of this study, ITIL V2 and V3 processes are included and have been classified as operational or tactical/strategic level as shown in the appendix.

Incident management is strongly linked to other operational processes such as change management and configuration management. It appears that the first process selected influences the cohort of processes selected. The operational-level processes are performed by a cohesive workgroup whereas the more tactically-oriented ITIL processes such as financial, demand, capacity and service continuity management are not as tightly inter-related and require the coordination and cooperation of a range of IT and business middle managers.

Therefore, the first hypothesis relates to the selective adoption of ITIL processes:

*H1: A higher number of operational level ITIL processes than tactical/strategic level processes are adopted by organisations*

**Variations in Adoption by Organisations**

Previous studies have examined internal organisational factors influencing ITIL adoption. However, there has been little research to date on the influence of external organisational characteristics. This study examines three external organisational characteristics to investigate their relationship with ITIL adoption: country, organisation size, and industry sector.

**Country**

Institutional theory posits that rules, obligations and beliefs travel through time and space resulting in some forms of global uniformity. As suggested by Dacin (1997) "organisations within the same population facing the same set of environmental constraints will tend to be isomorphic to one another and their environment because they face similar conditions" . While institutional theory suggests homogeneity and isomorphism, organisations are able to distinguish themselves based on how well the organisation manages to adapt to the institutional pressures (Oliver 1991).

However, significant differences across countries have been observed regarding the adoption of technologies (Abrahamson 1996) and the adoption of process based initiatives. For example, Newell, Swan and Robertson (1998) found significant differences in the rate of adoption of Business Process Reengineering (BPR) across four countries (UK, France, Netherlands, Sweden).

The adoption of ITSM internationally is evidenced by records in the APMG register of organisations achieving the International ITSM standard. The register shows variation by country: as at January 2011 the number of certificates for the countries included in this study were as follows: DACH (58); UK (56); USA (33) and Australia (5) (APMG International 2011).

The push for certification in an attempt to comply with organisation's demands has resulted in IT professionals seeking IT service certification to re-skill in service orientation. This is evidence of globalisation of expertise in service exchange at the inter-organisational level.

This may also be evidence of the open and social innovation within firms and with customers or suppliers because they use ITIL and ISO/IEC 20000 to enhance service offerings.

A survey reported in the Computer Weekly (2006) showed that Germany and UK were leaders in the adoption of ITIL. Results indicate that 63 percent of organisations surveyed in the UK and Germany reported adoptions of ITIL; Spain was third at 38 percent. A more recent global CIO study showed that UK and German IT organisations are significantly ahead of their USA counterparts with regard to providing IT services that directly benefit the business (Computer Associates, 2008). The study also highlights the fact that ITIL adoption is lower in the USA than in Germany and the UK. Similar results are noted from the Aberdeen Group, which found that 55 percent of European organisations are using ITIL framework guidelines, compared to 33 percent in North America.

A recently observed phenomenon is the increase in outsourcing and off-shoring of IT services which are no longer limited to application development. For example Procter & Gamble and General Motors have off-shored substantial parts of their IT services (Beulen et al. 2005). With the increase in out-sourcing of IT services, ITSM has become a global activity. Although variations in language, culture and IT labour costs affect IT service outsourcing decisions, risk strategies can mitigate these concerns (Beulen et al. 2005). Dramatic improvements in ITSM tools and methods have allowed geographically and culturally diverse IT staff to collaborate in global ITSM teams. Several of the cases studied by Beulen et al. confirmed that their standardised ITIL-based tool supported 24x7 global services from offices in India, Eastern Europe and Brazil (2005).

Based on findings by Dacin (1997) and the other research, that organisations with different population s would face a diverse set of environmental constraints, we propose the following hypothesis:

*H2a:  Adoption of ITIL processes varies depending on the country.*

**Organisational Size**

Institutional theorists have examined the phenomenon of the diffusion of management techniques across thousands of dissimilar organisations (Abrahamson 1991). However, a number of prior studies have reported that organisational size is related to the adoption of innovations (Rogers 2003; Swanson 1994). For example, Currie used institutional theory to examine the dissemination of software as a service by SMEs (2004). Newell et al. (1998) also used institutional theory and found there was a direct relationship between firm size and adoption of BPR.

Organisational behaviour and management literature establishes that small organisations are different from larger organisations in terms of formalisation, centralisation, complexity and personnel ratios (Daft 1998). Furthermore, research has highlighted other differences between small firms and large firms: small organisations have a flatter structure and are managed by their owners in a management style that encourages entrepreneurship and innovation, they use less formalised decision-making structures and procedures, and  provide more freedom for employees to depart from the rules (Cater-Steel, Toleman and Rout 2006). Therefore, small firms should not be considered to be scaled down versions of large firms (Storey 1994). In the same vein, process improvement models such as ITIL, which were originally developed for large UK data centres, may not be appropriate for small firms.

For small and medium-sized enterprises (SME) to compete with larger organisations they must be competitive and able to produce high quality outputs through structured processes. Large organisations often focus on the formalization of behaviour to accomplish coordination, while smaller organisations have an organic structure that is made up of informal working relationships (Ghobadian and Gallear 1996).

Since the release of V2 in 2000, ITIL has been adopted by many large organisations, initially those interested in contracting to the UK Government. In addition, many large organisations operating mission-critical systems require best practice techniques because failures have far reaching consequences and are highly publicised. For example poor ITSM practices may have contributed to the loss by the UK revenue and customs office (HMRC) of two CDs containing 25 million records with child benefit details (Turle 2009).

Although reports of benefits of ITIL adoption to large firms have been published, to the authors' knowledge, no academic research has been published about small firms. Anecdotes from practitioners highlight problems encountered such as: documentation overload; unrelated management structure; high resource requirements; high training costs; lack of needed guidance; costly tools. This view of ITIL being beyond the reach of small organisations has been highlighted by Valdés, St-Jean, Renault, Picard, Cortina, Betry and Barafort (2009) who explain that because of limited resources (human, financial, technical) SMEs cannot easily adopt ITIL so only adopt useful concepts and selected parts.

Some of the authors of ITIL V3 recognise that ITIL needs to be scaled down to match the size of the organisation (Taylor and Macfarlane 2005). They state that size is relative and is related to the complexity of the IT environment itself. They advise small organisation to consider the practicality, desirability and residual benefits when scaling down ITIL.

Due to these suggestions and Dacin's view (1997) that organisations with different population s would face a diverse set of environmental constraints, we propose the following hypothesis:

*H2b:   Adoption of ITIL processes varies with organisational size.*

**Industry Sector**

Institutional theory provides approaches to conceptualise industry influences in IS activities (Chiasson and Davidson 2005). Effective IT services are particularly important for industry sectors providing essential services (e.g. health, energy) and national security (e.g. defence). It could be argued that organisations with stricter governance requirements such as those in defence, finance and healthcare would require stringent and world class ITSM processes.

Increased adoption may be expected from organisations whose governments have indicated a preference for ITIL. For example, currently some USA government agencies require certification to the International Standard for ITSM (ITSM Portal 2010), and the Australian Federal Government has urged all agencies to use ITIL to improve their ICT infrastructure (Gershon 2008). As a result, it has been claimed that certification of IT service providers has become an important requirement as global certified processes facilitate communication across IT professionals, service providers and their customers (Beulen et al. 2005).

Previous studies related to the adoption of IT standards and innovations have found variation by industry sector e.g. Dutta, Lee and Van Wassenhove (1999), Ibbs and Kwak (2000), Glass (1996) and Newell, Swan and Robertson (1998).

In their consideration of diffusion theory, Bayer and Melone (1989) argue that mandated IT innovations first introduced to a government contractor population will later transfer to the commercial sector because members of one population interact with, and in fact may jointly belong to, other populations. According to institutional theory, as well as laws and regulations, Governments create norms, actions, or behaviours that people accept as good or take for granted (Scott 2008). King et al. (1994) considered the role of institutions such as government agencies in the diffusion of IT innovations. ITIL is an example of an initiative instigated by a national Government that has flowed to the private sector.

To date there has been little research into the relationship between the industry sector and ITIL adoption. Therefore the following hypothesis is proposed:

*H2c: Adoption of ITIL processes varies depending on the industry sector of the organisation.*

**Conceptual Model**

The research model with the four hypotheses is shown in Figure 1. The exploration of these hypotheses will determine the extent of adoption of ITSM processes and the relationship between specific organisational characteristics.
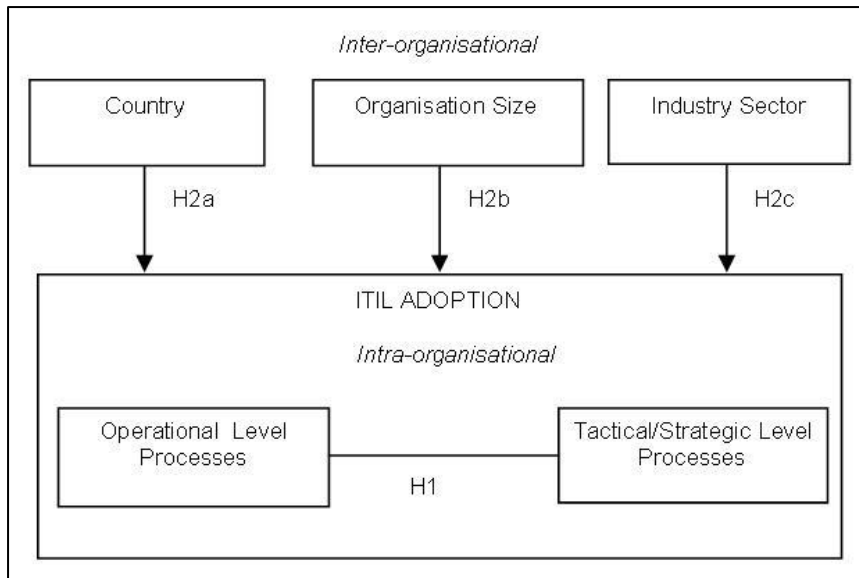
**Figure 1 Conceptual Model**

We use a hybrid conceptual model: hypothesis H1 is derived from process theories while

hypothesis H2 relies on factors (variance theory). Webster and Watson (2002) comment on

the strength of hybrid models that draw on both variance and process theory research. Using

two approaches can "reveal a deeper understanding of the topic" (2002). In the conceptual

model the variables are grouped into intra- and inter-organisational components based on

DiMaggio and Powell's (1983) advice to include organisational and field perspectives.

*METHODOLOGY*

The study presented here is part of a wider research project examining ITSM adoption. This

paper combined data from three surveys: UK/USA, DACH and Australia. A survey is

considered a feasible means of providing data for any study investigating the state of practice

(Wilson, Petocz and Roiter 1995). In this case the surveys provide a broad industry-wide

snapshot of adoption of ITIL in UK/USA, DACH and Australia. The US/UK and DACH

surveys were conducted in association with Materna and Hornbill respectively as they have

substantial client databases of ITSM practitioners. Members of itSMF, the professional

association most closely aligned to ITSM, were included in the surveys. An extract from the Australian questionnaires is provided as a sample in the appendix.

**UK/USA Survey**

The structure of UK/USA questionnaire addressed many aspects of ITIL including the ITIL processes' usage, adoption and maturity, as well as realised benefits due to the adoption. It also included questions on the topics of Business-IT alignment and service desk usage. The questions used for this survey were developed from previous ITIL adoption surveys (Cater-Steel et al. 2009a). The survey mostly contained questions whose answers are in Likert scale, nominal scale and open-ended response form. Demographic questions were also part of the survey.

In April 2009 an invitational email was sent to 5,000 organisations on the mailing lists of Hornbill, an ITSM tool provider, and the itSMF USA and UK chapters. The online questionnaire was accessible in the months of April and May 2009.

**DACH Survey**

Every year since 2003, Materna, an ITSM service provider, has carried out an ITSM executive survey in DACH countries. The survey investigates the current situation of ITSM, specifically how IT is perceived, the use of the ITIL processes, evaluation of ITIL V3, assessment of service strategy and service automation and performance measurement through ITIL.

In May 2009, an invitational email was sent to 400 organisations on the mailing lists of Materna. The survey was made available online for seven months. Additionally, this survey

was announced in various forums such as Xing and LinkedIn in groups formed to discuss topics such as ITSM and ITIL.

The language used for the questionnaire is German. A double translation process was applied to ensure the translation from English to German had been accurately performed.

**Australian Survey**

The data used in this paper is part of a wider Australian study that aims to develop a performance measurement framework for ITSM. The questionnaire comprised four sections: demographics; ITSM Processes; ITSM benefits measurement; and ITSM Challenges. Respondents were asked to select the ITSM framework adopted, specific ITSM processes, process specific benefits and key benefits from ITSM adoption.

After reviews by a panel of experts drawn from the public and private sectors, the questionnaire was pilot tested by five ITSM industry managers and three ITSM academics. The pre-test of the questionnaire by an industry panel of experts and academic researchers ensured construct validity (Iman and Conover 1983). With support from itSMF Australia a survey of its members was conducted in December 2009. The online questionnaire survey link was emailed by itSMF Australia to all its 2085 members. The target population of the survey was the itSMF Australia members.

**Combining the UK/USA, DACH and Australian Survey Data for Analysis**

Although the focus of the surveys was slightly different, there is sufficient overlap in the data collected to provide an International comparison of adoption across UK, USA, DACH and Australia. All the surveys cover ITIL adoption, benefits and performance measurement although the UK/USA survey emphasises adoption while the Australian survey focused on

performance measurement. The surveys were conducted within eight months providing a good opportunity to compare the results.

Based on our conceptual model the following variables are included in this study: ITIL process adoption, operational level adoption, tactical/strategic level adoption, organisation size, industry sector, country and ITIL version.

We calculate ITIL adoption for each organisation as the percentage of adopted processes. Operational level adoption is calculated as the percentage of operational processes that have been adopted. Tactical/strategic level adoption is calculated as the percentage of tactical/strategic processes that have been adopted by the organisation. The size of the organisation is defined as the total number of staff employed by the organisation. Although organisation size could be measured by sales, revenue or assets, by far the most common metric for organisation size in Information Systems research is the number of employees (Goode 2001). Industry sector is defined by ABS (2008) as a grouping of business units carrying out similar productive activities. Country is understood as the location of the respondent at the time of answering the questionnaire. The ITIL version being adopted could either be V2 or V3. Since different questionnaires were used for the USA/UK, DACH and Australian surveys, responses were coded to enable consolidation. Different sets of question and selection options and codes had initially been used for questions on the number of employees across the surveys. Agreement was reached on new codes for organisation size and the raw data was re-coded. For industry sector, new codes based on a modification of the Australian Bureau of Statistics' classification (Australian Bureau of Statistics 2008) were used and applied to recode the raw data to achieve alignment in the merged data set. This is summarised in Table 2.

In combining the survey data, only those responses that used ITIL V2 or V3 and specified adoption of at least one ITIL process were included. The variables are listed in Table 1.

**Table 1 Operationalisation of Variables**

| Variable | Operational Definitions | Data Type |
|---|---|---|
| ITIL adoption | Percentage calculated as the proportion of adopted processes over the total number of ITIL processes | Interval |
| Operational level adoption | Percentage calculated as the proportion of adopted operational level processes over the total number of operational level processes | Interval |
| Tactical/strategic level adoption | Percentage calculated as the proportion of adopted tactical/strategic level processes over the total number of tactical/strategic level processes | Interval |
| Organisation size | Less than 100; 101-500; 501-1,000; 1,001-5,000; 5001-10,000; more than 10,001 employees | Ordinal |
| Industry Sector | Sector lists from individual questionnaires consolidated to single list of 8 sectors | Nominal |
| Country | UK; USA; DACH; Australia | Nominal |
| ITIL Version | ITIL V2; ITIL V3 | Nominal |

## *RESULTS AND ANALYSIS*

The results from each survey are presented followed by analysis of the combined data set to statistically test the hypotheses formulated in the conceptual model.

**UK / USA Responses**

Out of the 784 respondents who attempted the UK/USA survey, 503 submitted the questionnaire. Partially completed responses were deleted. From the UK, 223 responses were received and 146 from the USA. From countries other than USA and UK, 47 responses were submitted and these were excluded from the analysis in this study.

The respondents from the UK were mostly IT managers (36%), process owners (24%) and head of service management (23%). In the USA, 30 percent of the respondents were IT managers, 21 percent process owners and close to 20 percent held the position of CIO/IT

director. As shown in Table 2, with regard to organisation size, in the UK, 44 percent of the respondents worked in organisations with more than 10,000 employees. Eighteen percent worked in organisations with between 1,001 and 5,000 employees. These figures are similar in the USA: 41 percent of organisations had more than 10,000 employees and 19 percent reported between 1,001 and 5,000 employees.

A diverse range of industry and education sectors was reported. In the UK 31 percent of the respondents came from the information, media & telecommunications, 30 percent from the public sector & education, 22 percent from the financial & management services and 5 percent from retail & distribution. In the USA the majority of responses came from the information, media & telecommunications (41%), while 24 percent of responses came from financial & management services and only 15 percent of responses were from the public sector & education.

All organisations that responded this survey used ITIL. ITIL V2 is used by 65 percent of UK and 45 percent of USA organisations surveyed. ITIL V3 was therefore used at 35 percent of UK and 55 percent of USA organisations.

**Table 2 Summary of UK and USA Responses**

| Number of Employees | UK | | USA | |
|---|---|---|---|---|
| | N | % | N | % |
| Less than 100 | 8 | 3.6 | 8 | 5.5 |
| 101-500 | 18 | 8.1 | 12 | 8.2 |
| 501-1,000 | 20 | 9.0 | 9 | 6.2 |
| 1,001-5,000 | 42 | 18.8 | 28 | 19.2 |
| 5,001-10,000 | 37 | 16.6 | 28 | 19.2 |
| More than 10,000 | 98 | 43.9 | 61 | 41.8 |
| **Total** | **223** | **100.0** | **146** | **100.0** |
| **Industry Sector** | | | | |
| Financial & Management Services | 48 | 21.5 | 35 | 24.0 |
| Healthcare | 1 | .4 | 7 | 4.8 |

| | | | | |
|---|---|---|---|---|
| Information Media and Telecommunications | 68 | 30.5 | 60 | 41.1 |
| Manufacturing and Construction | 5 | 2.2 | 8 | 5.5 |
| Public Sector and Education | 66 | 29.6 | 22 | 15.1 |
| Retail and Distribution | 10 | 4.5 | 7 | 4.8 |
| Utility | 4 | 1.8 | 2 | 1.4 |
| Other | 21 | 9.4 | 5 | 3.4 |
| **Total** | **223** | **100.0** | **146** | **100.0** |
| **ITIL Version** | | | | |
| V2 | 145 | 65.0 | 66 | 45.2 |
| V3 | 78 | 35.0 | 80 | 54.8 |
| **Total** | **223** | **100.0** | **146** | **100.0** |

## DACH Responses

Of the 240 who attempted the DACH questionnaire, 58 usable and complete responses were received. The roles of those who submitted the survey were highly varied. Seventeen percent of the respondents were head of service management, 14 percent were process owners and 12 percent were IT directors. As shown in Table 3, most responses came from respondents whose organisations had between 1,001 and 5,000 employees while 26 percent worked in organisations with more than 10,000 employees. With regards to industry sector, 35 percent of respondents were from the information media & telecommunications and 14 percent from the financial & management services. All organisations that responded this survey used ITIL V3.

**Table 3 Summary of DACH Responses**

| Number of Employees | | |
|---|---|---|
| | N | % |
| Less than 100 | 6 | 10.3 |
| 101-500 | 6 | 10.3 |
| 501-1,000 | 6 | 10.3 |
| 1,001-5,000 | 24 | 41.4 |
| 5,001-10,000 | 1 | 1.7 |
| More than 10,000 | 15 | 25.9 |
| **Total** | **58** | **100.0** |
| **Industry Sector** | | |

| | | |
|---|---|---|
| Financial & Management Services | 8 | 13.8 |
| Healthcare | 0 | 0 |
| Information Media and Telecommunications | 20 | 34.5 |
| Manufacturing and Construction | 4 | 6.9 |
| Public Sector and Education | 4 | 6.9 |
| Retail and Distribution | 1 | 1.7 |
| Utility | 5 | 8.6 |
| Other | 16 | 27.6 |
| **Total** | **58** | **100.0** |
| **ITIL Version** | | |
| V2 | 0 | 0.0 |
| V3 | 58 | 100.0 |
| **Total** | **58** | **100.0** |

**Australian Responses**

The Australian survey achieved a response rate of 13 percent with 263 itSMF Australia members completing the online survey, resulting in 215 usable responses. For this study only ITIL responses that had at least one process adopted were selected, resulting in 196 responses.

The Australian respondents were drawn from a wide cross-section of job roles: service manager (22%), IT manager (19%), process manager (6%), business manager (5%), change manager (4%), director (4%) and project manager (3%). The other positions included consultant (13%), technical expert (6%), ITIL business analyst (3%), help desk supervisor (3%), operations manager (3%) and trainer (2%). A small number were grouped under the other category (6%).

The Australian survey reported ITIL as the dominant ITSM framework in use by 95 percent of respondents, with a slight majority (57%) selecting ITIL V2 over V3 (43%). Some of the other ITSM frameworks reported include Microsoft Operations Framework and HP ITSM

Reference Model. A small number of respondents indicated using customised ITSM based on leading frameworks. A summary of the Australian responses is depicted in Table 4.

**Table 4 Summary of Australian Responses**

| Number of Employees | N | % |
|---|---|---|
| 101-500 | 14 | 7.1 |
| 501-1,000 | 55 | 28.1 |
| 1,001-5,000 | 65 | 33.2 |
| 5,001-10,000 | 28 | 14.3 |
| More than 10,000 | 34 | 17.3 |
| **Total** | **196** | **100.0** |
| **Industry Sector** | | |
| Financial & Management Services | 25 | 12.8 |
| Healthcare | 7 | 3.6 |
| Information Media and Telecommunications | 51 | 26.0 |
| Manufacturing and Construction | 10 | 5.1 |
| Public Sector and Education | 81 | 41.3 |
| Retail and Distribution | 4 | 2.0 |
| Utility | 9 | 4.6 |
| Other (e.g. NFP/charity, outsourcing, multiple sector) | 9 | 4.6 |
| **Total** | **196** | **100.0** |
| **ITIL Version** | | |
| V2 | 112 | 57.1 |
| V3 | 84 | 42.9 |
| **Total** | **196** | **100.0** |

**Analysis of Combined Datasets**

When the three data sets were combined a total of 623 responses were available with 323 organisations adopting ITIL V2 and 300 using V3. Since ITIL V3 was promoted vigorously in 2007 it has been widely adopted. In a period of two years, there are almost as many organisations adopting ITIL V3 as those still using ITIL V2. Recoding was done as detailed earlier.

For each of the 623 responses, the ITIL adoption was calculated for each organisation by summing the number of adopted processes and dividing this by the total number of ITIL

processes (depending on the version of ITIL adopted, 10 if the organisation adopted ITIL v2 or 25 if it adopted V3). The mean ITIL adoption is 48.09 percent. Operational level adoption and tactical/strategic level adoption were also calculated. The means and standard deviations are shown in Table 5.

**Table 5 Adoption Levels of Individual ITIL Processes**

| | ITIL V2 | V3 | Total | Adoption Mean |
|---|---|---|---|---|
| **Service Delivery – Tactical Level** | | | | |
| Service Level Management (SLM) | 179 | 182 | 361 | 57.95% |
| IT Service Continuity Management (ITSCM) | 112 | 135 | 247 | 39.65% |
| Availability Management | 92 | 118 | 210 | 33.71% |
| Capacity Management | 85 | 109 | 194 | 31.14% |
| Financial Management | 82 | 85 | 167 | 26.81% |
| Service Catalogue Management | | 147 | 147 | 23.60% |
| Information Security Management | | 136 | 136 | 21.83% |
| Service Reporting | | 123 | 123 | 19.74% |
| Service Measurement | | 105 | 105 | 16.85% |
| Supplier Management | | 99 | 99 | 15.89% |
| Service Portfolio Management | | 95 | 95 | 15.25% |
| Seven-Step Improvement Process | | 76 | 76 | 12.20% |
| Demand Management | | 73 | 73 | 11.72% |
| Mean adoption level | | | | 25.10% |
| **Service Support – Operational-level** | | | | |
| Incident Management | 309 | 282 | 591 | 94.86% |
| Change Management | 294 | 254 | 548 | 87.96% |
| Problem Management | 225 | 218 | 443 | 71.11% |
| Service Asset & Configuration Management | 148 | 144 | 292 | 47.87% |
| Release & Deployment Management | 135 | 155 | 290 | 46.55% |
| Request Fulfilment | | 169 | 169 | 27.13% |
| Event Management | | 132 | 132 | 21.19% |
| Access Management | | 131 | 131 | 21.03% |
| Knowledge Management | | 104 | 104 | 16.69% |
| Service Validation and Testing | | 99 | 99 | 15.89% |
| Transition Planning and Support | | 93 | 93 | 14.93% |
| Evaluation | | 74 | 74 | 11.88% |
| Mean adoption level | | | | 39.67% |

## Normal Distribution Tests

Prior to conducting statistical tests, an exploratory analysis was conducted to ensure the correct statistical approach was applied. The assumption of normality was not confirmed for ITIL adoption (Shapiro-Wilk statistic= .789, p=.000), operational level adoption (Shapiro-Wilk statistic=.941, p=.000), or tactical/strategic level adoption (Shapiro-Wilk statistic=.880, p=.000). As the data was not normally distributed, non-parametric tests were used. We now report the results of testing hypotheses H1 and H2.

## Selection of Operational versus Tactical/Strategic Processes

We combined the 351 ITIL V2 and 318 ITIL V3 responses and grouped them into two categories of processes: operational and tactical and strategic. As listed in Table A 1 in the appendix, we mapped the ITIL V3 processes to the ITIL V2 categories: all the service operation and service transition processes were categorised as service support while the service strategy, service design and continual service improvement processes fitted the tactical category. As shown in Table 5, the adoption varied from the highest adopted process, incident management at 95 percent adoption, to the least, demand management (12%).

A Wilcoxon signed test was conducted to determine if there was significant difference between adoption patterns of operational and tactical/strategic level processes. The Wilcoxon signed test corresponds to the dependent t-test and is suitable for non-normally distributed data. This test is based on differences between scores in two conditions of testing being compared (repeated measures in a similar sample). Results from the signed Wilcoxon test indicates that a significant difference exists between the adoption levels of operational level processes compared to tactical/strategic level processes (Z=-17.16, $p<0.001$).

**Variation by Country**

The number of responses and the mean of of ITIL adoption for each country can be seen in

Table 6. The highest adoption was reported from the DACH respondents where the average

adoption level is 75 percent. This means that on average, the DACH respondents have

adopted 75 percent of the ITIL processes.

**Table 6 ITIL Adoption per Country**

| Country | N | ITIL Adoption | |
| --- | --- | --- | --- |
| | | Mean | Std. Deviation |
| UK | 223 | 53.06% | 26.95% |
| USA | 146 | 39.27% | 24.23% |
| DACH | 58 | 75.24% | 23.62% |
| Australia | 196 | 40.98% | 24.29% |
| Total | 623 | 48.11% | 27.29% |

Firstly, a Kruskal-Wallis test for one way analysis of variance was conducted followed by the

Mann-Whitney U test. Since the study was concerned with how the nominated variables were

associated, caution was taken with the choice of test measures. As the Mann-Whitney U tests

inflate the Type I error rate, care was taken in the choice of comparisons made.

By observing the results from tests of means for each comparison made, we decide the

number of comparisons to be made. Since a number of tests will be conducted, a Bonferroni

correction will be applied as advised by Miller (2004). For example, if three comparisons are

to be made, a Bonferroni correction will be applied. Due to this correction, rather than using

the critical level of significance of 0.05, all effects would be reported at the level of

significance of one third of 0.05 (0.0167). All reported p values are using 2-tailed Monte

Carlo p values with a confidence level of 99 percent and a number of samples of 10,000. This

method was used because of the large sample size. Lastly, to measure the strengths of a

relationship between variables, Cohen's (*r*) convention of small (0.1), medium (0.3) or large (0.5) effect sizes was used (Rosenthal 1991).

Results of the Kruskal-Wallis test showed that the percentage of adopted ITIL processes varied by country (*H* (3) =87.63, *p*<0.001). Three comparisons were conducted: DACH and UK, Australia and UK, and finally Australia and USA. On account of three comparisons being made the critical level of significance is 0.0167. We found significant differences in the percentage of adopted ITIL processes between UK and DACH responses and between the UK and Australia responses. There was no significant difference in the percentage of adopted ITIL processes between USA and Australia. The results of the Mann-Whitney U tests are summarised in Table 7.

**Table 7 Country Comparisons**

| Comparison | U | p | r |
|---|---|---|---|
| DACH compared with UK | 3508.0 | 0.000* | -0.32 |
| Australia compared with UK | 16010.5 | 0.000* | -0.23 |
| Australia compared with USA | 13578.0 | 0.418 | -0.04 |
| *significant at 0.0167 | | | |

Results from our tests show that organisations in German-speaking countries have adopted the most ITIL processes, followed by organisations in the UK. The USA and Australia have adopted similar percentages of processes. Therefore, H2a is supported.

A post-hoc test was then undertaken to understand if this difference was also observed when comparing operational processes with tactical and strategic processes. Table 8 shows the ITIL adoption per country split by operational versus tactical/strategic level.

**Table 8 ITIL Adoption per Country: Operational versus Tactical/Strategic**

| Country | N | Operational Level Adoption | | Tactical/Strategic Level Adoption | |
|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Mean | Std. Deviation |
| UK | 223 | 63.36% | 27.07% | 42.89% | 33.44% |
| USA | 146 | 53.95% | 27.06% | 24.99% | 28.06% |
| Australia | 196 | 57.21% | 27.81% | 25.09% | 26.81% |
| DACH | 58 | 76.87% | 24.44% | 73.74% | 26.80% |
| **Total** | **623** | **60.48%** | **27.76%** | **35.97%** | **33.01%** |

DACH countries led with an average of both operational and tactical/strategic level processes, in the mid-seventies. UK organisations followed with an average of 60 percent of operational level processes adopted and 40 percent of the tactical/strategic level processes adopted. Once more, USA and Australia showed no statistical difference for both their average of adopted operational level processes (both percentages in their mid-fifties) and in their average of adopted tactical/strategic level processes (both in their mid-twenties).

A Kruskal-Wallis test revealed adoption of operational level processes varied by country ($H$ (3) =34.12, $p<0.001$). Similarly, adoption of tactical/strategic level processes also varied by country ($H$ (3) =110.45, $p<0.001$). Mann-Whitney U tests were used to confirm the findings.

Differences between the DACH countries and UK can be clearly observed. However, Australia and USA have very similar adoption patterns for operational and tactical/strategic level processes. Therefore only these two tests are completed. It was determined that operational level processes were not different between USA and Australia (U=13367, r=-.06). Likewise, tactical/strategic level processes were not statistical different between USA and Australia (U=13944, r=-.02).

**Organisation Size**

When organisation size was cross-tabulated with ITIL adoption, higher adoption rates were reported from the smallest and largest organisations as shown in Table 9 .

**Table 9 ITIL Adoption by Organisation Size**

| Size | N | ITIL Adoption | |
|---|---|---|---|
| | | Mean | Std. Deviation |
| Less than 100 employees | 22 | 52.82% | 25.91% |
| 101-500 | 50 | 47.52% | 30.04% |
| 501-1,000 | 90 | 44.84% | 26.45% |
| 1,001-5,000 | 159 | 43.36% | 26.33% |
| 5,001-10,000 | 94 | 45.17% | 25.65% |
| >10,000 | 208 | 54.08% | 27.64% |
| **Total** | **623** | **48.09%** | **27.28%** |

This study uses the USA definition of the term SME with the cut off of 500 employees (Ayyagari, Beck and Demirguc-Kunt 2007). We then decided to break the remainder of the respondents into two groups: large organisations with 500-10,000 employees, and very large organisations with more than 10,000 employees.

Table 10 shows the three groups of organisations by size, the number of organisations in each group, their ITIL adoption mean and standard deviation.

**Table 10 ITIL Adoption by Organisation Size**

| Size | N | ITIL Adoption | |
|---|---|---|---|
| | | Mean | Std. Deviation |
| SME (<500 employees) | 72 | 49.14 | 28.76% |
| Large (500-10,000) | 343 | 44.24 | 26.11% |
| Very Large (>10,000) | 208 | 54.08 | 27.64% |
| Total | 623 | 48.09 | 27.28% |

The Kruskal-Wallis test reveals the size of the organisation significantly affected the adoption of ITIL processes (H (2) =16.574, $p<0.001$). Mann-Whitney U tests were conducted to

confirm the results. Comparisons were conducted on the SME organisations with the large

organisations, the SME organisations with very large organisations, and the large

organisations with the very large organisations. Again, we completed three comparisons and

applying the Bonferroni correction, all effects were reported at a 0.0167 level of significance.

The Mann-Whitney U test revealed no significant difference when comparing the ITIL

adoption between SME organisations and large, or very large organisations. However, as

shown in Table 11 significant difference is found when comparing the ITIL adoption of large

organisations and very large organisations.

**Table 11 Comparisons Based on Organisation Size**

| Comparison | U | p | r |
|---|---|---|---|
| SMEs compared with Large | 11209.00 | 0.217 | -0.06 |
| SMEs compared with Very Large | 6696.00 | 0.180 | -0.08 |
| Large compared with Very Large | 28287.50 | 0.000* | -0.17 |
| *significant at 0.0167 | | | |

Findings from our analysis confirm that SME and very large enterprises have similar levels of

ITIL adoption, however when comparing large organisations with very large organisations, a

significant difference is observed. Therefore, H2b is partially supported.

**Industry Sector**

Organisations that responded our survey came mostly from three industry sectors:

information media & telecommunications, public sector & education, and financial &

management services. Table 12 shows the industry sectors, number of responses per industry

sector, the mean and standard deviation of ITIL adoption.

**Table 12 ITIL Adoption by Industry Sector**

| Industry Sector | N | ITIL Adoption | |
|---|---|---|---|
| | | Mean | Std. Deviation |
| Financial & Management Services | 116 | 51.59% | 26.20% |
| Healthcare | 15 | 28.40% | 19.96% |
| Information Media & Telecommunications | 199 | 55.93% | 28.50% |
| Manufacturing & Construction | 27 | 54.96% | 26.27% |
| Public Sector & Education | 173 | 37.06% | 23.25% |
| Retail & Distribution | 22 | 40.64% | 19.64% |
| Utility | 20 | 53.70% | 31.04% |
| Other | 51 | 50.16% | 26.94% |
| **Total** | **623** | **48.09%** | **27.28%** |

Conducting the Kruskal-Wallis test showed, ITIL adoption was significantly affected by the industry sector of the organisation ($H$ (7) =43.23, $p<0.001$). Organisations in the information, media & telecommunications sector have on average a higher percentage of ITIL processes, while the organisations in the public sector & education have the lowest percentage of processes. Comparisons were completed for the following industry sectors: information, media & telecommunications with public sector & education, financial & management services compared with public sector & education, and lastly, financial & management services compared with information media & telecommunications.

When comparing the information, media & telecommunications sector with the public sector & education responses, significant difference can be observed as shown in Table 13.

**Table 13 Industry Sector Comparisons**

| Comparison | U | p | r |
|---|---|---|---|
| Information, media & telecommunications compared with public sector and education | 10563.5 | 0.000* | -0.33 |
| Financial & management Services compared with public sector & education | 6724.0 | 0.000* | -0.28 |
| Financial & management services compared with information media & telecommunications | 10575.0 | 0.214 | -0.07 |
| *significant at 0.0167 | | | |

The Mann-WhitneyU tests showed significant difference when comparing the financial & management services sector with public sector & education responses. On our third comparison, financial & management services sector with information media & telecommunications sector, significant difference could not be observed. Therefore, H2c is partially supported.

## *DISCUSSION*

We now interpret and discuss the statistical tests to achieve the objective of this paper. To examine the adoption of ITIL processes two research questions were raised: *(RQ1) Are more operational level ITIL processes adopted than tactical and strategic level ITIL processes? and (RQ2) do factors such as country, size and industry sector contribute to variation in adoption of ITIL processes?*

In order to answer the research questions four hypotheses were proposed relying on institutional theory.

### Selection of Operational over Tactical and Strategic Level Processes

Our first hypothesis compares the number of operational-level processes adopted with the number of tactical and strategic processes. It proposes that the adoption of operational-level processes is higher. Results from our study indicate that a significant difference exists between the adoption levels of operational processes compared to tactical and strategic processes. We offer three explanations why this difference in adoption exists.

As pointed out in our literature review, the adoption of operational-level processes are performed by a cohesive workgroup while tactical and strategic processes require the coordination and cooperation of various divisions of the organisation which may not be as

tightly inter-related. In an attempt to achieve "quick wins" IT managers may decide to focus on the processes which may be considered internal first and later concentrate on adopting processes which may require more coordination amongst different divisions and customers of the organisation. The achievement of "quick wins" may be seen as critical to the execution of the adoption process (Hochstein et al. 2005a) as it may ensure support for the efforts both internally (the IT staff) and externally (business managers). This approach may help gain stakeholder engagement across the whole organisation.

Another factor is that buy-in of the ITSM framework starts in the IT function. To avoid the adoption "chasm", Moore (1999) suggests that technology must be accompanied by supportive initiatives such as policies, training, reference materials, procedures, systems integration and tools. The IT function is better positioned to be trained, to adopt software and to understand the concepts of the framework. Since this group already has a common goal it is possible that processes closer to them are the first ones to be adopted.

A second reason for the different adoption levels may be that organisations use something other than ITIL for their tactical/strategic planning. There are various IT process improvement frameworks and research indicates that CobiT® and ITIL may be frameworks that are adopted simultaneously by the IT organisation. CobiT supports IT governance in managing and understanding the risks and benefits associated with information and related technology. Van Grembergen, De Haes and Amelinckx (2003) distinguish the ITIL and CobiT frameworks by arguing that " CobiT tells *what* is done and ITIL explains the details of *how* it is done". Previous research suggests IT organisations are using CobiT for governance and at the strategic level of ITSM (top down) at the same time as ITIL at the operational-level (bottom up) (Cater-Steel, Tan and Toleman 2006).

A third reason relates to the heritage of the IT organisation. As expressed by Peppard, Lambert and Edwards (2000) when explaining the meaning of IT they claim that "the 'T' of IT has become the focus of attention rather than the 'I'". Similarly, Mueller, Ahlemann and Riempp (2009) propose that IT strategic management should evolve "from the often reactive management of an organisation's technology provider to steering a service-oriented partner of the business". Due to the heritage of technology-oriented thinking we offer that in the initial stages of the adoption of the service management frameworks, the IT organisation perceives itself as being technology-oriented and later evolves to be a partner of the business. As the IT organisation understands its new role, Business-IT alignment would be impacted and the focus shifts from operational to tactical and strategic levels.

**Variation by Country, Size, Industry Sector**

The second set of hypotheses proposes that inter-organisational factors such as country, size and industry sector contribute to variation in adoption of ITSM. Hypothesis H2a explores the variation between the adoption of ITIL processes in UK, USA, DACH countries (Germany, Austria, and Switzerland), and Australia.

Results from this cross-national study show that ITIL adoption levels vary depending on country. DACH countries have a very high percentage of ITIL processes with the average organisation having adopted 75 percent of processes. Organisations in the UK had adopted on average 53 percent of the processes, while the average in USA and Australia was around 40 percent. DACH and UK respondents differed in terms of the percentage of adopted ITIL processes. Australia and the UK groups also differed. However no significant difference was observed when comparing Australian and USA responses. Overall, H2a is confirmed:

adoption of ITIL does vary depending on the country. DACH has a high adoption of ITIL processes, followed by UK and lastly USA and Australia with similar adoption percentages.

Since the results indicate that levels of adoption in UK and USA, DACH countries and Australia vary, findings of this study may support the argument by Bruton, Ahlstrom and Wan who argue that "institutions in general and culture in particular, shape the actions of a firm" (2003). In an attempt to explain the cross-country differences, we now introduce the concept of national culture.

The concept of *national culture* as defined by Hofstede (1980) refers to the collective mental programming shared by people which distinguishes the members of one nation from that of other nations. He proposes that national cultures are differentiated by a number of dimensions which include power distance, individualism, masculinity, uncertainty avoidance, and long-term orientation. He argues that differences in these dimensions would affect the transferability of theories between cultures. To date, there has been limited research into the role of national culture in ITSM, and doubts have been raised about whether national culture, as defined by Hofstede, ever actually existed (Myers and Tan 2002). Bagchi, Hart and Peterson (2004) considered the role of national culture in IT adoption. Their results show that even after controlling for national economic and social differences, national cultural dimensions significantly predict most IT product adoptions. They found certain cultural dimensions (individualism, power distance and cultural femininity) are related to the adoption of IT products.

If an assumption is made that people of nations do share this mental programming, then the uncertainty avoidance index, proposed by Hofstede should be explored. Cultures with high

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uncertainty avoidance try to minimise the possibility of unstructured situations by employing standardised process and rules, safety and security measures. In Hofstede's study DACH countries scored higher than UK, USA and Australia in this dimension (1980). This difference indicates that the DACH organisations need more rules and procedures and are less tolerant of ambiguous situations than organisations in Australia, UK or USA. We can suggest that DACH countries are more likely to see the benefit of standardised processes and hence they may be more likely to adopt them in the workplace.

Conversely, no significant difference is observed when comparing the adoption of ITIL processes in the USA and Australia. Moreover, and startlingly, no significance could be observed when comparing the adoption pattern of operational and tactical and strategic processes. We suggest this is because USA and Australia are similar in culture (Hofstede 1980). At the same time, this argument does not help clarify why organisations in the UK have a higher adoption than countries such as USA, and Australia, that according to Hofstede (1980) should have a similar culture. As ITIL originated in UK, historical reasons may account for the UK's higher adoption level.

Overall, findings lend support to the argument by Reher (1998),"no matter how nearly universal the factors of modernization may be, once they enter into contact with different historical, cultural, geographical, or social realities, the end result will necessarily be different in each context".

While the results of this study are inclined towards the argument that adoption in distinct countries differs due to a variety of factors, since the study did not control for size or industry

sector, caution must be exercised while making a conclusive statement. The relationship

between organisational size and adoption of ITIL are explored in the next section.

In this study the implication that ITIL is too complex for SMEs or that SMEs lack knowledge

or interest is not strongly supported. Various explanations for these results are considered.

One perspective is that SMEs can successfully adopt ITIL processes as they have a lower

resistance to change. Further, SMEs are considered to be people-oriented and employees are

naturally responsible for quality, have effective, open communication channels and have

fewer resources to manage (Ghobadian and Gallear 1996).

Therefore, in the process of adoption they may have an advantage over larger organisations

which are often more segregated and geographically dispersed.  This advantage may be

temporary if we take into consideration the influence of powerful interest groups such as

professional associations (e.g. itSMF), management consultants and dominant IT vendors.

The iron triangle, comprising the three-sided relation of major organisations, management

consultants and IT vendors was identified by Newell et al. (1998) as influencing BPR

adoption. Large organisations participate more in the management discourse whereas small

firms are averse to consultants and reluctant to seek external help (Cragg 2002). Professional

associations and vendors act as institutional carriers, transporting ideas over time and space.

Such carriers are not neutral vehicles but have important effects on the elements transmitted

(Scott 2003).  Findings from the research suggest that organisation size plays no role in the

way that ITIL is adopted. The influence of industry sector on adoption is discussed next.

There has been little research into how various industry sectors adopt ITSM frameworks. This paper proposes that the adoption of ITIL varies depending on the industry sector of the organisation (H2c). Findings show that there was no significant difference when comparing the adoption percentage of ITIL processes of the finance & management services with the information media & telecommunications sector. However, differences were found when comparing the information media & telecommunications, finance & management services and the public & education industry sector.

Professionals in the information media & telecommunications sector have drawn criticism for lacking interpersonal skills despite possessing high technical skills. The positive response from the information media & telecommunications sector may indicate that many IT professionals now recognise the importance of service orientation (e.g. processes and certification) as essential to provide customer value. In an effort to be customer focused, other industry sectors already had customer orientation e.g. public sector and education.

Differences between private and public organisations and their adoption of IT have been widely studied. Early works by Caudle, Gorr and Newcomer (1991) reveal differences exist between public and private sectors such as: complicated nature of public goods, short-run perspective of politicians and government red tape. Red tape may be defined as "rules, regulations, and procedures that remain in force and entail a compliance burden, but do not advance the legitimate purposes the rules were intended to serve" (Bozeman 2000). The impact of red tape administrative delays on public organisations and its effect on the adoption of IT was studied by Pandey and Bretschneider (1997). In their research they point to various empirical studies showing public organisations have more red-tape than private organisations. More recent research indicates that red tape is still present in today's public organisations and

that it is negatively related to public service motivation (Moynihan and Pandey 2007). Caudle et al. (1991) point out that a lag exists in public IS development as compared to the private sector.

We suggest that due to the complicated nature of public goods and the red tape of administration, public organisations are lagging in their adoption when compared to organisations in industry sectors such as information media & telecommunications and finance & management services.

Overall, we are able to propose environmental factors which may play a role in the way ITIL is adopted. As well, we show how ITIL is adopted, particularly in terms of operational and tactical and strategic processes. Findings are consistent with the arguments of institutional theory and show where isomorphism can be observed.

### *CONCLUSION*

Transformations to and within IT functions are happening on a global scale, in organisations of all sizes and across different industry sectors. Although these transformations are enabled by, and often dependent on IT, the management of IT has also been experiencing transformation. ITSM is changing how organisations experience IT services and how IT functions create and offer these services.

While ITIL was developed for government agencies in the UK, results from this research show that the framework has been adopted widely. At the same time, this research unveils characteristics of the organisation, such as size, industry sector and country, which play an

important role in determining the adoption of the ITIL processes. While ITIL is considered a "best practice", its adoption may not homogeneous across all IT organisations.

IT organisations adopt innovations in different ways possibly due to cultural, political, and/or economic factors. Institutional theory may provide an appropriate lens through which we can study the adoption of ITIL. Institutional theory proved to be helpful in explaining the outcome of the analysis in that according to Moore (1999) ITIL is a "reference" material or "tool" to bridge the innovation path for early adopters to laggards. This also provides lessons for other service innovations to follow.

The paper combined three datasets from UK and USA, DACH countries and Australia to assess the adoption of ITIL and variations based on country, size and industry sector. We found that IT organisations focus more on adopting operational level processes rather than tactical and strategic processes. ITIL V2 clearly separated the operational and tactical while ITIL V3 introduces a life-cycle approach which starts from strategy creation and includes continual service improvement. It is possible that due to the structure of V2, IT organisations are still following this approach, or that the life-cycle approach may not be as practical as originally thought by the ITIL authors. Developers of IT frameworks may have to consider that IT organisations, possibly due to the heritage of IT, may want to focus on the operational processes more than on tactical and strategic processes.

There is a variation in adoption based on country: DACH countries have a higher penetration of ITIL, and within the Anglo-Saxon world, the UK leads USA and Australia. This may be contributed, according to Hofstede's national culture theory, to the higher uncertainty

avoidance of German national culture. DACH responses indicating their usage of only ITIL V3 as well as their high levels of adoption confirmed these views.

Interestingly, we observe no significant difference between small, large, and very large organisations. Despite the general notion, SMEs are not deterred by complexity and possible costs of adopting ITIL. They seem to expect benefits on the same level as large organisations.

In terms of industry sector, there is a difference with higher penetration in the finance & management services and information media & telecommunications sectors when compared to public sector & education. This difference may be based on the complicated nature of public goods and the red tape of administration; therefore public organisations are lagging in their adoption. Another explanation could be related to explicit customer-orientation and profit centre considerations (e.g. cost containment and efficiency requirements) of private sector companies compared to public sector organisations.

The results help researchers to better understand the cultural influences when introducing innovative services into the IT function. Organisation size, country and industry sector influence the adoption on ITIL, and practitioners need to be aware of this, specifically consultants and managers of global international organisations.

Practitioners gain insights when introducing IT services abroad, e.g. an Australian organisation learns what to expect in German-Australian collaboration scenario and vice versa. The adoption figures may also help to benchmark a given IT organisation as how it ranks in terms of processes compared to a peer group. A better understanding of cost and benefits and the factors influencing adoption (such as culture) are important lessons. The role

of education and professional formal (and informal) networks may also be paths for future research.

Limitations of this study are that the research focused on a set of data that limits its results to the factors studied. Another limitation is that empirical studies using surveys are dependent on the quality of data provided by the respondents. Additionally, this research aimed only at surveying IT executives, and only their views are included in this study. The sample may not be representative as random sampling was not used. The research design does not allow for causal relationships to be drawn and we may only derive associations. The interrelationship between the inter-organisational factors was also not considered.

While this research found differences between the diverse countries, the differences may be explained by the clustering of countries: Anglo (UK, USA, Australia), Germanic (DACH) according to similarities along cultural dimensions (Ronen and Shenkar 1985). We have only studied two clusters and future studies may explore other clusters for example: Latin American, Far Eastern, Near Eastern, Latin European and Nordic cultures. Future studies will be completed to predict adoption patterns of ITIL processes, based on the organisation size, industry sector and country. Future studies could explore hybrid use of IT service process improvement frameworks within an organisation, e.g. ITIL for operational and CobiT for strategic purposes.

## NOTES

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*APPENDIX*

**Table A 1 Description of Core ITIL Components (OGC 2000; 2001) and (OGC 2009)**

| ITIL V2 Process | ITIL V3 Process | ITIL V3 Phase |
|---|---|---|
| **Service Support – Operational-level** | | |
| **ITIL V2 Process** | **ITIL V3 Process** | **ITIL V3 Phase** |
| Service Desk Function | Service Desk Function | Service Operation |
| Incident Management | Incident Management | Service Operation |
| | Event Management | Service Operation |
| | Request Fulfilment | Service Operation |
| | Access Management | Service Operation |
| Problem Management | Problem Management | Service Operation |
| Change Management | Change Management | Service Transition |
| Release Management | Release & Deployment Management | Service Transition |
| Configuration Management | Service Asset & Configuration Management | Service Transition |
| | Transition Planning and Support | Service Transition |
| | Service Validation and Testing | Service Transition |
| | Evaluation | Service Transition |
| | Knowledge Management | Service Transition |
| **Service Delivery – Tactical and Strategic Level** | | |
| **ITIL V2 Process** | **ITIL V3 Process** | **ITIL V3 Phase** |
| Service Level Management (SLM) | Service Level Management (SLM) | Service Design |
| Financial Management | Financial Management | Service Strategy |
| Capacity Management | Capacity Management | Service Design |
| IT Service Continuity Management (ITSCM) | IT Service Continuity Management (ITSCM) | Service Design |
| Availability Management | Availability Management | Service Design |
| | Service Portfolio Management | Service Strategy |
| | Demand Management | Service Strategy |
| | Service Catalogue Management | Service Design |
| | Information Security Management | Service Design |
| | Supplier Management | Service Design |
| | Seven-Step Improvement Process | Continual Service Improvement |
| | Service Reporting | Continual Service Improvement |

**What ITIL® V2 processes has your organisation implemented?**

○ Incident Management    ○ Change Management    ○ ProblemManagement    ○ Release Management

○ Service Desk Function    ○ Incident Management    ○ Availability Management

○ Capacity Management    ○ Service Level Management    ○ Configuration Management

○ IT Financial Management    ○ Other (please state) _____

**To which business sector does your organisation belong?**

○ Accomodation, cafes and restaurants    ○ Construction    ○ Finance and insurance    ○ Manufacturing

○ Property and business services (including IT firms)    ○ Transport and storage    ○ Agriculture, forestry and fishing    ○ Education

○ Government, administration and    ○ Mining    ○ Communication services    ○ Electricity, gas and water

○ Health and community services    ○ Personal and other services    ○ Retail trade    ○ Other (please state) _____

**Approximately how many staff in total does your organisation employ?**

○ Less than 200 full time staff or equivalent    ○ 200 to 999 full time staff    ○ 1000 to 1999 full time staff    ○ 2000 to 4999 full time staff

○ 5000 to 9999 full time staff    ○ More than 10000 full time staff

**Figure A 1 Extract from Australian Questionnaire**

**Table A 2 Mapping of Variables Combined from Surveys**

| UK/USA | DACH | Australia | Combined Dataset |
|---|---|---|---|
| **Organisation Size** | | | |
| <100 | Numeric input | | <100 |
| 101-500 | | <200 | 101-500 |
| 501-1,000 | | 200-999; 1,000-1,999 | 501-1,000 |
| 1,001-5,000 | | 2,000-4,999 | 1,001-5,000 |
| 5,001-10,000 | | 5,000-9,999 | 5,001-10,000 |
| >10,000 | | >10,000 | >10,000 |
| **Industry Sector** | | | |

| | | | |
|---|---|---|---|
| Financial Service, Bank, Insurance | Business Services eg. Financial, Management, Marketing | Finance & insurance | Finance & Management Services |
| | Professional e.g. Law, Medicine, Accountancy, Property | | Finance & Management Services |
| Healthcare | | Health & community services | Healthcare |
| Service Provider (incl. IT) | Technical Business Services – e.g. IT | Property & business services (incl. IT firms) | Information Media & Telecommunication |
| Software | | | Information Media & Telecommunication |
| Media | | | Information Media & Telecommunication |
| Telecommunication | | Communication services | Information Media & Telecommunication |
| | | Mining | Manufacturing & Construction |
| Building | | Construction | Manufacturing & Construction |
| Chemical & Pharmaceutical | Manufacturing | Manufacturing | Manufacturing & Construction |
| Automotive | | | Manufacturing & Construction |
| | | Education | Public Sector & Education |
| Public administration | Military or Emergency Services | Government administration/ defence | Public Sector & Education |
| | Public Sector | | Public Sector & Education |
| Industry & Trade | Retail | Retail trade | Retail & Distribution |
| Wholesale / Retail | | | Retail & Distribution |
| Logistics, Transportation & Traffic | Transport / Logistics | Transport & storage | Retail & Distribution |
| Energy & Utility | | Electricity, gas & water | Utility |
| Non-profit / NGO | | Personal & other services | Other |
| Other industry | Other - please specify | Other (please state) | Other |
| | | Accommodation, cafes & restaurants | Other |
| | | Agriculture, forestry & fishing | Other |

# 4. Paper 2: Impact of IT Service Management Frameworks on the IT Organization: An Empirical Study on Benefits, Challenges and Processes

Chapter Four presents Paper 2. This paper (Marrone and Kolbe, 2010) has been published by the *Business and Information Systems Engineering (BISE)* Journal in Issue 1, in 2011. BISE is the English version on the *WIRTSCHAFTSINFORMATIK* journal. Both journals appear identically in German and English in the sense of a cover-to-cover translation. For convenience, two volumes are published. Hence, a translated version of this paper will also appear in the *WIRTSCHAFTSINFORMATIK.* The German title for this paper is "Einfluss von IT-Service-Management-Frameworks auf die IT-Organisation: Eine empirische Studie zu Vorteilen, Herausforderungen und Prozessen". An earlier version of this paper was accepted at the European Conference of Information Systems 2010 (Appendix Four).

**Overview of Paper 2**

As discussed in the previous chapters, while some qualitative research has been completed, empirical research in this area is remarkably scarce. Hence, there is a necessity for sound quantitative research dealing with these topics. This study is the first attempt to investigate empirically the benefits IT organizations realized when implementing ITIL.

The objective of this paper is to gain an understanding on the benefits and challenges of the implementation of ITIL. This study compares the benefits and challenges of companies at various maturities of implementation. It also looks at the number of implemented processes at the various levels.

For this research, we selected a multi-method approach, with the first approach focusing on collating constructs and the second on operationalising and validating the model in a web-

based survey. We have defined the constructs through our literature review by collating and synthesizing the benefits and challenges of implementing an IT Service Management Framework, which were found in various case studies.

A survey of IT organizations using ITIL was conducted. A total of 490 usable answers were received. Comparisons between the various levels or maturity of ITIL implementation were carried out.

Results indicate that, as the maturity of implementation increases, the perception of challenges decreases. Findings also show that as the implementation maturity increases, so does the number of implemented processes. In addition, results demonstrate that as the maturity of implementation increases, the number of realized benefits increases.

A major contribution of this paper is that an understanding is acquired that ITIL will provide the organization adopting the frameworks with various benefits throughout the implementation. Insight into the perception of ITIL effectiveness is presented here as well as implications for practitioners and researchers.

# Impact of IT Service Management Frameworks on the IT Organization

## An Empirical Study on Benefits, Challenges, and Processes

The objective of this paper is to gain an understanding on the benefits provided by the implementation of ITIL. This study compares the challenges and benefits of companies at various levels of implementation. It also looks at the number of implemented processes at the various levels. Results indicate that as the maturity of implementation increases, the perception of challenges decreases. Findings also show that as the maturity of implementation increases, the number of realized benefits increases. Insight into the perception of effectiveness of ITIL is presented here, as well as implications for practitioners and researchers.

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## 1 Introduction

In 1980, when listing the critical success factors of Information Systems (IS), Rockart (1982) argues that "the first, and most obvious, IS critical success factor is service". The Information Technology (IT) departments in many organizations were previously focused on the production of software applications, and in the late 1980s it started to change to a service mode of operation. For IT Service Management (ITSM), the main focus is not on the development of IT applications, but rather on the management of IT services.

Several studies have focused on the adoption of ITSM frameworks as well as on specific service oriented IT frameworks. Winniford et al. (2009) claim that around 45% of US companies are using an ITSM framework while 15% are planning its usage. The IT Governance Institute (2008) estimates that the IT operational framework with the highest adoption rate is IT Infrastructure Library (ITIL) with 24%, followed by Control Objectives for Information and related Technology (CobiT) with an adoption rate of 14%.

Additional to the rising adoption rates of ITSM frameworks, a factor to look at is the costs entailed by IT Services. IT Services account for an estimated 70% to 80% of the expenditure of an IT organization (Orlov 2005). Practitioners have an interest in understanding the possible benefits realized by companies which adopt an ITSM framework.

This empirical study focuses on ITIL as the most popular ITSM framework. In this research, importance is given to the understanding of how these benefits evolve as companies increase the adherence to the guidelines to the ITIL model. Also of interest is the perception of challenges of implementing ITIL, and as expressed previously, how the perceptions of challenges develop as companies increase their adherence to the model. The last point is to understand how the implementation of ITIL processes affects the maturity of the implementation of ITIL.

So far there have been no academic studies on this matter, and the research methodology of a large scale international survey has not been employed. Therefore, this research, using empirical data gathered from a survey with leading companies from various industries, sets out to understand the following:

- Which effect does the total number of implemented processes have on the maturity of the ITIL implementation?
- How are challenges perceived at different levels of maturity of the ITIL implementation?
- How does the total number of realized benefits develop as the maturity of the ITIL implementation increases?

This article begins with a literature review on IT Service Management, on processes of ITIL, as well as benefits and challenges of implementation. This is followed by a description of the methodology used for this research. The data gathered in our survey is analyzed using the

Kruskal-Wallis and Mann-Whitney tests to complete comparisons within the different implementation levels. Results of the survey are then analyzed and outcomes are discussed. Before the limitations and the future research sections, conclusions are drawn.

## 2 Literature Review

ITSM is a part of the Service Sciences that concentrates on IT Operations (Galup et al. 2009). It can be defined as "a set of processes that cooperate to ensure the quality of live IT services, according to the levels of service agreed to by the customer" (Young 2004). Conger et al. (2008) add that ITSM "focuses on defining, managing, and delivering IT services to support business goals and customer needs, usually in IT Operations".

Service oriented IT Management can be seen as a philosophy for an orientation towards market, service, lifecycle and processes (Zarnekow et al. 2005). First, there is a market orientation which implies that there is a customer-supplier relation instead of a relationship as project partners. Second, there is a service orientation which means service providers have service portfolios instead of project portfolios. These service portfolios include all of the IT services offered by the provider. Third, the focus is on the service lifecycle hence, ITSM provides a methodical approach to the management of IT services – from design, implementation, operation to continual improvement. It does not only focus on the technical aspects of IT but also allows the alignment of services and functions provided by IT within the organization. The main focus of the management of IT services is on the costs of the whole lifecycle, not merely on the costs of development. Fourth is the process orientation, so that the IT organization is oriented on processes and not on functional structures.

There are various concepts of ITSM frameworks. The most common approach is the ITIL which is a de facto standard for IT Service Providers (Hochstein et al. 2005; IT Governance Institute 2008). A variety of ITSM frameworks have been developed using ITIL as a reference, such as Hewlett-Packard (HP ITSM Reference model), IBM (IT Process Model) and Microsoft's MOF (van Bon et al. 2007).

The current version of ITIL, Version 3, was published in May 2007. It consists of 26 sections which are included in the following five lifecycle phases: Service Strategy, Service Design, Service Transition, Service Operation and Continual Service Improvement. The earlier version, Version 2, has a total of ten processes in two main domains: Service Support and Service Delivery. There are other operational guidance domains, but for this paper, we focus on these two key domains.

Academic research on ITSM is still in its early stages despite its numerous appearances in the popular press and practitioners' magazines. Existing academic literature merely presents the description of the areas documented on ITIL (Cervone 2008; Hendriks and Carr 2002) or analyses adopters of ITIL through case studies (Hochstein et al. 2005; Cater-Steel et al. 2006b; Marrone et al. 2010). A few researchers have covered the topic of ITIL benefits, challenges of implementation and the effectiveness of ITIL. Relevant academic research is shown in **Table 1**.

A summary of the benefits of ITSM frameworks found in literature sources is displayed in **Table 2**. In **Table 3**, a summary of the challenges faced when implementing ITSM frameworks is shown.

To comprehend at which level of adherence or maturity companies are in when adopting ITSM frameworks, numerous researchers including Cater-Steel et al. (2007) and Marrone et al. (2010) have used the maturity model. The maturity model levels presented in these studies are based on the model from CobiT and Capability Maturity Model Integration (CMMI). These levels are intended as profiles of IT processes, and companies would identify these levels as a description of their current state.

Until now, there has been no research which has involved the benefits, challenges and implementation of processes as well as their relation to the maturity of the ITIL implementation. Apart from that, the methodology of a large-scale survey for various countries has not been utilized.

## 3 Research Design

This section describes the levels of adoption, known as maturity model, as well as the propositions explored in this study. For the three questions listed in the introduction, a total of five propositions are described. These are shown below.

### 3.1 Maturity Model Levels

The maturity model is divided in levels which range from *non-existent* (0) to *optimized* (5). They were originally used by the CMM framework and later by CobiT. This study utilizes the same levels of maturity as those proposed in these frameworks. At the lowest level of the maturity model, the management processes are not applied at all. This level is known as *non-existent* (0) implementation. At the following level, named *initial*, processes are ad hoc and disorganized. Level 2 is referred to as *repeatable*, where the processes are intuitive, and provide, in most cases, deterministic and repeatable results. Level 3 is where processes are documented and provide standard procedures and clearly defined results/outputs. This level is known as *defined*. Level 4, known as *managed*, is based on critical success factors, where key performance indicators (KPIs) have been defined and are continually measured to quantify process performance. The highest level of maturity is known as *optimized*; this is where a continual improvement cycle has been implemented and is based on KPIs and internal audits. At this level the process is improved in effectiveness, efficiency and compliance. Companies would identify these levels as a description of their current state.

### 3.2 Implemented Processes and Maturity Level

The relation between the number of implemented processes and the levels of maturity is of interest for this research. To understand the effect of the total number of implemented processes on the maturity level of implementation, two possible propositions were initially suggested. Only one of the two propositions was then selected by the researchers. One possible proposition is that companies would select and implement processes which would, in their opinion, provide their companies with the biggest benefits, or processes that would help them deal with areas in which they are performing deficiently. Gammelgård et al. (2007) suggest that companies tend to adopt the processes that they require the most. Tuttle and Vandervelde (2007) argue that during the implementation of Business Process Management frameworks, not all processes are taken into consideration. Therefore, companies that have implemented only some of the processes would

**Table 1** Relevant research on ITSM and ITIL

| Author and year | Approach | Issues addressed in study |
| --- | --- | --- |
| Hochstein et al. (2005) | Qualitative | Lists four benefits: improvement in quality of IT services, efficiency and optimization of processes and transparency, and comparability through process documentation and process monitoring. Lists six success factors when implementing ITSM frameworks: Demonstrating "quick wins", Strive for continuous improvement, Market campaigns in order to create acceptance and understanding, Management support, training, and formation of virtual teams so that "new" processes would be developed simultaneously with the operational activities. |
| Potgieter et al. (2005) | Qualitative | Researches the effect of the implementation of ITIL on customer satisfaction and service quality. The researchers conclude that, at the research site, a large service unit of ICT in South Africa, there was a direct correlation between customer satisfaction, service quality and the use of ITIL. |
| Brenner (2006) | Conceptual | Proposes ways of how the ITIL process can be implemented efficiently with process-oriented tools such as workflow management systems. |
| Cater-Steel et al. (2006a) | Conceptual and quantitative | Describes processes such as ITIL, CobiT, CMMI, and ISO 9001, describing possible motivations and challenges for their adoption. |
| Cater-Steel et al. (2006b) | Qualitative | Describes the challenges of adopting ITIL as the following four factors: lack of management support, cultural change in terms of resistance, delays in choosing an appropriate tool, and management problems for resources such as time, people and money. |
| Spremic et al. (2008) | Qualitative | Monitors an IT Service provider in Croatia and applied various Key Performance Indicator (KPI) metrics before and after the implementation of a number of ITIL processes. The study concluded that the IT service provider underwent improvements which were attributable to the implementation of ITIL. |
| Cervone (2008) | Conceptual | Provides an overview of ITIL and suggests the following three benefits: cost reduction, improving customer satisfaction and improving the productivity of the IT department. |
| Marrone et al. (2010) | Qualitative | Identifies six factors considered benefits of an ITIL adoption: improvement in customer satisfaction, improvement in internal processes, standardization of processes, improvement in service quality, increase in efficiency, and improvement in return on investment. |
| Tan et al. (2009) | Qualitative | Sheds light on the challenges of implementation. Focuses on CSF and concludes that Senior Management, an appropriate Change Management strategy, a close relation with multiple vendors and effective project governance are key factors for implementation. |
| Pollard and Cater-Steel (2009a, 2009b) | Qualitative | Identifies the following CSF: Executive management support, Interdepartmental communication and collaboration, use of consultants, training and careful software selection, creating an ITIL-friendly culture, process as a priority, and customer-focused metrics. |
| Galup et al. (2009) | Conceptual | Presents an overview on ITSM, their global impact and the current initiatives. |
| Iden and Langeland (2010) | Qualitative | Studied the most important factors for a successful adoption of ITIL. The most important factors are management support, competence and training, information and communication, stakeholder involvement and ability to change organizational culture. |

then report the maturity level of their ITIL implementation based on the maturity of those processes which they have implemented, rather than on the whole ITIL framework.

Conversely, another possible proposition is that the maturity of the implementation of ITIL is based on the full lifecycle model. Therefore, rather than concentrating on the maturity of their implemented processes, the perception of maturity level would be based on the completed ITIL model. Hence, the more processes of ITIL companies implement, the higher the companies' maturity of the ITIL implementation. In this research, we support the latter. Since the number of processes varies depending on the version, each version is analyzed separately. The proposition is:

P1: *There is a positive relationship between implemented processes and perceived maturity of the ITIL implementation.*

### 3.3 Perceived Challenges and Maturity Level

This research aims to understand which effect, if any, maturity levels have on the perceived challenges of implementation. The proposition of the effect of the perceived challenges on the level of maturity is based on the model of the learning curve effect. The learning curve, also known as the experience curve, is a phe-

**Table 2** Summary of benefits of the implementation of ITSM frameworks

| Improvement of... | Hochstein et al. (2005) | Potgieter et al. (2005) | Marrone et al. (2010) | Cater-Steel et al. (2007, 2008) | Cervone (2008) |
|---|---|---|---|---|---|
| Service quality | × | × | × | × | × |
| Standardization of services | × | | × | × | |
| Customer satisfaction | | × | × | × | |
| Return on investment | | | × | × | × |
| Business-IT alignment | | | | × | |
| Reduction of IT downtime | | | | × | × |
| Operations through implementation of a best practice | × | | | | |
| Financial contribution control | | | | × | |
| Call fix rate | | | | × | |
| Morale of IT staff | | | | × | |

**Table 3** Challenges of implementing ITSM frameworks

| | Hochstein et al. (2005) | Tan et al. (2007) | Cater-Steel et al. (2007, 2008) | Iden and Langeland (2010) | Pollard and Cater-Steel (2009a, 2009b) |
|---|---|---|---|---|---|
| Lack of executive sponsorship | × | × | × | × | × |
| Business understanding ITIL objectives | | | × | × | |
| Lack of resources (time or people) | | | | | × |
| Lack of internal skills/knowledge relating to ITIL | × | × | × | × | × |
| Lack of funding/Cost of adoption | × | | × | | |
| Organizational/Cultural resistance to change | × | | | × | × |
| Maintaining momentum/Progress stagnates | | (Plan objectives) | × | | × |

nomenon which was initially observed by Wright (1936). He observed that as the quantity of units manufactured doubles, the number of hours of direct labor required to produce an individual unit decreases at a uniform rate. Wright also argued that learning can occur for the production of any good or service. Applying this model to our proposition we can assume that the organization gains experience dealing with the challenges and becomes more efficient as it progresses in its learning, allowing for the perception of the challenges to decrease over time. Therefore, our proposition is formulated as follows:

P2: *There is a negative relationship between maturity levels of the ITIL implementation and perceived challenges of implementation.*

## 3.4 Number of Realized Benefits and Maturity Levels

This question focuses on understanding the total number of realized benefits due to the implementation of ITIL for each company. Rather than concentrating on the individual benefits which were surveyed, the focus of this research is to understand the progression of the total number of realized benefits for the companies. Consequently, for each company, benefits which they realize are added up. The same approach is used for the number of benefits supported by metrics and the number of benefits acknowledged by the business.

We believe that the benefits provided by ITIL will be noticed by IT initially, and that metrics to back up the benefits will not be available at earlier stages. At later levels these benefits will be supported by

metrics and may also be acknowledged by the business.

For this proposition, the Law of Diminishing Returns is taken into consideration. It suggests that the continued improvement efforts towards a particular project or goal would lead to a decline in effectiveness after a particular level of result has been accomplished (Drucker et al. 1998). In other words, after a certain level of standardization, increasing the standardization further provides few additional benefits. Consequently, the following proposition is suggested:

P3a: *There is a positive relationship between maturity levels of the ITIL implementation and perceived realized benefits.*

We also expect that the number of realized benefits which are supported by metrics will become visible on the later levels of maturity, rather than on the initial lev-

els of maturity. We understand that as at later levels of maturity companies are expected to use metrics in a regular manner. Particularly, the interest of this proposition is not to see if companies are using metrics per se, but rather if the metrics used were able to support the perception of the benefits that were attained. In other words, we are interested in understanding if IT executives were able to quantify the benefits of implementing ITIL with their use of metrics. Similarly, the business may recognize the benefits of the ITIL implementation on the later levels of adoption, possibly due to a better Business-IT alignment, which is a proposed benefit of ITIL. Therefore, the following propositions are suggested:

P3b: *There is a positive relationship between maturity levels of the ITIL implementation and usage of metrics to measure the realized benefits.*

P3c: *There is a positive relationship between maturity levels of the ITIL implementation and acknowledgement by the business of the realized benefits.*

## 4 Methodology

The online questionnaire was made available in the months of April and May 2009. An invitational email was sent to individuals who were on the mailing lists of Hornbill and the IT Service Management Forum (itSMF) in the United States of America and United Kingdom. Additionally, in an attempt to expand the findings of this research, the survey was announced in various internet groups and forums whose sole topic was ITIL. The target participants would be ITIL champions for their organization and would be broadly involved in the implementation of ITIL.

The structure of the questionnaire addressed many aspects of ITIL, its adoption, usage, implementation and maturity as well as effectiveness of processes and realized benefits. It also covered the topics of Business-IT alignment and service desk usage. The survey contained questions to which responses used Likert scales, nominal scales and open-ended questions.

First, those surveyed were asked to rate the perception of the maturity of their ITIL processes on a scale based on the CobiT and CMMI maturity.

Respondents were also requested to specify which version of ITIL they had

implemented. Based on this, they were asked to select which processes they had implemented considering their ITIL version. All processes were listed in the survey.

Additionally, respondents were inquired about their perception of challenges of implementing ITIL. They were asked to rate challenges on a scale from 1 to 5, where 1 meant *no challenge* and 5 meant *major challenge*. The challenges that are studied, based on those gathered in our literature review and summarized in **Table 3**, are Lack of executive sponsorship, Business understanding of ITIL objectives, Lack of resources (time or people), Lack of internal knowledge/skills relating to ITIL, Lack of funding/costs of adoption, Organizational/cultural resistance to change, and Maintaining momentum/progress stagnates.

Finally, those surveyed had to select realized benefits that could be achieved due to the adoption of ITIL. The benefits listed on the survey are Improvements: of service quality, of customer satisfaction, due to having standardized processes, of interaction of IT with the rest of the business, of reduction in IT downtime, of return on IT spending (ROI), by applying best practice experience of others, in measuring the financial contribution of IT to the business, of call fix rate and of the morale of the IT staff. These benefits are those shown in **Table 2**. If respondents had realized one of these benefits, they were able to select whether these benefits were supported by metrics and whether the business had acknowledged the improvements.

## 5 Results

### 5.1 Respondents' profile

More than 5,000 invitations were sent out to members of the itSMF UK and US and to the mailing list of Hornbill. Out of the 784 IT executives, who started the survey, 503 completed and submitted the survey. Twelve responses were identified as not valid and were excluded from the statistical analysis. Partially completed surveys were not used for the study. Four fifth of those who completed the survey were directly invited to participate in the survey, the others were recruited through the forum posting. The return rate of the survey invitations was of eight percent.

Respondents were asked about their companies' industry, number of sites

supported by IT, number of employees in the company as well as their title and their location. **Table 4** shows the profile of the respondents. In the sample, around three fourths of those surveyed were from the technology, public, financial and banking sectors. Other industries include the professional, retail and manufacturing industries.

Nearly 70% of the respondents had ten or more sites supported by central IT, and close to 20% had two to five sites. Almost 45% of those interviewed worked in a company which had more than 10,000 employees. The job roles of those interviewed is also shown. Of those surveyed 33% were IT managers, while 23% were Process Specific Managers. Due to the usage of mailing lists and posting of invitations to the survey on English speaking websites, the majority of answers came from the United Kingdom (52%) and United States (36%) with various answers coming from Canada, India and Ireland.

**Figure 1** reveals the implementation maturity of ITSM frameworks for all participants. As can be observed, more than half of those surveyed place their implementations to be either on Level 2 (Repeatable), with 32%, or Level 3 (Defined), with 25%, while a minority placed themselves at the extremes, Level 1 (Initial) with 13% and Level 5 (Optimized) with 11%.

### 5.2 Empirical Results

An exploratory analysis was conducted for each variable to test for normality. Both, the Kolmogorov-Smirnov and the Shapiro-Wilk tests showed significance for versions of ITIL ($p < 0.001$), all the variables describing challenges of ITIL's adoption ($p < 0.001$) and the realized benefits of ITIL ($p < 0.001$). As the data was non-normal, the Kruskal-Wallis, a non-parametric one way analysis of variance, was used to study the data. If the data using the Kruskal-Wallis showed significant differences between the groups, the Mann-Whitney $U$ test was applied.

Since the study was concerned with how the nominated variables were impacted as the ITIL implementation increases, caution was taken with the choice of test measures. The Mann-Whitney $U$ tests inflate the Type I error rate, so care was taken in the choice of comparisons made.

The suggested comparisons are between the first and middle levels of ITIL implementation maturity, the first and

**Table 4** Profile of responding organizations ($n = 491$)

| Industry | % | Countries | % | Number of sites | % |
|---|---|---|---|---|---|
| Technology | 31 | United Kingdom | 52 | 10+ | 69 |
| Public | 23 | United States of America | 36 | 2–5 | 18 |
| Financial and Banking | 18 | Canada | 1 | 6–10 | 7 |
| Professional | 5 | India | 1 | 1 | 6 |
| Manufacturing | 5 | Ireland | 1 | | |
| Retail and Distribution | 5 | Other | 9 | | |
| Other | 4 | | | | |
| Utility | 3 | Number of employees | % | Job role | % |
| Entertainment and hospitality | 2 | | | | |
| Healthcare | 2 | 10000+ | 40 | IT manager | 32 |
| Telecommunication | 2 | 1001–5000 | 21 | Process specific manager | 22 |
| | | 5001–10000 | 16 | Service delivery manager | 17 |
| | | 501–1000 | 9 | IT director – Organization level | 14 |
| | | 101–500 | 8 | Help/Service desk manager | 11 |
| | | <100 | 6 | Help/Service desk operative | 4 |
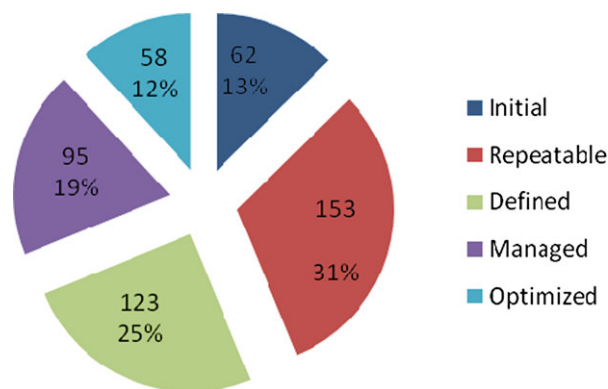


**Fig. 1** Maturity of ITIL implementation of respondents ($n = 491$)

last levels of ITIL implementation maturity, and between the middle and final levels of ITIL implementation maturity. Therefore, the following three tests were conducted:

- Test 1: Level 1 (Initial) compared to Level 3 (Defined)
- Test 2: Level 1 (Initial) compared to Level 5 (Optimized)
- Test 3: Level 3 (Defined) compared to Level 5 (Optimized)

Since three tests were conducted, a Bonferroni correction was applied. Due to this correction, rather than using the critical level of significance of 0.05, all effects were reported at 0.0167 level of significance. All reported $p$ values are using 2-tailed Monte Carlo $p$ values with a confidence level of 99% and a number of samples of 10,000. This method was used because of the large sample size.

Additionally, to understand the trends in the data the Jonckheere-Terpstra test was used. Lastly, $r$ was used to measure the strengths of a relationship between variables (Rosenthal, 1991 p. 19). Cohen suggests that the sizes of the effect are small (0.1), medium (0.3) or large (0.5). In the next sections, the following abbreviations are used: $H$ corresponds to the Kruskal-Wallis statistic, $U$ represents the Mann-Whitney $U$ statistic, while $J$ symbolizes the observed $J$–$T$ statistic.

### 5.2.1 Implemented Processes and Maturity Level (P1)

The number of implemented processes for both versions of ITIL, version 2 ($n = 248$) and version 3 ($n = 193$), are studied to understand the effect on the maturity level of implementation. **Figure 2** presents the mean and median of

the number of implemented processes of ITIL version 2 or ITIL version 3 for each of the maturity levels.

In general, the numbers of implemented processes significantly affect the maturity level of the implementation (Version 2 $H(4) = 99.03$, $p < 0.001$, Version 3 $H(4) = 82.108$, $p < 0.001$). Mann-Whitney $U$ tests were used to follow up on the findings. **Table 5** shows that the number of implemented processes is significant when comparing the Initial level (1) with the Defined level (3). The same occurs when comparing the Initial level (1) with the Optimized level (5). When comparing the Defined level (3) with the Optimized level (5) significance was also observed. Using Cohen's benchmark, we observe that there is a medium to large change on the number of implemented processes as maturity increases.

With the help of Jonckheere's test, a significant trend in the data can be observed. As the level of maturity goes up, the median of number of implemented processes increases. (Version 2: $J = 18001$, $z = 10.49$, $r = .67$, Version 3: $J = 11398$, $z = 9.63$, $r = .69$)

In conclusion, regardless of the version of ITIL implemented, as the level of maturity goes up, the number of implemented processes also ascends.

### 5.2.2 Perceived Challenges and Maturity Level (P2)

Respondents were asked to rate challenges on a scale from 1 to 5, where 1
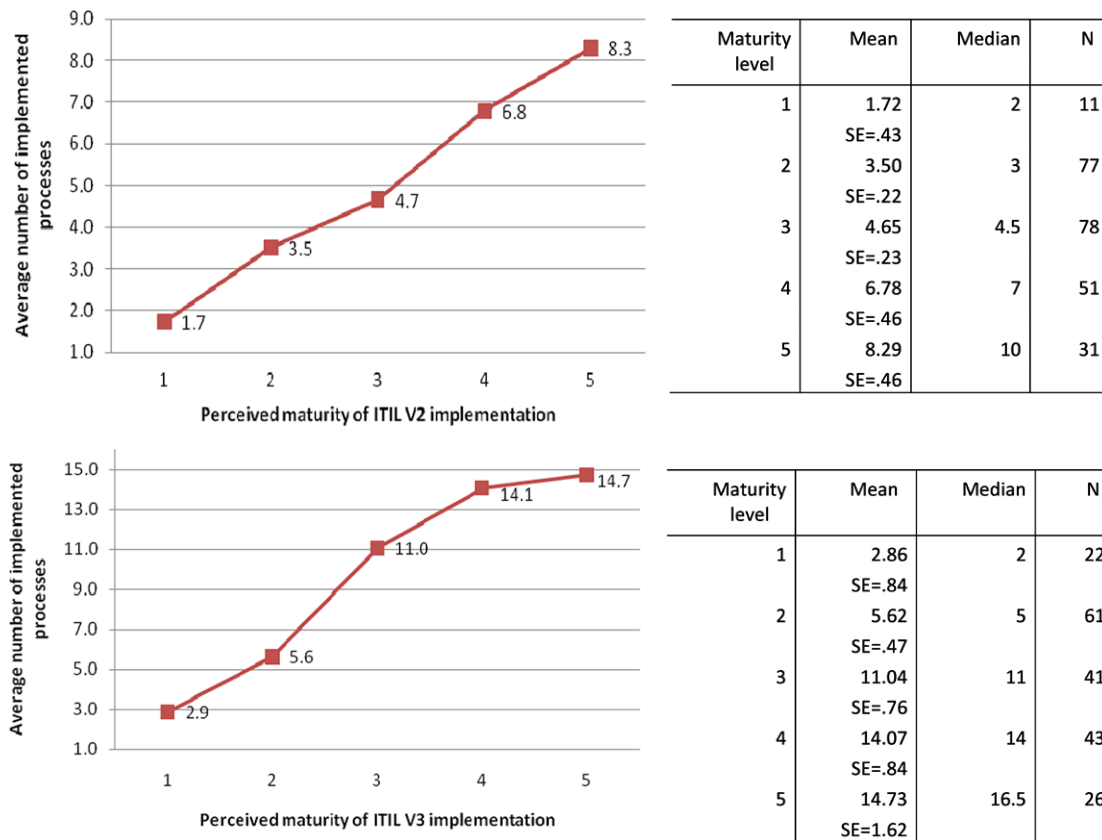
| Maturity level | Mean | Median | N |
|---|---|---|---|
| 1 | 1.72 SE=.43 | 2 | 11 |
| 2 | 3.50 SE=.22 | 3 | 77 |
| 3 | 4.65 SE=.23 | 4.5 | 78 |
| 4 | 6.78 SE=.46 | 7 | 51 |
| 5 | 8.29 SE=.46 | 10 | 31 |

| Maturity level | Mean | Median | N |
|---|---|---|---|
| 1 | 2.86 SE=.84 | 2 | 22 |
| 2 | 5.62 SE=.47 | 5 | 61 |
| 3 | 11.04 SE=.76 | 11 | 41 |
| 4 | 14.07 SE=.84 | 14 | 43 |
| 5 | 14.73 SE=1.62 | 16.5 | 26 |

**Fig. 2** Descriptive statistics of processes implemented for version 2 and version 3

**Table 5** Mann-Whitney test results for ITIL versions and maturity

| | Level 1 compared with Level 3 | | | Level 1 compared with Level 5 | | | Level 3 compared with Level 5 | | |
|---|---|---|---|---|---|---|---|---|---|
| | $U$ | $p$ | $r$ | $U$ | $p$ | $r$ | $U$ | $p$ | $r$ |
| ITIL Version 2 | 98.5 | 0.000[a] | −0.44 | 12.0 | 0.000[a] | −0.73 | 323.5 | 0.000[a] | −0.58 |
| ITIL Version 3 | 75.5 | 0.000[a] | −0.68 | 83.0 | 0.000[a] | −0.61 | 345.0 | 0.013[a] | −0.30 |

[a]Significance at 0.0167

meant *no challenge* and 5 meant *major challenge*. **Figure 3** demonstrates the perceived ranking of the challenges. Of the challenges queried, the challenge that was perceived by those surveyed to be the least of challenges was Lack of Knowledge and Skills, very closely followed by Executive Sponsorship. A challenge which was highly rated by the respondents was the Lack of Resource. This challenge obtained the lowest 1 and 2 selections.

**Tables 6** and **7** show the means and medians for each challenge and maturity level, while **Figs. 4** and **5** show a graph on the mean rating of the challenge perception for each of the challenges studied for companies on various perceived maturity levels. A downward trend can be observed. As the perceived maturity
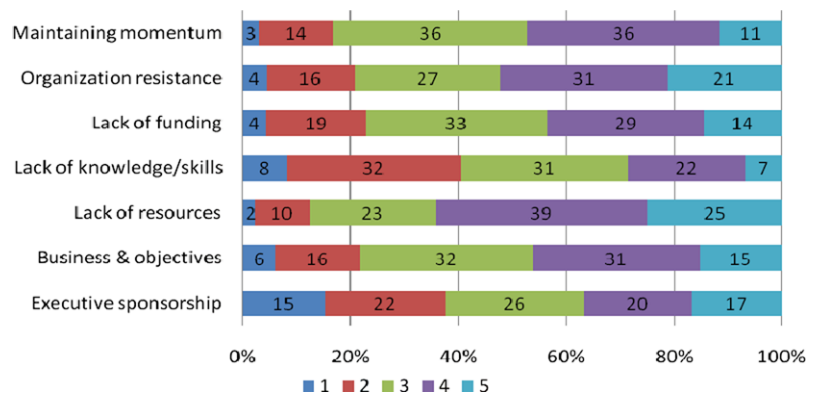


**Fig. 3** Descriptive statistics on challenge rating (1 = No Challenge, 5 = Major Challenge)

level increases, the perception of challenge of implementation decreases.

In general, challenges of adopting ITIL are significantly affected by the

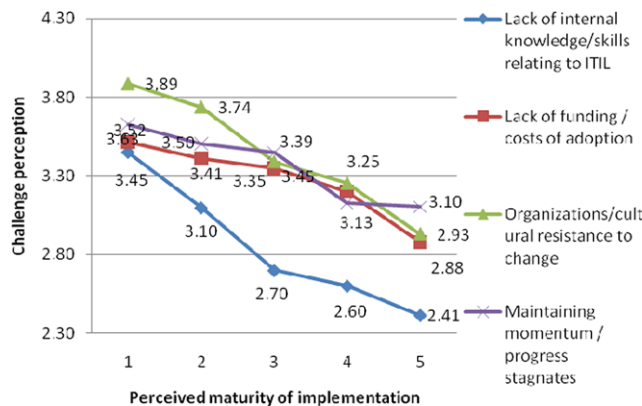**Table 6** Descriptive statistics on each maturity level for each challenge (Part I)

| Maturity Level | N | Lack of executive sponsorship | | | Business understanding of ITIL objectives | | | Lack of resources (time or people) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | M | SE | Mdn | M | SE | Mdn | M | SE | Mdn |
| 1 | 62 | 3.26 | .15 | 3 | 3.79 | .13 | 4 | 4.15 | .12 | 4 |
| 2 | 153 | 3.38 | .11 | 3 | 3.57 | .09 | 4 | 3.89 | .08 | 4 |
| 3 | 123 | 3.01 | .11 | 3 | 3.33 | .09 | 3 | 3.74 | .07 | 4 |
| 4 | 95 | 2.63 | .12 | 2 | 2.99 | .10 | 3 | 3.57 | .11 | 4 |
| 5 | 58 | 2.34 | .19 | 2 | 2.79 | .17 | 3 | 3.22 | .13 | 3 |

**Table 7** Descriptive statistics on each maturity level for each challenge (Part II)

| Maturity Level | N | Lack of internal knowledge/skills relating to ITIL | | | Lack of funding/costs of adoption | | | Organizations/cultural resistance to change | | | Maintaining momentum/progress stagnates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | M | SE | Mdn | M | SE | Mdn | M | SE | Mdn | M | SE | Mdn |
| 1 | 62 | 3.45 | .15 | 4 | 3.52 | .13 | 3 | 3.89 | .12 | 4 | 3.63 | .11 | 4 |
| 2 | 153 | 3.10 | .08 | 4 | 3.41 | .08 | 4 | 3.74 | .09 | 4 | 3.50 | .07 | 4 |
| 3 | 123 | 2.70 | .08 | 3 | 3.35 | .09 | 3 | 3.39 | .10 | 3 | 3.45 | .09 | 4 |
| 4 | 95 | 2.60 | .09 | 3 | 3.20 | .11 | 3 | 3.25 | .11 | 3 | 3.13 | .10 | 3 |
| 5 | 58 | 2.41 | .14 | 2 | 2.88 | .14 | 3 | 2.93 | .16 | 3 | 3.10 | .12 | 3 |
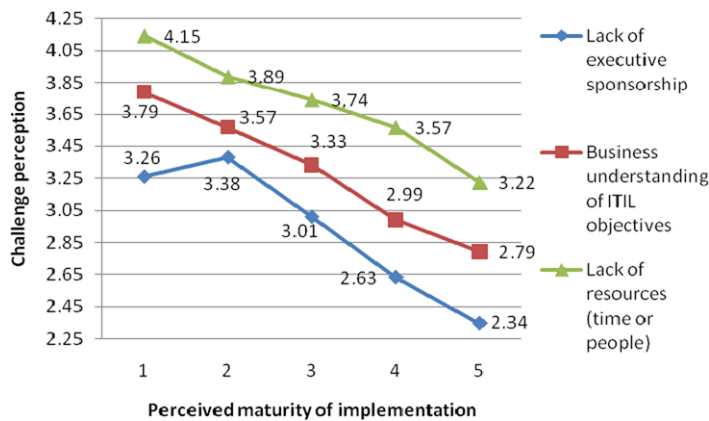


**Fig. 4** Descriptive statistics on each maturity level for each challenge (Part I)



**Fig. 5** Descriptive statistics on each maturity level for each challenge (Part II)

implementation maturity of ITIL: Lack of executive sponsorship ($H(4) = 37.75$, $p < 0.001$), Business understanding of ITIL objectives ($H(4) = 42.19$, $p < 0.001$), Lack of resource, time or people ($H(4) = 32.39$, $p < 0.001$), Lack of internal knowledge and skills relating to ITIL ($H(4) = 42.86$, $p < 0.001$), Lack of funding/cost of adoption ($H(4) = 14.21$, $p < 0.01$), Organization/culture resistance to change ($H(4) = 33.41$, $p < 0.001$), Maintaining momentum/progress stagnates ($H(4) = 18.88$, $p < 0.005$). Mann-Whitney tests were also used to follow up on this finding.

Table 8 shows the results from the selective comparisons. It can be observed that between levels Initial (1) and Defined (3) there was significance for Business understanding of ITIL objectives, Lack of resource, time or people, Lack of internal knowledge and skills relating to ITIL, and Organization/culture resistance to change. Based on Cohen's benchmark, a small to medium change can be seen on the lowering of the perception of challenges as maturity increases. However, no significance could be shown for Lack of executive sponsorship, Lack of funding/cost of adoption and Maintaining momentum/progress stagnates.

When comparing the Initial (1) with Optimized (5) significance can be observed for all variables with a medium effect size.

**Table 8** Mann-Whitney test results for perception of challenges and maturity levels

| Challenges | Level 1 compared with Level 3 | | | Level 1 compared with Level 5 | | | Level 3 compared with Level 5 | | |
|---|---|---|---|---|---|---|---|---|---|
| | $U$ | $p$ | $r$ | $U$ | $p$ | $r$ | $U$ | $p$ | $r$ |
| Lack of executive sponsorship | 3375.0 | 0.189 | −0.10 | 1104.5 | 0.000[a] | −0.34 | 2492.0 | 0.001[a] | −0.25 |
| Business understanding of ITIL objectives | 2736.5 | 0.001[a] | −0.24 | 993.0 | 0.000[a] | −0.40 | 2634.0 | 0.003[a] | −0.22 |
| Lack of resources (time or people) | 2756.5 | 0.001[a] | −0.24 | 894.0 | 0.000[a] | −0.45 | 2496.5 | 0.001[a] | −0.26 |
| Lack of internal knowledge/skills relating to ITIL | 2461.0 | 0.000[a] | −0.30 | 977.5 | 0.000[a] | −0.40 | 2884.5 | 0.031 | −0.16 |
| Lack of funding/costs of adoption | 3433.0 | 0.254 | −0.09 | 1234.0 | 0.002[a] | −0.28 | 2724.5 | 0.008[a] | −0.20 |
| Organizations/cultural resistance to change | 2825.0 | 0.003[a] | −0.22 | 1017.5 | 0.000[a] | −0.39 | 2785.0 | 0.014[a] | −0.18 |
| Maintaining momentum/progress stagnates | 3419.5 | 0.225 | −0.09 | 1245.0 | 0.003[a] | −0.28 | 2869.0 | 0.027[a] | −0.17 |

[a]Significance at 0.0167

Lastly, comparing the Defined (3) with the Optimized (5) maturity level, significance can be observed for Lack of executive sponsorship, Business understanding of ITIL objectives, Lack of resource, time or people, Lack of funding/cost of adoption, Organization/culture resistance to change. Marginal significance can be observed for Lack of internal knowledge and skills relating to ITIL and Maintaining momentum/progress stagnates.

Jonckheere's test revealed a significant trend in the data. As the level of maturity goes up, the median of challenges decreases (Lack of executive sponsorship $J = 36500$, $z = −5.9$, $r = −.26$, Business understanding of ITIL objectives $J = 35298$, $z = −6.6$, $r = −.30$ Lack of resource, time or people $J = 37332$, $z = −5.5$, $r = −.25$, Lack of internal knowledge and skills relating to ITIL $J = 35233$, $z = −6.7$, $r = −.30$, Lack of funding/cost of adoption $J = 40536$, $z = −3.6$, $r = −.16$, Organization/culture resistance to change $J = 36699$, $z = −5.8$, $r = −.26$, Maintaining momentum/progress stagnates $J = 39816$, $z = −4.0$, $r = −.18$).

We can conclude that as the maturity of implementation increases there is a reduction on the perception of difficulty when facing the challenges studied in this research. The challenge of Maintaining momentum/progress stagnates is the only factor that has no significance when examining the Initial (1) and Defined (3) level, and only marginal significance when comparing the Defined (3) and Optimized (5) level. However, when examining the Initial (1) and Optimized (5) level significance does exist. When examining the variables Lack of executive
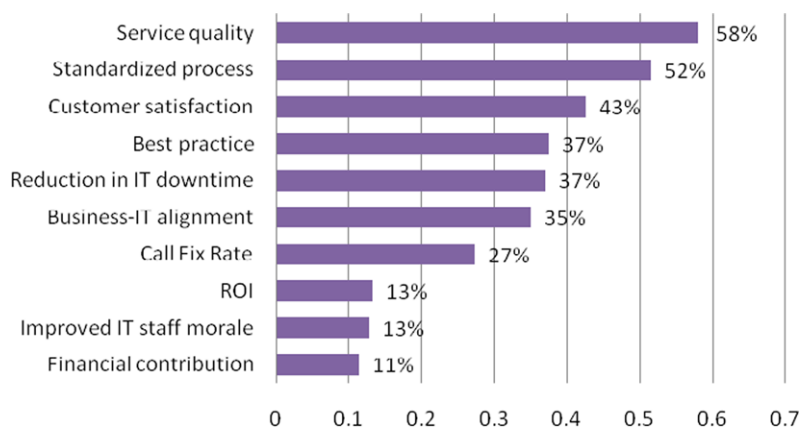


**Fig. 6** Percentages of companies that have realized a benefit

sponsorship and Lack of funding/cost of adoption one can observe that at the lower levels of implementation one can detect no significance. However, when comparing the Defined (3) with the Optimized (5) level significance can be observed.

### 5.2.3 Number of Realized Benefits and Maturity Levels (P3)

Figure 6 provides detail of the benefits received by those who implemented an ITSM framework. Overall, the figure would appear to suggest that half of those surveyed would perceive a service quality improvement and also an increase in the usage of standardized processes. Three benefits which were only seen by close to one tenth of those surveyed include improvement of Return on Investment (ROI), IT staff morale and an improvement on measuring of the financial contribution of IT.

When conducting the Kruskal-Wallis test, the number of realized benefits is

significantly affected by the level of implementation maturity ($H(4) = 134.49$, $p < 0.001$ for the total number of realized benefits, $H(4) = 139.37$, $p < 0.001$ for realized benefits backed by metrics, $H(4) = 91.64$, $p < 0.001$ for realized benefits acknowledged by the business). The mean and median of the benefits for each of the different maturity levels is displayed on **Table 9**.

**Figure 7** plots the perceived number of realized benefits for companies at various maturity levels of implementation. In this figure an upward trend can be observed. Companies at higher levels of perceived implementation maturity believe to realize a larger number of benefits.

As shown in **Table 10**, the number of realized benefits is significantly higher when comparing the Initial (1) with the Defined (3) level of maturity of implementation. Based on Cohen's benchmark, there is a large change on the number of realized benefits as maturity increases. One can also observe this when

**Table 9** Descriptive statistics of realized benefits ($n = 491$)

| Maturity Level | N | Total realized benefits | | | Total realized benefits backed by metrics | | | Total realized benefits acknowledged by business | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | M | SE | Mdn | M | SE | Mdn | M | SE | Mdn |
| 1 | 62 | 1.03 | 0.19 | 0 | 0.48 | 0.15 | 0 | 0.44 | 0.14 | 0 |
| 2 | 153 | 2.46 | 0.14 | 2 | 1.04 | 0.1 | 1 | 0.75 | 0.1 | 0 |
| 3 | 123 | 4.06 | 0.19 | 4 | 2.49 | 0.17 | 2 | 1.71 | 0.16 | 1 |
| 4 | 95 | 4.13 | 0.21 | 4 | 2.65 | 0.19 | 2 | 2.23 | 0.22 | 2 |
| 5 | 58 | 4.89 | 0.37 | 5 | 3.89 | 0.37 | 4 | 3.34 | 0.41 | 3 |
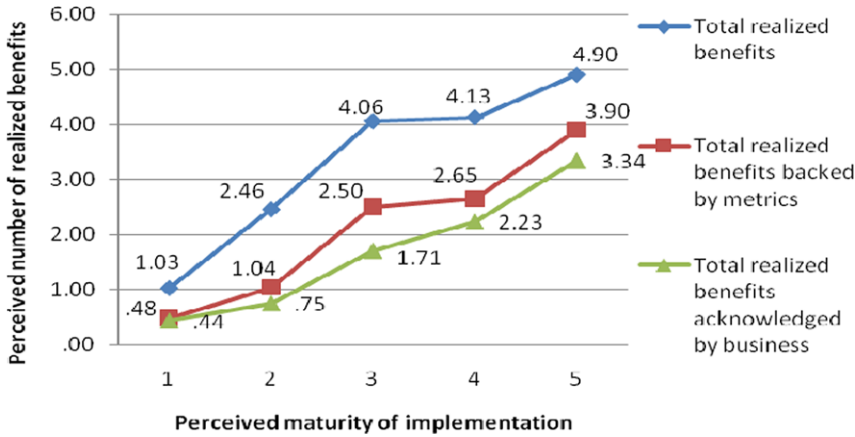


**Fig. 7** Descriptive statistics of realized benefits ($n = 491$)

comparing the Initial (1) with the Optimized (5) level. Finally, when comparing the Defined (3) with Optimized (5) level no significance can be determined. Yet, significance can be observed when examining the number of realized benefits that have been backed by metrics as well as when observing the number of realized benefits that have been acknowledged by the business.

To corroborate with the findings, an additional analysis is conducted for each of the benefits listed. In this analysis, the individual benefits of implementation are evaluated at the different levels of maturity. Each variable is dichotomous (realized benefit or not realized benefit). The Kruskal-Wallis test shows that all of the benefits realized are significantly affected by the level of implementation maturity (Service Quality $H(4) = 92.08$, $p < 0.001$, Customer Satisfaction $H(4) = 44.41$, $p < 0.001$, IT resource downtime $H(4) = 46.41$, $p < 0.001$, Benefits from the usage of a best practice $H(4) = 42.05$, $p < 0.001$, Business-IT alignment $H(4) = 25.45$, $p < 0.001$, Call fix rate $H(4) = 34.65$, $p < 0.001$, Standardized Process $H(4) = 68.20$, $p < 0.001$, IT morale $H(4) = 19.61$, $p < 0.001$, Return on Investment $H(4) = 26.40$, $p < 0.001$,

Measurement of the financial contribution $H(4) = 18.93$, $p < 0.001$). Mann-Whitney tests were used to follow up on the findings. Table 11 provides the results from this test. When comparing the companies on the Initial (1) level with those on the Defined (3), all variables had a significant change with the exception of the Improvement of IT morale, Return on Investment, and Financial Contribution. When comparing the Defined (3) with the Optimized (5) level, only Return on Investment was significant, and all other variables had no significant change. This confirms and expands the findings of the previous analysis (P3a). Finally, when contrasting the benefits received on the Initial (1) level with the Optimized (5) level significance can be observed for all variables.

Jonckheere's test shows a significant trend in the data, as the level of maturity goes up, the median of number of realized benefits increases ($J = 66553$, $z = 11.44$, $r = .52$), the median of number of realized benefits backed by metrics increases ($J = 67164$, $z = 11.69$, $r = .54$), and finally the median of number of realized benefits acknowledged by business increases ($J = 62730$, $z = 9.73$, $r = .44$).

We can conclude that as the level of maturity increases, so does the number of realized benefits. However, there appears to be a stall in the number of realized benefits between the Defined (3) and the Optimized (5) level. In contrast, on the later stages companies are able to show the benefits of the implementation of ITIL through the metrics used and are also showing the realized benefits to the business.

## 6 Discussion

The results of the current study confirm P1. It states that as more processes of ITIL are implemented, the perceived maturity of the ITIL implementation increases. It can be observed that there is a positive direct influence between the number of implemented ITIL processes and the maturity level of the ITIL implementation. This result may also give an insight on how ITIL adopters are implementing the ITIL processes, which is on increasing implementation of processes rather than of implementing all processes at once. While IT executives may hand pick the processes that they implement, they understand the framework as a whole and perceive the maturity of their implementation to be based on the maturity from the whole framework perspective.

In general, the second proposition P2 is also confirmed. This proposition states that the perception of the listed challenges of implementation decreases as the maturity levels of implementation increase. This can be due to the fact that as adopters overcome the initial challenges of implementation, experience is gained, and future challenges are perceived to be less complex than those in the earlier levels. As well, it follows the pattern of the learning curve model, where at the initial levels there is a difficulty in undergoing the implementation, yet, as experience is gained, these difficulties decrease.

**Table 10** Mann-Whitney test results for realized benefits and maturity levels

| . . . per company | Level 1 compared with Level 3 | | | Level 1 compared with Level 5 | | | Level 3 compared with Level 5 | | |
|---|---|---|---|---|---|---|---|---|---|
| | U | p | r | U | p | r | U | p | r |
| Total realized benefits | 980.5 | 0.000[a] | −0.61 | 434.0 | 0.000[a] | −0.67 | 2956.5 | 0.060 | −0.14 |
| Total realized benefits backed by metrics | 1209.5 | 0.000[a] | −0.57 | 478.5 | 0.000[a] | −0.67 | 2529.5 | 0.002[a] | −0.24 |
| Total realized benefits acknowledged by business | 2099.0 | 0.000[a] | −0.40 | 658.0 | 0.000[a] | −0.59 | 2511.5 | 0.001[a] | −0.24 |

[a]Significance at 0.0167

**Table 11** Mann-Whitney test results for each benefits and maturity levels

| Improvements in | Level 1 compared with Level 3 | | | Level 1 compared with Level 5 | | | Level 3 compared with Level 5 | | |
|---|---|---|---|---|---|---|---|---|---|
| | U | p | r | U | p | r | U | p | r |
| Service quality | 1544.0 | 0.000[a] | −0.57 | 720.0 | 0.000[a] | −0.59 | 3551.0 | 0.560 | −0.05 |
| Customer satisfaction | 2536.5 | 0.000[a] | −0.32 | 908.0 | 0.000[a] | −0.49 | 2994.5 | 0.027 | −0.15 |
| Reduction in IT downtime | 2416.0 | 0.000[a] | −0.37 | 1046.0 | 0.000[a] | −0.47 | 3382.0 | 0.301 | −0.05 |
| Best practice | 2352.5 | 0.000[a] | −0.37 | 978.0 | 0.000[a] | −0.48 | 3306.5 | 0.218 | −0.07 |
| Business-IT alignment | 2909.0 | 0.001[a] | −0.24 | 1220.0 | 0.000[a] | −0.34 | 3266.0 | 0.178 | −0.08 |
| Call fix rate | 2601.5 | 0.000[a] | −0.33 | 1137.0 | 0.000[a] | −0.41 | 3389.0 | 0.311 | −0.05 |
| Standardized process | 1856.0 | 0.000[a] | −0.48 | 852.0 | 0.000[a] | −0.53 | 3521.0 | 0.494 | −0.01 |
| IT staff morale | 3346.0 | 0.018 | −0.16 | 1449.0 | 0.003[a] | −0.26 | 3311.5 | 0.176 | −0.08 |
| ROI | 3502.5 | 0.034 | −0.15 | 1300.0 | 0.000[a] | −0.38 | 2869.5 | 0.001[a] | −0.24 |
| Financial contribution | 3533.0 | 0.073 | −0.13 | 1422.0 | 0.001[a] | −0.30 | 3083.0 | 0.018 | −0.17 |

[a]Significance at 0.0167

It can also indicate that these challenges are reduced because the benefits of ITIL are made evident to the business and those involved in the project of implementation. As explained by Huber (1991), organization learning occurs to a larger extent when the knowledge obtained is recognized to be useful. In other words, the organization is more likely to learn if there are benefits presented to the individuals and to the organization. In the case of this study, the reason why the challenge perception decreases over time may also be due to the benefits shown by the implementation, which may encourage the organization and individuals to learn and to implement further processes.

When looking at the listed challenges specifically, challenges such as Lack of executive sponsorship, Lack of funding, and Maintaining momentum/project stagnates show no significance when comparing the maturity levels of implementation Initial (1) and Defined (3). However, when the maturity levels of implementation Defined (3) and Optimized (5) are compared, these challenges decrease. This may be due to the fact that at the earlier levels, the business has yet to realize benefits and skepticism exists. Conversely, in the later stages of implementation, once the business has acknowledged benefits of the ITIL implementation it is likely to support the further implementation of ITIL.

When comparing the maturity levels of implementation Defined (3) and Optimized (5), marginal significance can be observed in the challenges such as the Lack of internal knowledge and skills and Maintaining momentum/project stagnates. In the case of Lack of internal knowledge and skills, this could be due to the fact that acquiring personnel that have specialized knowledge in this field may be difficult, or that the training programs, being new, are not often available. Maintaining momentum/project stagnates is the only challenge that was not proven statistically significant in two of the three comparisons, the two being the comparison between Initial (1) and the Defined (3) level as well as the comparison of Defined (3) and Optimized (5) level. This indicates that, throughout the project, this challenge must be the focus of IT Managers

and may be a critical success factor for the implementation. As well, this factor can be considered to be independent of the ITIL implementation and may be a factor attributed to those executing the implementation of ITIL.

Finally, results from P3a, P3b and P3c also showed to be statistically significant. The fact that there are benefits due to the adoption of ITIL agrees with the results from individual case studies on the effectiveness of ITIL presented by Potgieter et al. (2005) and Spremic et al. (2008). As reported by Hochstein et al. (2005), "Quick wins" are critical success factors when implementing ITIL. Thus, some companies may be attempting to realize benefits on the lower levels of implementation.

As it can be observed from the results of P3a, as the maturity level increases the number of realized benefits increases. However, there is no significance when comparing the Defined (3) with the Optimized (5) level of the ITIL implementation. Therefore, looking only at this result the Law of Diminishing Returns for the studied benefits of ITIL appears to apply. When we look at the individual

## Abstract

**Mauricio Marrone, Lutz M. Kolbe**

## Impact of IT Service Management Frameworks on the IT Organization

### An Empirical Study on Benefits, Challenges, and Processes

Over 90 percent of companies are estimated to use IT Service Management (ITSM) frameworks, yet there is little research on their benefits to the Information Technology (IT) department and the business units. An international survey of 491 firms was conducted to assess the benefits of the IT Infrastructure Library (ITIL), the de-facto ITSM framework, specifically on how these benefits evolve as companies increase their adoption of the ITIL model. Also studied are the perception of challenges of the implementation and the number of ITIL processes implemented in relation to the progress of the adoption of ITIL. Results indicate that as the maturity of implementation increases, the perception of challenges decreases. Findings also show that as the maturity of implementation increases, the number of realized benefits increases, as well as the number of implemented ITIL processes. Implications for practitioners and researchers are also discussed.

**Keywords:** IT Infrastructure Library, IT Service Management, Best Practice, ITIL, ITSM, IT Services

benefits of implementation, none of the variables studies showed a change except for Return on Investment. This indicates that during the earlier stages companies will receive most of the direct benefit from the ITIL implementation. It could also indicate that most of the variables studied apply only to companies in the earlier stages, and that other benefits could exist.

Considering the results of P3b and P3c we cannot be certain that the Law of Diminishing Returns applies. As revealed from the findings of P3b, improvements backed by metrics are seen on the later levels of implementation. As well, benefits of the ITIL implementation, which are acknowledged by the business (P3c), are also demonstrated at the later levels of implementation.

The contribution to research is that it delivers insight into the perception of effectiveness of ITIL, the implementation of processes and the evolution of challenges. Additionally, this research opens the path for future research. In practice, the findings can serve as a guideline for those IT managers considering or who have already adopted ITIL. For those considering the adoption and having doubts on the benefits of ITIL, the results show that due to the implementation of ITIL companies do receive several benefits. For those IT departments that have adopted ITIL and ponder on the idea of expanding their implementation of ITIL, they are provided with the understanding of the evolution of benefits realizable, and how their perception of challenges of implementation is affected as they continue implementing ITIL.

## 7 Conclusion

Based on the results gained in the previous sections, it has been shown that as the maturity of the ITIL implementation increases the number of implemented processes also increases. In addition to this, as the maturity increases, the challenges of implementation decrease. This is explained using the learning curve as well as insights from organizational learning. Results conclude that as the maturity of ITIL increases, so does the number of realized benefits. Marginal returns can be observed after the implementation reaches the Defined (3) level. Yet, in later levels of implementation further returns of the ITIL implementation can be seen. In these later levels, there is an increase in

the usage of metrics to measure the benefits of the implementation as well as in the business acknowledging the benefits provided by IT.

Limitations of this study are that the study concentrates only on the United States and United Kingdom, and that it over-samples the larger enterprises. This research aimed only at surveying IT executives, and only their views are included in this study. Another limitation is that empirical studies are dependent on the quality of data provided by the respondents. Additionally, the paper uses a perceived maturity which is based on a single measurement. As well, the results are based only on the challenges and benefits that were listed on the survey.

Since this research is targeted towards IT experts, further studies will be conducted to understand the views of the business in respect to the challenges and benefits of the ITIL implementation. A comparison of views, the IT and the business view, on these topics is relevant. As well, studies will be conducted to understand how Business-IT alignment is affected by the implementation of ITIL. This could be done by conducting a survey and using a proven method of measuring Business-IT alignment and measuring ITIL maturity. Future work should complete a longitudinal study of the impact of ITIL.

## Appendix: Survey Used

(1) Which of the following statements best describes your IT organization?
- We have not adopted ITIL (Level 0)
- We are new to ITIL and have just started to implement processes (Level 1)
- We have a relatively low level of ITIL process maturity. Some processes are documented and these are generally understood, but errors are likely (Level 2)
- We have a medium level of ITIL process maturity. Processes are documented monitored for compliance (Level 3)

- We have a reasonably high level of ITIL process maturity. Our processes are documented, and measured according to established metrics (Level 4)
- We have a very high level of ITIL process maturity. Our processes are documented, understood, backed by metrics and continually reviewed for improvement (Level 5)

(2) Which version of ITIL (if any) are you using?
  - ITIL V2
  - ITIL V3, upgraded from V2
  - ITIL V3
  - Have not adopted ITIL

(The following two questions are only for respondents who answered ITIL V2 on question 2)

(3) Which of the following ITIL V2 Service Support processes have you implemented?
  - Incident Management
  - Problem Management
  - Change Management
  - Release Management
  - Configuration Management

(4) Which of the following ITIL V2 Service Delivery processes have you implemented?
  - Availability Management
  - Capacity Management
  - Financial Management
  - Service Level Management
  - IT Service Continuity Management

(The following five questions are only for respondents who answered ITIL V3 or ITIL V3, upgraded from V2 on question 2)

(5) Which Service Strategy process have you implemented?
  - Strategy Generation
  - Service Portfolio Management
  - Demand Management
  - Financial Management

(6) Which Service Design process have you implemented?
  - Service Catalogue Management
  - Service Level Management
  - Availability Management
  - Capacity Management
  - IT Service Continuity Management
  - Information Security Management
  - Supplier Management

(7) Which Service Transition process have you implemented?
  - Transition Planning and Support
  - Change Management

- Service Asset & Configuration Management
- Release & Deployment Management
- Service Validation & Testing
- Evaluation
- Knowledge Management

(8) Which Service Operation process have you implemented?
  - Incident Management
  - Problem Management
  - Request Fulfillment
  - Event Management
  - Access Management

(9) Which Continual Service Improvement process have you implemented?
  - Service Level Management – Seven Level improvement process
  - Service Measurement
  - Service Reporting

(10) On a scale of 1–5, where $1 =$ No Challenge and $5 =$ Major Challenge, how would you rate the following barriers to ITIL implementation in your organization?
  - Lack of Executive sponsorship
  - Business understanding of ITIL objectives
  - Lack of resources (time or people)
  - Lack of internal knowledge/skills relating to ITIL
  - Lack of funding/cost of adoption
  - Organization/cultural resistance to change
  - Maintaining momentum/progress stagnates

(11) Owing to the ITIL implementation, have you had an improvement in the following areas?
  - Service Quality
  - Customer satisfaction
  - Standardized process adoption across all of IT
  - Interaction of IT with rest of business
  - Reduction in IT downtime
  - Return on investments in IT
  - Benefited from best practice experience of others
  - Financial contribution of IT to the business
  - Call fix rate
  - Morale of IT staff

(Follow-up question, only for the selected elements of the previous question)

(12) Have the improvements in the areas been noted by the business?

(13) Have the improvements been backed by metrics?

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# 5. Paper 3: Impact of Selective ITIL v3 Processes on the Realization of Benefits: An Empirical Study

Paper 3 is presented in this chapter. This paper (Marrone and Kolbe, 2011) is under review for the *Journal of Strategic Information Systems*.

**Overview of Paper 3**

Our previous study showed that companies which implemented ITIL had had realized benefits as a result of its implementation. The question then arises: can the maturity and implementation of specific processes of ITIL be a useful predictor of the realization of such benefits?

The purpose of this paper is to understand, through empirical data, how ITIL processes impact the IT organizations' environment, and which ITIL processes have the biggest impact on the realization of benefits. A survey is designed, and using the data collected from 190 IT organizations, logistic regressions are conducted to reveal which ITIL process would have an impact on the realization of benefits.

The main contribution of this work is that the results indicate that a group of seven ITIL processes strongly predict the realization of benefits due to the implementation of the framework. Findings show that Access Management and Financial Management are often involved as predictors of the realization of benefits. Other processes are Change Management, Request Fulfilment, Event Management, Incident Management and Service Portfolio Management.

These findings are aimed at helping IT executive direct the IT organization's resources at these key processes, in order to improve their chances of realizing the benefits of the ITIL implementation.

This study proves to be original, as it is the first to show which processes may have an impact on various benefits of the implementation of ITIL. Findings of this work allow for IT executives to concentrate on improving the maturity of certain processes and being able to achieve a particular benefit.

# Impact of Selective ITIL V3 Processes on the Realization of Benefits:
## An Empirical Study

**Abstract:**
Over the past years, the implementation of IT operational frameworks has increased. While many companies have adopted them, the benefits that they provide have not been carefully examined. In this empirical study, logistic regression tests are run to understand if specific IT Infrastructure Library (ITIL) processes can allow for the realization of benefits. The aim of this study is to model the relationship between the ITIL v3 processes and the realized benefits. Using data from 193 IT organizations, results show that certain ITIL processes are predictors of the realization of benefits. Findings show that processes such as Access Management and Financial Management are often involved as predictors of the realization of benefits.

## I. INTRODUCTION

Information Technology (IT) managers have been asked by the business management to show how their department is performing. To answer this call, IT managers need to demonstrate that their departments are strategic enterprise assets that provide value and benefit. This is a new challenge, partially because IT was previously seen as an overhead expense (Shu & Strassmann 2005). As they face this challenge, IT managers confront increasing difficulty of justifying their expenditures (Counihan et al. 2002).

At the same time, due to global competitive pressure, IT organizations must also deliver high-quality services which satisfy customers' demands. IT Service Management is a critical aspect that is capable of meeting these demands (Cater-Steel & Tan 2005). Currently, it has been estimated that close to 60% of IT organizations have implemented or are in the process of implementing IT Service Management practices, such as ITIL (Information Technology Infrastructure Library), as a part of their strategies (Winniford et al. 2009). While investment for such frameworks is considered to be high (Hochstein et al. 2005), there have only been a few studies focusing on the implementation of ITIL and the benefits which are realized through its implementation.

This research will investigate if the realization of benefits can be predicted by the maturity of implemented ITIL processes. It will also examine the benefits that have been realized through the implementation of the ITIL framework. Further, it suggests which ITIL processes are the biggest predictors to the realization of benefits.

## II. THEORETICAL BACKGROUND

IT Service Management (ITSM) "focuses on defining, managing, and delivering IT services to support business goals and customer needs, usually in IT Operations" (Conger et al. 2008). A study estimated that 90% of United States companies are considering or currently using an ITSM framework (Galup et al. 2009). Research from the IT Government Institute (2008) estimates that the ITSM framework with the highest adoption rate is ITIL with 24%. ITIL has gained importance all over the world and is now known as a 'de facto standard for IT Service Management' (Hochstein et al. 2005).

ITIL was originally developed in the 1980s by the Central Computer and Telecommunications Agency (CCTA) in Great Britain. This initial version of ITIL was then revised and replaced by eight, more closely connected and consistent books consolidated within an overall framework. This second version became universally accepted and is now used in many countries by thousands of organizations as the basis for effective IT service provision (Lienemann 2006).

In 2007, ITIL v2 was superseded by an enhanced third version, consisting of five core service lifecycle phases. These are: (Office of Government Commerce 2007)
- *Service Strategy (SeS):* establishes an overall strategy for the organization's planned IT services and IT Service Management practices.
- *Service Design (SeD):* conceives and develops new or changed services for the introduction into the live environment.
- *Service Transition (SeT):* shifts new or changed services into the production environment while controlling the risks of failure and disruption.
- *Service Operation (SeO):* performs the day to day operation of the processes which manage the services. This is where performance metrics are gathered as well as reported and where value is realized.
- *Continual Service Improvement (CSI):* identifies and implements improvements to the IT services.

Each of the main processes for ITIL v3 is found in Table 1 (Office of Government Commerce 2007). It also contains a short description and the lifecycle phase in which it is incorporated.

## Table 1: ITIL V3 Processes

| Process | Definition |
| --- | --- |
| SeS-Demand Management | Activities that understand and influence customer demand for services and the provision of capacity to meet these demands. |
| SeS-Strategy Generation | Defines the business market for new IT services by understanding the needs of customers. |
| SeS-Service Portfolio Management | Manages the service portfolio. |
| SeS-IT Financial Management | Administers an IT Service provider's budgeting, accounting and charging requirements. |
| SeD-Service Catalogue Management | Manages the information contained in the service catalogue and to ensure its accuracy. |
| SeD-Service Level Management | Coordinates a structured approach for improvements to IT services. |
| SeD-Capacity Management | Ensures that the capacity of IT services and the IT infrastructure are able to deliver agreed service level targets in a cost effective and timely manner. |
| SeD-Availability Management | Defines, analyses, plans, measures and improves all aspects of the availability of IT services. |
| SeD-Service Continuity Management | Evaluates the level of insurance needed to protect service assets and a manuscript to recover from disaster. |
| SeD-Information Security Management | Ensures the confidentiality, integrity and availability of an organization's assets, information, data and IT services. |
| SeD-Supplier Management | Guarantees that all contracts with suppliers support the needs of the business, and that all suppliers meet their contractual commitments. |
| SeT-Transition and Support | Reduce the need for corrective measures during and after release into live operation. |
| SeT-Change Management | Controls the lifecycle of all changes. |
| SeT-Service Asset and Configuration Management | Provides a logistical model of the IT infrastructure. |
| SeT-Release and Deployment Management | Implements authorized changes to IT services. |
| SeT-Service Validation and Testing | Ensures that new or changed IT services match the design specification and will meet the needs of the business. |
| SeT-Evaluation | Assesses new or changed IT Service to ensure that risks have been managed and to help determine whether to proceed with the change. |
| SeT-Knowledge Management | Gathers, analyzes, stores and shares knowledge and information within an organization. |
| SeO-Event Management | Manages, monitors all types of events that occur through the IT infrastructure. |
| SeO-Incident Management | Restores normal service operations as soon as possible. |
| SeO-Request Fulfillment | Manages the lifecycle of all service requests. |
| SeO-Problem Management | Prevents incidents from occurring, minimizes the impact of incidences that cannot be prevented. |
| SeO-Access Management | Grants authorized users the right to use of a service, while preventing access to non-authorized users. |
| CSI-Service Measurement | Defines how to measure IT services. |
| CSI-Service Reporting | Responsible for producing and delivering reports of achievement and trends against service levels. |
| CSI-Service Improvement - Seven Step | Suggests improvements to guarantee that a service delivers the greatest benefit. |

Findings from previous studies showed that ITIL was being implemented differently from company to company. Respondents from the study of Hochstein et al.'s (2005) pointed out that they intended to adopt all the ITIL processes; however priority was given to adopting operational processes. Adoption patterns in Australia showed that some of the processes were being widely adopted, while others were rarely implemented (Cater-Steel et al. 2009). The perceived relevance of processes may affect the adoption rate or the priority given to their adoption. Findings from these studies may indicate that managers are selecting specific processes for implementation rather than adopting all processes.

Various researchers have searched for the benefits achieved through the implementation of ITSM. Cervone (2008) provides an overview of ITIL and suggests the following three benefits could be achieved when implementing it: cost reduction, improved customer satisfaction, and improved the productivity of the IT department.

In their case study, Cater-Steel, Toleman & Tan (2006) find that organizations in Australia, which have implemented ITIL, are realizing benefits such as: more rigorous control of testing and system changes, more predictable infrastructure, improved consultation with IT groups within the organization, reduced server faults, seamless end-to-end service, documented and consistent IT service management processes across the organization, and consistent logging of incidents.

Cater-Steel and McBride (2007) identify that ITIL may have an impact on service quality, customer satisfaction, and on the infrastructure and resource management. Potgieter, Botha and Lew (2005) using metrics, determine that usage of the ITIL framework would provide benefits in the areas of service quality and customer satisfaction.

A key study is conducted by Spremic, Zmirak & Kraljevic (2008), given that they monitor an IT Service provider in Croatia and apply various Key Performance Indicator (KPI) metrics before and after the implementation of a number of ITIL processes. The study concludes that the IT service provider undergoes improvements which are attributable to the implementation of ITIL. They realize improvements in the areas of service quality and customer satisfaction.

Hochstein et al. (2005), complete a case study of four German companies and list four benefits that these companies have achieved through the implementation of IT Service Management frameworks: improvement in quality of IT services, efficiency and optimization of processes and transparency, standardization of services through process documentation, and process monitoring.

From the literature we are able to collect and identify the main benefits achieved due to the implementation of IT Service Management frameworks. These are improvements in:

- Service Quality
- Standardization of Services
- Customer Satisfaction
- Reduction of IT Downtime
- Return on Investment
- Financial Contribution Control

Table 2 groups these benefits and identifies the authors who have acknowledged these factors to be central.

| Improvement of… | Hochstein et al., 2005 | Potgieter et al., 2005 | Cater-Steel & McBride 2007 | Cater-Steel et al. 2006b | Cervone, 2008 |
|---|---|---|---|---|---|
| Service Quality | X | X | X | | X |
| Standardization of Services | X | | | X | |
| Customer Satisfaction | | X | X | | |
| Reduction of IT Downtime | | | X | X | X |
| Return on Investment | | | | | X |
| Financial Contribution Control | | | | | X |

Table 2: Benefits Observed in Literature

Since organizations appear to be selecting specific processes rather than adopting all processes, could the implementation of certain processes influence the realization of benefits? While there have been several case studies that have looked at the benefits of implementing ITSM frameworks, it has yet to be determined if certain ITIL processes have a significant impact on the realization of benefits.

## III. METHOD

### Design

The online questionnaire was made available in the months of April and May 2009 to ITIL senior executives. The target participants were ITIL "champions" within their organization and were heavily involved in the implementation of ITIL. The importance of champions for IS projects have been previously discussed (e.g. Bose & Luo (2011), Pan et al. (2004)).

An invitational email was sent to individuals who were on the mailing lists of Hornbill and the IT Service Management Forum (itSMF) in the United States of America and United Kingdom. The itSMF being the most well-known forums for IT Service Management professionals was considered to be the appropriate mailing list for this survey. Additionally, in an attempt to obtain a greater number of participants, the survey was announced in various internet groups and forums whose sole topic was ITIL. This broader approach has rendered the research findings applicable to a greater population of ITIL users, rather than solely to the members of certain mailing lists or groups. The sample targets to reach IT executives that would have implemented ITIL in their organizations.

The structure of the questionnaire addressed many aspects of ITIL, its adoption, usage, implementation and maturity, as well as effectiveness of processes and realized benefits. It also covered the topics of Business-IT alignment and service desk usage.

The following categories included in the survey were used for this study:
- Rate the perception of the maturity of each of the 26 ITIL processes (using a scale based on the Maturity Model from 0 (not implemented) to 5 (optimized))
- Select realized benefits that were achieved due to the adoption of ITIL (benefits listed in the Related Research section)

Both of these are specified further in the following two subsections.

**Maturity Levels of ITIL Implementation**
To comprehend at which level of adherence or maturity companies are in when adopting the ITSM model, various researchers have used the Maturity Model. The Maturity Model presented in these studies is based on the model from CobiT (Control objective for information and related Technologies) and Capability Maturity Model Integration (CMMI) (Ciborra 1998)(IT Governance Institute 2007). These levels are intended as profiles of IT processes. In this research, companies identify these levels as a description of their current state of each of the ITIL v3 processes. Table 3 covers the definitions for each level of the maturity model.

| Table 3: Maturity Model Levels with Definitions | | |
|---|---|---|
| Level | Level Name | Definitions |
| 0 | Non-existent | Management of processes is not applied at all |
| 1 | Initial / Ad Hoc | Processes are ad hoc and disorganized |
| 2 | Repeatable | Processes follow a standard, are documented and understood |
| 3 | Defined | Processes are documented and monitored for compliance |
| 4 | Managed | Management monitors and measures according to metrics established on the previous level |
| 5 | Optimized | Good practices are followed and automated |

**Benefits**
Four main benefits are considered in this study are:
- Improvement of Service Quality
- Improvements due to having a Standardized Process
- Improvement of Customer Satisfaction
- Improvement of IT Resource Downtime

Additionally, the following benefits in IT finance are also considered:
- Improvement of the Return on Investment
- Improvement of the Ability to Measure the Financial Contribution of IT to the Business

These benefits can be observed in Table 2.

Since the dependent variables (realized benefits) are dichotomous, the model was estimated using logistic regression. A logistic regression is a form of regression which can be used to predict a dichotomous dependent variable on the bases of continuous independents. It is used to assess the importance of independents and understand the impact of covariate control variables. This test is comparable to ordinary least square regression; however, the coefficients in a logistic regression model are interpreted as the logarithm of the odds of an occurring event provided by the independent variables in the model.

The method of logistic regression that was used was the backward stepwise method using 0.05 as entry probability and 0.10 as removal probability. This method begins with all predictors included and then only the predictors that have no substantial effect are removed. This method is preferred when no previous research exists on the topic (Field 2009).

The following statistics are reported: exp B, Confidence Interval, $R^2$ and B coefficient. Exp B is an odds ratio which shows the odds of an organization realizing a benefit having implemented the examined process. The Confidence Interval (CI) for the exp B is used to report if we can be confident that the results observed also apply to the population. If the value is greater than 1 then it indicates that as the predictor variables increase, the odds of the outcome also increase. If the value is less than 1 then as the

predictor variables increase, the odds of the outcome decrease. If the ranges of CI are not all greater than 1 or all less than one, the reported variable is not considered as a useful predictor in the logistic model. $R^2$ provides an estimate of the substantive significance of the model. The model chi-square test measures the improvement in fit that the predictor variables make, compared to only analyzing the constant. To establish the probability that a case falls into certain category, the B coefficient value can be placed in the logistic regression equation.

## Instrument validation

The resultant instrument was examined for validity. As argued by Parasuraman et al. (1988), the content validity of a construct depends on the extent to which the construct items represent the construct's theme. The constructs in this study are believed to possess content validity because of the twofold reasons: (1) the measuring items were predominantly derived from the literature such as those shown on Table 2; and (2) the items incorporated were filtered through extensive discussions with practitioners and researchers in the domain.

## Respondents' Profile

Participants were surveyed via an online self-completion questionnaire, developed through piloting and validation. More than 5,000 invitations were sent out to members of the itSMF in United Kingdom and United States and to the mailing list of Hornbill. Since, partially completed surveys were not used for the study out of the 784 IT executives who started the survey, 503 completed and submitted the survey. There were 248 IT Organizations using ITIL v2, while 193 used ITIL v3. Those not using ITIL were excluded from this study. To strengthen the results, the study looks only at those organizations which use ITIL v3. The final sample size was 193.

Respondents were asked about their companies' industry, number of sites supported by IT, number of employees in the company as well as their title and their location. Table 3 shows the profile of the respondents. In the sample, around three fourths of those surveyed were from the technology, public, financial and banking sectors. Other industries include the professional, retail and manufacturing industries.

Over 70% of the respondents had ten or more sites supported by central IT, and close to 15% had two to five sites. Almost half of those interviewed worked in a company which had more than 10,000 employees. The job roles of those interviewed is also shown. Of those surveyed 32% were IT managers, while 22% were Process specific managers. Due to the usage of mailing lists and posting of invitations to the survey on English speaking websites, the majority of answers came from equally from the United States and the United Kingdom with 45% each, with various answers coming from Canada, India and Ireland.

## Table 4: Respondents' Profile

| Industry | Percent |
|---|---|
| Technology | 34 |
| Financial and Banking | 21 |
| Public | 20 |
| Manufacturing | 6 |
| Other | 4 |
| Retail and Distribution | 4 |
| Professional | 3 |
| Healthcare | 3 |
| Telecommunication | 2 |
| Utility | 2 |
| Entertainment and Hospitality | 1 |

| Countries | Percent |
|---|---|
| United States of America | 45 |
| United Kingdom | 44 |
| India | 2 |
| Canada | 1 |
| Ireland | 1 |
| Other | 7 |

| Number of Sites | Percent |
|---|---|
| 10+ | 73 |
| 2-5 | 15 |
| 6-10 | 7 |
| 1 | 5 |

| Number of Employees | Percent |
|---|---|
| 10000+ | 50 |
| 1001-5000 | 15 |
| 5001-10000 | 15 |
| 101-500 | 8 |
| 501-1000 | 6 |
| < 100 | 6 |

| Job Role | Percent |
|---|---|
| IT Manager | 32 |
| Process Specific Manager | 22 |
| Service Delivery Manager | 21 |
| IT Director - Organization Level | 15 |
| Helpdesk / Service Desk Manager | 7 |
| Helpdesk / Service Desk Operative | 3 |

## V. RESULTS

The aim of this study is to model the relationship between the ITIL v3 processes and the realized benefits. A number of logistic regressions are completed for each of the benefits to understand which processes were successful predictors.

A correlation matrix was conducted to search for multicollinearity. All of the correlation coefficients were less than .8 in absolute value, indicating no multicollinearity (Kennedy 2008).

It is recommended that there are at least 15 participants per predictor (Field 2009). Since there are 26 ITIL v3 processes being used as predictors, the sample size may be considered too small to use all of the processes as predictors. To overcome this, a logistic regression is run using as predictors the sum of the maturities for the processes within each of the five lifecycle phases of ITIL. If any of the lifecycle factors is significant, a second logistic regression is run using the processes that belong to the significant lifecycle phases. Residuals were also examined to comprehend how well the model fits the observed data.

Figure 1 displays the percentage of companies which realized benefits through the implementation of ITIL. More than 60% of companies realized an improvement in Service Quality. Over 50% of the companies realized an improvement by the Standardization of Processes. Benefits which had the lowest attainment were improvement on Return on Investment, with 15%, and Ability to Measure Financial Contribution, with 14%.
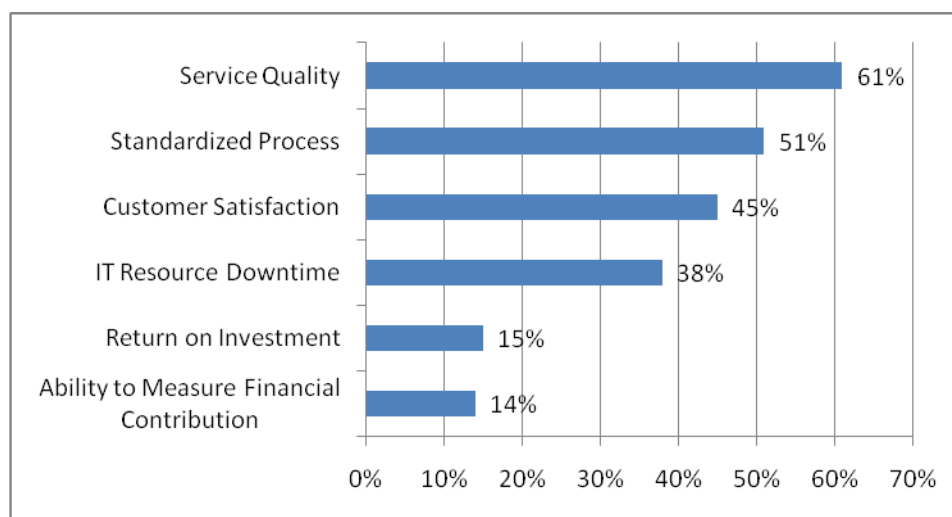


**Figure 1. Percentage of companies which realized studied benefit**

**Financial Contribution**
Table 5 presents the results from the logistic regression for the ITIL lifecycle phases. The model fits the data reasonably well (Chi-square = 22.34, p < 0.001), with about 87% of the cases being predicted correctly. Service Strategy was identified as factor independently and significantly associated with the realization of the Financial Contribution benefit.

A logistic regression with the maturity of processes within the Service Strategy lifecycle (Demand Management, Strategy Generation, Service Portfolio Management, IT Financial Management) is then completed. The model fits the data well (Chi-square = 22.02, p < 0.001), with 87% of the cases being predicted correctly. The processes that were found to be the best predictors were Service Portfolio Management and Financial Management. Of those surveyed, 21% had implemented Service Portfolio Management with an average maturity of 2.9. Financial Management was also implemented by 21% of companies, with a maturity mean of 3.6. These two predictors account for 11-20% of the variance of realizing the studied benefit. The odds of an organization that implemented Service Portfolio Management also realizing the benefit were 36% higher than those of a company that did not implement this process. Also, companies which had implemented Financial Management were 51% more likely to realize the benefit.

## Table 5: Logistic Regression Results

| | | B (SE) | 95% CI for exp b | | |
|---|---|---|---|---|---|
| | | | Lower | exp b | Upper |
| | **Included** | | | | |
| | Constant | -2.48 (0.29)* | | | |
| | Service Strategy | 0.26 (0.06)* | 1.15 | 1.3 | 1.46 |

Note $R^2$ = .10 (Cox & Snell), .19 (Nagelkerke).

Model $\chi^2$ (2) = 21.10, $p<.001$

* $p<.001$.

**Financial Contribution**

| | | B (SE) | 95% CI for exp b | | |
|---|---|---|---|---|---|
| | | | Lower | exp b | Upper |
| | **Included** | | | | |
| | Constant | -2.55 (0.30)* | | | |
| | S. Portfolio Mgt. | 0.31 (0.15)*** | 1.02 | 1.36 | 1.81 |
| | Financial Mgt. | 0.42 (0.12)** | 1.19 | 1.51 | 1.93 |

Note $R^2$ = .11 (Cox & Snell), .20 (Nagelkerke).

Model $\chi^2$ (2) = 22.64, $p<.001$

* $p<.001$. ** $p<.01$. *** $p<.05$.

**Customer Satisfaction**

Table 6 indicates results from the logistic regression of all ITIL Services. The model fits the data well (Chi-Square = 15.63, p < 0.001) with 62% of the cases being predicted correctly. The service that was found to be the best predictor was Service Operation. This test was followed by running a logistic regression with the processes of Service Operation.

A follow-up logistic regression was completed using the maturity of the processes within Service Operation as factors. The model fits the data well (Chi-Square = 20.12, p < 0.001), with 65% of the cases being properly predicted. The processes that were found significant were Request Fulfillment and Event Management. Request Fulfillment was implemented by 52% of companies and had a mean maturity of 3.5, while Event Management was implemented by 36% of companies with an average maturity of 3.5. These two predictors account for 11-20% of the variation of realizing an improvement in customer satisfaction.

## Table 6: Logistic Regression Results

| | | | 95% CI for exp $b$ | | |
| --- | --- | --- | --- | --- | --- |
| | | B (SE) | Lower | exp $b$ | Upper |
| | **Included** | | | | |
| | Constant | -0.98 (0.27)* | | | |
| | Service Operation | 0.08 (0.02)* | 1.03 | 1.08 | 1.13 |
| | Note $R^2$ = .07 (Cox & Snell), .09 (Nagelkerke). | | | | |
| | Model $\chi^2$ (1) = 13.00, $p<.001$ | | | | |
| | * $p<.001$ | | | | |
| **Customer Satisfaction** | | | 95% CI for exp $b$ | | |
| | | B (SE) | Lower | exp $b$ | Upper |
| | **Included** | | | | |
| | Constant | -0.82 (0.21)* | | | |
| | Request Ful. | 0.19 (0.09)*** | 1.01 | 1.21 | 1.45 |
| | Event Mgt | 0.20 (0.10)*** | 1 | 1.22 | 1.49 |
| | Note $R^2$ = .09 (Cox & Snell), .12 (Nagelkerke). | | | | |
| | Model $\chi^2$ (2) = 18.21, $p<.001$ | | | | |
| | * $p<.001$. *** $p<.05$ | | | | |

**IT Resource Downtime**
Results from the logistic regression are displayed on Table 7. The model correctly classifies 65% of organizations (Chi-Square = 18.80, p < 0.001). Service Operation was found to be the best predictor.

The logistic regression model is run using as predictors the processes of Service Operations (Chi-Square = 19.51, p < 0.001). The model correctly classified 67% of the companies. Incident Management and Access Management are significant predictors that a company will realize the benefit of an improvement of IT resource down time. Out of the whole sample, 88% had implemented Incident Management, and those that had implemented it, had an average maturity of 3.6. Access Management was implemented by 38% of companies, and they had an average process maturity of 3.5.

These two predictors alone account for 11-15% of the variation of realizing the studied benefit. The odds of an organization that implemented Incident Management also realizing the benefit were 38% higher than those of a company that did not implement this process. Companies that had implemented Access Management were 25% more likely to realize the benefit.

## Table 7: Logistic Regression Results

|  |  | | 95% CI for exp $b$ | |
|---|---|---|---|---|
|  |  | B (SE) | Lower | exp $b$ | Upper |
|  | **Included** | | | | |
|  | Constant | -1.54 (0.29)* | | | |
|  | Service Operation | 0.10 (0.02)* | 1.06 | 1.11 | 1.16 |

Note $R^2$ = .10 (Cox & Snell), .14 (Nagelkerke).

Model $\chi^2$ (1) = 21.05, $p$<.001

* $p$<.001

**IT Resource Downtime**

|  | | 95% CI for exp $b$ | |
|---|---|---|---|
|  | B (SE) | Lower | exp $b$ | Upper |
| **Included** | | | | |
| Constant | -1.85 (0.41)* | | | |
| Incident Mgt. | 0.32 (0.11)** | 1.1 | 1.38 | 1.72 |
| Access Mgt. | 0.22 (0.09)*** | 1.05 | 1.25 | 1.49 |

Note $R^2$ = .11 (Cox & Snell), .15 (Nagelkerke).

Model $\chi^2$ (2) = 22.15, $p$<.001

* $p$<.001. ** $p$<.01. *** $p$<.05.

**Standardized Process**

Table 8 shows the results from the logistic regression for the ITIL lifecycle services. We can conclude that the Service Transition and Service Operation are the best predictors (Chi-Square = 24.99, p < 0.001). Around 70% of the cases were correctly predicted.

From the results of the logistic regression of the Service Transition and Service Operation lifecycle processes, we can conclude that Incident Management, Access Management, Change Management and Problem management are the best predictors of realizing an improvement through the standardized process (Chi-Square = 54.90, p < 0.001). Close to 65% of the cases were correctly classified by the model. Change Management was implemented by 73% of companies, and these had an average process maturity of 3.6 for Change Management.

These four factors explained 26-36% of the variation of realizing an improvement through standardizing the processes. The odds of an organization that implemented Change Management also realizing the benefit were almost two higher than those of a company that did not implement this process. Similarly, companies that had implemented Incident Management were 43% more likely to realize the benefit.

## Table 8: Logistic Regression Results

| | | 95% CI for exp b | | |
| --- | --- | --- | --- | --- |
| | B (SE) | Lower | exp b | Upper |
| **Included** | | | | |
| Constant | -1.09 (0.28)* | | | |
| Service Transition | 0.07 (0.03)*** | 1 | 1.07 | 1.15 |
| Service Operation | 0.06 (0.03)*** | 1 | 1.06 | 1.13 |

Note $R^2$ = .14 (Cox & Snell), .18 (Nagelkerke).

Model $\chi^2$ (2) = 28.35, $p<.001$

* $p<.001$. *** $p<.05$.

**Standardized Processes**

| | | 95% CI for exp b | | |
| --- | --- | --- | --- | --- |
| | B (SE) | Lower | exp b | Upper |
| **Included** | | | | |
| Constant | -2.09 (0.43)* | | | |
| Problem Mgt. | -0.36 (0.14)** | 0.53 | 0.7 | 0.92 |
| Access Mgt. | 0.21 (0.10)** | 1 | 1.23 | 1.51 |
| Incident Mgt. | 0.36 (0.17)** | 1.03 | 1.43 | 1.99 |
| Change Mgt. | 0.60 (0.14)* | 1.38 | 1.82 | 2.39 |

Note $R^2$ = .26 (Cox & Snell), .36 (Nagelkerke).

Model $\chi^2$ (1) = 59.69, $p<.001$

* $p<.001$. ** $p<.05$.

**Return on Investment**

Service Strategy and Service Operations were the services that were able to predict whether the benefit was realized (Chi-Square = 28.66, p < 0.001). Further information is shown on Table 9. Nearly 86% of the cases were correctly classified with this model.

Processes, which were the best predictors of the realization of the improvement of ROI, were Financial Management and Access Management (Chi-Square = 34.07, p < 0.001). Approximately 86% of the cases were correctly classified.

In total, these two predictors explained 17-29% of the variance of realizing an improvement on the ROI. The odds of an organization that implemented Financial Management also realizing the benefit were almost 63% higher than those of a company that did not implement this process. Similarly, those that had implemented Incident Management were 42% more likely to realize the benefit.

## Table 9: Logistic Regression Results

|  |  | 95% CI for exp *b* | | |
| --- | --- | --- | --- | --- |
|  | B (SE) | Lower | exp *b* | Upper |
| **Included** |  |  |  |  |
| Constant | -3.39 (0.51)* |  |  |  |
| Service Strategy | 0.16 (0.07)*** | 1.03 | 1.18 | 1.34 |
| Service Operation | 0.10 (0.04)** | 1.03 | 1.11 | 1.19 |

Note $R^2$ = .14 (Cox & Snell), .25 (Nagelkerke).

Model $\chi^2$ (2) = 29.71, *p*<.001

* *p*<.001. ** *p*<.01. *** *p*<.05.

**Return on Investment**

|  |  | 95% CI for exp *b* | | |
| --- | --- | --- | --- | --- |
|  | B (SE) | Lower | exp *b* | Upper |
| **Included** |  |  |  |  |
| Constant | -3.09 (0.40)* |  |  |  |
| Access Mgt. | 0.49 (0.12)* | 1.28 | 1.63 | 2.08 |
| Financial Mgt. | 0.35 (0.12)** | 1.12 | 1.42 | 1.81 |

Note $R^2$ = .17 (Cox & Snell), .29 (Nagelkerke).

Model $\chi^2$ (2) = 35.02, *p*<.001

* *p*<.001. ** *p*<.01.

**Service Quality**

Table 10 shows the results for the logistic regression. The model fits the data well (Chi-Square = 17.28, p < 0.001), and 68% of the cases are correctly classified. Service Transition is the lifecycle service that is shown to be the best predictor.

The benefit of an improved service quality is best predicted by the process of Change Management. (Chi-Square = 17.67, p < 0.001) Close to 66% of the cases were correctly classified. Release Management is not considered as a useful predictor in the logistic model. As explained previously, predictors whose lower CI value is below 1 and all other values are above 1 cannot be considered to be valid when looking at the entire population. Therefore, this predictor is not considered further.

## Table 10: Logistic Regression Results

| | | B (SE) | 95% CI for exp *b* | | |
| --- | --- | --- | --- | --- | --- |
| | | | Lower | exp *b* | Upper |
| | **Included** | | | | |
| | Constant | -0.25 (0.23) | | | |
| | Service Transition | 0.10 (0.03)* | 1.05 | 1.11 | 1.16 |
| | Note $R^2$ = .09 (Cox & Snell), .12 (Nagelkerke). | | | | |
| | Model $\chi^2$ (1) = 17.28, *p*<.001 | | | | |
| **Service Quality** | * *p*<.001 | | | | |
| | | | 95% CI for exp *b* | | |
| | | B (SE) | Lower | exp *b* | Upper |
| | **Included** | | | | |
| | Constant | -0.38 (0.26) | | 6.85 | |
| | Change Mgt. | 0.20 (0.10)*** | 1.01 | 1.23 | 1.49 |
| | Release Mgt. | 0.19 (0.10) | 0.99 | 1.2 | 1.46 |
| | Note $R^2$ = .09 (Cox & Snell), .12 (Nagelkerke). | | | | |
| | Model $\chi^2$ (2) = 17.70, *p*<.001 | | | | |
| | *** *p*<.05 | | | | |

## 6. DISCUSSION

This research looks at the benefits that are provided by the implementation of ITIL and creates a model that shows which processes are the significant predictors of benefit realization. As summarized in Figure 2, using statistical tests, we have predicted which processes are able to impact significantly on the realization of a benefit. The figure shows the processes that are significant predictors of the benefits realizable when implementing ITIL.
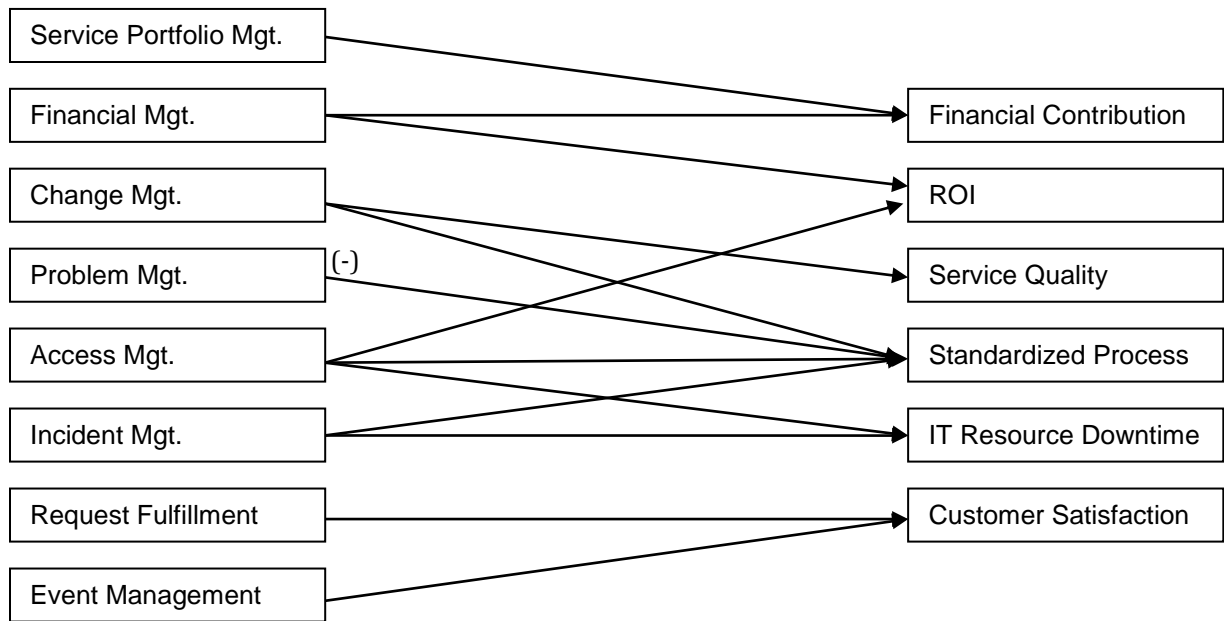
**Figure 2. Results of Logistic Regression Analyses**

While a benefit is not caused by one factor alone, understanding the impact of the processes on the benefit is a step in the right direction. Service Operation is the lifecycle phase that appears most frequently as a predictor for the realization of benefits. This lifecycle phase emerges as a predictor for four of the six benefits. Various explanations for this are proposed. Service Operation is considered an essential part of the service lifecycle (Bon 2007). It is in this phase, more than in any other phase, where the efforts of the IT organization are displayed and where the contact with the customer exists. While it is essential that the services are well-designed and transitioned, these services will not be realized if the day-to-day operation is not executed to the satisfaction of the customer. Value is delivered directly in this lifecycle phase.

The other lifecycle phases that also contributed to the prediction of the realization of benefits were Service Strategy and Service Transition.

Looking at the processes that had the greatest effect on the realization of benefits, Access Management was shown to be a predictor of a majority of benefits. Access Management is the process responsible for granting "authorized users the right to use the services" (Office of Government Commerce 2007). It provides value for the business by allowing staff to have the right access level to work properly (Office of Government Commerce 2007). Access Management is the predictor for benefits such as improvements in IT Resource Downtime, Standardized Processes and Return on Investment.

While the process of providing access to services may be considered trivial, Gartner (Witty et al. 2004) estimates that 15% to 30% of help desk calls are access authorization issues, also known as password resets. Other organizations say that 50% of calls to the help desk are related to access issues (Leung 2006). There is a definite likelihood that this process could be one of the main tasks of the helpdesk.

The Gartner study further states that each password reset request, if handled by the help desk, can cost between $51 and $147 (USD). This study does not calculate the time that the IT resources are unavailable for the user. On average, each employee will call with an access related issue at least four to five times in a year (Witty et al. 2004). If one is to calculate the costs per user of an access issue handled by the helpdesk, one can understand the impact that this has on the IT's Return on Investment. Therefore, results from this survey are in-line with other results on the importance of Access Management.

Other processes that appeared often as predictors were Incident Management, Change Management and Financial Management. Incident Management and Change Management are the processes with the highest implementation rate. Incident Management is a predictor for an improvement in Standardization of Processes and IT Resource Downtime. Change Management is a predictor for the benefits of an improvement of Service Quality and Standardization of Processes.

Financial Management, being one of the processes furthest from the realm of IT, is a predictor for the realization of improvements in ROI and the Ability to Measure the Financial Contribution of IT. Another predictor for the Ability to Measure the Financial Contribution of IT is Service Portfolio Management. This process "helps managers prioritize investments and improve the allocation of resources" (Office of Government Commerce 2007). The authors go on to suggest that "portfolios instill a certain financial discipline necessary to avoid making investments that will not yield value". Therefore, in theory Service Portfolio Management is to have an impact on the Ability to Measure the Financial Contribution of IT and this can also be seen in the results from our logistic tests.

The only process that has a negative impact on the outcome of a benefit is Problem Management. From the results, as the maturity of Problem Management increases, the realization of the benefit Standardization of Processes decreases. We suggest that one reason why this happens is because companies that over-focus on Problem Management may see IT as being technology oriented, rather than incorporating a business focus.

Request Fulfillment and Event Management predict the realization of an improvement in Customer Satisfaction. Request Fulfillment provides the opportunity for users to quickly and effectively access services that are highly requested by users. Event management delivers business value by providing mechanisms that allow for early detection of incidents, which allow a quicker response and improve process performance (Office of Government Commerce 2007). As well, these two processes are focused on having an impact on Customer Satisfaction and from findings from the test conducted in this paper we observe that they are likely to have an impact in this area.

This research encounters the following limitations. It uses the perception of IT senior executives to understand if the benefits were realized. Additionally, this study concentrates on ITIL v3 and does it mainly from an IT perspective. Also, the results are not based on metrics. It can be considered that the results are biased towards a few countries and industry types, and that this may have an influence on the results. Despite these limitations, the results provide a compelling depiction on the likelihood of realizing benefits through the implementation of ITIL.

The results from this research also open up the path for further research. Research needs to be undertaken into the processes that have shown to have a significant impact on the realization of benefits, specifically the analysis of key performance metrics. The use of metrics will allow for a confirmation of the results as well as quantifying the results. The positive findings in this study suggest that other environmental factors, tangible and intangible, should be considered. Factors such as: organizational skills, organization's ability to change, its industry, size and others need to be considered. Given that the proposed framework has only been quantitatively examined, further validation is needed through qualitative studies. These studies can be carried out to examine the validity of constructs, and provide further interpretations to the relationships identified, as well as testing the comprehensiveness of the model. By using focus-group or semi-structured interviews with senior IT managers in-depth insights might be provided.Further studies in this area will be of interest in both the practitioner and the academic areas.

## 7. CONCLUSION

Each company that sets out to implement ITIL may do it in a way that is specific to the organization's needs. Previous research shows that not all companies where achieving the same benefits when

implementing ITIL. This research sets out to understand if certain ITIL processes lead to the realization of benefits.

In this empirical study, the researchers used logistic regression to understand if certain ITIL processes could predict the realization of IT benefits. Six benefits were studied: Improvement on Service Quality, Improvements due to having a Standardized Process, Improvement on Customer Satisfaction, Improvement on IT Resource Downtime, Improvement on the Return on Investment, Improvement on the Ability to Measure the Financial Contribution of IT to the Business.

This research suggests two key findings. First, it significantly shows that the implementation of ITIL v3 can directly lead to the realization of improvements. Second, it also identifies processes that significantly predict the realization of benefits. Furthermore, the research eliminates those processes that are not significant predictors of benefit realization.

The following benefits were positively and significantly predicted by these ITIL v3 processes.
- *Service Quality:* Change Management
- *Customer Satisfaction:* Request Fulfillment and Event Management.
- *IT Resource Downtime:* Incident Management and Access Management.
- *Having a Standardized Process:* Access Management, Incident Management and Change Management
- *Return on Investment:* Access Management and Financial Management.
- Ability to Measure the Financial Contribution of IT to the Business: Service Portfolio Management and Financial Management.

The study clarifies the relation between specific ITIL processes and the benefits attainable through its implementation. The findings suggest that there is a strong possibility that links exist between the usage of ITIL v3 and the realization of operational benefits and improvements. The study's findings and the literature available provide a relatively robust confirmation for the growing support for ITIL's implementation.

This study has a number of implications for both research and practice. This study contributes to research in assessing the impact of different lifecycle phases and processes of ITIL on the realization of benefits. The study also highlights the number of organizations that realized benefits through the implementation of ITIL. Additionally, the results can be used to improve the focus on current IT operational frameworks. As well, only very limited empirical research has been completed on the benefits provided by ITSM frameworks. Results from this provide a comprehensive, empirically validated conceptualization of the factors pertaining to benefits of implementation of ITIL.

A contribution is also done with regards to the methodology used. While previous research has concentrated on the general benefits realized when implementing ITSM frameworks, this study concentrates on factors which may contribute to realizing such benefits.

From the perspective of practitioners, IT managers can direct their ITIL improvement efforts on the ITIL processes which lead to benefits they wish to attain. For organizations considering the implementation of such ITSM frameworks, preliminary results show that ITIL processes can produce performance advantages. The research could also alleviate concerns about the value delivery of the ITIL implementation.

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# 6. Paper 4: Uncovering ITIL Claims: IT Executives' Perception on Benefits and Business-IT Alignment

Chapter Five presents Paper 4 (Marrone and Kolbe, 2010) which was published in the *Information Systems and e-Business Management* Journal in a special issue on Applications of Empirical Research in Business Process Management.

**Overview of Paper 4**

Many organizations are constantly seeking to improve their business process. In the 1980s manufacturing process improvement programs such as TQM (Total Quality Management), Six Sigma, and Just-In-Time (JIT) became exceedingly popular. However, many companies were failing in the process of implementing such programs. Many researchers argued that the reason for the failures was because the adoption of such frameworks was not in-line with the organizations' strategy or was used as a substitute for the strategies of an organization.

The purpose of this research is to understand if ITIL is able to provide both operational and strategic benefits to the companies that have implemented it. The research reports on an international survey of 441 firms about the benefits that ITIL provided to the IT organizations.

The study shows that the adoption of ITIL processes positively affect the strategic positioning of the IT organizations, specifically by improving its business-IT alignment. Findings show that operational benefits as well as strategic benefits are provided by the adoption of ITIL.

The research proves original as it contributes to a better understanding of the overall benefits which can be achieved through the implementation of ITIL. Understanding that ITIL has an impact on the business-IT alignment is of importance given that a greater strategic alignment between the business and IT makes operational improvements more effective.

ORIGINAL ARTICLE

# Uncovering ITIL claims: IT executives' perception on benefits and Business-IT alignment

Mauricio Marrone · Lutz M. Kolbe

**Abstract** Over 45% of companies are estimated to use IT Service Management (ITSM) frameworks, yet, these frameworks can be imitated and hence the competitive advantage gained from these will quickly become obsolete. Therefore, research on the benefits of ITSM must focus on both operational and strategic benefits. An international survey of 441 firms was conducted to examine the benefits that IT Infrastructure Library (ITIL), the de-facto ITSM framework, provided to the IT organizations. The research focused on how (1) operational benefits, and, (2) strategic positioning of the IT organizations, specifically how the perceived level of Business-IT alignment maturity evolved as the adoption of ITIL increased. Results indicate that as the adoption of ITIL increased, the number of realized operational benefits increased, as well as the levels of maturity of the Business-IT alignment. This indicates that the further the implementation of ITIL the greater the operational and strategic benefits to the organization. Implications for practitioners and researchers are also discussed.

**Keywords** IT infrastructure library · ITIL · Business-IT alignment · Business process management · BPM

## 1 Introduction

In the 1980s manufacturing companies implemented improvement programs such as TQM (Total Quality Management), Lean Manufacturing, JIT (Just-In-Time)

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amongst others. Companies implemented such programs in order to achieve competitive advantage and become "world-class" through the achievement of operational improvements. However, in their study, Hubiak and O'Donnell (1996) argue the majority of the implementations of such programs were not successful and did not provide the expected benefits. Hayes and Pisano (1994) state that "if managers pin their competitive hopes on the implementation of a few best-practice approaches, they implicitly abandon the central concept of strategy in favor of a generic approach to competitive success". Porter (1996) argues that focusing on operational improvements is not a replacement of a strategy and that the main focus of the business should be on the later.

Nowadays, the usage of IT best practices is becoming more and more common. Several studies have focused on the adoption of IT Service Management (ITSM) as well as a specific service oriented best practices. Winniford et al. (2009) claim that around 45% of US companies are using an ITSM while 15% are planning its usage. The IT Governance Institute (2008) estimates that the ITSM framework with the highest adoption rate is IT Infrastructure Library (ITIL) with 24%, followed by Control Objectives for Information and related Technology (CobiT) with an adoption rate of 14%.

When analyzing the benefits that such best practices have on the organizations that implement them, it is not only important to understand if best practices can provide operational benefits, but also to examine if they can provide a greater alignment between the IT organization and the business.

To date there have been few academic studies on the benefits on ITSM, yet, practitioners and researchers are interested in understanding the possible benefits realized by companies which adopted an ITSM, specifically those companies which have adopted ITIL. Moreover, importance is given to the understanding of how operational benefits evolve as companies increase the adherence to the guidelines to the ITIL model. Also of interest is the perception by IT managers of the alignment of IT and the business and, how this perception develops as companies increase their adherence to the model.

The research methodology of a large scale international survey has not yet been employed. Therefore, this research, using empirical data gathered from a survey with major companies from various industries, and set out to understand the following:

1. How is the Business-IT alignment perceived at different levels of maturity of the ITIL implementation?
2. How does the total number of realized benefits develop as the maturity of the ITIL implementation increases?

In this context, this paper begins with a literature review on IT Service Management as well as benefits of the usage of ITIL and on Business-IT alignment. This is followed by a description of the methodology used for this research. Results of the survey are then analyzed and outcomes are discussed. Before the limitations and the future research sections conclusions are drawn.

## 2 Related research

IT Service Management can be defined as "a set of processes that cooperate to ensure the quality of live IT services, according to the levels of service agreed to by the customer" (Young 2004) Conger et al. (2008) add that ITSM "focuses on defining, managing, and delivering IT services to support business goals and customer needs, usually in IT Operations". Since ITSM is process focused, it shares a joint ideology with process improvement movements such as Business Process Management (BPM; Brenner 2006; Galup et al. 2009).

Service oriented IT Management can be seen as a philosophy for an orientation towards market, service, lifecycle and processes (Zarnekow et al. 2005). First, there is a market orientation, which implies that there is a customer–supplier relation instead of a relationship as project partners. Second, there is a service orientation, which means service providers have service portfolios instead of project portfolios. These service portfolios include all of the IT services offered by the provider. Third, the focus is on the service lifecycle hence, the ITSM provide a methodical approach to the management of IT services—from design, implementation, operation to continual improvement. It does not only focus on the technical aspects of IT but also allows the alignment of the service and functions provided by IT within the organization. The main focus of the management of IT services is on the costs of the whole lifecycle, not merely on the costs of development. This leads to a lifecycle orientation. Fourth is the process orientation, so that the IT organization is oriented on processes and not on functional structures.

There are various concepts of ITSM. The most common approach is the ITIL which is a de facto standard for IT Service Providers (Hochstein et al. 2005; IT Governance Institute 2008). Various ITSM frameworks have been developed using ITIL as a reference, such as Hewlett-Packard (HP ITSM Reference model), IBM (IT Process Model) and Microsoft's MOF (van Bon et al. 2007).

The current version of ITIL, Version 3, was published in May 2007. It consists of 26 sections which are included in the following five services: Service Strategy, Service Design, Service Transition, Service Operation and Continual Service Improvement. The earlier version, Version 2, has a total of ten processes in two main domains: Service Support and Service Delivery.

Academic research on ITIL is still in its early stages despite its numerous appearances in the popular press and practitioners' magazines. Existing academic literature merely presents the description of the areas documented on ITIL (e.g. Cervone 2008) or analyzes adopters of ITIL through case studies (e.g. Hochstein et al. 2005; Marrone et al. 2010). A summary of benefits of ITIL found in academic literature published in peer-reviewed journals and conferences is shown in Table 1.

To achieve a superior profitability it is not enough to receive benefits at an *operational level*. Changes at an *operational level*, such as the usage of best practices, can be quickly imitated as other companies observe that the usage of a best practice gives a company the competitive advantage. The greater the usage of best practices the more similar companies becomes. Porter (1996) proposed that improvements created by best practice do not lead to improvements for any organization. Porter argues that a company should focus on both the *operational*

**Table 1** Summary of benefits of ITIL

| Improvement of… | Hochstein et al. (2005) | Potgieter et al. (2005) | Marrone et al. (2010) | Cater-Steel et al. (2008) | Cervone (2008) |
|---|---|---|---|---|---|
| Service quality | X | X | X | X | X |
| Standardization of service | X | | X | X | |
| Customer satisfaction | | X | X | X | |
| Return on investment | | | X | X | X |
| Reduction of downtime | | | | X | X |
| Benefited from best practice experience of others | X | | | | |
| Financial contribution control | | | | X | |
| First-call resolution rate | | | | X | |
| Morale of IT | | | | X | |

*effectiveness* and the *strategic positioning* and that continual improvement is necessary to stay relevant in the market.

IT organizations that have implemented a best practice such as ITIL need to have a dual focus. They need to concentrate not only on the *operational level* benefits achieved by the implementation of best practices but also on their *strategic level* positioning to develop a unique and valuable stance relevant to the customer. In other words, it is also important for the IT organization to be more than a mere support for the business, but rather a proactive organization that is responsive to the needs of the business and the market.

Business-IT alignment engages in creating and supporting the activities that fit the strategy between the business and IT. It can be defined as "The extent to which the IS strategy supports, and is supported by, the business strategy" (Luftman et al. 1993). The strategic outcome is that the overall business benefits from effective IT functioning and IT benefits from being integral to the business plans of the company. Two directions of alignment can be identified; one on the way IT is aligned to business, and the other, on the way business can be aligned to IT (Luftman 2003). Both directions are equally important.

Business-IT alignment has been shown to have a positive effect on business performance (Sabherwal and Chan 2001). It provides a competitive advantage and increases profitability (Henderson et al. 1996), and is a key factor for successful IT systems implementations (Boynton et al. 1994).

Currently there is a debate in the literature about how alignment should be measured and what should be measured. In a review of the various measuring approaches, Avison et al. (2004) conclude that there is no agreement on the factors that can measure Business-IT alignment.

Researchers such as Tallon et al. (2000) have assessed strategic alignment using a single item. This approach has been supported by Venkatraman and Ramanujam (1987) who found a correlation between the reality and the perception of executives.

On the other hand, researchers such as Das et al. (1991), Reich and Benbasat (2000) and Luftman (2003) use multi-dimensional scales to measure the alignment.

Das et al. (1991) identify five dimensions: formality, scope, participation, influences, and co-ordination. Reich and Benbasat (2000) suggest four elements; shared domain knowledge, IT implementation success, communication between IT and the business, and connection between IT and business planning.

Luftman (2004) considers six criteria when measuring the alignment. These are: Communication Maturity, Competence/Value Measurement Maturity, Governance Maturity, Partnership Maturity, Scope and Architecture Maturity and Skills Maturity. However, Fimbel (2007) observes that professionals do not use the available alignment models because these do not enable them to shed light on company's practices. He proposes the Dynamic and Global Alignment Model (DyGAM) developed from an international survey conducted amongst 150 companies.

While there has been no agreement on how to measure the Business-IT alignment, there have been attempts to understand whether ITIL contributes to this alignment. Kashanchi and Toland (2006) conducted an exploratory analysis of data gained from interviews with three experts and concluded that ITIL has the ability to support business strategy and to improve IT strategy.

Until now there has been no research that has measured the benefits and the Business-IT alignment and their relation to the maturity of the ITIL implementation. Similarly, the methodology of a large scale survey involving a range of countries and industries has not be undertaken. This literature review leads to the research hypotheses, which are presented in the following section.

## 3 Research design

Rather than merely analyzing the *operational level* improvements, which may be achieved through the adoption of ITIL, attention should also be placed on the *strategy level* improvements. This section describes the levels of adoption, generally known as maturity model, as well as specifying the hypotheses derived from the two research questions listed in the introduction. A total of four hypotheses are formulated.

### 3.1 Maturity levels

To comprehend at which level of adherence or maturity companies are in when adopting the ITSM model, various researchers including Cater-Steel et al. (2006) and Marrone et al. (2010) have used the Maturity Model. The Maturity Model presented in these studies is based on the model from CobiT and Capability Maturity Model Integration (CMMI). These levels are intended as profiles of IT processes. Companies would identify these levels as a description of their current state. Table 2 covers the definitions for each level of the maturity model.

Similarly, to understand at which level of maturity companies are regarding their Business-IT alignment, the levels proposed by Luftman's (2001) Strategy Alignment Maturity Model (SAMM) are used. The five levels of Business-IT alignment

**Table 2** Maturity model levels with definitions

| Level | Level name | Definitions |
|---|---|---|
| 0 | Non-existent | Management of processes is not applied at all |
| 1 | Initial/ad hoc | Processes are ad hoc and disorganized |
| 2 | Repeatable | Processes follow a standard, are documented and understood |
| 3 | Defined | Processes are documented and monitored for compliance |
| 4 | Managed | Management monitors and measures according to metrics established on the previous level |
| 5 | Optimized | Good practices are followed and automated |

maturity are: (1) Initial/Ad Hoc, (2) Committed, (3) Established/Focused, (4) Improved/Managed, and (5) Optimized.

### 3.2 Hypotheses

The research focuses on the IT organization's perception of the Business-IT alignment and aims to understand which effect, if any, the increase of the adoption of the ITIL model has on the perception of the Business-IT alignment. We hypothesize the following:

**H1** *Based on the perception of the IT organization, as the maturity level of ITIL increases, the Business-IT alignment increases.*

Additionally, the focus of our research is to understand the progression of the 'total impact of realized benefits' to the companies rather than the 'perception of the benefits realized' in the individual areas. Consequently, the total number of realized benefits due to the implementation of ITIL is calculated for each company. The same approach is used for the number of benefits supported by metrics and the number of benefits acknowledged by the business. Therefore, the following hypothesis is suggested:

**H2a** *As the maturity level of ITIL increases, so does the quantity of realized benefits at the earlier levels of implementation, while on the later levels, the quantity of realized benefits stays nearly constant.*

We also expect that at later levels of maturity the number of realized benefits that are supported by metrics will be observed, rather than on the initial levels of maturity. Similarly, the business may recognize the benefits of the ITIL implementation in the later levels of adoption, possibly due to a better Business-IT alignment, which is a proposed benefit of ITIL. Therefore, the following hypotheses are suggested:

**H2b** *As the maturity level of ITIL increases, so does the usage of metrics to measure the realized benefits.*

**H2c** *As the maturity level of ITIL increases, so does the acknowledgement by the business of the benefits of ITIL.*

## 4 Methodology

### 4.1 Design

The online questionnaire was made available in the months of April and May 2009. An invitational email was sent to individuals who were on the mailing lists of Hornbill and the IT Service Management Forum (itSMF) in the United States of America and United Kingdom. Additionally, in an attempt to expand the findings of this research, the survey was announced in various internet groups and forums whose sole topic was ITIL. Using this approach the research findings are applicable to a greater population of ITIL users, rather than solely to the members of certain mailing lists or groups. The target participant would be ITIL champions for their organization and would be heavily involved in the implementation of ITIL.

The structure of the questionnaire addressed many aspects of ITIL, its adoption, usage, implementation and maturity, as well as effectiveness of processes and realized benefits. It also covered the topics of Business-IT alignment and service desk usage. The survey contained questions to which responses used Likert scales, nominal scales and open-ended questions.

The following three categories were used for the study:

1. Rate the perception of the maturity of your ITIL implementation (using a scale based on the Maturity Model).
2. Choose the perceived level of Business-IT alignment (based on Luftman's (2001) SAMM levels with each level and their definitions displayed for further information).
3. Select realized benefits that could be achieved due to the adoption of ITIL (benefits listed on the survey are those found on the Table 1).

"Appendix" contains an extract of the original survey used. Question 1 was used to understand the maturity of the ITIL implementation. Question 2 was used to understand the current level of Business-IT alignment. Question 3 was used to record the benefits which were realized. There were two follow up questions. Question 4 was used to understand if the benefits that had been realized had been quantified through the usage of metrics. Question 5 asked whether the benefits that had been realized had also been acknowledged by the business.

Therefore, for this study the perceived maturity level is the independent variable, while the perceived realized benefits and the perceived Business-IT alignment are the dependent variables.

Questions on benefits were validated by IT service experts in a pilot survey that was carried out at the CeBIT fair in Hannover, Germany in February 2009. From the feedback received, a small number of word changes were completed.

### 4.2 Respondents' profile

More than 5,000 invitations were sent out to members of the itSMF UK and US and to the mailing list of Hornbill. Out of the 784 IT executives who started the survey, 503 completed and submitted the survey. Partially completed surveys were not used

for the study. Four-fifth of those who completed the survey were directly invited to participate in the survey, the remainder were recruited through the forum posting. The return rate of the survey invitations was less than eight percent. One hundred and 93 of the respondents used ITIL Version 3, while a total of 248 used Version 2. Those not using ITIL were excluded for this study. The final sample size was 441.

Respondents were asked about their companies' industry, number of sites supported by IT, number of employees in the company as well as their title and their location. Table 3 shows the profile of the respondents. In the sample around three-fourths of those surveyed were from the technology, public, financial and banking sectors. Other industries include the professional, retail and manufacturing industries.

Nearly 70% of the respondents had ten or more sites supported by central IT, and close to 20% had two to five sites. Almost 45% of those interviewed worked in a company which had more than 10,000 employees. The job roles of those interviewed are also shown. Of those surveyed 33% were IT managers, while 23% were Process Specific Managers. The majority of the answers received were from IT job roles. Due to the usage of mailing lists and posting of invitations to the survey on English speaking websites, the majority of answers came from the United Kingdom (53%) and United States (35%) with various answers coming from Canada, India and Ireland.

## 5 Results

An exploratory analysis was conducted for each variable to test for normality. Both, the Kolmogorov–Smirnov and the Shapiro–Wilk tests showed significance for the perceived Business-IT alignment ($p < 0.001$) and for the realized benefits of ITIL ($p < 0.001$). As the data was non-normal, the Kruskal–Wallis, a non-parametric one way analysis of variance, was used to study the data. If the data using the Kruskal–Wallis showed significant differences between the groups, the Mann–Whitney $U$ test is applied.

As the study was concerned with how the nominated variables were impacted as the ITIL implementation increases, caution was taken with the choice of test measures. The Mann–Whitney $U$ tests inflates the Type I error rate, so care was taken in the choice of comparisons made.

The suggested comparisons are between the first and middle level of ITIL implementation maturity, the first and last level of ITIL implementation maturity, and between the middle and final level of ITIL implementation maturity. Therefore the following three tests were conducted:

- Test 1: Level 1 (Initial) compared to Level 3 (Defined).
- Test 2: Level 1 (Initial) compared to Level 5 (Optimized).
- Test 3: Level 3 (Defined) compared to Level 5 (Optimized).

Since three tests were conducted, a Bonferroni correction is applied. Due to this correction, rather than using the critical level of significance of 0.05, all effects were reported at 0.0167 level of significance. All reported $p$ values are using two-tailed

**Table 3** Profile of responding organizations ($n = 441$)

| Industry | Percent |
| --- | --- |
| Technology | 32 |
| Public | 23 |
| Financial and banking | 19 |
| Manufacturing | 5 |
| Other | 5 |
| Retail and distribution | 4 |
| Professional | 4 |
| Utility | 2 |
| Entertainment and hospitality | 2 |
| Healthcare | 2 |
| Telecommunication | 2 |

| Countries | Percent |
| --- | --- |
| United Kingdom | 53 |
| United States of America | 35 |
| Canada | 1 |
| India | 1 |
| Ireland | 1 |
| Other | 9 |

| Number of sites | Percent |
| --- | --- |
| 10+ | 69 |
| 2–5 | 18 |
| 6–10 | 7 |
| 1 | 6 |

| Number of employees | Percent |
| --- | --- |
| 10,000+ | 42 |
| 1,001–5,000 | 19 |
| 5,001–10,000 | 17 |
| 101–500 | 9 |
| 501–1,000 | 8 |
| <100 | 5 |

| Job role | Percent |
| --- | --- |
| IT manager | 33 |
| Process specific manager e.g. change | 23 |
| Service delivery manager | 19 |
| IT director—organisation level | 13 |
| HelpDesk/service desk manager | 9 |
| HelpDesk/service desk operative | 3 |

Monte Carlo $p$ values with a confidence level of 99% and a number of samples of 10,000. This method was used because of the large sample size.

Additionally, to understand the trends in the data the Jonckheere–Terpstra test was used. Lastly, $r$ was used to measure the strengths of a relationship between variables (Rosenthal 1991 p. 19). Cohen suggests that the sizes of the effect are small (0.1), medium (0.3) or large (0.5). If $r$ is a negative number this reveals that the data lies on a straight line with a negative slope.

In the next sections the following abbreviations are used: H corresponds to the Kruskal–Wallis statistic, $U$ represents the Mann–Whitney $U$ statistic, SE is the Standard Error, while $J$ symbolizes the observed Jonckheere–Terpstra statistic.

### 5.1 Business-IT alignment and maturity level (H1)

Table 4 displays the means and medians for the perceived Business-IT alignment. In general, the perceived Business-IT alignment is significantly affected by the implementation maturity of ITIL ($H(4) = 77.43$, $p < 0.001$). Mann–Whitney tests were also used to follow up this finding.

Table 5 shows the results from the selective comparisons. It can be observed that between Level 1 (Initial) and Level 3 (Defined) there was significance ($U = 1,411$, $r = -.21$). When comparing Level 1 (Initial) with Level 5 (Optimized) significance

**Table 4** Descriptive statistics of Business-IT alignment ($n = 441$)
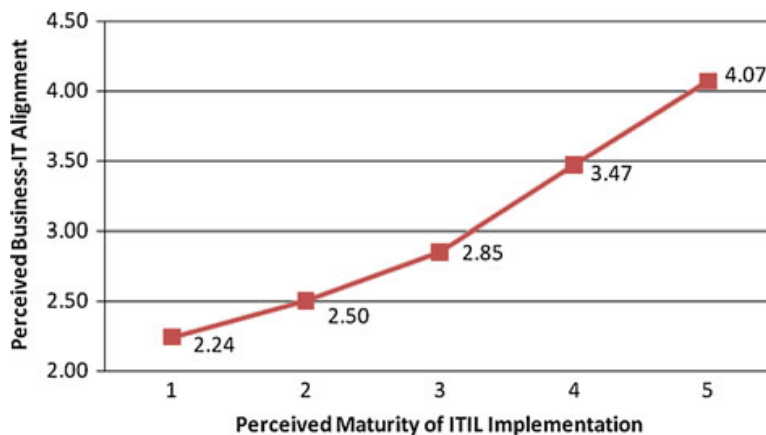
**Table 5** Mann–Whitney $U$ test results for perceived Business-IT alignment maturity levels ($n = 441$)

| | Level 1 compared with Level 3 | | | Level 1 compared with Level 5 | | | Level 3 compared with Level 5 | | |
|---|---|---|---|---|---|---|---|---|---|
| | $U$ | $p$ | $r$ | $U$ | $p$ | $r$ | $U$ | $p$ | $r$ |
| Business-IT alignment (H1) | 1,410.5 | 0.010* | −0.21 | 331.5 | 0.000* | −0.55 | 1,620.5 | 0.000* | −0.44 |

* Significance at 0.0167

can be observed with a large effect size ($U = 332$, $r = -.55$). Lastly, comparing Level 3 (Defined) with Level 5 (Optimized) significance can be observed ($U = 1,620$, $r = -.44$). The greatest increase of the perceived level of maturity can be seen when comparing Level 3 (Defined) and Level 5 (Optimized).

Jonckheere's test revealed a significant trend in the data. As the level of maturity goes up, the median of the perceived Business-IT alignment increases ($J = 49,777$, $z = 8.79$, $r = .42$). We can conclude that the perceived Business-IT alignment increases as the maturity of implementation increases.

### 5.2 Number of realized benefits and maturity levels (H2)

When conducting the Kruskal–Wallis test, the number of realized benefits is significantly affected by the level of implementation maturity [$H(4) = 80.12$, $p < 0.001$ for the total number of realized benefits (H2a), $H(4) = 98.44$, $p < 0.001$ for realized benefits using metrics (H2b), $H(4) = 62.95$, $p < 0.001$ for realized benefits acknowledged by the business (H2c)]. Table 6 presents the means, standard error and medians for the perceived realized benefits.

As shown in Table 7, the number of realized benefits (H2a) is significantly higher when comparing Level 1 (Initial) with Level 3 (Defined) of maturity of implementation. Based on Cohen's benchmark, there is a medium to large change on the number of realized benefits as maturity increases ($U = 778$, $r = -.40$). One can also observe this when comparing Level 1 (Initial) with Level 5 (Optimized; $U = 347$, $r = -.46$). Finally, when comparing Level 3 (Defined) with Level 5 (Optimized) no significance can be determined ($U = 2,831$, $r = -.15$). Yet, when comparing the same levels, significance can be observed when examining the number of realized benefits that have been measured using metrics (H2b; $U = 2,400$, $r = -.24$) as well as when observing the number of realized benefits that have been acknowledged by the business (H2c; $U = 2,386$, $r = -.24$). Significance for the total realized benefits backed by metrics (H2b) can be seen also when comparing Level 1 (Initial) with Level 3 (Defined; $U = 838$, $r = -.37$). Additionally, significance can also be observed for the total realized benefits acknowledged by business (H2c) when comparing Level 1 (Initial) with Level 3 (Defined; $U = 1,325.5$, $r = -.22$).

Jonckheere's test shows a significant trend in the data. As the level of maturity goes up, the median number of realized benefits increases (H2a; $J = 49,784$, $z = 11.44$, $r = .41$), the median number of realized benefits backed by metrics increases (H2b; $J = 51,503$, $z = 11.69$, $r = .46$), and finally, the median number of

**Table 6** Descriptive statistics of realized benefits ($n = 441$)
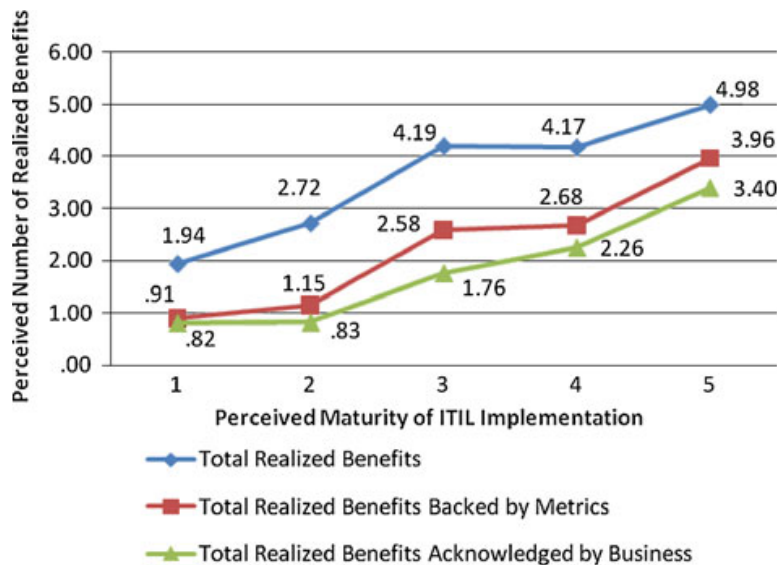


**Table 7** Mann–Whitney $U$ test results for total number of perceived realized benefits and maturity levels ($n = 441$)

| … per company | Level 1 compared with Level 3 | | | Level 1 compared with Level 5 | | | Level 3 compared with Level 5 | | |
|---|---|---|---|---|---|---|---|---|---|
| | $U$ | $p$ | $r$ | $U$ | $p$ | $r$ | $U$ | $p$ | $r$ |
| Total realized benefits (H2a) | 777.5 | 0.000* | −0.40 | 347.0 | 0.000* | −0.46 | 2,830.5 | 0.068 | −0.15 |
| Total realized benefits backed by metrics (H2b) | 838.0 | 0.000* | −0.37 | 324.0 | 0.000* | −0.48 | 2,400.0 | 0.002* | −0.24 |
| Total realized benefits acknowledged by business (H2c) | 1,325.5 | 0.000* | −0.22 | 432.0 | 0.000* | −0.40 | 2,386.0 | 0.001* | −0.24 |

* Significance at 0.0167

realized benefits acknowledged by business increases (H2c; $J = 48,387$, $z = 9.73$, $r = .38$).

We can conclude that as the level of maturity increases, so does the number of realized benefits and on later levels of maturity, specifically between the maturity Level 3 (Defined) and Level 5 (Optimized), companies concentrate more on using metrics and on showing the realized benefits to the business.

## 6 Discussion

In this research we focus on ITIL and the benefits it provides to the IT organization. Our research looks at how the implementation of ITIL may impact both factors: the *operational effectiveness* and *strategic positioning*. The research concentrates on the Business-IT alignment because it helps to support the services provided by IT to meet the needs of the business. This may provide the organization with a sustainable competitive advantage.

In general, the results of the current study confirm H1. H1 states that as the maturity of ITIL increases, so does the Business-IT alignment. It is shown that companies that are highly mature in the ITIL implementation are also highly aligned organizations. Of importance is that the greatest increase in the perceived level of maturity is seen in the later stages of maturity, Level 3 (Defined) and Level 5 (Optimized). These results confirm the exploratory research carried out by Kashanchi and Toland (2006).

Additionally, results from H2a, H2b and H2c are statistically significant. H2a explores the effect that the ITIL maturity has on the total number of realized benefits, while H2b and H2c concentrates on the number of realized benefits backed by metrics and acknowledged by the business, respectively. The fact that there are benefits gained from the adoption of ITIL agrees with the results from individual case studies on the effectiveness of ITIL undertaken by Potgieter et al. (2005) and Spremic et al. (2008).

As observed in the results of H2a, the number of realized benefits increases as the maturity level increases. However, there was no significance when comparing the later levels of maturity, Level 3 (Defined) with Level 5 (Optimized). While no significant increase in the number of realized benefits can be observed in the later stages, between Level 3 (Defined) and Level 5 (Optimized) significant progress can be observed in other areas. These are:

1. The usage of metrics to support the realized benefits (H2b). The usage of metrics leads to improved decision making and problem solving (Banker et al. 2004), the survival and prosperity of organizations (Kaplan and Norton 1996), and more importantly, it encourages the realignment of strategy (Neely et al. 1994).
2. Acknowledgement of the benefits realized by the business (H2c) and shows that there is a movement towards a higher Business-IT alignment.

All results from this study suggest, ITIL not only provide various benefits at *operational level* but also contributes to the *strategic positioning*. It does this by improving the Business-IT alignment which allows IT to enable the business in its

creation of a sustainable competitive advantage. Additionally, it points towards a greater control of IT processes which allows IT to respond to the environmental uncertainty faced by the business. Furthermore, as proposed by Porter (1996), the strategic alignment between the Business and IT makes operational improvements more effective.

The study provides a contribution to both research and practice. The contribution to research is twofold. It provides a collection of nine key benefits (see Table 1) of ITSM and ITIL by using suggestions made by Hochstein et al. (2005), Potgieter et al. (2005), Marrone et al. (2010), Cater-Steel et al. (2008) and Cervone (2008). It also delivers insight into the perception of the effectiveness of ITIL, the perception of the progress of the maturity of the Business-IT alignment, as well as filling a research gap. Additionally, this research opens the path for future research.

In practice, the findings can serve as a guideline for IT managers who are considering adoption or who already have adopted ITIL. Three trends must be considered by IT managers:

1. the IT organization will receive various operational benefits in the early stages of implementation
2. in the later stages of implementation the usage of metrics to measure the benefits as well as the benefits acknowledged by business will continue to increase; and
3. the Business-IT alignment will increase throughout the implementation of ITIL, specifically in the later stages, which may lead to a greater strategic positioning of the IT organization.

Limitations in the study include a concentration on the United States and United Kingdom and an over-sampling of larger enterprises. As well, only the IT perception was considered. Another limitation is that empirical studies are dependent on the quality of data provided by the respondents. Also the results are based only on the perceived Business-IT alignment and on those benefits that were listed in the survey.

Since this research is targeted towards IT experts, further studies will be conducted to understand the views of the business in respect to the benefits of the ITIL implementation. A comparison of views, the IT and the business view, on these topics is relevant. Also studies will be conducted to understand how Business-IT alignment is affected by the implementation of ITIL measuring the alignment using Luftman's SAMM.

## 7 Conclusion

Over the past years the usage of IT operational frameworks based on BPM principles such as ITIL has been on the rise. Various researchers have speculated on the possibilities of such frameworks improving process performance. Having an informed opinion on the improvements which may be provided by these frameworks is important to practitioners and researchers. In a small measure this research contributes to a better understanding of the perceived benefits provided by ITIL.

While delivering tangible performance improvement is the goal of numerous IT managers this must not be the main objective of the IT organization. As a result, a distinction between *operational effectiveness* and *strategy positioning* must exist. As expressed earlier, both are essential but they each work in a unique form.

Both of these areas are touched by the four principal observations of this study. It shows that as the maturity of ITIL increases:

1. the perception of the level of Business-IT alignment increases
2. the number of realized benefits increases
3. the usage of metrics to measure the benefits of the implementation increases
4. the number of benefits provided by IT that are acknowledged by the business increases.

The research contributes to a better understanding of the overall benefits that can be achieved through the implementation of ITIL. It can be observed that its implementation has the potential for a strong positive effect on business performance, competitive advantage and increased profitability. Similarly, the indirect impact of the metrics and the acknowledgement of the benefits provided by IT on strategic positioning have a strong positive influence on the business.

## Appendix: Survey used

Which of the following statements best describes your IT organization?

- We have not adopted ITIL (Level 0).
- We are new to ITIL and have just started to implement processes (Level 1).
- We have a relatively low level of ITIL process maturity. Some processes are documented and these are generally understood, but errors are likely (Level 2).
- We have a medium level of ITIL process maturity. Processes are documented monitored for compliance (Level 3).
- We have a reasonably high level of ITIL process maturity. Our processes are documented, and measured according to established metrics (Level 4).
- We have a very high level of ITIL process maturity. Our processes are documented, understood, backed by metrics and continually reviewed for improvement (Level 5).

Which statement would you use to describe the relationship between IT and the business?

- Business and IT lack understanding (Level 1).
- Business and IT have a limited understanding (Level 2).
- There is a good understanding between IT and business (Level 3).

- There is an improved and managed process of alignment (Level 4).
- There is a complete alignment with integration of strategic planning of Business and IT (Level 5).

Owing to the ITIL implementation, have you had an improvement in the following areas? (multiple answers allowed)

A.   Service quality.
B.   Standardized process adoption across all of IT.
C.   Customer satisfaction.
D.   Return on IT spending.
E.   Reduction in IT downtime.
F.   Benefited from best practice experience of others.
G.   Financial contribution of IT to the business.
H.   First-call resolution rate.
I.   Improved the morale of IT staff.

(Question 4 and Question 5 are follow-up questions of Question 3. Only the factors chosen on Question 3 appear on Question 4 and Question 5).

Have the improvements in the areas been noted by the business? (multiple answers allowed)

A.   Service quality.
B.   Standardized process adoption across all of IT.
C.   Customer satisfaction.
D.   Return on IT spending.
E.   Reduction in IT downtime.
F.   Benefited from best practice experience of others.
G.   Financial contribution of IT to the business.
H.   First-call resolution rate.
I.   Improved the morale of IT staff.

Have the improvements been backed by metrics? (multiple answers allowed)

A.   Service quality.
B.   Standardized process adoption across all of IT.
C.   Customer satisfaction.
D.   Return on IT spending.
E.   Reduction in IT downtime.
F.   Benefited from best practice experience of others.
G.   Financial contribution of IT to the business.
H.   First-call resolution rate.
I.   Improved the morale of IT staff.

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# 7. Paper 5: Fulfilling its Promises: a Perspective of IT Executives on the Benefits of Implementing CobiT

Paper 5 (Marrone, Kolbe, 2010) is presented in this chapter. Earlier versions of this paper have been presented at the Americas Conference of Information Systems (AMCIS) (Marrone, Hoffmann and Kolbe, 2010) and Pacific and Asia Conference of Information Systems (PACIS) (Marrone and Kolbe, 2010). Using the feedback presented at these conferences and expanding this project, this paper has been created.

Hoffmann worked under my supervisor as a research assistant. He was in charge of tasks of routine nature such as checking the validity of the data and sending out invitations and reminders to the survey. For his work on the AMCIS paper he is acknowledged as a co-author.

**Overview of Paper 5**

The previous paper shows that, as the maturity of the ITIL implementation increases, so does the perceived business-IT alignment. ITIL is not the only operational process improvement framework which has been theorized to have an impact on the business-IT alignment. As covered in the literature review, one of the major objectives of CobiT is on aligning the Business with IT. IT governance and CobiT have often been referred to as the responsibility of the board of directors and executive management.

In this paper, we explore whether use of CobiT is able to have an impact on the perception of business-IT alignment. Further, we concentrate on understanding if the implementation of CobiT has a positive impact on the focus areas of IT governance. The focus areas of IT governance are: strategic alignment, performance measurement, control and accountability, risk management, value delivery and resource management.

The purpose of this global study is to understand the impact that IT governance frameworks have on the business. Specifically this study examines the effect on business-IT alignment and areas of IT governance. A survey was conducted, and 190 IT organizations responses were received. Only companies using CobiT v4 were considered, therefore, 113 responses were deemed as valid. Tests were used to understand if differences in the realization of benefits and maturity of the business-IT alignment exist when comparing companies at different stages of the CobiT adoption.

Results indicate that companies with higher implementation levels of CobiT experienced positive impacts on their maturity of their business-IT alignment. Additionally, they received greater benefits in the focus areas of IT governance. Findings highlight the IT governance areas which are most likely to display improvements at different levels of implementation. In the early levels of implementation, Capability Management and Control and Accountability are areas likely to have a significant positive impact. In the later stages, Strategic Alignment, Risk Management and Control and Accountability are also likely to achieve a significant positive impact.

This is the first global empirical study of the benefits of the CobiT implementation, and it is the first study that concentrates on the impact of the CobiT implementation on the IT governance focus areas. Practitioners implementing CobiT will gain an understanding of when they may expect an impact on these areas when they implement the framework. This way they can understand in which areas and at which level of implementation the value of the CobiT implementation is likely to become visible.

**Title** Fulfilling its Promises: a Perspective of IT Executives on the benefits of implementing CobiT

**Abstract** Various companies have implemented IT governance frameworks to improve their management and governance of IT. The benefits and areas of focus of IT governance have been widely explored only in theory. In this research an international survey of 113 firms using CobiT was conducted to understand the evolution of factors such as the benefits and Business-IT alignment as companies increase their adoption of CobiT. Results indicate that companies which have achieved higher implementation levels experienced high positive impacts on their Business-IT alignment and received greater benefits in the areas of IT governance. Furthermore, the research maps out the IT governance areas which are most likely to display improvements at different levels of implementation maturity.

# 1    Introduction

Information Technology (IT) is the backbone of businesses and many companies could not function without a solid IT base. As a result, the IT function is changing from a technology provider into a strategic partner (Venkatraman, 1999). The new role of IT needs to be managed and governed according to the principles of efficient management which apply to all areas of organizations. This shift in the focus and reliance on IT has generated attention towards the processes of IT governance.

IT governance has its roots in corporate governance and has been a research topic since the 1990s (Webb et al., 2006). Effective IT governance ensures the linkage of business and IT, identifies and calculates risks, enables effective resource management, monitors IT resources and delivers value through IT.

A 2008 survey by PricewaterhouseCoopers found that only 18% of companies had implemented IT governance processes but 34% of companies were in the process of implementing it. The survey concludes that usage had doubled over the previous two years. Some authors (Van Grembergen et al., 2003); (Ridley et al., 2004) have argued that the high acceptance of IT governance is because it is considered an appropriate control framework to help an organization ensure its Business-IT alignment. Weill and Ross 2005) estimated that organizations with high levels of IT governance could increase their profits by up to 20% compared to those organizations with low implementation of IT governance practices. However, Koch (2002) argues that IT governance is often more theoretical than practical, which may hamper the benefits provided.

While many organizations across the world are adopting IT governance frameworks, little empirical research has been conducted (Ridley et al., 2004); (Brown & Nasuti, 2005); (Bowen et al., 2007). The existing research mainly uses case studies and literature reviews and is often limited to specific geographic regions. Ridley et al. (2004) point out that there is a call for quantitative studies in IT governance frameworks, such as the CobiT (Control Objectives for Information and Related Technology).

Of interest to research and praxis is to understand the impact of implementation of CobiT on these areas, throughout various phases of implementation. There are five phases of implementations, ranging from Initial to Optimized. The research described in this paper uses empirical data gathered from a survey of major companies from across various industry sectors and geographic regions. It seeks to understand the following questions.

- Is there a relationship between the size of the company and their CobiT implementation maturity?

- How is Business-IT alignment affected as the CobiT implementation matures?

- How do companies perceive realized benefits as the CobiT implementation matures?

The central question of this research is how the different phases of the implementation influence the success of CobiT adoption, specifically the benefits granted by implementation. Additionally, since one of the major tasks of CobiT is to ensure the strategic alignment between business and IT, this research examines the impact of the maturity of the CobiT implementation on the IT perceived Business-IT alignment.

This article begins with a literature review on IT governance, CobiT and its benefits followed by a description of the methodological approach. A deductive approach is chosen, and a survey of 113 is completed. Discussion of the results and the outcomes of the survey then presented. Subsequently, limitations and future research are explored and conclusions are drawn.

# 2    Related Research

The IT Governance Institute (ITGI) (2007) states that "IT governance is an integral part of enterprise governance and consists of the leadership and organizational structures and processes that ensure that the organization's IT sustains and extends the organization's strategies and objectives". Van Grembergen (2003) bases his definition of IT governance on the above but added that IT governance is driven by the top management and is used to control the development and implementation of IT strategy. Korac-Kakabadse and Kakabadse (2001) proposed that IT governance can be a critical success factor in achieving corporate success by providing information through the application of technology.

Patel (2002) considers that IT governance will enhance organizational accountability, improving IT's return on investment. However, Korac-Kakabadse et al. (2001) also stated that the benefits realized may vary from implementation to implementation.

The ITGI (2007) suggests that IT governance focuses on these areas:

- **Strategic Alignment** is concerned with the alignment between IT and business.

- **Value Delivery** encompasses how IT adds value to the business and how the expenses and the return on investment are optimized.

- **Risk Management** assures a continuous operation of IT and deals with operational IT risks, mostly techno-logical risks.

- **Performance Measurement** monitors and controls the performance of IT towards the business goals.

- **Capability Management** manages all resources including people, data and technology.

Webb et al. (2006) add the area of **Control and Accountability** to the ones mentioned above. Control and Accountability imply leadership, control and accountability from personnel within the organization who have authority to govern.

These six areas have been widely used in theory. Dahlberg and Kivijärvi (2006) create an assessment tool to measure the effectiveness of the implementation of IT Governance based on these areas. Research by Gellings (2007) using these five areas of IT governance looked at three German banks to understand how outsourcing relationships were improved due to the usage of IT governance.

IT control frameworks, which have been developed to promote effective IT governance, also focus on these six areas. An example of this is CobiT, which supports IT governance in managing and understanding the risks and benefits associated with information and related technology. In 2007 CobiT version four was released and it describes 34 IT processes with their associated tasks, divided across four domains: 1) planning & organization, 2) acquisition & implementation, 3) delivery & support and, 4) monitoring & evaluation (IT Governance Institute, 2007).

Few authors have concentrated on the benefits provided by the adoption of IT governance frameworks in practice. Gomes and Ribeiro (2009) studied a high education institution who implemented CobiT. They found that the implementation of CobiT led to improved quality of services, reduced execution time of tasks, reduced number of incidents and reduced number of reopened incidents. A study by De Haes and Van Grembergen (2009) explored six Belgium financial organizations and the impact on Business-IT alignment through IT governance. The study concludes that the IT governance maturity may have an impact on the maturity of Business-IT alignment

The achievement of an improved Business-IT alignment is a major aim of CobiT (Patel, 2002); (Ribbers et al., 2002); (De Haes & Van Grembergen, 2009). Business-IT alignment engages in creating and supporting the activities that link the strategy between the business and IT. Business-IT alignment can be defined as "The extent to which the IS strategy supports, and is supported by, the business strategy" (Tallon & Kraemer, 1998). Two directions of alignment can be identified; one on the way IT is aligned to business, and the other, on the way business can be aligned to IT (Luftman 2001).

Dahlberg and Kivijärvi (2006) argue that Business-IT alignment "impacts how IT is organized, resourced and managed, what risks are identified and mitigated, and what targets and measures are set for IT. Through this mechanism, Business-IT alignment impacts the value delivery of IT indirectly in addition to its direct impact on value delivery". This argument encapsulates the focus areas of IT governance and provides the rational for why Business-IT alignment is an important area for research. The importance of Business-IT alignment is also pointed out in the research of Bowen et al. (2007). They conclude that 'more effective IT governance performance outcomes' are associated with: a shared understanding of business and IT objectives, a balance of business and IT representatives in IT decisions, and comprehensive and well communicated IT strategies and policies. All of these factors have roots on Business-IT alignment and therefore, an effective IT governance is associated with a good Business-IT alignment.

## 3 Research Design

For the three research questions listed in the introduction, four propositions were developed and are described in the section below. A description of the maturity levels used to understand the level of implementation of CobiT is explained prior to the propositions studied.

### 3.1 Maturity Levels

The maturity model is a description of the level of 'adoption, adherence or maturity' of a company as it relates to the adoption of the CobiT framework. The CobiT maturity model is outlined in the IT governance guidelines (IT Governance Institute, 2007). Van Grembergen et al. (2003) argue that this tool offers an easy-to-understand method to determine the current state of maturity by benchmarking the current state and the best practices and standard guideline. Table 1 covers a brief description of each level of the maturity model.

| Level | Level Name | Description |
|---|---|---|
| 0 | Non-existent | Management of processes is not applied at all |
| 1 | Initial / Ad Hoc | Processes are ad hoc and disorganized |
| 2 | Repeatable | Processes follow a standard, are documented and understood |
| 3 | Defined | Processes are documented and monitored for compliance |
| 4 | Managed | Management monitors and measures according to metrics established in the previous level |
| 5 | Optimized | Good practices are followed and automated |

**Tab. 1**   Maturity Model Levels with Descriptions

To assist in understanding the level of maturity of companies with regards to their Business-IT alignment, Luftman (2001) developed the Strategy Alignment Maturity Model (SAMM). The model covers five levels of Business-IT alignment maturity: 1) Initial / Ad Hoc, 2) Committed, 3) Established / Focused, 4) Improved / Managed and 5) Optimized.

3.2  Size and Maturity

In order for small and medium-sized enterprise (SME) to compete with larger companies they must be competitive and able to produce high quality outputs through structured processes. As expressed by Ghodabian and Gallear (1996) large companies often focus on the formalization of behavior to accomplish coordination, while smaller companies have an organic structure which lacks standardization and is made up of informal working relationships. They claim that SMEs are generally slower at implementing standardized frameworks due to their nature. They argue that most of the research done is focused on large enterprises, which is true in the case of CobiT, with many researchers only focusing on large corporation (Sohal & Fitzpatrick, 2002); (Bowen et al., 2007); (Willson & Pollard, 2009). Studies on other frameworks such as Total Quality Management (Ghobadian & Gallear, 1996) and Six Sigma (Wessel & Burcher, 2004) also exhibit that there are different adoption rates levels of SMEs and larger corporations.

Additionally, O'Donohue et al. (2006) completed a survey with regards to IT Governance in Australia and conclude that SMEs lack interest and knowledge regarding IT Governance. Referring specifically to CobiT, Albayarak et al. (2009) believe that the usage of 34 processes may prove to be too complex for a SME.

On the other hand, when looking at research into IT Governance, the size of the corporation was not shown to be a significant antecedent for the adoption of a precise IT governance design (Ahituv et al., 1989); (Olson & Chervany, 1980); (Tavakolian, 1989). Ein-Dor and Segev (1982) demonstrate that size, as measured by total revenue, is significantly related; however, Ein-Dor and Segev found no significant relationship between the number of employees.

This research aims to understand if smaller companies have a lower maturity level of CobiT implementation than larger companies. In this research we consider companies to be SMEs if they employ up to 500 people. We propose the following:

*P1: There is a positive relationship between the company size and perceived maturity of the CobiT implementation.*

3.3      Business-IT Alignment and Maturity

Following on the research of De Haes et al. (2009), we explore the impact and relation of the implementation of CobiT and Business-IT alignment. This research aims to understand which effect, if any, the increase in the adoption of the CobiT model has on the perception of the Business-IT alignment. Business-IT alignment engages in creating and supporting the activities that fit the strategy between the business and IT.

Business-IT alignment has been shown to have a positive effect on business performance (Sabherwal and Chan 2001). It provides a competitive advantage, increases profitability (Henderson et al. 1996), and is a key factor for successful IT systems implementations (Boynton et al. 1994).

Currently there is a debate in the literature about how alignment should be measured and what should be measured. In a review of the various measuring approaches, Avison et al. (2004) conclude that there is no agreement on the factors that can measure Business-IT alignment.

Researchers such as Tallon et al. (2000) have assessed strategic alignment using a single item. This approach has been supported by Venkatraman and Ramanujam (1987) who found a correlation between the reality and the perception of executives.

On the other hand, researchers such as Das et al. (1991), Reich and Benbasat (2000) and Luftman (2004) use multi-dimensional scales to measure the alignment. Das et al. (1991) identify five dimensions: formality, scope, participation, influences, and co-ordination. Reich and Benbasat (2000) suggest four elements: shared domain knowledge, IT implementation success, communication between IT and the business, and connection between IT and business planning.

Luftman (2004) considers six criteria when measuring the alignment. These are: communication maturity, competence/value measurement maturity, governance maturity, partnership maturity, scope & architecture maturity and skills maturity. However, Fimbel (2007) observes that professionals do not use the available alignment models because these do not enable them to shed light on company's practices. We propose the following:

*P2: There is a positive relationship between Business-IT alignment and perceived maturity of the CobiT implementation.*

### 3.4 Realization of Benefits and Maturity

Our research focuses on understanding the impact of CobiT on the six areas of IT governance which were discussed in the related research section above. The focus on the benefits is twofold. Firstly, the research focuses on the individual areas of IT governance and the positive impact perceived as organizations adopt CobiT. We propose the following proposition:

*P3: There is a positive relationship between maturity levels of the CobiT implementation and perceived realized benefits for individual areas of IT governance.*

Secondly, the research also focuses on understanding the progression of the 'total impact of realized benefits' to the companies. Consequently, for each company, the benefit's impact of CobiT is averaged across the different areas of IT governance. The following proposition is suggested:

*P4: There is a positive relationship between maturity levels of the CobiT implementation and the overall perceived realized benefit for all areas of IT governance.*

## 4 Methodology

### 4.1 Design

The online questionnaire was made available during the months of October and November 2009. This survey was announced in various CobiT dedicated internet groups and forums. One hundred and ninety one (191) IT executives completed and submitted the survey. Only those using CobiT version four were considered in order to strengthen the reliability of the results. Out of the total number of respondents, 125 stated that they have implemented CobiT version 4, 19 had adopted version 3, and 2 were following version 2 or older. Forty five (45) respondents said that they have not adopted CobiT. From the 125 responses, 12 responses were identified as not valid and were excluded from the statistical analysis. Therefore, the total sample size was of 113.

The following three questions were used for the study:

- Rate the perception of the maturity of each of the 34 CobiT processes (using a scale based on the Maturity Model.)

- Choose your current level of Business-IT alignment (based on Luftman's 2001) SAMM levels with each level and their definitions displayed for further information.)

- Express the magnitude of the realized positive impact in each of the areas of IT governance due to the use of CobiT (using a five point scale where 1 meant no benefits realized and 5 meant benefits realized to a great extent)

### 4.2 Respondents' Profile

Respondents were asked about their companies' industry, number of sites supported by IT, number of IT employees in the company as well as their title and their location. This is shown on Table 2.

| Industry | Percent |
|---|---|
| Financial and Banking | 35 |
| Technology | 22 |
| Telecommunications | 9 |
| Healthcare | 7 |
| Public | 7 |
| Manufacturing | 5 |
| Retail and Distribution | 5 |
| Utility | 4 |
| Other | 4 |
| Professional | 2 |

| Countries | Percent |
|---|---|
| United States | 16 |
| Germany | 8 |
| Switzerland | 6 |
| United Arab Emirates | 6 |
| Belgium | 5 |
| Australia | 5 |
| Other | 54 |

| Number of Sites | Percent |
|---|---|
| Over 100 | 29 |
| Less than 10 | 29 |
| 10-24 | 20 |
| 50-66 | 12 |
| 25-49 | 10 |

| Number of IT Employees | Percent |
|---|---|
| Less than 100 | 39 |
| Over 500 | 32 |
| 100-299 | 19 |
| 300-499 | 10 |

| Job Role | Percent |
|---|---|
| IT Manager | 35 |
| Executive Manager | 23 |
| Internal Auditor | 23 |
| CIO | 12 |
| Other | 7 |

**Tab. 2**  Respondents' Profile by Industry, Country Number of Sites Supported by IT, Job Role and Number of IT Employees

## 5  Results

An exploratory analysis was conducted for each variable to test for normality. Both the Kolmogorov-Smirnov and the Shapiro-Wilk showed significance for the perceived Business-IT alignment ($p<0.001$) and for the realized benefits of CobiT ($p<0.001$). As the data was non-normal, the Spearman's rho was used to test for correlations. Additionally, Kruskal-Wallis, a non-parametric one way analysis of variance was used to study the data. If the data using the Kruskal-Wallis showed significant differences between the groups, the Mann-Whitney U test was applied to understand if groups were statistically different.

A cluster analysis was used to group the companies based on the maturity of each of the 34 CobiT processes. For this analysis, the hierarchical clustering was used because of its high acceptance in practice. Research has shown that the Ward method is an appropriate algorithm and can be relied upon to assign the cases to the groups correctly (Backhaus et al., 2008). The interval chosen was the Squared Euclidean distance. There were an adequate number of clusters resulting from the elbow method which analyses the error sum of squares for each number of clusters. Based on this method, five clusters were identified, which follow the same attributes as that of the Maturity Model (see Table 1). Cluster one contains the respondents with the lowest maturity and cluster five the ones with the highest maturity. Table 3 shows the five clusters suggested and the number of respondents, maturity mean, median and standard error.

| Cluster Levels | Number of Respondents | Maturity (Mean) | Maturity (Median) | Standard Error |
|---|---|---|---|---|
| 1 – Initial | 16 | 1.44 | 1.00 | .814 |
| 2 – Repeatable | 20 | 2.05 | 2.00 | .224 |
| 3 – Defined | 28 | 2.61 | 3.00 | .497 |
| 4 – Managed | 27 | 3.04 | 3.00 | .192 |
| 5 - Optimized | 22 | 3.59 | 4.00 | .503 |

**Tab. 3**  Characterization of Maturity Clusters

As the study was concerned with how the nominated variables are impacted as the CobiT implementation increases, caution was taken with the choice of test measures. The Mann-Whitney U tests inflates the Type I error rate, so care was taken in the choice of comparisons made. Therefore the following three comparisons were conducted:

Test 1: Level 1 (Initial) cluster compared to Level 3 (Defined) cluster
Test 2: Level 3 (Defined) cluster compared to Level 5 (Optimized) cluster
Test 3: Level 1 (Initial) cluster compared to Level 5 (Optimized) cluster

As three tests were conducted, a Bonferroni correction is applied. This correction means that instead of using the critical level of significance of 0.05, all effects are reported at 0.0167 level of significance. All reported *p* values

are using 1-tailed Monte Carlo *p* values with a confidence level of 99% and a number of samples of 10,000. This method is used because of the large sample size.

Lastly, *r* was used to measure the strengths of a relationship between variables (Rosenthal, 1991). Cohen suggests that the sizes of the effect are small (0.1), medium (0.3) or large (0.5). In the next sections the following abbreviations are used: H corresponds to the Kruskal-Wallis statistic, U represents the Mann-Whitney U statistic, while SE is the Standard Error.

## 5.1 Size and Maturity (P1)

In order to analyse this proposition a test of correlation was performed with the nonparametric correlation coefficient of Spearman, regarding the cluster CobiT maturity level. Small companies with less than 500 employees form group one, companies with $500 - 999$ employees are group two, $1000 - 4999$ are group three, $5,000 - 15,000$ employees are group four and companies with more than 15,000 employees are part of group five. The results show that there was little or no correlation between the size of the companies and CobiT maturity levels ($r = .191$, $p < .05$).

A Kruskal-Wallis-H-Test for differences between all four groups was performed. This test does not result in significance, so the differences between the different sizes of companies are not statistically proven. This means that there are no significant differences between any of the five company sizes studied. Table 4 displays the means and medians for the perceived maturity for each of the company sizes.
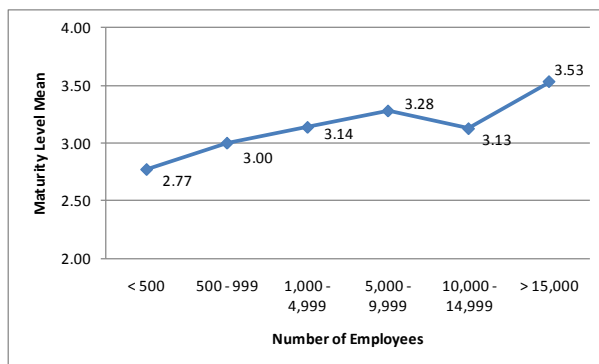


| Company size | Mean | Standard Error | Median | N |
|---|---|---|---|---|
| < 500 | 2.77 | .294 | 3.00 | 22 |
| 500 - 999 | 3.00 | .422 | 3.00 | 10 |
| 1,000 - 4,999 | 3.14 | .274 | 3.00 | 22 |
| 5,000 - 9,999 | 3.28 | .266 | 3.00 | 18 |
| 10,000 - 14,999 | 3.13 | .515 | 3.00 | 8 |
| > 15,000 | 3.53 | .238 | 4.00 | 32 |

**Tab. 4**          Descriptive Statistics of Company Size (n=113)

## 5.2          Business-IT Alignment and Maturity (P2)

First a correlation analysis was performed to investigate if there is a relationship between the CobiT maturity levels and the Business-IT alignment. It was shown that there was a significant relationship between Business-IT alignment and the levels of adoption of CobiT ($r = .519$, $p < .001$).

Table 5 displays the means and medians for the perceived Business-IT alignment. In general, Business-IT alignment is significantly affected by the maturity level of the implementation ($H(4)=30.70$, $p<.001$). Mann-Whitney U tests were used to follow up on the findings.
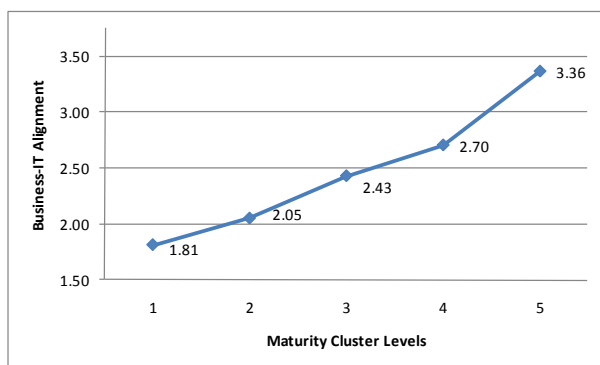


| Maturity Level | Mean | Standard Error | Median | N |
|---|---|---|---|---|
| 1 | 1.81 | .245 | 1.5 | 16 |
| 2 | 2.05 | .135 | 2 | 20 |
| 3 | 2.43 | .140 | 2.5 | 28 |
| 4 | 2.70 | .149 | 3 | 27 |
| 5 | 3.36 | .203 | 3 | 22 |

**Tab. 5**          Descriptive Statistics of Business-IT Alignment (n=113)

Table 6 shows the results from the selective comparisons. The comparison between Level 1 (Initial) and Level 3 (Defined) was significant with a small effect (U=135, r=-.21). When comparing Level 3 (Defined) with Level 5 (Optimized) there was significance with a medium to large effect (U=148.5, r=-.47). Lastly, when comparing Level 1 (Initial) with Level 5 (Optimized) (U=49.5, r=-.63) significance was observed with a large change. The greatest increase of the perceived level of alignment between a two-level comparison can be seen when comparing Level 3 (Defined) and Level 5 (Optimized).

| | Level 1 compared with Level 3 | | | Level 1 compared with Level 5 | | | Level 3 compared with Level 5 | | |
|---|---|---|---|---|---|---|---|---|---|
| | U | p | r | U | p | r | U | p | r |
| Business-IT Alignment | 135 | 0.009* | -0.21 | 49.5 | 0.000* | -0.63 | 148.5 | 0.000* | -0.47 |

*significance at 0.0167

**Tab. 6**      Mann-Whitney U Test Results for Perceived Business-IT Alignment at Distinct Maturity Levels (n=113)

5.3      Individual IT Governance Areas and Maturity (P3)

Table 7 presents the means, standard error and medians for the areas of IT governance. The Spearman's rho analysis shows that there was a correlation between the CobiT maturity levels and each of the IT governance areas [Strategic Alignment r=.26 p<.01, Value Delivery r=.28 p<.01, Performance Management r=.32 p<.001, Capability Management r=.36 p<.001, Risk Management r=.37 p<.001, Control and Accountability r=.42 p<.001]. This shows that as the CobiT implementation increases, there is a positive increase in the impact in the areas of IT governance.

Kruskal-Wallis test show that the areas of IT governance are significantly affected by the level of implementation maturity [Strategic Alignment H(4)=8.85 p<.05, Value Delivery H(4)=9.08 p<.05, Performance Management H(4)=11.33 p<.01, Capability Management H(4)=16.17 p<.001, Risk Management H(4)=16.17 p<.001, Control and Accountability H(4)=19.54 p<.001]
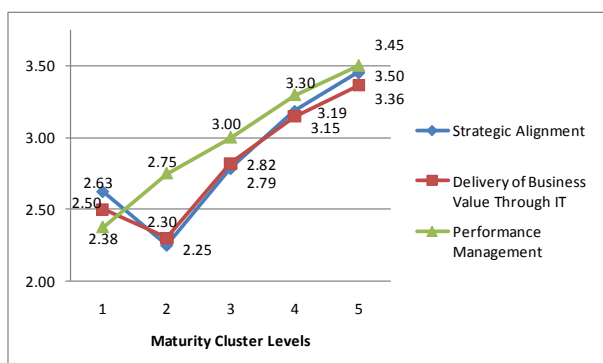


| Maturity Level | N | Strategic Alignment | Value Delivery | Performance Management |
|---|---|---|---|---|
| 1 | 16 | M=2.63 SE=.29 Mdn=2 | M=2.50 SE=.22 Mdn=2 | M=2.38 SE=.30 Mdn=2 |
| 2 | 20 | M=2.25. SE=.19 Mdn=2 | M=2.30 SE=.23 Mdn=2.5 | M=2.75 SE=.24 Mdn=3 |
| 3 | 28 | M=2.79 SE=.01 Mdn=3 | M=2.82 SE=.20 Mdn=3 | M=3.00 SE=.18 Mdn=3 |
| 4 | 27 | M=3.19 SE=.18 Mdn=3 | M=3.15 SE=.15 Mdn=3 | M=3.30 SE=.17 Mdn=3 |
| 5 | 22 | M=3.45 SE=.19 Mdn=3.5 | M=3.36 SE=.20 Mdn=4 | M=3.50 SE=.18 Mdn=4 |

| Maturity Level | N | Capabilities Management | Risk Management | Control and Accountability |
|---|---|---|---|---|
| 1 | 16 | M=2.13<br>SE=.27<br>Mdn=2 | M=2.38<br>SE=.34<br>Mdn=2 | M=2.25<br>SE=.32<br>Mdn=2 |
| 2 | 20 | M=2.50<br>SE=.20<br>Mdn=3 | M=2.40<br>SE=.22<br>Mdn=2 | M=2.65<br>SE=.27<br>Mdn=3 |
| 3 | 28 | M=2.69<br>SE=.19<br>Mdn=3 | M=2.71<br>SE=.21<br>Mdn=3 | M=3.07<br>SE=.22<br>Mdn=3 |
| 4 | 27 | M=3.41<br>SE=.12<br>Mdn=3 | M=3.33<br>SE=.16<br>Mdn=3 | M=3.07<br>SE=.22<br>Mdn=3 |
| 5 | 22 | M=3.36<br>SE=.20<br>Mdn=3 | M=3.73<br>SE=.19<br>Mdn=4 | M=3.95<br>SE=.20<br>Mdn=4 |
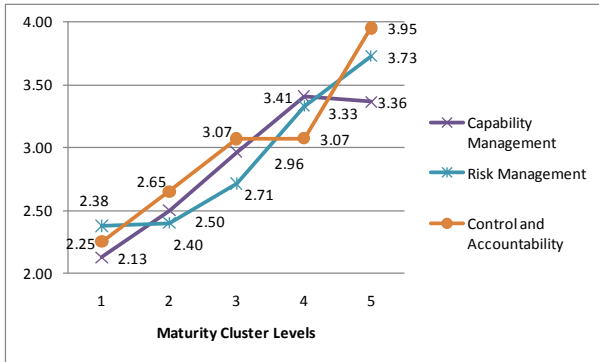
**Tab. 7** Descriptive Statistics for IT Governance Areas (n=113)

As shown in Table 8, results from the Mann-Whitney test demonstrate that there is significance between all areas of IT governance when comparing Level 1 (Initial) with Level 5 (Optimized) [Strategic Alignment (U=98.5, r=-.39), Risk Management (U=78, r=-.49), Performance Management (U=79, r=-.48), Control and Accountability (U=55.5, r=-.59), Value Delivery (U=90.5, r=-.43) and Capability Management (U=64.5, r=-.55)]. Large changes can be observed in the areas of Capability Management and Control and Accountability, while medium to large changes can be identified for all other areas. Respondents of Level 5 (Optimized) had a significantly higher perceived impact than respondents of Level 3 (Defined) with a medium to large change in the areas of Control and Accountability (U=167, r=-.41), Risk Management (U=148, r=-.46), and a medium change in the area of Strategic Alignment (U=185.5, r=-.35). Marginal significance was observed in the areas of Performance Management (U=209, r=-.29) and Value Delivery (U=203, r=-.30). No significance could be observed for Capability Management. Finally, when comparing Level 1 (Initial) with Level 3 (Defined) significance can be determined only for Control and Accountability (U=132.5, r=-.35) with a medium change and Capability Management (U=112.5, r=-.43) with a medium to large change.

| | Level 1 compared with Level 3 | | | Level 1 compared with Level 5 | | | Level 3 compared with Level 5 | | |
|---|---|---|---|---|---|---|---|---|---|
| | U | p | r | U | p | r | U | p | r |
| Strategic Alignment | 204.00 | .312 | -0.08 | 98.50 | .007* | -0.39 | 185.50 | .007* | -0.35 |
| Delivery of Business Value Through IT | 182.50 | .154 | -0.16 | 90.50 | .003* | -0.43 | 203.00 | .017 | -0.30 |
| Performance Management | 147.50 | .025 | -0.29 | 79.00 | .001* | -0.48 | 209.00 | .018 | -0.29 |
| Capability Management | 112.50 | .002* | -0.43 | 64.50 | .001* | -0.55 | 225.00 | .042 | -0.24 |
| Risk Management | 175.00 | .115 | -0.19 | 78.00 | .001* | -0.49 | 148.00 | .001* | -0.46 |
| Control and Accountability | 132.50 | .011* | -0.35 | 55.50 | .001* | -0.59 | 167.00 | .002* | -0.41 |

*significance at 0.0167

**Tab. 8** Mann-Whitney U Test Results for IT Governance areas at Distinct Maturity Levels (n=113)

## 6 Discussion

In this research we focus on CobiT and on factors such as Business-IT alignment and realized benefits. Four propositions were stated. The first proposition P1 concentrates on the maturity level of the CobiT implementation and on the size of the company. Out of the five groups of company sizes, close to one fifth of the companies that answered this survey are considered SMEs. The largest group with 32% was those that had over 15,000 employees. Results from the statistical tests show no difference between the groups, signifying that there is no

statistical difference between the achieved maturity of smaller and larger companies. Therefore, P1 is rejected. In this survey the implication that the implementation of CobiT is too complex for SMEs or that SMEs lack knowledge or interest is not evidenced. Various explanations are considered. Research by Thomas (2010) indicates that most small companies in the US have complied with the mandates of the Sarbanes Oxley (SOX) in a serious and diligent manner. Results from this study are in-line with previous research into the relationship of adoption of IT governance and organizational size (Ahituv et al., 1989); (Ein-Dor & Segev, 1982); (Olson & Chervany, 1980); (Tavakolian, 1989). Since small companies must demonstrate that the organization has a sound assurance of governance over its IT's function, one may not be able to differentiate them from larger companies. Another perspective is that SMEs may be able to achieve a higher maturity of CobiT implementation because they have a lower resistance to change. Further, it is considered to be people oriented, employees are naturally responsible for quality, have effective, open communication channels (Ghobadian & Gallear, 1996) and have less resources to manage. Therefore, in the process of implementation they may have an advantage over larger companies which are often more segregated and geographically disperse.

In general, the results of the current study confirm P2. The second proposition P2 examines the impact of the increase in maturity on Business-IT alignment. Business-IT alignment is an approach which ensures an adequate congruence of the strategic goals of business and IT. As discussed earlier it is a central goal of CobiT and one of the reasons why organizations adopt it. The finding of this study supports the earlier case studies by De Haes et al. (2009) which used Luftman's (2001) SAMM to measure Business-IT alignment. The six Belgian companies studied had an average of 2.69 maturity. In our survey the overall average maturity of the Business-IT alignment across all organisations, based on the perception of the participants, was 2.52.

De Haes et al. (2009) propose that low maturity companies also have a low implementation of CobiT. The results from the statistical tests completed in this study confirm this and show a strong positive correlation between Business-IT alignment and the maturity levels. It reveals that as the level of CobiT implementation increases so does the level of Business-IT alignment. As CobiT positively influences the alignment between business and IT, the importance of the adoption of CobiT is confirmed. Consequently CobiT could deliver major benefits to organizations, especially if implemented up to a high level of maturity.

The third proposition P3 looks at the individual areas of IT governance and the IT executives' perception of the impact of implementing CobiT. Based on the literature review, six major areas of IT governance have been defined and the survey respondents have been able to rate the degree of benefits received in these six areas. Results show that there is a general positive impact in all areas of IT governance as companies adopt and increase their usage of the framework. However, the positive increase in impact across the areas differs. In the initial stages a positive increase in the impact can be seen only in the areas of Control and Accountability and Capability Management. Marginal significance can be seen for Performance Management. In the later stages of implementation, a significant improvement can be seen in the areas of Control and Accountability, Risk Management, and Strategic Alignment. Marginal improvements are found in the areas of Performance Management and Delivery of Business Value through IT. In this comparison, the only area that showed no significance was Capability Management, nevertheless, a statistical impact could be seen in the earlier stages. Table 11 presents the levels at which a significant impact on the IT Governance focus areas could be observed.

| | Level 1 - Level 3 | Level 3 - Level 5 | Level 1 - Level 5 |
|---|---|---|---|
| **Statistically significant differences** | Capability Management | Strategic Alignment | Strategic Management |
| | Control and Accountability | Risk Management | Value Delivery |
| | | Control and Accountability | Performance Measurement |
| | | | Capability Management |
| | | | Control and Accountability |
| | | | Risk Management |

Tab. 11          Improvements realized in the areas of IT Governance

Research of Gomes and Ribeiro (2009) showed in their single case study that improvements in the area of Capability Management could be observed. Their research followed an educational institution through their first year of implementation of CobiT. Since they compiled this information in the first year, we can assume that the or-

ganization would be in the early stages of implementation and that our results confirm the findings of their research.

There is an overlap in the results from P2 and P3 since one of the areas of IT governance is Strategic Alignment. In the initial stages of implementation, a small and significant change can be seen in the Business-IT alignment level; however IT executives perceived no significant impact attributable to the implementation of CobiT. In the area of Strategic Alignment, in the later stages, a medium to large change can be observed when looking at the Business-IT alignment level, and a medium change is observed in this area of IT governance as a result of the implementation of IT governance. Results display that both variables show similar results. During the implementation of CobiT there is an increase in the Business-IT levels, which may be a result of the usage of CobiT, and this improvement may be more apparent in the later stages of implementation.

Table 12 presents previous work in the area of CobiT with regards to the IT governance focus areas and shows the contributions made by our findings.

| Focus Area | Researcher | Findings | Contribution to existing literature |
|---|---|---|---|
| Strategic Alignment | De Haes et al. (2009) | Companies with low IT governance also have low Business-IT alignment | Later stages of implementation |
| Value Delivery | Weill and Ross (2005) | Companies with high level of IT governance could achieve more than 20% greater profit than organizations with low IT Governance | Later stages of implementation |
| Capability Management | Gomes and Ribeiro, 2009 | Improvements in this area can be observed in their case studies | Earlier stages of implementation |
| Performance Measurement | | | Only when comparing with high level of IT governance with those with low IT governance |
| Control and Accountability | | | Improvements seen throughout the implementation of IT governance |
| Risk Management | | | Later stages of implementation |

**Tab. 12**          Findings and their impact on existing literature

This research shows a strong increase in the realized benefits with increasing maturity levels. This increase is demonstrated to be statistically significant. Findings suggest that on the whole benefits of implementing CobiT can be seen more clearly in the later stages, rather than in the initial stages.

Overall, the companies that have achieved higher implementation levels were experiencing a high positive impact on their Business-IT alignment and also received greater benefits in the areas of IT governance. However, companies do recognize less substantial benefits at the initial levels. There is a number of hypotheses of why this might occur. One hypothesis is that during the initial stages of implementation various organizational and process changes occur and during this time the company may not be able to identify the benefits that the implementation provides. Another hypothesis is that there are companies that adopt CobiT for marketing purposes or to comply with regulations and may not seek to find real benefits. Other companies implement CobiT because there is a genuine interest to improve their IT governance. For these companies there is a greater interest in the outcome of the adoption and greater management support which can drive the companies to a higher maturity level and receive the various benefits. A final interpretation is that there may be a laggard effect of the benefits of CobiT that during the initial stages of implementation cannot be seen.

The impact of the phases of CobiT on the realization of benefits will be extended through future research, specifically by analysing the realization of individual benefit at the different levels. This research would enable organizations to identify processes that are crucial for the realization of benefits. Future research would also need to examine the relationship between CobiT and other frameworks, such as ITIL, in organization practice.

The limitations of this study are that it concentrates on CobiT version four, and mostly from an IT perspective. A further limitation lies in the nature of empirical studies being dependent on the quality of data provided by the respondents. Additionally, there is a high variability in the number of respondent's industry and country. Also, the results are based on perceived Business-IT alignment, which was calculated by a single measurement, and only on the positive impact on the areas of IT governance rather than measures of the effectiveness or efficiencies of IT governance.

## 7    Conclusion

Effective IT governance could generate business benefits such as improved reputation, trust, product leadership and a reduction of costs (Bowen et al., 2007). So far there have been few and limited academic studies on the CobiT and there has been no major empirical survey at an international level. This empirical survey provides a strong basis for researchers and practitioners to understand the implications of the impact of the CobiT implementations. The 113 respondents to this study form a representative sample of the companies which have implemented CobiT and provide a global perspective on the issues they face.

Various researchers (e.g. Webb et al. 2006; Dahlberg & Kivijarvi 2006; Willson & Carol Pollard 2009) have proposed the different areas which would be impacted by the adoption of IT governance. This research looks at the six areas of IT governance, Strategic Alignment, Risk Management, Performance Management, Control and Accountability, Value Delivery and Capability Management, to understand if a positive impact could be perceived by those companies that have implemented CobiT. Results from this research show that at the initial stages of implementation, between Level 1 (Initial) and Level 3 (Defined), companies are likely to notice improvements in the areas of Capability Management and Control and Accountability. In the later stages of implementation, between Level 3 (Defined) and Level 5 (Optimized), companies are likely to observe an improvement in Strategic Alignment, Risk Management and Control and Accountability.

Overall, findings show that the higher the maturity levels the greater the benefits realized. This is important for organizations to understand and to consider when planning their implementation process. Additionally, the Business-IT alignment, as a major goal of IT governance, increases as the level of maturity of CobiT increases. Practitioners need to be aware that benefits might not be 'visible' in all areas of IT governance at the early stages of adoption. Organizations should not evaluate the success of CobiT on the first phases but rather on the later stages of implementation and organizational metrics should be tailored to this process. With the further implementation of CobiT in the organization learning effects are generated and through these additional benefits are realized.

This study provides a solid contribution to research and practitioners in the field of IT governance. The contribution to research is delivered through insight into the perception of effectiveness of CobiT, the perception of the progress through the maturity levels of the Business-IT alignment by managers and practitioners in IT. This research is a first step towards the development of a framework for evaluating the impact that CobiT has on the IT function and on the business. Also, the methodology of comparison between different maturity levels is novel. It starts to address a research gap and opens the way for future research. In practice the findings serve as a guideline for IT managers who are considering adoption or who already have adopted CobiT. Insight is given as to when benefits due to implementation might become evident and it is shown that 'Quick wins' are unlikely because the benefits are likely to become apparent in the later stages. It is suggested that organizational metrics are tailored to this. As the CobiT implementation matures in the organization, learning effects are generated, and through these additional benefits are realized.

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**Appendix 1 - Survey Used**

**Which of the following statements best describes your IT organization?**
- We have not adopted CobiT
- We are new to CobiT and have just started to implement processes.
- We have a relatively low level of CobiT process maturity. Some processes are documented and these are generally understood, but errors are likely.
- We have a medium level of CobiT process maturity. Processes are documented monitored for compliance
- We have a reasonably high level of CobiT process maturity. Our processes are documented, and measured according to established metrics
- We have a very high level of CobiT process maturity. Our processes are documented, understood, backed by metrics and continually reviewed for improvement

**Which version of ITIL (if any) are you using?**
- CobiT V4
- CobiT V3
- CobiT V2 or previous
- Have not adopted CobiT

**Which statement would you use to describe the relationship between IT and the business?**

- Business and IT lack understanding
- Business and IT have a committed understanding
- There is a good understanding between IT and business
- There is an improved and managed process of alignment
- There is a complete alignment with integration of strategic planning of Business and IT

**Which of the following 'Plan and Organize' processes have you implemented? (If implemented, please rate your process maturity from 1-5)**

- PO1: Define a strategic IT plan
- PO2: Define the information architecture
- PO3: Determine technological direction
- PO4: Define the IT processes, organisation and relationships
- PO5: Manage the IT investment
- PO6: Communicate management aims and directions
- PO7: Manage IT human resources
- PO8: Manage quality
- PO9: Assess and manage IT risks

-   PO10: Manage Projects

**Which of the following 'Acquire and Implement' processes have you implemented? (If implemented, please rate your process maturity from 1-5)**

-   AI1: Identify automated solutions
-   AI2: Acquire and maintain application software
-   AI3: Acquire and maintain technology infrastructure
-   AI4: Enable operation and use
-   AI5: Procure IT resources
-   AI6: Manage changes
-   AI7: Install and accredit solutions and changes

**Which of the following 'Deliver and Support' processes have you implemented? (If implemented, please rate your process maturity from 1-5)**

-   DS1: Define and manage service levels
-   DS2: Manage third-party services
-   DS3: Manage performance and capacity
-   DS4: Ensure continuous service
-   DS5: Ensure systems security
-   DS6: Identify and allocate costs
-   DS7: Educate and train users
-   DS8: Manage service desk and incidents
-   DS9: Manage the configuration
-   DS10: Manage problems
-   DS11: Manage data
-   DS12: Manage the physical environment
-   DS13: Manage operations

**Which of the following 'Monitor and Evaluate' processes have you implemented? (If implemented, please rate your process maturity from 1-5)**

-   ME1: Monitor and evaluate IT performance
-   ME2: Monitor and evaluate internal control
-   ME3: Ensure compliance with external requirements
-   ME4: Provide IT governance

**On a scale of 1-5, where 1 = No Challenge and 5 = Major Challenge, how would you rate the following barriers to CobiT implementation in your organization?**
-   Lack of Executive sponsorship
-   Business understanding of ITIL objectives
-   Lack of resources (time or people)
-   Lack of internal knowledge / skills relating to ITIL
-   Lack of funding / cost of adoption
-   Organization / cultural resistance to change
-   Maintaining momentum / progress stagnates

**Owing to the CobiT implementation, on a scale from 1 to 5, where 1 = no improvement and 5 = great improvement, rate the improvement (if any) in the following areas:**

-   Strategic alignment between business and IT
-   Delivery of business value through IT
-   Performance Management of IT
-   Manage IT capabilities effectively
-   Implement structured risk management
-   Compliance, Control and Accountability

# 8. Discussion

The focus of this thesis has been to understand if IT operational process improvement frameworks, specifically ITIL and CobiT, have an impact on the IT organization, as perceived by IT executives. This examination has entailed a review and analysis of the relevant literature directed at these two IT operational process improvement frameworks. Literature streams in the two topics were defined and organized.

Gaps that were found in the literature were investigated in studies reported in five manuscripts. The aim of this chapter is to review the findings and develop a theoretical framework which unites the themes of this research. The research mainly looks at two IT operational process improvement frameworks, however other frameworks in this area exist, and new ones are being developed. This theoretical foundation will permit further development of the research question, by attempting to generalize the impact that IT operational process improvement frameworks have on the IT organization. We propose that the knowledge-based view of the firm and its knowledge integration mechanisms provide substantial insight into why IT operational process improvement frameworks provide for the bases of the realization of benefits within the IT organization.

This chapter is divided into two parts. In the first part, we demonstrate the novel findings of our research and show how these findings fit with academic literature in this area of research. In the second part we establish a theoretical foundation to provide a logical structure and theoretical grounding to the research area and findings of this thesis. For this we will use the knowledge-based view approach which was introduced in the literature review chapter. We explore knowledge integration mechanisms and afterwards, propose how these knowledge integration mechanisms are present in ITIL and CobiT. Finally, we suggest how the implementation of these frameworks may have a positive impact on the organization's knowledge-base.

## 8.1 Findings of the Thesis

A summary of the main findings of each of the manuscripts is highlighted below.

**Paper 1: IT Service Management Innovation: A Cross-National Study of ITIL Adoption Using Institutional Theory**

The study focuses on understanding how ITIL is implemented across various countries, organization sizes and industries. It also compares the number of adopted operational-level processes with the number of tactical and strategic processes and shows that organizations are still focusing more on IT operations. It also proposes that inter-organisational factors such as country, size and industry sector contribute to variation in adoption of ITIL.

**Paper 2: Impact of IT Service Management frameworks on the IT Organization: An Empirical Study on Benefits, Challenges and Processes**

This study compares the challenges and benefits of companies at various implementation levels. It also looks at the number of implemented processes at various levels. Results indicate that, as the maturity of implementation increases, the perception of challenges decreases. Findings also show that, as the maturity of the implementation increases, the number of realized benefits increases.

**Paper 3: Impact of Selective ITIL v3 Processes on the Realization of Benefits: An Empirical Study**

Having shown that ITIL leads to benefits in Paper 2, in this research we set out to determine which ITIL processes can act as a predictor for the listed benefits. Using data from 193 IT organizations, the findings of our research show that specific ITIL processes are able to successfully predict if a company will realize benefits due to their implementation. Results from the logistic regression tests show that processes such as Access Management and Financial Management are often predictors of the realization of benefits. Other relevant processes are Change Management and Incident Management.

**Paper 4: Uncovering ITIL claims: IT executives' perception on benefits and Business-IT alignment**

The research presented in this paper focuses on two aspects: (1) operational benefits, and, (2) strategic positioning of the IT organizations, specifically in terms of its business-IT alignment. The study looks at how operational benefits and business-IT alignment evolve as perceived level of implementation maturity of ITIL increases. Findings of this study indicate that as the adoption of ITIL increases, the number of realized operational benefits increases, as well as the levels of maturity of the business-IT alignment. This may indicate that as the implementation of ITIL progresses, an impact to the IT organization can be observed through operational and strategic benefits.

**Paper 5: Fulfilling its Promises: a Perspective of IT Executives on the benefits of implementing CobiT**

A global study was conducted to understand the impact which IT governance frameworks have on the business. Specifically, this study examines the effect that CobiT has on business-IT alignment and areas of IT governance. Results indicate that companies, which have achieved higher implementation levels, experienced high positive impacts on their business-IT alignment. Additionally, they received greater benefits in the areas of IT governance. Findings highlight the areas of IT governance which are most likely to display improvements at different levels of implementation.

We set out to relate these findings to previous work. In 1955, Adams was one of the first to suggest that given the commonalities of goals, modern economic systems would create adjustments to the social structure to meet the needs of the economy. Nowadays, this known as the Convergence Hypothesis. The Convergence Hypothesis supports the perspective that nations become more alike as they become more industrialized. It views technology as the critical ingredient in the industrialization process because managers with varying cultural and ideological positions can agree on the best design or most desirable system. An opposing view is supported by the National Specificity Argument which posits that "observed differences

across nations – whether arising from cultural, political, and/or economic factors –impedes the cross-national organisational applicability of managerial practices" (Rungtusanatham, Forza, Koka, Salvador & Nie 2005).

On the one hand, Convergence Hypothesis supports the view that organisations that implement ITIL would become very similar since they would adopt ITIL in a similar manner. On the other hand, the National Specificity Argument suggests that due to cultural, political and economical factors the adoption of ITIL would lead to different levels of adoption across a range of countries.

Results from our study show that factors of National Specificity and Convergence Hypothesis could be observed in the organizations implementing IT operational process improvement frameworks. In a similar study conducted in Germany, Italy, Japan and USA, Rungtusanatham et al. (2005) observed the implementation patterns of TQM, a process improvement framework. The research reveals some support for the both the Convergence Hypothesis and National Specificity argument.

The understanding of how the organizations implement IT process improvement frameworks may shed some light on the generalizability of the findings of this research, specifically with regards to the findings of benefits and challenges of implementing IT operational process improvement frameworks. Previous case studies have identified various benefits and challenges of implementation of ITIL. Our findings incorporate previous research in this topic and, through this survey, we are able to understand how the benefits and challenges of implementing ITIL are effected as the organization increases their maturity of implementation. To our knowledge, no-one has used an empirical approach, so using the identified benefits and challenges of implementation as a basis, a survey was carried out. Results from the survey shown in Paper 2 are in line with previous findings. Works from researchers such as Hochstein et al. (2005), Potgieter et al. (2005), Cater-Steel and McBride (2007), Marrone et al. (2010), Cater-Steel et al., (2007; 2008), Kashanchi and Toland (2006), Cater-Steel et al. (2006b), Cervone (2008) are all

taken into account when looking at the benefits of ITIL implementation. Challenges of ITIL implementation have been depicted by various researchers, including Hochstein et al. (2005), Cater-Steel et al. (2006b), Cater-Steel et al. (2007; 2008), Iden and Langeland (2010), Iden (2009), Tan et al. (2009), Pollard and Cater-Steel (2009), and Shang and Lin (2010).

Having shown that benefits could be achieved, as shown in Paper 2, we then set out to understand if specific ITIL processes could predict if companies would achieve these benefits, in Paper 3.

Paper 4 expands on the work of Kashanchi and Toland (2006), who carry out exploratory case studies to understand if ITIL could contribute to the business-IT alignment. The impact that the implementation of ITIL has on the business-IT alignment has been theorized by researchers such as Cater-Steel, Toleman and Tan (2006). Conclusions of this paper match the previous findings of these researchers.

Paper 5 builds upon work of De Haes et al. (2009), who suggest that the implementation of CobiT may have an impact on the business-IT alignment. The work also expands and corroborates on previous findings of Weill and Ross (2004), who argue that IT governance has an effect on the value delivery, and on work by Gomes and Ribeiro (2009), who argue that due to the implementation of CobiT an improvement in the area of capability management can be observed. As well, findings of our paper 5 are in line with previous research.

Paper 2 and Paper 4 show that the implementation of both ITIL and CobiT are able to have a positive impact on the IT organization. Paper 4 and Paper 5 show that as the organizations increase their implementation of CobiT or ITIL there is a perception of improvement of the business-IT alignment.

In an attempt to understand why these frameworks are able to have a positive impact on the IT organization, as shown mostly in Paper 2, Paper 4 and Paper 5, we endeavour to find an

overarching current theoretical framework. This would explain the relationships of the factors and variables that have been researched on this study. In the next sections we will re-introduce the ideas of Knowledge-Based View (KBV) of the firm, to provide theoretical grounding to the field researched.

Knowledge management is important since much of the knowledge in an organization is uncodified (Ruggles 1999). Alavi and Leidner (2001) list three common applications of organizational knowledge management initiatives. These are (1) the coding and sharing of best practices, (2) the creation of corporate knowledge directories, and (3) the creation of knowledge networks. With regards to IT operational process improvement frameworks would fit with the first item. A theoretical approach which considers knowledge to be the most strategically significant resource of the organization is KBV. Therefore, we explore the KBV as an applicable theoretical framework for this research in the next section. This is done in an attempt to connect the findings and provide a theoretical basis.

The usage of the KBV approach has not yet been suggested by other researchers for the ITSM or IT governance frameworks. Therefore, in the following sections we explore further the integration mechanisms of knowledge as proposed by Grant (1996) and then search for integration mechanisms characteristics in the IT operational process improvement frameworks.

## 8.2    Integration Mechanisms of Knowledge

According to the KBV, the firm should generate conditions which can integrate the specialized knowledge of multiple individuals (Grant 1996b). He goes on to state "a knowledge-based view of the firm encourages us to perceive interdependence as an element of organizational design and the subject of managerial choice rather than exogenously driven by the prevailing production technology. The general issue is devising mechanisms for integrating individual's specialized knowledge" (1996b, p.114).  Alavi and Leidner (2001) state that a survey by Gazeau (1998) found that 74% of respondents thought that their organization's best knowledge was

inaccessible and 68% thought that inaccuracies were replicated numerous times. This highlights the importance of knowledge integration within the organization.

Grant (1996b) develops four integration mechanisms of knowledge which are Rules and Directives, Sequencing, Routines, Group Problem Solving and Decision Making. These mechanisms are to be supported by a base of what he terms "Common Knowledge". These mechanisms economize communication and coordination between individuals. Each of these mechanisms is explained further:

- *Rules and Directives:* as expressed by Van de Ven et al. (1976) *Rules and Directives* alludes to "impersonal" approaches to coordination that entail "plans, schedules, forecast, rules, procedures and policies, as well as information and communication systems". Aside from minimizing the need for communication, these mechanisms assist the transfer of tacit to explicit knowledge by acting as codification devices. Grant (1996b) argues that "Rules may be viewed as *standards* which regulate the interaction between individuals" (emphasis added). This informal communication helps specialists in one area of knowledge to create standards, rules or directives which can be followed by non-specialist (Demsetz 1988).

- *Sequencing:* refers to allocation of tasks to members who have the appropriate knowledge. Therefore, activities are organized in time-patterned sequences which minimize the need for ongoing coordination. Therefore, the specialist's participation occurs separately in a pre-assigned period of time.

- *Routines:* as defined by Winter (1986) are a "relatively complex pattern of behaviour [...] triggered by a small number of initiating signals or choices and functioning as a recognizable unit in a relatively automatic fashion" (p.165). In this way, individuals only need to understand their role in the routine in order to realize specialized knowledge in a coordinated way. They are able to support, without the need of *Rules and Directives,*

relatively complex behaviours and interactions between individuals. Through the creation of precise roles, individuals are consequently able to integrate their specialized knowledge without the need of communicating that knowledge.

- *Group problem solving and decision making:* relies on methods which are non-standard, high communication methods. It allows for the combination of knowledge which was previously dispersed over various individuals in order to solve a problem or make a decision.

The first three mechanisms explained above aim for efficiency of integration by avoiding the cost of communication and learning. The fourth may require integration through more personal and communication-intensive manners.

Common Knowledge, as referred to by Grant (1996b), support all mechanisms of knowledge integration. Four forms of Common Knowledge are common language between organizational members, commonalities in the individual's specialized knowledge, shared meaning and understanding among individuals, and recognition of individual domains.

Using the integration mechanisms proposed by Grant, we will attempt to understand if the IT operational process improvement frameworks, such as ITIL and CobiT, incorporate these integration mechanisms.

## 8.3 Integration mechanisms present in ITIL and CobiT

We aim to create connections between the four mechanisms of integration of knowledge and current literature. This literature includes findings of our papers presented in this thesis, as well as academic case studies and surveys completed on the benefits of the implementation of ITIL and CobiT, and the guidelines written on these frameworks. Results are as follows:

- *Rules and Directives:* ITIL provides descriptions of a number of relevant IT practices, through comprehensive checklists, tasks, procedures and responsibilities aimed at the IT organization (Bon 2007). Historically, ITIL was developed to establish a standard approach for efficient and effective operations of the IT organization. In Paper 2, one of the benefits which are realized when implementing ITIL is "Standardized process adoption across all of IT". Paper 3 shows that 51% of companies selected that they had realized these benefits due to the implementation of ITIL.

Similar to ITIL, CobiT provides a set of measures, indicators, processes and industry recommendations to maximize the benefits of IT (Link 2008). Therefore, we propose than ITIL and CobiT are able to have an impact on the area of *Rules and Directives*, as they aim at developing set procedures inside the organization to improve its efficiency. These frameworks help by converting tacit knowledge into explicit knowledge ("best practices"). It is through the creation of the procedures, following the ITIL and CobiT guidelines, that companies are able to standardize and integrate their knowledge.

- *Sequencing:* In the view of Singh (2009), a key feature of IT governance is sequencing, defined as "practices an organization carries out, so as to arrive at an IS portfolio mutually acceptable to all interested parties". The developers of CobiT argue that
    "CobiT control objectives are high-level requirements to be considered for effective control of each IT process. They are written as short, action-oriented management practices. Whenever possible, they follow a logical lifecycle sequence" (IT Governance Institute 2007b, p.12).

Particularly ITIL V3 approaches service management from the life cycle aspect of service.
    "The service life cycle is an organizational model providing insight into the way service management is structured, and the way the various components are linked to each other. The impact that changes in one component will have on

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other system components and on the entire system [...] [ITIL] focuses on the service life cycle, and the way service management components are linked" (Bon 2007, p.8).

Based on this, we propose that CobiT and ITIL, having a sequential structure, are able to integrate specialized knowledge of the organization without the necessity of communicating that knowledge. This way companies are able to economize on communication while still being able to integrate specialized knowledge.

- *Routines:* For individuals to be able to integrate their specialized knowledge without the need to communicate, the organization requires clear and specified roles. In a survey carried out by Cater-Steel et al. (2009), they found that one of the top benefits of implementing ITIL is that the roles and responsibilities are clarified. ITIL uses the RACI Model (Responsible, Accountable, Consulted and Informed) to help define their roles and responsibilities (Bon 2007).

  In CobiT, in the "Plan and Organize" domain there is a process named "Define the IT processes, Organization and Relationship", which focuses on establishing roles and responsibilities integrated into the business (IT Governance Institute 2007a). Additionally, a process control in CobiT PC4 requests that the organization should "assign and communicate unambiguous roles and responsibilities for effective execution of the key activities and their documentation" (IT Governance Institute 2007a).

  In Paper 5, we explore how Control and Accountability is impacted as the CobiT implementation matures. Control and Accountability implies leadership, control and accountability from personnel within the organization who have authority to govern. Our findings suggest that as the implementation of CobiT increases, so does the impact on Control and Accountability. By establishing clear roles, which are traits that can be

observed in ITIL and CobiT, specialists are able to generate specialized knowledge in a coordinated way.

- *Group problem solving and decision making*: ITIL recommends the creation of various groups, such as the IT Steering Group and the Support Group. The Steering Group is a formal group which is responsible for ensuring the alignment of the business and IT service provider strategies and plans. The Support Group is a group of specialists with technical skills and is responsible for providing technical support needed by all IT service management processes (Bon 2007). These are two examples of groups, proposed in the ITIL framework, which are responsible for decision making and problem solving.

In regards to CobiT, similar groups are recommended to solve problems and also reach consensus when making decisions. Both of these frameworks create environments where group problem solving and decision making can be performed. Consequently, the implementation of these frameworks will have an impact on these integration mechanisms.

As previously expressed, all of these integration mechanisms of knowledge depend on the existence of "Common Knowledge". From our review, we found that when referring to the benefits of CobiT, Tshinu et al. (2008) argue that CobiT provides a "shared understanding amongst all stakeholders, based on a common language". In the case studies completed by Cater-Steel et al. (2008) they cite a manager stating that "Standardization makes us more efficient and using common language, you get benefits out of using the same tools". Similarly, research conducted by Marrone, Kiessling and Kolbe (2010) (See Appendix One) contains results from our case studies conducted in Germany, where one of the benefits that companies had realized due to the implementation of ITIL was "Adoption of a common IT process methodology".

We can observe from various case studies that ITIL and CobiT are able to provide a common language, which is the foundation needed to support the knowledge interaction. From this basis, for all of the four integration mechanisms of knowledge, we can see that both ITIL and CobiT are able to have a considerable impact in these areas.

We have found that the characteristics of knowledge integration, as proposed by Grant, are present in the structure of IT operational process improvement frameworks. Of interest is to explore how the implementation of IT process improvement frameworks has an effect on the knowledge of the organization. In the next section, we explore how knowledge existing within the organization is impacted throughout the process of implementing these frameworks.

## 8.4  Impact of the Implementation on the Organization's Knowledge

Cases of successful implementations of IT operational process improvement frameworks are widely publicized. These cases include companies such as BMW, Proctor & Gamble and Queensland Health. However, it has been suggested by researchers that in their process of implementation, some companies are unsuccessful. The question then arises, how does the implementation of these frameworks impact the organization?

In our previous section we saw that IT operational process improvement frameworks have characteristics of knowledge integration, however, this knowledge exists outside the organization and must be incorporated to the knowledge that already exists within the organization in a process of transformation and internalization. It is in this process where complications may arise when implementing the framework.

In a relatively obscure paper by Bueno and Salmador (2003), quoting their original paper published in Spanish, the authors develop a model named the "Knowledge-based system knowledge" which attempt to explain how companies internalize knowledge which is external to the organization. This model is shown in Figure 15. The authors propose that knowledge is

first acquired from knowledge which exists outside the organization. Then, knowledge is introduced into the organization, and after a phase of transformation, this flow of knowledge will generate new knowledge that is integrated into distinctive and essential competences of the organization (Hedlund and Nonaka 1993, Hedlund, 1994). If the new knowledge creates value for business, this signals the presence of intangible assets, which are part of the intellectual capital. As noted by Huber (1991, p89) "an organization learns if any of its units acquires knowledge that it recognizes as potentially useful to the organization".
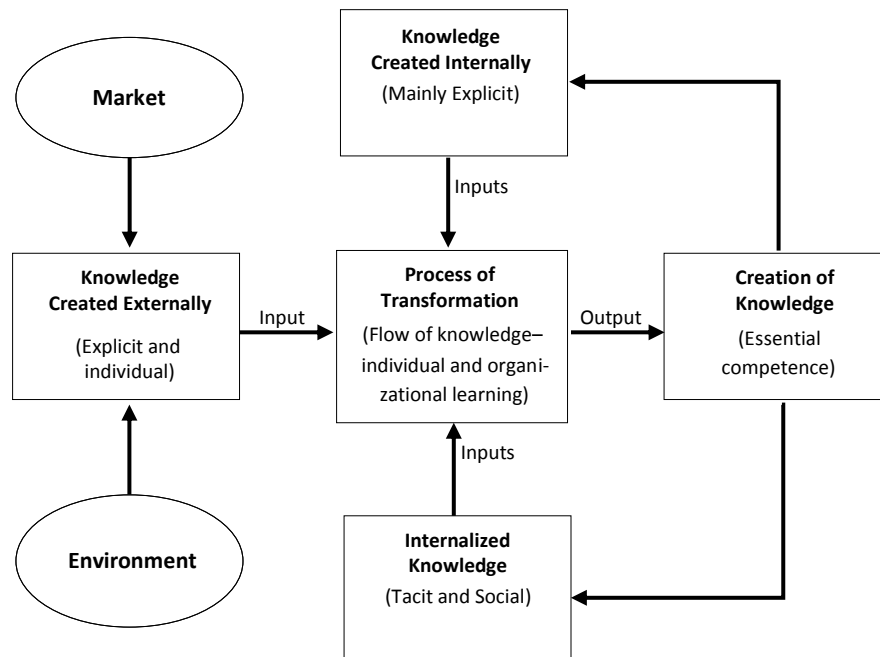


**Figure 15. Basic Elements of the Knowledge-Based System (Adapted from Bueno et al. 2003)**

We apply this model to the implementation of an IT operational process improvement framework within a company. We observe that initially knowledge, which was created outside the company, is introduced into the organization. The knowledge that is introduced is a condensed and compiled view of practices to be followed. The organization introduces this knowledge and combines it with the knowledge that already exists and is relevant to the company. This leads to the creation and implementation of new knowledge. If this new knowledge is useful, it creates value for the organization. At the same time, the introduced

knowledge has been transformed, and now this newly created knowledge is specific and relevant to that organization. Therefore, it is through the cycle of transformation that value is generated for the organization. Due to the transformation and assimilation of knowledge, it becomes a part of the organization and its individuals.

Various researchers have suggested that an organization would become competitive if it combines different knowledge streams, applies these to certain tasks, integrates specialized knowledge of individuals and allows for the creation of new knowledge (Conner & Prahalad 1996; Grant 1996b; Grant 1996a; Sabherwal & Becerra-Fernandez 2003). Additionally, Rivkin (2001) proposes that lasting improvements can be created through the expansion of the knowledge base used.

Based on the model by Bruno et al. (2003), we understand that an organization implementing an IT operational framework would first internalize, and then transform knowledge to make it relevant to the organization, therefore creating new knowledge. The process of internalization sheds light on why some organizations are not as successful in the implementation of these frameworks. If companies are able to expand their knowledge base while maintaining the current "know-how" of the organization it is probable that they will successfully implement the frameworks.

By applying this model we also observe that the success of the implementation is dependent on the process of transformation of the knowledge, taking the knowledge that is external to the organization and converting it into useful knowledge relevant to the organization. This model attempts to explain why IT organizations that have implemented the frameworks have realized benefits due to this implementation. It also helps to understand key issues for successful implementation of a framework.

## 8.5    Chapter Conclusion

Results from studies completed in this thesis have suggested various benefits achievable through the implementation of IT operational frameworks. However, theoretical development remains fragmented. This chapter is an effort to add the effect of knowledge determinants to the impact that these frameworks have, not only on the IT organization, but also on the firm.

IT operational frameworks, such as CobiT and ITIL, provide policies, procedures and tools that are inherently useful as enablers of knowledge generation, integration and application. Therefore, these frameworks are able to have a positive influence on knowledge transfer. These frameworks have the ability to significantly influence the IT organization's resources and capabilities.

At the same time, it is understood that frameworks as "best practices" contain knowledge which reflects the cumulative experience of hundreds of individuals and organizations around the world (Spafford 2003). Based on Nonaka's (1994) modes of knowledge conversion and the model proposed by Bueno et al. (2003), when these frameworks are implemented in the organization new knowledge is created from a combination of the knowledge contained in the organization and the implementation of the framework.

This theoretical discussion leads to the ability to propose ways in which further research could be driven from a theoretical perspective. This is explored in the recommendation for further research in the next chapter.

# 9. Conclusion

This final chapter concludes the research activities outlined in the introduction. It discusses the study and outcomes in the light of their contributions, significance and limitations. The chapter starts off with a brief recapitulation of the research process presented here. Then, study contributions are summarized. Conclusions are drawn with regards to the implications of the study of research and practice, before limitations of the research are presented. Lastly we present the outlook for future research.

## *9.1    Reprise*

This thesis was motivated by the relevance of IT operational frameworks to current IS practices. The focus of this thesis has been to understand if IT operational frameworks, specifically ITIL and CobiT, have an impact on the IT organization, as perceived by IT executives. This examination has entailed a review and our analysis of the relevant literature directed at two IT operational frameworks. Literature streams in the two topics were defined and organized. Gaps that were found in literature were investigated by research reported in five manuscripts. From the literature review and pilot case studies an initial conceptual model was designed.

We start off by shedding light into the adoption patterns of ITIL in Australia, DACH countries, United Kingdom and United States. Differences in adoption are observed amongst the countries. Characteristics of the organisation, such as size and industry sector also play an important role in determining the adoption of the ITIL processes. While ITIL is considered a "best practice", its adoption may not homogeneous across all IT organisations.

For ITIL, the benefits of its implementation gathered from the literature review include: service quality, standardization of services, customer satisfaction, return on investment, business-IT

alignment, reduction of IT downtime, operations through implementation of a best practice, financial contribution control, call fix rate, and morale of IT staff.

Challenges of the ITIL implementation include factors such as: lack of executive sponsorship, business understanding ITIL objectives, Lack of resources (time or people), Lack of internal skills / knowledge relating to ITIL, lack of funding / cost of adoption, organizational / cultural resistance to change, maintaining momentum / progress stagnates.

After gathering these factors, a web-based survey was conducted from organizations of varying sizes. Close to 500 responses were received. This study compares the challenges and benefits of companies at various levels of implementation. Results indicate that as the maturity of implementation increases, the perception of challenges decreases. Findings also show that as the maturity of implementation increases, the number of realized benefits increases.

Understanding that benefits were provided by the implementation of ITIL, the research set out to determine which ITIL processes can act as predictors for the listed benefits. Using data from 190 IT organizations, the findings of our research show that Access Management and Financial Management often predict the realization of benefits. Other important processes are Change Management and Incident Management.

While the research only focuses on the operational benefits provided by ITIL, the next step as followed in the research is to understand if the implementation can help in the strategic positioning of IT organizations, specifically by improving its business-IT alignment. Findings of this study indicate that as the adoption of ITIL increases, the perceived level of maturity of the business-IT alignment also increases.

Having conducted an international study on the adoption of ITIL findings of this research are not limited to the US and UK but may also be observed in other countries, such as Australia and DACH countries.

Lastly, the research set out to understand if these traits could also be observed in other IT operational process improvement frameworks. In a survey of over 120 IT organizations using CobiT, findings shows that companies which have achieved higher implementation levels experienced high positive impacts on their business-IT alignment. Furthermore, they received a positive impact in the areas of IT governance: Strategic Alignment, Performance Measurement, Control and Accountability, Risk Management, Value Delivery and Resource Management.

While these papers concentrate on showing the benefits that these frameworks are able to provide, there has been no theoretical basis explaining why companies achieve these improvements. In the discussion chapter we utilized the knowledge-based view of the firm approach to deliver understanding of why organizations are able to create knowledge when implementing these frameworks. The discussion chapter helps illustrate how IT operational frameworks can help in the knowledge integration process. Additionally, using the model of "Knowledge-Based System" proposed by Bueno and Salmador (2003), we show that the implementation of IT operational frameworks would bring new knowledge into the organization. This knowledge would then be transformed to knowledge which is relevant to the company.

## *9.2    Contributions*

Based on the literature review, pilot case studies, pilot surveys, and various surveys, the following research and managerial contributions can be drawn.

### 9.2.1  Research Contribution

While in academic research the effects of IT operational process improvement frameworks have been studied in various case studies, no studies to date directly address the issue empirically. Therefore, this dissertation contributes to IS literature in several ways.

First of all, our literature review is able to provide structure by creating streams of research for both research areas, IT Service Management and IT governance. Two main streams identified in the research area of IT Service Management are Academia and IT organizations. The stream on IT organizations is then subdivided into sub-streams. Sub-streams identified were: Critical Success Factors (CSF) and Challenges, Benefits, Overview and Framework Building, and Knowledge Management.

In the area of IT governance, Brown and Grant (2005) have completed a thorough literature review in the area, so we have built upon this work. They identified two streams, IT governance forms and IT governance contingency analysis. These two streams then merge into a stream titled Contemporary IT governance frameworks. Our literature review gathers articles in this area and divides the research stream by categorizing it in the six focus areas of IT governance. This analysis presents a single consolidated overview for all IT Service Management and IT governance literature until the end of 2010 in pertinent IS outlets.

The second contribution relates to the fact that only very limited research has been completed on the benefits provided by IT Service Management and IT governance frameworks. Results from this provide a comprehensive, empirically validated conceptualization of the factors pertaining to benefits of implementation of ITIL and CobiT. The two surveys presented here are the first empirically validated instruments that set out to understand the impact that these two IT operational process improvement frameworks have on the organization.

The third major contribution relates to the methodology used. Previous empirical studies on manufacturing frameworks compared companies that had implemented the framework with those that had not. The novel methodology used in this thesis compares companies at different levels of adoption. With this new methodology we are able to understand at which levels of the implementation companies perceive to have an impact on their IT organization.

Since the field of IT operational process improvement frameworks lacks theoretical grounding, we have viewed our results through the lens of the KBV. We propose that the four integration mechanisms of knowledge inside the KBV are incorporated in the IT operational frameworks. Using this theory, the research also sheds light on why companies that implement IT operational frameworks are able to realize benefits through their implementation.

A further contribution of this research lies in the finding that if upcoming IT operational frameworks are able to guide the organizational transformation of knowledge there is likelihood that the implementation of the framework will positively affect the organization. For a framework to positively affect the organization it must contain various fundamentals. These new frameworks are to:

- Capture relevant and accurate knowledge
- Allow for straightforward transfer of knowledge into the organization
- Contain integration mechanisms of knowledge

A further contribution is that we now suggest improvements to the ITIL and CobiT frameworks. In our analysis of these frameworks through the lens of the KBV and the integration mechanisms of knowledge, we noticed that ITIL has deficiencies in the area of sequencing. One example of problems of sequencing found in ITIL can be illustrated with the problems managers experience when implementing the ITIL framework. When managers implement the framework there is no clear starting point to the implementation. While the lifecycle approach provides some sequence, IT managers implementing the ITIL framework have problems understanding in which stage of the lifecycle they should begin the implementation.

In CobiT, the knowledge integration mechanism that shows some deficiency is group problem solving and decision making. CobiT concentrates on the accountability and decision making, preferring to assign one accountable person with this task rather than a team of experts. While this mechanism may require integration through more personal and communication-intensive

manners, it proves useful because the knowledge of various people is incorporated and taken into account when reaching to a decision.

### 9.2.2 Managerial Contribution

The contribution of this research to organizations is varied. The instrument presented here in this study was designed with academic rigor and tested through various statistical tests with the empirical data gathered. We are able to provide contributions to two main groups of IT executives. The first one is for IT executives of companies considering the implementation of ITIL or CobiT, while the second group of contribution is relevant to those IT executives of companies that have implemented ITIL or CobiT. For the latter, we are able to show what they can expect as they continue in their process of maturing their implementation.

We are able to show that the adoption of ITIL will have a considerable perceived improvement in various areas. These significant positive effects were found mostly in the initial stages of implementation. Improvement is seen in areas such as: service quality, standardization of services, customer satisfaction, business-IT alignment, reduction of IT downtime, operations through implementation of a best practice, financial contribution control. In the later stages of implementation improvement is seen in the measurement of the return of investment. As well, in the later stages IT organizations are likely to show the improvements made by means of metrics outcomes, as well as the business acknowledging that improvements have been made. In other words, it is shown that organizations may gain benefits from the adoption of ITIL. For those that have implemented ITIL we are able to show what they may expect in the later stages of implementation.

As well, we explore ITIL processes which can act as predictors of benefits. Conclusions drawn in this area are useful for managers wishing to improve specific areas of their IT organization, since they would now be able to use their limited resources for focusing on the maturing of specified processes.

Additionally, contributions to managers that have implemented CobiT are also demonstrated. Executives will now be able to understand when they can expect to realize improvements. In the initial stages managers can expect an improvement in the area of Capability Management and Control and Accountability. In the later stages of the implementation process, improvements can be expected in Strategic Alignment, Risk Management, and Control and Accountability.

Overall, the findings of this research allow managers to be fully aware of the potentials of implementing these frameworks. Managers should be conscious of the impact that these frameworks will have on their IT organization and on the relations between the business and IT. As well, we show organizational characteristics, such as country, size and industry, which may have an impact when implementing an IT operational process improvement framework.

By applying the KBV, contributions to practitioners include the understanding that the benefits would also come from transforming the organizational knowledge from tacit to explicit, as well as by the implementation of the "best practice". By using this theory, we suggest that managers concentrate also on the knowledge integration mechanisms rather than only on the suggestions of the IT operational process improvement framework.

## 9.3 Limitations of the Thesis

The results of this research should be interpreted through the limitations of the study. We address the limitations of each of the papers within the proposed manuscript. In this section we expand on the overall limitations of the research.

In order to maintain a feasible, realistic and manageable scope of the project, we only cover ITIL and CobiT. As well, our literature review was limited to a systematic examination of academic research published in specific IS journals and conferences. Further, only the versions of ITIL V2 and V3 were considered, and for CobiT research is only completed for v4.

Survey research is commonly associated with a number of limitations. Weaknesses of this method are to be associated with this research. This research, being mostly empirical, depends on the answers and perceptions provided by the respondents and their answers were not independently evaluated. Respondents from various levels of the IT organization answered our survey, which provided a good overall picture of how CobiT and ITIL were perceived at different levels of the organization. However, limiting the respondents to C-level executives would have created a clearer view on how these executives and the business perceive the effectiveness of the frameworks. Further limitations include the way the constructs were operationalized. A different conceptualization of the constructs may lead to different results. Another limitation of a web-survey is sampling. Performing a random sample is difficult, and this may pose a threat to the validity and generalizability of the results.

Other limitations of this study are that the benefits' study concentrates only on the United States and United Kingdom, and that it over-samples the larger enterprises. Another limitation is that empirical studies are dependent on the quality of data provided by the respondents. Addition-ally, the paper uses a perceived maturity which is based on a single measurement.

The studies conducted in this thesis do not pursue any measure of organizational performance as it lies outside the scope of the research. However, completing a survey involving metrics would provide data which would quantify the impact of the benefits realized through the implementation of the frameworks. This would also provide a clearer image of which processes could be predictors of achievable benefits.

As well, using Luftman's (2001) model on business-IT alignment would provide a clearer picture on areas of alignment which are to be impacted by the implementation of the frameworks. This approach was not completed due to the high number of questions we were already asking our respondents.

## *9.4    Recommendations for Future Research*

It is hoped that this thesis stimulates fellow researchers to venture on to extend the body of knowledge provided in this research. There are a number of areas where further research is required, both from a scientific and practical point of view. Some pathways that could be followed are proposed here. These include, but are not limited to:

**Metrics:** A survey using Key Performance Indicators (KPI) which are frequently employed by organizations, would provide vast information of how benefits are realized as the maturity of the implementation increases. Most importantly, understanding would be gained on the extent of impact that the implementation would have on the IT organization.

**Users Vs. Non-Users:** While a novel methodology is used here in this research to understand how the frameworks have an impact on the IT organization, it would be important to carry out a comparison between the outcomes of companies using IT operational process improvement frameworks versus companies that have internally developed their own framework.

**Usage of the combination of ITIL and CobiT:** The number of companies implementing both ITIL and CobiT simultaneously is increasing. At the earlier stages of the research this phenomenon was rarely observed, but it is becoming more common nowadays. This factor was first discussed by Cater-Steel (2006). Future studies are being recommended to look at how companies are dealing with the implementation of both frameworks simultaneously. Questions on the challenges of implementation and the realization of benefits should be included.

**Factors for failure of adoption:** The research here focused on companies that were using either ITIL or CobiT. However, of interest would be to understand if and why companies failed when implementing such frameworks. The KBV could be used, concentrating on how the companies transformed the knowledge within the framework and merged it with the knowledge contained

within the IT organization. Also of interest is to understand if the implementation of the framework was in-line with the strategy of the organization.

**Testing the KBV approach as theoretical grounding:** Further research should develop and test a model which would show and prove the relations between the creation of benefits due to the implementation of such frameworks and the improvements achieved through knowledge integration. Further studies must be completed to see if improvements are due to the knowledge integration mechanisms established within the organization or if it is due to the implementation of "best practice" frameworks. As well, case studies will be completed to understand mechanisms that assist in the process of transformation of knowledge.

**High maturity of implementation:** A large number of researches have been done examining companies in the early stages of their implementation of ITIL or CobiT. Of interest would be to examine companies that are mature in their implementation to understand the benefits and challenges of implementation. In this form, an understanding would be gained of how these companies dealt with the issues and we would be able to enrich the theory by making the model proposed in this thesis (Basic elements of the Knowledge-Based System) more specific. For this study we would propose as a tool the Delphi method.

## *9.5 Concluding statements*

This thesis sets out to understand the perception of IT executives of improvements realizable through the adoption of IT operational process improvement frameworks. The thesis attempts to systematically approach the field by gathering relevant factors and building an instrument. This is then validated through empirical data. A great deal of data has been collected during this research, and this thesis has only been able to examine a minute part of the data. The survey completed for ITIL contained close to 60 questions, while the survey on CobiT close to 20. We have only been able to report the findings for a few of the answers gathered.

Every major phase in this thesis had a unique contribution to knowledge and opens the path for further research. It is hoped that the thesis stimulates researchers to embark on the suggested research paths, since this was one of our main intentions.

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# 11. Appendix One

**Are We Really Innovating? An Exploratory Study on Innovation Management and Service Management**

Paper published at the 5<sup>th</sup> IEEE Conference on Management of Innovation and Technology. Through case studies, it showcases the benefits of implementation of IT Service Management frameworks. In conjunction with academic literature, this was used to construct pilot survey.

# Are We Really Innovating? An Exploratory Study on Innovation Management and Service Management

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*Abstract* - **The paper explores the relation between innovations and standards in companies which have implemented an IT Service Management framework. Six German companies were asked which process was implemented first: the framework or the Innovation Management process. In addition, the companies were queried about the impact of IT Service Management frameworks on innovation. Research shows that the majority of companies adopted an IT Service Management framework first and implemented the Innovation Management process later. Benefits observed include a faster adoption of innovations and an enhanced ability to recognize potential for improvement. Yet, results show that most companies do not differentiate between imitating, improving and innovating.**

*Keywords* - **Innovation Management, IT Service Management**

## I. INTRODUCTION

The adoption of IT Service Management (ITSM) frameworks is on the rise. It is estimated that 90% of US companies are considering or currently using an ITSM framework [1]. One of the goals of ITSM is to attain a particular level of standardization of operational processes in the Information Technology (IT) department.

On the other side, innovation is a process requiring creativity. Hence, a specific degree of freedom is needed for the development of new ideas. The processes – innovation and standardization – are seen as either mutually exclusive [2] or complementary, as in the study by [3], in which they found that standardization spurred innovation in 50% of the cases.

Relevant to this research is the impact of a standard on innovation in IT departments *per se*. IT is one of the most frequently changing departments. As stated by [4], by adopting the stage theory as a foundation, methods for managing the department must evolve over time if the management of IT in the long term is to be successful.

Further, [5] suggests that an organization may be more likely to produce innovative ideas when its environment is rapidly changing. Arrow [6] argues that a more competitive environment would give a greater incentive to innovate.

Consequently in this paper we focus on companies that have implemented the ITSM standard, and we explore different views on managing innovation.

In this context, the following four research questions are addressed:

1) Which process – ITSM or Innovation Management – is implemented first in the majority of cases, and what are the reasons for the adoption of ITSM?
2) Are ITSM and Innovation Management independent processes?
3) Which approach to innovation are IT Service companies following?
4) What is the impact of ITSM on Innovation Management, and how do they coexist?

## II. THEORETICAL FOUNDATIONS

### A. Management of Innovations

Development of innovations decides if companies stay in a market or get outperformed by competitors [7]. In other words, the ability to innovate is a key success factor to growth and competitive advantage [8]. Therefore, it is not surprising, that 74% of the respondents in a BCG survey from 2009 stated that innovation is one of the top 3 strategic priorities [9].

Rogers [11] defines innovation as "the application of new ideas to the products, processes or any other aspect of a firm's activities". Innovation can be further understood as improvement, whose implementation into market raises the competitiveness of the innovator for at least a limited amount of time [12]. Organizational innovation can be defined as "the adoption of an idea or behaviour that is new to the organization adopting it" [13]. Van de Ven [14] describes an innovation as an idea that is new to the people involved, even though it may appear as an imitation to others.

As proposed by [10], organizational innovation can be divided into three sections: diffusion of innovation, factors of the innovativeness of organizations and the innovation process. One of the core elements of innovation is the economic value or successful implementation into the market.

To stay competitive and to promote innovation, companies cannot rely on chance alone. It is crucial to manage the innovation process systematically, providing both structure and goals [15]. This necessity is based on limited financial, material and human resources [16].

In general, "Innovation Management is about learning to find the most appropriate solution to the problem of consistently managing this process" [17]. It can also be defined as planning, organizing, executing and controlling all activities related to the development and implementation of innovations [18]. Moreover, Drejer et

al. [19] describe Innovation Management as consisting of five activities: technological integration, the process of innovation, strategic technology planning, organizational change and business development.

Papinniemi [20] quotes [21] who lists the generations of industrial innovations, and how various companies can approach innovation. These approaches are:

- Technology Push: emphasis on R&D
- Need-Pull: emphasis on marketing as a source of ideas; R&D has a reactive role
- Coupling Model: emphasis on integration of R&D and marketing. (Push/Pull combination)
- Integrated Model: close coupling between leading-edge customers, with emphasis on integration between R&D and manufacturing
- System Integration and Network Model: customer focus on forefront of strategy and integration with suppliers, emphasis on corporate flexibility and increase focus on quality and other non-price factors.

Furthermore, he refers to [22] who found that companies which follow more than one approach are likely to attain higher levels of innovation than companies which only use one.

Even though these approaches have been suggested for industrial innovation, they also apply to service innovation.

### B. Fundamentals of ITSM

ITSM is a part of Service Sciences which concentrates on IT Operations [1]. It can be defined as "a set of processes that cooperate to ensure the quality of live IT services, according to the levels of service agreed to by the customer" [23].

ITSM is the management and delivery of IT services with focus on customer needs [24]. The strategy and operation of IT are offered to customers and consist of contracts and service level agreements to ensure an effective provision of IT. ITSM is process-oriented and leads to a flexible, cost effective and service oriented IT organization [25]. Additionally, a factor to look at is the cost entailed by IT Services. IT Services account for an estimated 70% to 80% of the expenditure of an IT organization [26]. Therefore, an efficient and effective ITSM is needed, so that the application is usable for the user, even in case of an incident [27].

The basic aspects of IT Service Management are services and processes. Services can be seen as the delivery of value to the business by providing hardware, applications and human resources [24]. It is important for IT Service Management to have processes oriented instead of functional structures [28]. Satisfying the needs of the customers regarding IT through the IT resources is the prime task of ITSM [29].

There are several studies considering the implementation of ITSM. In a survey with 364 participants in the US showed that 45% of the respondents are using ITSM in their company, while 15 %

are planning on using it. Of those using ITSM, 66 % were familiar with the concept of ITIL. As mentioned previously, another study estimates that 90% of US companies are considering or currently using an ITSM framework [1].

There are various concepts of ITSM. The most common approach is ITIL, which is a de facto standard for IT Service Providers [30]. Various ITSM frameworks have been developed using ITIL as a reference, such as Hewlett-Packard (HP ITSM Reference model), IBM (IT Process Model) and Microsoft's MOF [27].

The current version of ITIL, Version 3, was published in May 2007. It consists of 26 sections which are included in the following five services: Service Strategy, Service Design, Service Transition, Service Operation and Continual Service Improvement. The earlier version, Version 2, has a total of ten processes in two main domains: Service Support and Service Delivery.

### III. METHODOLOGY

To examine objectives and experiences reflecting the impact of ITSM on Innovation Management, partially structured expert interviews were conducted.

Chief Information Officers (CIOs) of eight IT Service Providers were approached, of whom six were interviewed between November, 2008, and January, 2009. Interviewees came from different fields and levels of responsibility. The interviews averaged 20 minutes and were primarily held by telephone. Some were conducted by e-mail, with the potential for further questioning to supplement incomplete information.

Based on the theoretical foundations, interview topics were outlined and grouped into four sections: 1) personal information on the interviewees' background and responsibilities; 2) reasons for ITSM adoption; 3) conducting of Innovation Management; 4) possible links between ITSM and Innovation Management. In order to encourage interviewees to express their opinions, many questions were open-ended. The order and direction of topics varied, as openness and flexibility allowed new points to be raised. Each interview was recorded in order to permit information to be extracted and compared in a systematic and objective fashion.

TABLE I
Interviewees' sample demographics

| Case | Company Size | Company Description |
| --- | --- | --- |
| A | Large | Internal IT Service Provider |
| B | Mid-size | IT Consultant |
| C | Mid-size | External IT Service Provider |
| D | Small | Software Management and Software Distribution |
| E | Small | External IT Service Provider |
| F | Large | Internal IT Service Provider |

The limiting of our sample to companies in Germany allows for greater comparability as well as a simplification of the data collection. One criterion is the

use of ITSM within the company. In Table 1, the interviewed companies are introduced, along with a description of their respective IT services.

## IV. RESULTS

The following section presents 1) the results, considering ITSM adoption and Innovation Management implementation separately; and 2) the interviewees' perception of the impact of ITSM on their Innovation Management. Results are summarized later in Table 2.

### A. ITSM Adoption

The length of time that ITSM has been in place in the various companies differs. Cases A, B and C have implemented ITSM over a period of seven to ten years; cases D and F for five years; and case E for three years. Since different perceptions of maturity levels exist, it is important to know what is meant by "maturity" in the various cases. Five out of six respondents employ the Capability Maturity Model Integration (CMMI), or models based on CMMI, such as the CobiT maturity levels, as their basic definition.

Following the CMMI model, cases A, D and E show a "defined process" maturity level, in which the processes have been standardized and documented. Cases B and F reflect a "managed and measured" maturity level, where procedures are monitored by the management.

Case F is alone in reporting difficulties in specifying a maturity level. They have installed Key Performance Indicators (KPIs) for the assessment of central processes, however not for all processes.

Case C has an "optimized" maturity level, in which processes have been polished to a level of good practice. Areas of improvement targeted were:
- customer satisfaction
- internal processes
- standardization of processes
- service quality
- efficiency
- return on investment

### B. Innovation Management Implementation

In case A, Innovation Management is conducted on an interdepartmental basis. The various ideas for improvement of products and services are collected as part of the Innovation Management process, after which they undergo review and are considered for implementation.

Case B focuses not only on internal processes but also on innovation geared at customers. A special team is solely responsible for research and innovation. Suggested innovations are evaluated by a standardized process.

Innovation Management in case C is essential to their business strategy, to improve the effectiveness and efficiency of their products, services, processes and structures.

Case D implemented Innovation Management and holds yearly reviews of their internal processes in order to assess efficiency and effectiveness. They expressed that a more systematic Innovation Management will be implemented in the future once a higher maturity level of their Service Management and other processes has been reached.

Due to their size, case E does not yet see Innovation Management as an independent process within their company. Finally, in case F the main focus of Innovation Management is on collaboration with customers to identify improvements in products and services.

### C. Link between ITSM and Innovation Management

On the question of the noted effect or impact of ITSM on Innovation Management, companies submitted different feedback.

In case A, no direct impact of ITSM on Innovation Management is noted. Thus, the two need to be considered as separate processes. As a first step, ITSM needs to be aligned with customers' needs and interests. Only when all ITSM processes have been installed properly and have reached a certain maturity level can Innovation Management follow as a next step, to optimize and develop processes.

Case B describes ITSM and Innovation Management as "natural enemies," for they represent contrary goals. According to this firm, the adoption of an innovative process distracts from the main objective of ITSM frameworks. To them, the objective of ITSM is to have clearly defined standard processes. Innovation Management has to be seen as a separate process in which innovations are identified, developed and implemented. The implementations of these innovations need to proceed under controlled circumstances in order to be able to evaluate the results in a standard fashion.

In contrast, case C claims that they could identify impact of ITSM on Innovation Management.

TABLE 2
Interview Results

| Case | Years of Adoption | Maturity Level | First Implemen-tation | Independent Process |
|------|-------------------|----------------|-----------------------|---------------------|
| A | 10 | defined | ITSM | no |
| B | 8-10 | managed | Innovation Mgt. | yes |
| C | 7 | optimized | ITSM | no |
| D | 5 | defined | ITSM | no |
| E | 3 | defined | ITSM | no |
| F | 5 | managed | ITSM | no |

Using a "Plan-Do-Check-Act" cycle to recognize potential for improvement, they believe that Innovation Management within their ITSM framework shows three

basic types of impact: 1) significant increase of customer satisfaction; 2) image improvement; and 3) product and service quality improvement.

Case D definitely noticed the effect of ITSM on their Innovation Management. For them it is not a question of whether there is an impact, but rather how great this impact is. Specifically, they have noticed that due to the faster adoption of innovations via ITSM customers' needs can be handled more efficiently. In this the company differentiates itself from its competitors.

In assessing the impact of ITSM on Innovation Management, case F sees ITSM as the superior model. After first implementing ITSM, they later introduced Innovation Management into the framework as an independent process. This opportunity to employ Innovation Management as a new strategic process was possible since case F's ITSM consists of not only operational processes (e.g. Incident Management) but also strategic processes (e.g. IT Strategy, IT Business Assessment).

## V. DISCUSSION

All companies argued that they are innovative. Furthermore, the adoption of an ITSM framework is always considered to support change. For example, the reasons for adoption of ITIL are (1) customer satisfaction, (2) internal processes, (3) standardization of processes, (4) service quality, (5) efficiency, and (6) return on investment. Schmenner and Vollman [31] describe the driving force for change and innovation to be (1) customer satisfaction, (2) quality, (3) employee involvement, (4) return on investment and (5) integration with customer. All five issues match the reasons for the ITSM adoption, which suggests that the adoption of ITSM leads to a process innovation within the company.

This research also concentrates on how the innovation management is done once ITSM is implemented. Therefore, to understand how companies viewed their innovativeness we asked which process was implemented first – the ITSM framework or Innovation Management. Interviewees responded more frequently that ITSM frameworks preceded implementation of Innovation Management. One possible reason for this is the inherent capacity of the ITSM framework for continuous improvement of existent services. This process – Continual Service Improvement (CSI) – is "responsible for managing improvements to ITSM Processes and IT Services" [32]. Rather than considering Innovation Management as a separate entity, respondents perceived that ITSM includes innovation in its very structure.

Additional insight was gleaned when the companies were asked if in fact they had implemented an Innovation Management process, and if so, where it was introduced. This revealed case B as the only company to have implemented Innovation Management independently of the ITSM framework. This was done to give enough space for innovations to evolve without obligation to integrate them within current business operations. It thus eliminates the risk of affecting business processes already defined in line with ITSM. By separating the two, they reduce the risk of compromising the quality of either process. They state that they follow an Integrated and a Need-Pull approach to innovation.

On the contrary, cases A, C and F have fully integrated Innovation Management into their ITSM. This leads to an Innovation Management that is more directly related to business operations as well as to customers, incorporating improvements through the CSI process. It can, however, be suggested that this process yields if not favours incremental rather than radical innovations. As well, most companies concentrate on a Need-Pull approach to innovation.

In our case studies the two small companies, which have not yet implemented systematic Innovation Management, nonetheless reveal that innovations are perceived to be developed more quickly than in cases of the larger companies.

Furthermore, these two small companies explain that they not only incorporate their customers' innovative requirements, but also emulate innovations observed in suppliers and competitors. We notice that this behaviour again favours the improvement method.

Those companies which have the process of Innovation Management embedded in their ITSM believe that they innovate through imitation, others through improvement while the company with a separate process for Innovation Management focuses on their "leap innovation". We define leap innovation as a disruptive innovation.

As already stated, [14] argues that an innovation can also be an imitation. He points out that it depends on the environment and related persons if something new can be seen as an innovation. For example, if a company implements new enterprise resource planning software (ERP), it is an innovation for the company, but not a radical innovation for consumers or other companies.

TABLE 3
Improvement versus Innovation

|  | Improvement | Innovation |
| --- | --- | --- |
| Level of change | Incremental | Radical |
| Starting point | Existing processes | Clean slate |
| Frequency of change | One-time / continuous | One-time |
| Time required | Short | Long |
| Participation | Bottom-up | Top-down |
| Typical scope | Narrow, within functions | Broad cross-functional |
| Risk | Moderate | High |
| Primary enabler | Statistical control | Information Technology |
| Type of change | Cultural | Cultural / structural |

However, the difference between improvement and innovation is considered by various authors.

Table 3 shows a differentiation between improvement and innovation. Craig and Yetton [33] discuss four interesting facts for innovations. First, the starting point of innovation is a clean slate while improvements are made for existing processes. Second, the frequency of change for innovation is unique. Improvements are considered to be developed continuously. Third, the required time for innovations is longer than for improvements. Fourth, the risk for an innovation is high while it is moderate for improvements.

Bond [34], on the one hand, argues that "both small incremental change (*kaizen*) or innovative step change (process re-engineering) are routes to progress. The two are complementary, not mutually exclusive".

On the other hand, Deming, creator of the Deming Cycle, is quoted for saying that "a company that focuses on continuous improvement may be unable to quantum leap to new market sectors" [35].

As well, [36] agrees and adds that "Companies who make occasional improvements at a pedestrian pace cannot possibly hope to keep up with their competitors. They need to set ambitious goals".

In a nutshell, companies often view their imitations as innovations. They also may view their improvements as innovations. Small companies view themselves as being innovative through imitation. All companies believe that they are innovative. Those that have their Innovation Management process included in their ITSM framework believe they are innovative because of their Continual Service Improvements. However, as expressed by various authors, improvements are not innovations, and therefore these companies are not really innovating. Additionally, as expressed by [33], improvement of elements of operation, such as structure, IT and human resources may result in increased efficiency, but not improved effectiveness. We therefore suggest that if companies wish to be innovative, they should implement an independent process of innovation, which may lead to a 'leap' innovation and an improvement of their effectiveness.

Finally, when the companies were queried on the impact of Innovation Management on ITSM, five out of six described a modification in both speed and quantity of innovations, as well as an improved ability to recognize potential for improvement.

## VI. CONCLUSION

Three principal observations from the study show that 1) in its yield of incremental improvements, Innovation Management as a subset of the ITSM frameworks is able to contribute to standardization efforts; 2) companies develop an Innovation Management process due to adoption of an ITSM, employing the concurrent Continual Service Improvement built into the ITSM; and 3) companies recognize that one impact of ITSM on Innovation Management is an increased ability to adopt innovations and to identify areas for potential improvement.

Another take-away point is that the process of implementing ITSM will lead to a process re-engineering. This is considered as innovative. However, the Continual Service Improvements process, which is incorporated in the ITSM, may lead to an improved efficiency, but not to an improved effectiveness.

Furthermore, the analysis of the case studies specified that any improvement, no matter which level or what the source of the improvement, is perceived as an innovation. The discussion on this missing rigour revealed that companies should consider if they are really innovative because this is important to gain competitive advantages.

As limitations of this study, we identify: 1) the lack of understanding of the different types of Innovation Management in the companies (systematic, non-systematic or prescribed from ITSM specifications) and 2) the focus on companies in Germany alone. Thus, the paper and the conducted expert interviews are merely exploratory in nature. Further research should include a larger-scale survey employing the same factors to understand adoption of Innovation Management inside and outside ITSM. Moreover, the perception of maturity level of ITSM should be explored as it relates to the adoption of Innovation Management. As well, the topics innovation, imitations, and improvements need to be differentiated as their definitions are sometimes contradictory.

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# 12. Appendix Two

**Pilot Survey on IT Service Management**

This pilot survey was carried out at the CeBIT conference in Hannover, Germany in February 2009. Eleven answers were collected, and with the feedback given by those surveyed additions were made on the survey. Answers collected with this survey were not used further. Carrying out this survey allowed us to talk to various key players of the industry and understand their needs for information in this field.

# GEORG-AUGUST-UNIVERSITÄT GÖTTINGEN

**We are conducting a survey to understand the strengths and weaknesses of IT Service Management frameworks. We are grateful for answering the following questions.**

## What is your position in your company?

| | | | |
|---|---|---|---|
| ☐ CIO/IT Mgr | ☐ Project Mgr | ☐ Service Support Mgr | ☐ CEO |
| ☐ Service Mgr | ☐ Consultant | ☐ Developer | ☐ Other_____ |

## In what industry is your company?

| | | | |
|---|---|---|---|
| ☐ IT / IS | ☐ Finance and Banking | ☐ Government and Utility | ☐ Agriculture and Mining |
| ☐ Manufacturing | ☐ Retail and Distribution | ☐ Entertainment and Hospitality | ☐ Other _____ |

## 1 - Which IT Service Management frameworks are you considering or using?

| | | | |
|---|---|---|---|
| ☐ ITIL v2 | ☐ CobiT | ☐ HP ITSM | ☐ IBM SMSL |
| ☐ ITIL v3 | ☐ ISO 20000 | ☐ Microsoft MOF | ☐ Internally Developed |

## 2 - Are you using or considering an IT Service Management framework?

| | | |
|---|---|---|
| ☐ Not considering or using | **Considering** to implement in<br>☐ 1-6 months<br>☐ 6-12 Months<br>☐ 1-2 years<br>☐ Over 2 years | **Using** for<br>☐ 1-6 months<br>☐ 6 months to 1 year<br>☐ 1-3 years<br>☐ 3-5 years<br>☐ Over 5 years |

## 3 – Evaluate the improvements caused by IT Service Management frameworks:

| | Great | Moderate | Small | Minimal | None |
|---|---|---|---|---|---|
| Establish clear roles and responsibilities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Response and resolution time. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Software Development. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Customer satisfaction. | ☐ | ☐ | ☐ | ☐ | ☐ |
| System and application availability. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Reduces IT departments' costs. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Service quality. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Business IT alignment. | ☐ | ☐ | ☐ | ☐ | ☐ |

## 4 - IT Service Management frameworks are difficult to implement because of:

| | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| Lack of management support. | ☐ | ☐ | ☐ | ☐ | ☐ |
| High costs of implementation. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Inability to measure impact of Service Management. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Lack of supporting software tools. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Not enough knowledge on IT Service Management. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Difficulties in adapting the model to fit our needs. | ☐ | ☐ | ☐ | ☐ | ☐ |
| They are too complex. | ☐ | ☐ | ☐ | ☐ | ☐ |

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**Optional contact details on the back** ⟶

**Optional – Contact Information**

**Name:** _____

**Email:**_____

☐ Please send me the results of the survey
☐ Please contact me when new surveys are carried out
☐ Please send me the Chair's quarterly newsletter on current topics on Information Management
☐ I am interested on an expert study on measuring the benefits of IT Service Management

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# 13. Appendix Three

**Survey on ITIL Adoption**

Answers from some of these questions were used to collect data which would later be utilized to produce Paper 1 though Paper 4.

**1. Which of the following statements best describes your IT organization? ***

○ We have a very high level of ITIL process maturity. Our processes are documented, understood, backed by metrics and continually reviewed for improvement.

○ We have a reasonably high level of ITIL process maturity. our procesess are documented, understood and monitored for compliance.

○ We have a medium level of ITIL process maturity. Processes are standardized, documented and understood.

○ We have a relatively low level of ITIL process maturity. Some processes are documented and these are generally understood, but errors are likely.

○ We are new to ITIL and have just started, or are planning to implement process.

○ No processes exist/we have not looked at ITIL

## 3. Q2a

**2. Please choose up to 5 of the following benefits of ITIL adoption you find most important. ***

☐ Improving service quality

☐ Increasing customer satisfaction

☐ Improving interaction of IT with rest of business

☐ Reducing IT downtime

☐ Improving call fix rate

☐ Improving return on IT spending

☐ Measuring financial contribution of IT to the business

☐ Adopting a common IT process methodology

☐ Benefiting from best practice experience of others

☐ Improving the morale of IT staff

☐ Other [                    ]

## 4. Q2b Q3a

**3. On a scale of 1-5, where 1=No Challenge and 5=Major Challenge, how would you rate the following barriers to ITIL adoption in your organization? ***

| | No Challenge 1 | 2 | 3 | 4 | Major Challenge 5 |
|---|---|---|---|---|---|
| Lack of Executive sponsorship | ○ | ○ | ○ | ○ | ○ |

| | | | | | |
|---|---|---|---|---|---|
| Business understanding of ITIL objectives | ○ | ○ | ○ | ○ | ○ |
| Lack of resource (time or people) | ○ | ○ | ○ | ○ | ○ |
| Lack of internal knowledge/skills relating to ITIL | ○ | ○ | ○ | ○ | ○ |
| Lack of funding / cost of adoption | ○ | ○ | ○ | ○ | ○ |
| Organization - cultural resistance to change | ○ | ○ | ○ | ○ | ○ |
| Maintaining momentum / progress stagnates | ○ | ○ | ○ | ○ | ○ |

## 5. Q3 Q4

**4. Which version of ITIL (if any) are you using? ***

- ○ ITIL V2
- ○ ITIL V3, upgraded from V2
- ○ ITIL V3
- ○ Have not adopted ITIL

## 6. ITIL V1 / V2 Q4a Q4b

**5. When (approximately) did you adopt ITIL V2 ***

- ○ Over 5 years ago
- ○ 2 - 5 years ago
- ○ 1 - 2 years ago
- ○ Within the last year

**6. Which of the following ITIL V2 Service Support processes have you implemented / do you plan to implement? ***

| | Implemented | Planning within 12 months | Planning 1-2 Years | Planning 2+ Years | No Plans |
|---|---|---|---|---|---|
| Incident Management | ○ | ○ | ○ | ○ | ○ |
| Problem Management | ○ | ○ | ○ | ○ | ○ |
| Change Management | ○ | ○ | ○ | ○ | ○ |

| | Implemented | Planning within 12 months | Planning 1-2 Years | Planning 2+ Years | No Plans |
|---|---|---|---|---|---|
| Release Management | ○ | ○ | ○ | ○ | ○ |
| Configuration Management | ○ | ○ | ○ | ○ | ○ |

**7. Which of the following ITIL V2 Service Delivery processes have you implemented / do you plan to implement? ***

| | Implemented | Planning within 12 months | Planning 1-2 Years | Planning 2+ Years | No Plans |
|---|---|---|---|---|---|
| Availability Management | ○ | ○ | ○ | ○ | ○ |
| Capacity Management | ○ | ○ | ○ | ○ | ○ |
| Financial Management | ○ | ○ | ○ | ○ | ○ |
| Service Level Management | ○ | ○ | ○ | ○ | ○ |
| IT Service Continuity Management | ○ | ○ | ○ | ○ | ○ |

## 7. Q4c - Q4e

**8. In which order did you implement these Service Support & Delivery processes? Choose the same option if processes were implemented at the same time (e.g. Incident Management - 1st, Problem Management - 1st). ***

Incident Management     `-- Please Select -- ▼`

Problem Management     `-- Please Select -- ▼`

Change Management     `-- Please Select -- ▼`

Release Management     `-- Please Select -- ▼`

Configuration Management     `-- Please Select -- ▼`

Availability Management     `-- Please Select -- ▼`

Capacity Management     `-- Please Select -- ▼`

Financial Management     `-- Please Select -- ▼`

Service Level Management     `-- Please Select -- ▼`

IT Service Continuity Management     `-- Please Select -- ▼`

**9. On a scale of 1 - 5, how would you rate your maturity level against each of these Service Support processes, where 1=Process exists but not documented and 5= Process continually improved** *

| | Process exists but not documented 1 | Process documented, errors likely 2 | Process documented and standardized 3 | Process monitored for compliance 4 | Process Continually Improved 5 |
|---|---|---|---|---|---|
| Incident Management | ○ | ○ | ○ | ○ | ○ |
| Problem Management | ○ | ○ | ○ | ○ | ○ |
| Change Management | ○ | ○ | ○ | ○ | ○ |
| Release Management | ○ | ○ | ○ | ○ | ○ |
| Configuration Management | ○ | ○ | ○ | ○ | ○ |

**10. How would you rate your maturity level against each of these Service Delivery processes, where 1=Process exists but not documented and 5=Process continually improved** *

| | Process exists but not documented 1 | Process documented, errors likely 2 | Process documented and standardized 3 | Process monitored for compliance 4 | Process Continually Improved 5 |
|---|---|---|---|---|---|
| Availability Management | ○ | ○ | ○ | ○ | ○ |
| Capacity Management | ○ | ○ | ○ | ○ | ○ |
| Financial Management | ○ | ○ | ○ | ○ | ○ |
| Service Level Management | ○ | ○ | ○ | ○ | ○ |
| IT Service Continuity Management | ○ | ○ | ○ | ○ | ○ |

**11. On a scale of 1 - 5, how would you rate the effectiveness of each of these Service Support processes, where 1=Not at all effective and 5=Highly effective** *

| | Not at all Effective 1 | 2 | 3 | 4 | Highly Effective 5 |
|---|---|---|---|---|---|
| Incident Management | ○ | ○ | ○ | ○ | ○ |
| Problem Management | ○ | ○ | ○ | ○ | ○ |
| Change Management | ○ | ○ | ○ | ○ | ○ |
| Release Management | ○ | ○ | ○ | ○ | ○ |

| | Configuration Management | ○ | ○ | ○ | ○ | ○ |

**12. On a scale of 1 - 5, how would you rate the effectiveness of each of these Service Delivery processes, where 1=Not at all effective and 5=Highly effective ***

| | Not at all Effective 1 | 2 | 3 | 4 | Highly Effective 5 |
|---|:---:|:---:|:---:|:---:|:---:|
| Availability Management | ○ | ○ | ○ | ○ | ○ |
| Capacity Management | ○ | ○ | ○ | ○ | ○ |
| Financial Management | ○ | ○ | ○ | ○ | ○ |
| Service Level Management | ○ | ○ | ○ | ○ | ○ |
| IT Service Continuity Management | ○ | ○ | ○ | ○ | ○ |

## 8. Q4f - Q4h

**13. Have you considered upgrading to ITIL V3? ***
- ○ Project currently underway
- ○ Considering it now
- ○ Not yet, but likely to look at it soon
- ○ Staying with V2, but introducing some V3 concepts
- ○ Considered it, but ruled it out
- ○ Not considered it / unlikely to

**14. When are you likely to implement ITIL V3 ***
- ○ Within the next 12 months
- ○ Within 1-2 years
- ○ Within 2-5 years
- ○ No timeframe

**15. Why are you not adopting ITIL V3? ***
- ☐ Too expensive (re-training, consulting etc)
- ☐ Cannot justify value to the business
- ☐ Still getting to grips with ITIL V2
- ☐ ITIL V3 a step too far, V2 is all we need
- ☐ Lack of management backing
- ☐ ITIL V3 training not available
- ☐ Waiting to hear the expereince of others

- ☐ Other: _____

**16. How long ago did you adopt ITIL V3? ***

○     Using V3 concepts before it was released to the industry

○     1 - 2 years ago

○     Within the last year

## 9. ITIL V3 Q5-Q7

**17. What are the main drivers to adopt ITIL v.3 over v.2?** *

☐     Up to date / latest version

☐     Service Lifecycle approach

☐     Clearer business benefits

☐     Easier to adopt

☐     Easier to understand

☐     Introduction of new/updated processes (Service Catalog, Request Fulfilment, etc)

☐     Other: _____

## 10. Q7a Q7b

**18. Which Service Strategy processes have you implemented or are you planning?** *

|  | Implemented | Planning | No Plans |
|---|---|---|---|
| Strategy Generation | ○ | ○ | ○ |
| Service Portfolio Management | ○ | ○ | ○ |
| Demand Management | ○ | ○ | ○ |
| Financial Management | ○ | ○ | ○ |

**19. Which Service Design processes have you implemented or are you planning?** *

|  | Implemented | Planning | No Plans |
|---|---|---|---|
| Service Catalog Management | ○ | ○ | ○ |
| Service Level Management | ○ | ○ | ○ |
| Availability Management | ○ | ○ | ○ |
| Capacity Management | ○ | ○ | ○ |
| IT Service Continuity Management | ○ | ○ | ○ |
| Information Security Management | ○ | ○ | ○ |

Supplier Management   ○    ○    ○

**20. Which Service Transition processes have you implemented or are you planning? \***

|  | Implemented | Planning | No Plans |
|---|---|---|---|
| Transition Planning & Support | ○ | ○ | ○ |
| Change Management | ○ | ○ | ○ |
| Service Asset & Configuration Management | ○ | ○ | ○ |
| Release & Deployment Management | ○ | ○ | ○ |
| Service Validation & Testing | ○ | ○ | ○ |
| Evaluation | ○ | ○ | ○ |
| Knowledge Management | ○ | ○ | ○ |

**21. Which Service Operation processes have you implemented or are you planning? \***

|  | Implemented | Planning | No Plans |
|---|---|---|---|
| Incident Management | ○ | ○ | ○ |
| Problem Management | ○ | ○ | ○ |
| Request Fulfilment | ○ | ○ | ○ |
| Event Management | ○ | ○ | ○ |
| Access Management | ○ | ○ | ○ |

**22. Which Continual Service Improvement processes have you implemented or are you planning? \***

|  | Implemented | Planning | No Plans |
|---|---|---|---|
| Service Level Management - Seven level improvement process | ○ | ○ | ○ |
| Service Measurement | ○ | ○ | ○ |
| Service Reporting | ○ | ○ | ○ |

# 11. Q7c

**23. On a scale of 1 - 5, how would you rate your maturity level against each of these Service Strategy processes? \***

|  | Process exists but not | Process documented, | Process documented | Process monitored | Process Continually |
|---|---|---|---|---|---|

| | documented 1 | errors likely 2 | and standardized 3 | for compliance 4 | Improved 5 |
|---|---|---|---|---|---|
| Strategy Generation | ○ | ○ | ○ | ○ | ○ |
| Service Portfolio Management | ○ | ○ | ○ | ○ | ○ |
| Demand Management | ○ | ○ | ○ | ○ | ○ |
| Financial Management | ○ | ○ | ○ | ○ | ○ |

**24. On a scale of 1 - 5, how would you rate your maturity level against each of these Service Design processes? ***

| | Process exists but not documented 1 | Process documented, errors likely 2 | Process documented and standardized 3 | Process monitored for compliance 4 | Process Continually Improved 5 |
|---|---|---|---|---|---|
| Service Catalog Management | ○ | ○ | ○ | ○ | ○ |
| Service Level Management | ○ | ○ | ○ | ○ | ○ |
| Availability Management | ○ | ○ | ○ | ○ | ○ |
| Capacity Management | ○ | ○ | ○ | ○ | ○ |
| IT Service Continuity Management | ○ | ○ | ○ | ○ | ○ |
| Information Security Management | ○ | ○ | ○ | ○ | ○ |
| Supplier Management | ○ | ○ | ○ | ○ | ○ |

**25. On a scale of 1 - 5, how would you rate your maturity level against each of these Service Transition processes? ***

| | Process exists but not documented 1 | Process documented, errors likely 2 | Process documented and standardized 3 | Process monitored for compliance 4 | Process Continually Improved 5 |
|---|---|---|---|---|---|
| Transition Planning & Support | ○ | ○ | ○ | ○ | ○ |
| Change Management | ○ | ○ | ○ | ○ | ○ |
| Service Asset & | | | | | |

| | Process exists but not documented 1 | Process documented, errors likely 2 | Process documented and standardized 3 | Process monitored for compliance 4 | Process Continually Improved 5 |
|---|---|---|---|---|---|
| Configuration Management | ○ | ○ | ○ | ○ | ○ |
| Release & Deployment Management | ○ | ○ | ○ | ○ | ○ |
| Service Validation & Testing | ○ | ○ | ○ | ○ | ○ |
| Evaluation | ○ | ○ | ○ | ○ | ○ |
| Knowledge Management | ○ | ○ | ○ | ○ | ○ |

**26. On a scale of 1 - 5, how would you rate your maturity level against each of these Service Operation processes? \***

| | Process exists but not documented 1 | Process documented, errors likely 2 | Process documented and standardized 3 | Process monitored for compliance 4 | Process Continually Improved 5 |
|---|---|---|---|---|---|
| Incident Management | ○ | ○ | ○ | ○ | ○ |
| Problem Management | ○ | ○ | ○ | ○ | ○ |
| Request Fulfilment | ○ | ○ | ○ | ○ | ○ |
| Event Management | ○ | ○ | ○ | ○ | ○ |
| Access Management | ○ | ○ | ○ | ○ | ○ |

**27. On a scale of 1 - 5, how would you rate your maturity level against each of these Continual Service Improvement processes \***

| | Process exists but not documented 1 | Process documented, errors likely 2 | Process documented and standardized 3 | Process monitored for compliance 4 | Process Continually Improved 5 |
|---|---|---|---|---|---|
| Service Level Management - Seven level improvement process | ○ | ○ | ○ | ○ | ○ |
| Service Measurement | ○ | ○ | ○ | ○ | ○ |
| Service Reporting | ○ | ○ | ○ | ○ | ○ |

## 12. Q8 - Q8e

In the context of your current organisation, please indicate to what extent you agree / disagree with following statem
for each of the Service lifecycle phases:

**28. The ITIL book is easy to digest and contains concepts that are easy to implement.**
*

|  | Strongly Disagree | Slightly Disagree | Neither Agree or Disagree | Slightly Agree | Strongly Agree |
|---|---|---|---|---|---|
| Service Strategy | ○ | ○ | ○ | ○ | ○ |
| Service Design | ○ | ○ | ○ | ○ | ○ |
| Service Operation | ○ | ○ | ○ | ○ | ○ |
| Service Transition | ○ | ○ | ○ | ○ | ○ |
| Continual Service Improvement | ○ | ○ | ○ | ○ | ○ |

**29. We have people with the requisite skills to implement and manage the processes.**
*

|  | Strongly Disagree | Slightly Disagree | Neither Agree or Disagree | Slightly Agree | Strongly Agree |
|---|---|---|---|---|---|
| Service Strategy | ○ | ○ | ○ | ○ | ○ |
| Service Design | ○ | ○ | ○ | ○ | ○ |
| Service Operation | ○ | ○ | ○ | ○ | ○ |
| Service Transition | ○ | ○ | ○ | ○ | ○ |
| Continual Service Improvement | ○ | ○ | ○ | ○ | ○ |

**30. Planning and communication between IT and the business is sufficient to enable implementation and ongoing management of the processes.**
*

|  | Strongly Disagree | Slightly Disagree | Neither Agree or Disagree | Slightly Agree | Strongly Agree |
|---|---|---|---|---|---|
| Select one | ○ | ○ | ○ | ○ | ○ |

**31. We can readily define and capture the metrics we will need to validate the quality of service for each lifecycle phase.**
*

|  | Strongly Disagree | Slightly Disagree | Neither Agree or Disagree | Slightly Agree | Strongly Agree |
|---|---|---|---|---|---|
| Select one | ○ | ○ | ○ | ○ | ○ |

**32. Within 5 years, we will have mastered all or most of the processes within each lifecycle phase.**
*

|  | Strongly Disagree | Slightly Disagree | Neither Agree or Disagree | Slightly Agree | Strongly Agree |
|---|---|---|---|---|---|

Select one          ○          ○          ○          ○          ○

## 13. IT & Business Integration Q9-Q10b

**33. Is IT represented at Board level within your organization? ***
○     Yes
○     No

**34. How frequently are IT and Business planning meetings held within your organization?**
***
○     Annually
○     Quarterly
○     Monthly
○     Weekly
○     Daily
○     Ad-hoc, as and when needed
○     Rarely

**35. Do you believe that IT and Business planning in your organization...? ***

|  | Yes | No |
|---|---|---|
| enables IT to properly understand business goals | ○ | ○ |
| enables IT to plan resource to meet demand | ○ | ○ |
| sets clear metrics to enable IT to measure achievements | ○ | ○ |
| establishes clear lines of service reporting and escalation | ○ | ○ |
| is sufficently frequent to drive improvement | ○ | ○ |

○

## 14. Q11 - Q11c

**37. Do you charge the business for your IT Services? ***
- ○ Yes
- ○ No

**38. Do you track the actual cost of providing service? ***
- ○ Yes
- ○ No

**39. How do you allocate cost? ***
- ○ Service - we allocate a cost per user for each service
- ○ Employee/dept - we divide costs evenly across all employees/departments
- ○ Consumption - we track consumption rates e.g. Gb storage
- ○ Professional Services - we charge a hourly/daily rate
- ○ Other [                    ]

## 15. Service Design Q12 - Q12c

**40. Have you implemented a Service Catalog? ***
- ○ Yes
- ○ No
- ○ Being developed
- ○ Being considered

**41. Who owns your Service Catalog? ***
- ○ The business
- ○ IT
- ○ Service Delivery/Service Level Manager
- ○ Other [                    ]

**42. How did you define your services? ***
- ○ Defined by the business
- ○ Defined by IT
- ○ Defined jointly by IT and the business
- ○ Other [                    ]

**43. Please answer Yes or No to the following statements: In designing our services we have… ***

|  | Yes | No |
|---|---|---|

| | | |
|---|---|---|
| differentiated between business services and IT services | ○ | ○ |
| mapped out our business services | ○ | ○ |
| mapped out our IT services | ○ | ○ |
| defined relationships between business and IT services | ○ | ○ |
| negotiated availability of services with the business | ○ | ○ |
| introduced different service level options e.g. bronze, silver. gold | ○ | ○ |
| addressed capacity requirements for each service | ○ | ○ |
| addressed IT service continuity for critical services | ○ | ○ |

## 16. CMS/CMDB Q13-Q14

**44. Do you have a Configuration Management System or Database (CMS/CMDB)? ***

○     Yes
○     No
○     Being developed
○     Being considered

**45. Please answer Yes or No to the following statements; Our CMDB… ***

| | Yes | No |
|---|---|---|
| contains dependencies between IT services and CIs | ○ | ○ |
| contains relationships between CIs | ○ | ○ |
| is federated to other trusted data sources | ○ | ○ |
| is consistently updated through Change and Release Management | ○ | ○ |
| is considered to be accurate | ○ | ○ |
| contains financial information relating to CIs | ○ | ○ |

**46. Having implemented ITIL, which of the following benefits have you realised (any improvement)? ***

☐     Service quality

- ☐ Customer satisfaction
- ☐ Interaction of IT with rest of business
- ☐ Reduction in IT downtime
- ☐ Call fix rate
- ☐ Return on IT spending
- ☐ Financial contribution of IT to the business
- ☐ Standardized process adoption across all of IT
- ☐ Benefited from best practice experience of others
- ☐ Improved the morale of IT staff
- ☐ Other [_____]

**47. If you had to go through the process of ITIL adoption again, what things would you do differently? (maximum of three)**

- ☐ Put more effort into obtaining executive sponsorship
- ☐ Spend more time helping the business to understanding ITIL objectives
- ☐ Looked for more resource (time or people)
- ☐ Spent more time developing internal knowledge/skills relating to ITIL
- ☐ Looked for more funding/budget
- ☐ Not underestimate the impact of cultural resistance to change
- ☐ Worked harder on maintaining progress / momentum
- ☐ Other [_____]

**48. What worked really well during adoption? (maximum of three)**
*

- ☐ Working with a consulting organisation
- ☐ Advice from an industry body e.g. itSMF
- ☐ Getting advice from my colleagues / peers
- ☐ Running workshops with other departments
- ☐ Attending seminars / educational events
- ☐ Educating key staff early in the project
- ☐ Getting help from service desk vendors
- ☐ Other [_____]

## 17. Q14-Q16

**49. Having implemented ITIL, to what extent can you measure these realized benefits?**
*

## 18. Technology Q17-17d

**50. Which service desk tool(s) are you using?** *

- ☐ Axios Systems assyst
- ☐ BMC Remedy
- ☐ CA Service Desk
- ☐ Datawatch Quetzal
- ☐ EMC Infra
- ☐ FrontRange ITSM
- ☐ Hornbill Supportworks ITSM
- ☐ HP Service Manager
- ☐ IBM Tivoli Service Request Manager
- ☐ Internally built solution
- ☐ LANDesk Service Desk
- ☐ Oracle
- ☐ SAP
- ☐ Service-Now.Com
- ☐ Sunrise Sustenuto
- ☐ Tech Excel
- ☐ Touchpaper ITBM
- ☐ Numara Footprints
- ☐ Marval
- ☐ Other (Please specify) [_____]

**51. How long has the help / service desk tool been implemented?** *

- ○ Less than 12 months
- ○ 1 - 2 years
- ○ 2-5 years
- ○ Over 5 years

**52. Which factors were a major influence in the selection of the tool?** *

- ☐ Gartner Magic Quadrant
- ☐ Forrester Wave
- ☐ Pink Verify certification
- ☐ Dictated by parent company - not our decision
- ☐ Cost
- ☐ Ease of use
- ☐ Ease of customisation
- ☐ Ease of deployment
- ☐ Product architecture/ease of integration
- ☐ Vendor reputation
- ☐ Vendor size
- ☐ Third party recommendation
- ☐ Customer references / success stories
- ☐ Prior experience with tool
- ☐ Other [_____]

**53. How satisfied are you with your current service desk implementation?** *

| Completely | Somewhat | Neither Satisfied | Somewhat | Completely |

| Satisfied | Satisfied | or Dissatisfied | Dissatisfied | Dissatisfied |
|-----------|-----------|-----------------|--------------|--------------|
| ○ | ○ | ○ | ○ | ○ |

**54. You indicated that you are dissatisfied with your service desk implementation. Is this because of… ***

- ○ the vendor…poor support, account management etc
- ○ the product…lack of functionality, difficult to upgrade
- ○ your organisation…inability to make best use of the tool
- ○ Other [                    ]

# 19. Demographics Q18-Q18c

**55. What type of organization do you operate within? ***

- ○ Business Services – eg. Financial, Management, Marketing
- ○ Technical Business Services – eg. IT
- ○ Professional – eg. Law, Medicine, Accountancy, Property
- ○ Public Sector
- ○ Manufacturing
- ○ Retail
- ○ Transport / Logistics
- ○ Military or Emergency Services
- ○ Other - please specify [                    ]

**56. Number of Sites Supported by Central IT: ***

- ○ 1
- ○ 2-5
- ○ 6-10
- ○ 10+

**57. Number of employees: ***

- ○ < 100
- ○ 101-500
- ○ 501-1000
- ○ 1001-5000
- ○ 5001-10000
- ○ 10000+

**58. What is your job role? ***

- ○ HelpDesk / Service Desk operative
- ○ HelpDesk / Service Desk Manager
- ○ Service Delivery Manager - organization level
- ○ Process specific eg Change Manager
- ○ IT Manager
- ○ IT Director - organization level

# 14. Appendix Four

**ITIL and the creation of benefits: An Empirical Study on Benefits, Challenges and Processes**

Paper published at the European Conference on Information Systems, 2010. This is an earlier version of Paper 2.

# ITIL AND THE CREATION OF BENEFITS: AN EMPIRICAL STUDY ON BENEFITS, CHALLENGES AND PROCESSES

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## Abstract

*Over 90 percent of companies are estimated to use IT Service Management (ITSM) frameworks, yet there is little research on their benefits to the Information Technology (IT) department and the business units. An international survey of 503 firms was conducted to examine the benefits of the IT Infrastructure Library (ITIL), the de-facto ITSM framework, specifically on how these benefits evolve as companies increase their adoption of the ITIL model. Also studied are the perception of challenges of the implementation and the number of ITIL processes implemented in relation to the progress of the adoption of ITIL. Results indicate that as the maturity of implementation increases, the perception of challenges decreases. Findings also show that as the maturity of implementation increases, the number of realized benefits increases, as well as the number of implemented ITIL processes. Implications for practitioners and researchers are also discussed.*

*Keywords: IT Infrastructure Library, IT Service Management, Benefits, Challenges, Best Practices, ITIL, ITSM, IT Services*

# 1    INTRODUCTION

In 1980, when listing the critical success factors of Information Systems (IS), Rockart (1980) argues that "the first, and most obvious, IS critical success factor is service". The Information Technology (IT) departments in many organizations were previously focused on the production of software applications, and in the late 1980s it started to change to a service mode of operation. For IT Service Management (ITSM), the main focus is not on the development of IT applications, but rather on the management of IT services.

Several studies have focused on the adoption of ITSM as well as specific service oriented IT management concepts. One study estimated that 90% of United States companies are considering or currently using an ITSM (Galup et al. 2009). In a more specific research, the IT Government Institute (2008) estimates that the ITSM framework with the highest adoption rate is IT Infrastructure Library (ITIL), with 24%, followed by Control Objectives for Information and related Technology (CobiT) with an adoption rate of 14%.

Additional to the rising adoption rates of ITSM, a factor to look at is the costs entailed by IT Services. IT Services account for an estimated 70% to 80% of the expenditure of an IT organization (Orlov 2005). Therefore practitioners and researchers are interested in understanding the possible benefits realized by companies which adopted an ITSM, specifically in the case of those companies that have adopted ITIL. Moreover, importance is given to the understanding of how these benefits evolve as companies increase the adherence to the guidelines to the ITIL model. Also of interest is the perception of challenges of implementing ITIL, and as expressed previously, how the perceptions of challenges develop as companies increase their adherence to the model. The last point is to understand how the implementation of ITIL processes affects the maturity of the implementation of ITIL.

So far there have been no academic studies on this matter, and the research methodology of a large scale international survey has not been employed. Therefore, this research, using empirical data gathered from a survey with major companies from various industries, sets out to understand the following:

- Which effect does the total number of implemented processes have on the maturity of the ITIL implementation?

- How are challenges perceived at different levels of maturity of the ITIL implementation?

- How does the total number of realized benefits develop as the maturity of the ITIL implementation increases?

Consequently, this article begins with a literature review on IT Service Management, on processes of ITIL, as well as benefits and challenges of implementation. This is followed by a description of the methodology used for this research. Results of the survey are then analyzed and outcomes are discussed. Before the limitations and the future research sections, conclusions are drawn.

# 2    LITERATURE REVIEW

ITSM is a part of the Service Sciences that concentrates on IT Operations (Galup et al. 2009). It can be defined as "a set of processes that cooperate to ensure the quality of live IT services, according to the levels of service agreed to by the customer" (Young 2004).

Academic research on ITSM is still in its early stages despite its numerous appearances in the popular press and practitioners' magazines. Existing academic literature merely presents the description of the areas documented on ITIL (Cervone 2008; Hendriks & Carr 2002) or analyzes adopters of ITIL through case studies (Hochstein et al. 2005; Cater-Steel, Tan et al. 2006; Kießling et al. 2009). A few

researchers have covered the topic of ITIL benefits, challenges of implementation and the effectiveness of ITIL. Relevant academic research is shown in Table 1.

| Author and Year | Approach | Issues Addressed in Study |
|---|---|---|
| Hochstein et al., 2005 | Qualitative | In the analysis of their six case studies, the researchers list the following four benefits: improvement of quality of IT services, efficiency and optimization of processes, as well as transparency and comparability through process documentation and process monitoring. |
| Potgieter et al., 2005 | Qualitative | Completes research on the effect of the implementation of ITIL on customer satisfaction and service quality. The researchers conclude that in the research site, a large service unit of ICT in South Africa, there is a direct correlation between customer satisfaction, service quality and the use of ITIL. |
| Brenner, 2006 | Conceptual | Proposes ways of how the ITIL process can be implemented in efficient ways with process-oriented tools such as workflow management systems. |
| Cater-Steel, Tan et al., 2006 | Conceptual and Quantitative | Describes processes such as ITIL, CobiT, CMMI and ISO 9001 as well possible motivations and challenges for their adoption. |
| Cater-Steel et al., 2006 | Qualitative | In a case study of six companies they describe the challenges of adopting ITIL to be the following four factors: lack of management support, cultural change in terms of resistance, delays in choosing an appropriate tool, and management problems for resources such as time, people and money. |
| Spremic et al., 2008 | Qualitative | Monitors an IT Service provider in Croatia and applies various Key Performance Indicator (KPI) metrics before and after the implementation of various processes of ITIL. The study concludes that the IT service provider undergoes improvements which may be attributable to the implementation of ITIL. |
| Cervone, 2008 | Conceptual | Provides overview of ITIL and suggest the following three benefits of ITIL: cost reduction, improving customer satisfaction and improving the productivity of the IT department. |
| Kießling et al., 2009 | Qualitative | Completes six expert interviews and conclude that the following six factors are benefits of an ITIL adoption: improvement of customer satisfaction, improvement of internal processes, standardization of processes, improvement of service quality, increase of efficiency, and improvement of return on investment. |
| Galup et al., 2009 | Conceptual | Presents an overview on ITSM, their global impact and the current initiatives |

*Table 1.        Relevant research on ITSM and ITIL*

A summary of the benefits of ITSM and ITIL found in literature sources are displayed in Table 2.

| Improvement of… | Hochstein et al., 2005 | Potgieter et al., 2005 | Kießling et al., 2009 | Cater-Steel et al., 2006 | Cervone, 2008 |
|---|---|---|---|---|---|
| Service Quality | X | X | X | X | X |
| Standardization of Service | X | | X | X | |
| Customer Satisfaction | | X | X | X | |
| Return on Investment | | | X | X | X |
| Reduction of Downtime | | | | X | X |
| Best Practice | X | | | | |
| Financial Contribution Control | | | | X | |
| Call Fix Rate | | | | X | |
| Morale of IT | | | | X | |

*Table 2.        Summary of Benefits of ITIL*

To comprehend in which level of adherence or maturity companies are in when adoption the ITSM model, various researchers, including Cater-Steel et al. (2006) and Kießling et al. (2009) have used the Maturity Model. The Maturity Model presented on these studies is based on the model from CobiT and Capability Maturity Model Integration (CMMI). These levels are intended as profiles of IT processes, and companies would identify these levels as a description of their current state. The model is divided in levels which range from *non-existent* (0) to *optimized* (5). At the lowest level of the maturity model, the management processes are not applied at all. This level is known as *non-existent* (0) implementation. At the following level, named *Initial*, processes are ad hoc and disorganized.

Level 2 is referred to as *repeatable*, where the processes follow a standard, are documented and understood.  Level 3 is where processes are documented and monitored for compliance. This level is known as *defined*. Level 4, known as *managed*, is one where management monitors and measures according to metrics established in the previous level. The highest level of maturity is known as *optimized*; this is where good practices are followed and automated.

Until now, there has been no research which has involved the benefits, challenges and implementation of processes as well as their relation to the maturity of the ITIL implementation. Apart from that, the methodology of a large scale survey for various countries has not been utilized. This literature review leads to the research propositions which are presented in the following section.

# 3    RESEARCH DESIGN

For the three questions listed in the introduction, a total of five propositions are described. These are described below.

### 3.1    Implemented Processes and Maturity Level

The relation between the number of implemented processes and the levels of maturity is of interest for this research. Since the number of processes varies depending on the version, each version is analyzed separately. To understand the effect of the total number of implemented processes on the maturity level of implementation, two possible propositions were initially suggested. Only one of the two propositions was then selected by the researchers. One possible proposition is that companies would select and implement processes which would, in their opinion, provide the companies with the biggest benefits, or processes that would help them deal with areas in which they are performing deficiently. Companies that have implemented only some of the processes would then report the maturity level of their ITIL implementation based on the maturity of those processes which they have implemented, rather than on the whole ITIL process. Conversely, another possible proposition is that the maturity of the implementation of ITIL is based on the full lifecycle model. Therefore, rather than concentrating on the maturity of their implemented processes, the perception of maturity level would be based on the completed ITIL model. Hence, the more processes of ITIL companies implement, the higher the companies' maturity of the ITIL implementation. In this research, we support the later. The proposition is:

**P1: There is a positive relationship between implemented processes and perceived maturity of the ITIL implementation.**

### 3.2    Perceived Challenges and Maturity Level

This research aims to understand which effect, if any, maturity levels have on the perceived challenges of implementation. The proposition of the effect of the perceived challenges on the level of maturity is based on the model of the learning curve effect. The learning curve, also known as the experience curve, is a phenomenon which was initially observed by Wright (1936). He observed that as the quantity of units manufactured doubles, the number of hours of direct labor required to produce an individual unit decreases at a uniform rate. Wright also argued that the learning can occur for the production of any good or service. Applying this model to our proposition we can assume that the organization gains experience dealing with the challenges and becomes more efficient as it progresses in its learning, allowing for the perception of the challenges to decrease over time. Therefore, our proposition is formulated as follows:

**P2: There is a negative relationship between maturity levels of the ITIL implementation and perceived challenges of implementation.**

### 3.3 Number of Realized Benefits and Maturity Levels

This question focuses on understanding the total number of realized benefits due to the implementation of ITIL for each company. Rather than concentrating on the individual benefits which were surveyed, the focus of this research is to understand the progression of the total number of realized benefits for the companies. Consequently, for each company, benefits which they realize are added up. The same approach is used for the number of benefits supported by metrics and the number of benefits acknowledged by the business.

We believe that, initially, the benefits provided by ITIL will be noticed by IT, and that metrics will not be used at earlier stages. At the following levels, these benefits will be supported by metrics and may also be acknowledged by the business.

For this proposition, the Law of Diminishing Returns is taken into consideration. It suggests that the continued improvement efforts towards a specific project or goal would lead to a decline in effectiveness after a particular level of result has been accomplished (Drucker et al. 1998). In other words, after a certain level of standardization, increasing the standardization further provides few additional benefits. Consequently, the following proposition is suggested:

**P3a: There is a positive relationship between maturity levels of the ITIL implementation and perceived realized benefits.**

We also expect that the number of realized benefits which are supported by metrics will be used on the later levels of maturity, rather that on the initial levels of maturity. Similarly, the business may recognize the benefits of the ITIL implementation in the later levels of adoption, possibly due to a better Business-IT alignment, which is a proposed benefit of ITIL. Therefore, the following propositions are suggested:

**P3b: There is a positive relationship between maturity levels of the ITIL implementation and usage of metrics to measure the realized benefits.**

**P3c: There is a positive relationship between maturity levels of the ITIL implementation and acknowledgement by the business of the realized benefits.**

## 4 METHODOLOGY

The online questionnaire was made available in the months of April and May 2009. An invitational email was sent to companies that were in the mailing lists of Hornbill[1] and the IT Service Management Forum[2] (itSMF) in the United States of America and United Kingdom. Additionally, this survey was announced in various internet groups and forums. The survey targets ITSM champions. Because the champion actively supports and promotes the project they would have the knowledge about the entire implementation of the ITSM in the company as well as the benefits that were provided. Out of the 784 IT executives who started to fill out the survey, 503 completed and submitted the survey. Partially completed surveys were not used for the study. The sample size is of 503, unless specified otherwise.

The structure of this questionnaire addressed many aspects of ITIL, its adoption, usage, implementation and maturity, as well as effectiveness of processes and realized benefits. It also entails the topics of Business-IT alignment and service desk usage. The survey contains mostly questions whose answers are in Likert scale, nominal scale and open-ended answers form.

First, those surveyed were asked to rate the perception of the maturity of their ITIL process on a scale based on the CobiT and CMMI maturity.

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[1] IT Service Management Software provider, http://www.hornbill.com/
[2] Forum for ITSM professionals, http://www.itsmf.co.uk/

Respondents were also requested to specify which version of ITIL they had implemented. Based on this, they were asked to select which processes they had implemented considering their ITIL version. All processes were listed in the survey.

Additionally, respondents were inquired about their perception of challenges of implementing ITIL. They were asked to rate challenges on a scale from 1 to 5, where 1 meant *no challenge* and 5 meant *major challenge*. The challenges that are studied are Lack of executive sponsorship, Business understanding of ITIL objectives, Lack of resources (time or people), Lack of internal knowledge / skills relating to ITIL, Lack of funding / costs of adoption, Organization / cultural resistance to change, and Maintaining momentum / progress stagnates. Challenges are based on those found in the literature review.

Finally, those surveyed had to select realized benefits that could be achieved due to the adoption of ITIL. The benefits listed on the survey are: Improving of service quality, Increasing customer satisfaction, Adopting a common IT process methodology, Improving interaction of IT with the rest of the business, Reducing IT downtime, Improving return on IT spending, Benefiting from best practice experience of others, Measuring the financial contribution of IT to the business, Improving call fix rate and Improving the morale of the IT staff. If respondents had realized one of these benefits, they were able to select whether these benefits were supported by metrics and whether the business had acknowledged the improvements. These benefits are based on those found on the literature review.

# 5    RESULTS

## 5.1    Respondents' profile

Respondents were asked about their companies industry, number of sites supported by IT, number of employees in the company, as well as their title and their location. Table 3 shows the profile of the respondents. As can be seen, the Technology, Public, as well as the Financial and Banking sectors represent over 80% of the industries surveyed. Other industries include the Professional, Retail and Manufacturing industries.

Nearly 70% of the respondents had ten or more sites supported by central IT, and close to 20% had two to five sites. The job roles of those interviewed are also shown. 36% of those surveyed were IT managers, while 22% were Process Specific Managers. Almost 40% of those interviewed worked in a company that had more than 10,000 employees. Due to the usage of mailing lists and posting of invitations to the survey in English speaking websites, the majority of answers came from the United Kingdom (52%) and United States (36%) with answers coming from Canada, India and Ireland.

| Industry | Percent |
|---|---|
| Technology | 32 |
| Public | 22 |
| Financial and Banking | 18 |
| Professional | 5 |
| Manufacturing | 5 |
| Retail and Distribution | 5 |
| Other | 4 |
| Utility | 3 |
| Entertainment and Hospitality | 2 |
| Healthcare | 2 |
| Telecommunication | 2 |

| Countries | Percent |
|---|---|
| United Kingdom | 52 |
| United States of America | 36 |
| Canada | 1 |
| India | 1 |
| Ireland | 1 |
| Other | 9 |

| Number of Sites | Percent |
|---|---|
| 10+ | 69 |
| 2-5 | 18 |
| 6-10 | 7 |
| 1 | 6 |

| Number of Employees | Percent |
|---|---|
| 10000+ | 39 |
| 1001-5000 | 20 |
| 5001-10000 | 16 |
| 501-1000 | 10 |
| 101-500 | 9 |
| < 100 | 6 |

| Job Role | Percent |
|---|---|
| IT Manager | 32 |
| Process Specific Manager | 22 |
| Service Delivery Manager | 17 |
| IT Director - Organisation Level | 14 |
| Help/ Service Desk Manager | 11 |
| Help/ Service Desk Operative | 4 |

*Table 3.        Profile of responding organizations (n=503)*

## 5.2 Empirical Results

An exploratory analysis was conducted for each variable to test for normality. Both, the Kolmogorov-Smirnov and the Shapiro-Wilk showed significance for versions of ITIL (p<0.001), for all of the variables of challenges of adoption of ITIL ($p$<0.001) and for the realized benefits of ITIL (p<0.001). Due to the data being non-normal, the Kruskal-Wallis, a non-parametric one way analysis of variance, was used to study the data. If the data using the Kruskal-Wallis showed significant differences between the groups, the Mann-Whitney U test was used.

Since using a large quantity of Mann-Whitney tests will inflate the Type I error rate, only a selective comparison will be carried out. The suggested comparisons will be between the first and middle level of maturity, the first and last level of maturity, and between the middle and final level of maturity. Therefore the following three tests will be conducted:

- Test 1: Initial (1) level compared to Defined (3) level

- Test 2: Initial (1) level compared to Optimized (5) level

- Test 3: Defined (3) level compared to Optimized (5) level

The reason for the selection of these tests is that the research concentrates on how the variables progress as the maturity of the ITIL implementation increases.

Since three tests will be conducted, a Bonferroni correction was applied. Due to this correction, rather than using the critical level of significance of 0.05, all effects are reported at 0.0167 level of significance. All reported $p$ values are using 2-tailed Monte Carlo $p$ values with a confidence level of 99% and a number of samples of 10,000. This method is used because of the large sample size.

Additionally, to understand the trends in the data the Jonckheere-Terpstra test was used. Lastly, $r$ was used to measure the strengths of a relationship between variables (Rosenthal 1991, p.19). Cohen suggests that the sizes of the effect are small (0.1), medium (0.3) or large (0.5). The negative sign for the r demonstrates that the data lies on a straight line with a negative slope.

In the next sections the following abbreviations are used: $H$ corresponds to the Kruskal-Wallis statistic, $U$ represents the Mann-Whitney U statistic, while $J$ symbolizes the observed J-T statistic.

### 5.2.1 Implemented Processes and Maturity Level (P1)

The number of implemented processes for both versions of ITIL, Version 2 ($n$=248) and Version 3 ($n$=193), are studied to understand the effect on the level of maturity of implementation. In general, the numbers of implemented processes significantly affect the maturity level of the implementation (Version 2 $H(4)$=99.03, $p$<0.001, Version 3 $H(4)$=82.108, $p$<0.001). Mann-Whitney U tests were used to follow up on the findings.

Table 4 shows that the number of implemented processes is significant when comparing the Initial level (1) with the Defined level (3). The same occurs when comparing the Initial level (1) with the Optimized level (5). When comparing the Defined level (3) with the Optimized level (5) significance was also observed. Using Cohen's benchmark, we observe that there is a medium to large change on the number of implemented processes as maturity increases.

With the help of Jonckheere's test a significant trend in the data can be observed, as the level of maturity goes up, the median of number of implemented processes increases. (Version 2: $J$=18001, $z$=10.49, $r$=.67, Version 3: $J$=11398, $z$=9.63, $r$=.69)

In conclusion, regardless of the version of ITIL implemented, as the level of maturity goes up, the number of implemented processes also ascends.

| Implemented processes of ITIL | Implementation level medians | | | Initial (1) level compared with Defined (3) level | | | Initial (1) level compared with Optimized (5) level | | | Defined (3) level compared with Optimized (5) level | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Initial | Defined | Optimized | U | p | r | U | p | r | U | p | r |
| ITIL Version 2 | 2 | 4.5 | 10.0 | 98.5 | 0.000* | -0.44 | 12 | 0.000* | -0.73 | 323.5 | 0.000* | -0.58 |
| ITIL Version 3 | 2 | 11.0 | 16.5 | 75.5 | 0.000* | -0.68 | 83 | 0.000* | -0.61 | 345.0 | 0.013* | -0.30 |

* significance at 0.0167

*Table 4.        Mann-Whitney test results for ITIL versions and maturity levels*

### 5.2.2    Perceived Challenges and Maturity Level (P2)

In general, challenges of adopting ITIL are significantly affected by the implementation maturity of ITIL: Lack of executive sponsorship $H(4)=37.75$, $p<0.001$, Business understanding of ITIL objectives $H(4)=42.19$, $p<0.001$, Lack of resource, time or people $H(4)=32.39$, $p<0.001$, Lack of internal knowledge and skills relating to ITIL $H(4)=42.86$, $p<0.001$, Lack of funding / cost of adoption $H(4)=14.21$, $p<0.01$, Organization / culture resistance to change $H(4)=33.41$, $p<0.001$, Maintaining momentum / progress stagnates $H(4)=18.88$, $p<0.005$. Mann-Whitney tests were also used to follow up this finding.

Table 5 shows the results from the selective comparisons. It can be observed that between levels Initial (1) and Defined (3) there was significance for Business understanding of ITIL objectives, Lack of resource, time or people, Lack of internal knowledge and skills relating to ITIL, and Organization / culture resistance to change. Based on Cohen's benchmark, a small to medium change can be seen on the lowering of the perception of challenges as maturity increases. However, no significance could be shown for Lack of executive sponsorship, Lack of funding / cost of adoption and Maintaining momentum / progress stagnates.

When comparing the Initial (1) with Optimized (5) significance can be observed for all variables with a medium effect size: Lack of executive sponsorship, Business understanding of ITIL objectives, Lack of resource, time or people, Lack of internal knowledge and skills relating to ITIL, Lack of funding / cost of adoption, Organization / culture resistance to change, Maintaining momentum / progress stagnates.

Lastly, comparing the Defined (3) with the Optimized (5) maturity level, significance can be observed for Lack of executive sponsorship, Business understanding of ITIL objectives, Lack of resource, time or people, Lack of funding / cost of adoption, Organization / culture resistance to change. Marginal significance can be observed for Lack of internal knowledge and skills relating to ITIL and Maintaining momentum / progress stagnates.

| Challenges | Implementation level medians | | | Initial (1) level compared with Defined (3) Level | | | Initial (1) level compared with Optimized (5) Level | | | Defined (3) level compared with Optimized (5) Level | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Initial | Defined | Optimized | U | p | r | U | p | r | U | p | r |
| Lack of Executive sponsorship | 3 | 3 | 2 | 3375.0 | 0.189 | -0.10 | 1104.5 | 0.000* | -0.34 | 2492.0 | 0.001* | -0.25 |
| Business understanding of ITIL objectives | 4 | 3 | 3 | 2736.5 | 0.001* | -0.24 | 993.0 | 0.000* | -0.40 | 2634.0 | 0.003* | -0.22 |
| Lack of resource time or people | 4 | 4 | 3 | 2756.5 | 0.001* | -0.24 | 894.0 | 0.000* | -0.45 | 2496.5 | 0.001* | -0.26 |
| Lack of internal knowledge / skills relating to ITIL | 4 | 3 | 2 | 2461.0 | 0.000* | -0.30 | 977.5 | 0.000* | -0.40 | 2884.5 | 0.031 | -0.16 |
| Lack of funding / cost of adoption | 3 | 3 | 3 | 3433.0 | 0.254 | -0.09 | 1234.0 | 0.002* | -0.28 | 2724.5 | 0.008* | -0.20 |
| Organization / cultural resistance to change | 4 | 3 | 3 | 2825.5 | 0.003* | -0.22 | 1017.5 | 0.000* | -0.39 | 2785.0 | 0.014* | -0.18 |
| Maintaining momentum / progress stagnates | 4 | 4 | 3 | 3419.5 | 0.225 | -0.09 | 1245.0 | 0.003* | -0.28 | 2869.0 | 0.027 | -0.17 |

* significance at 0.0167

*Table 5.        Mann-Whitney test results for perception of challenges and maturity levels*

Jonckheere's test revealed a significant trend in the data. As the level of maturity goes up, the median of challenges decreases (Lack of executive sponsorship $J=36500$, $z=-5.9$, $r=-.26$, Business understanding of ITIL objectives $J=35298$, $z=-6.6$, $r=-.30$ Lack of resource, time or people $J=37332$, $z=-5.5$, $r=-.25$, Lack of internal knowledge and skills relating to ITIL $J=35233$, $z=-6.7$, $r=-.30$,  Lack

of funding / cost of adoption $J$=40536, $z$=-3.6, $r$=-.16,  Organization / culture resistance to change J= 36699, $z$=-5.8, r=.26,  Maintaining momentum / progress stagnates J= 39816, $z$=-4.0, $r$ =-.18)

We can conclude that the perception of difficulty when facing the challenges studied in this research reduces as the maturity of implementation increases. The challenge of Maintaining momentum / progress stagnates is the only factor that has no significance when examining the Initial (1) and Defined (3) levels, and only marginal significance when comparing the Defined (3) and Optimized (5) levels. However, when examining the Initial (1) and Optimized (5) level significance does exist. When examining the variables Lack of executive sponsorship and Lack of funding / cost of adoption one can observe that in the lower levels of implementation one can detect no significance. However, when comparing the Defined level (3) with the Optimized level (5) significance can be observed.

### 5.2.3    Number of Realized Benefits and Maturity Levels (P3)

When conducting the Kruskal-Wallis test, the number of realized benefits is significantly affected by the level of implementation maturity ($H$(4)=134.49, $p$<0.001 for the total number of realized benefits, $H$(4)=139.37, $p$<0.001 for realized benefits using metrics, $H$(4)=91.64, $p$<0.001 for realized benefits acknowledged by the business).

As shown in Table 6, the number of realized benefits is significantly higher when comparing the Initial (1) with the Defined (3) level of maturity of implementation. Based on Cohen's benchmark, there is a large change on the number of realized benefits as maturity increases. One can also observe this when comparing the Initial (1) with the Optimized (5) level. Finally, when comparing the Defined (3) with Optimized (5) level no significance can be determined. Yet, significance can be observed when examining the number of realized benefits that have been obtained by using metrics as well as when observing the number of realized benefits that have been acknowledged by the business.

Jonckheere's test shows a significant trend in the data, as the level of maturity goes up, the median of number of realized benefits increases ($J$=66553, $z$=11.44, $r$=.52), the median of number of realized benefits backed by metrics increases ($J$=67164, $z$=11.69, $r$=.54), and finally, the median of number of realized benefits acknowledged by business increases ($J$=62730, $z$=9.73, $r$=.44).

We can conclude that as the level of maturity increases, so does the number of realized benefits and in later levels of maturity, specifically between the maturity Defined (3) and the Optimized (5) level, companies concentrate more on using metrics and on showing the realized benefits to the business.

| Benefits | Implementation level medians | | | Initial (1) level compared with Defined (3) level | | | Initial (1) level compared with Optimized (5) level | | | Defined (3) level compared with Optimized (5) level | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Initial | Defined | Optimized | U | p | r | U | p | r | U | p | r |
| Number of realized benefits | 0 | 4 | 5 | 980.5 | 0.000* | -0.61 | 434.0 | 0.000* | -0.67 | 2956.5 | 0.060 | -0.14 |
| Number of benefits backed by metrics | 0 | 2 | 4 | 1209.5 | 0.000* | -0.57 | 478.5 | 0.000* | -0.67 | 2529.5 | 0.002* | -0.24 |
| Number of benefits acknowledged by the business | 0 | 1 | 3 | 2099.0 | 0.000* | -0.40 | 658.0 | 0.000* | -0.59 | 2511.5 | 0.001* | -0.24 |

\* significance at 0.0167

*Table 6.        Mann-Whitney test results for realized benefits and maturity levels*

## 6      DISCUSSION

The results of the current study confirm P1. P1 states that as more processes of ITIL are implemented, the maturity of ITIL increases. It can be observed that there is a positive direct influence between the number of implemented ITIL processes and the maturity level of the ITIL implementation. This result may also give an insight on how ITIL adopters are implementing the ITIL processes, which is on increasing implementation of processes rather than of implementing all processes at once.

In general, the second proposition (P2) is also confirmed. This proposition states that the perception of the listed challenges of implementation would decrease as the maturity levels of implementation increase. This can be due to the fact that as adopters overcome the initial challenges of implementation, experience is gained, and future challenges are perceived to be less complex than those in the earlier levels. As well, it follows the pattern of the learning curve model, where at the initial levels there is a difficulty in undergoing the implementation, yet, as experience is gained, these difficulties decrease.

Another possibility can be that these challenges are reduced because the benefits of ITIL are made evident to the business and those involved in the project of implementation. As explained by Huber (1991), organization learning occurs to a larger extent when the knowledge obtained is recognized to be useful. In other words, the organization is more likely to learn if there are benefits presented to the individuals and to the organization. In the case of this study, the reason why the challenge perception decreases over time may also be due to the benefits shown by the implementation, which may encourage the organization and individuals to learn and to implement further processes.

When looking specifically at the listed challenges, challenges such as Lack of executive sponsorship, Lack of funding, and Maintaining momentum / project stagnates show no significance when comparing the maturity levels of implementation Initial (1) and Defined (3). However, when the maturity levels of implementation Defined (3) and Optimized (5) are compared, these challenges decrease. This may be due to the fact that at the earlier levels, the business has yet to feel the benefits and scepticism exists. Conversely, in the later stages of implementation, once the business has acknowledged benefits of the ITIL implementation, it is likely to support further implementation of ITIL.

When comparing the maturity levels of implementation Defined (3) and Optimized (5), marginal significance can be observed in the challenges such as the Lack of internal knowledge and skills and Maintaining momentum / project stagnates. In the case of Lack of internal knowledge and skills, this could be due to the fact that acquiring personnel that has specialized knowledge in this field may be difficult, or that the training programs, being new, are not often available. Maintaining momentum / project stagnates is the only challenge that was not proven statistically significant in two of the three comparisons, the two being the comparison between Initial level (1) and the Defined (3) as well as the comparison of Defined level (3) and Optimized (5). This indicates that throughout the project this challenge must be the focus of IT Managers and may be a critical success factor for the implementation. As well, this factor can be considered to be independent from the ITIL implementation and may be a factor attributed to those executing the implementation of ITIL.

Finally, results from P3a, P3b and P3c also showed to be statistically significant, yet, in general, the law of diminishing returns could not be observed. The fact that there are benefits due to the adoption of ITIL agrees with the results from individual case studies on the effectiveness of ITIL presented by Potgieter et al. (2005) and Spremic et al. (2008). As reported by Hochstein et al. (2005), "Quick wins" are critical success factors when implementing ITIL. Thus, some companies may be attempting to realize benefits in the lower levels of implementation.

As it can be observed from the results of P3a, the number of realized benefits increases as the maturity level increases. However, there was no significance when comparing the Defined (3) with the Optimized (5) level of the ITIL implementation. Therefore, looking only at this result the law of Diminishing Returns for the studied benefits of ITIL appears to apply.

Nevertheless, with the results of P3b and P3c we cannot prove that the law of Diminishing Returns applies. As revealed from the results of P3b, the usage of metrics occurs even in the later levels of implementation. It has been shown that using performance metrics leads to improved decision making and problem solving (Banker et al. 2004), allows the survival and prosperity of organizations (Kaplan & Norton 1996) as well as encourages the renovation of strategy (Neely et al. 1994). Therefore, the usage of metrics provides indirect benefits of implementation in the later levels.

Moreover, that the benefits of ITIL are acknowledged by the business (P3c), even in the later levels of the ITIL implementation, may endorse the view that ITIL contributes to the Business-IT alignment (Kashanchi & Toland 2006). This would lead the business to a greater understanding about the general benefits and value that IT provides to the enterprise. Other indirect benefits of the ITIL implementation conveyed by a higher Business-IT alignment include: a positive effect on business performance (Sabherwal & Chan 2001), a competitive advantage and increased profitability (Henderson et al. 1996) as well as it being one of the key factors for successful IT systems implementations (Boynton et al. 1994; King & Sabherwal 1992; Lederer & Sethi 1988).

The contribution to research is that it delivers insight into the perception of effectiveness of ITIL, the implementation of processes and the evolution of challenges, as well as filling a research gap. Additionally, this research opens the path for future research. In practice, the findings can serve as a guideline for those IT managers considering or who have already adopted ITIL. For those considering the adoption and having doubts on the benefits of ITIL, the results show that due to the implementation of ITIL companies do receive several benefits. For those IT departments that have adopted ITIL and ponder on the idea of expanding their implementation of ITIL, they are provided with the understanding of the evolution of benefits realizable, and how their perception of challenges of implementation is affected as they continue implementing ITIL.

# 7      CONCLUSION

Based on the results reached in the previous sections, it has been shown that as the maturity of the ITIL implementation increases the number of implemented processes also increases. Additional to this, as the maturity increases, the challenges of implementation decrease. This is explained using the learning curve as well as insights from organizational learning. Results conclude that as the maturity of ITIL increases, so does the number of realized benefits. Marginal returns can be observed after the implementation reaches the Defined (3) level. Yet, in later levels of implementation further returns of the ITIL implementation can be seen. In these later levels there is an increase in the usage of metrics to measure the benefits of the implementation as well as in the business acknowledging the benefits provided by IT.

Limitations of this study are that the study concentrates only on the United States and United Kingdom, and that it over-samples the larger enterprises. Another limitation is that empirical studies are dependent on the quality of data provided by the respondents. Additionally, the paper uses a perceived maturity which is based on a single measurement. As well, the results are based only on the challenges and benefits that were listed on the survey.

Since this research is targeted towards IT experts, further studies will be conducted to understand the views of the business in respect to the challenges and benefits of the ITIL implementation. A comparison of views, the IT and the business view, on these topics is relevant. As well, studies will be conducted to understand how Business-IT alignment is affected by the implementation of ITIL. This could be done by conducting a survey and using a proven method of measuring Business-IT alignment and measuring ITIL maturity.

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# 15. Appendix Five

**Survey on CobiT Adoption**

Answers from some of these questions were used to collect data which would later be utilized to produce Paper 5.

## CobiT- Adoption, Benefits and Challenges

Over the past years CobiT®'s adoption rate has been increasing at exceptional levels. CobiT® v4 has been out for almost four years, yet there has been little information available about its uptakes, benefits and challenges.

This research, conducted by the University of Göttingen, will provide answers to various questions practitioners have, such as:

- What is the uptake of CobiT® v4?
- How mature are the CobiT® processes in various organisations?
- What are the reasons for adoption?
- Are organisations realising the benefits?

The survey is detailed and will take less than 10 minutes to complete.

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## CobiT- Adoption, Benefits and Challenges

### 1 Profile

**1. How many employees does your company have?**

- ○ < 500
- ○ 500 - 999
- ○ 1,000 - 4,999
- ○ 5,000 - 9,999
- ○ 10,000 - 14,999
- ○ > 15,000

**2. From what country is your company? ***

-- Please Select --

**3. To which industry is your company assigned to?**

- ○ Public sector
- ○ Manufacturing
- ○ Technology Business Services - e.g. IT
- ○ Professional - e.g. Law, Medicine, Real Estate
- ○ Financial and banking
- ○ Retail and distribution
- ○ Utility
- ○ Entertainment and Hospitality
- ○ Health Care
- ○ Telecommunications
- ○ Other

**4. If you would like to receive the results of this survey after it is completed, please fill in your Email Address.**

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**5. What is your job position?** *

- Executive Manager
- CIO
- IT Professional
- Accountant
- Internal Auditor
- Other [_____]

**6. How many employees are working in the IT department?**

- < 100
- 100 - 299
- 300 - 499
- > 500

**7. How many sites are supported by IT?**

- < 10
- 10 - 24
- 25 - 49
- 50 - 99
- > 100

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## 2 General questions about CobiT

**8. Which version of CobiT® are you using?** *

- CobiT® v4
- CobiT® v3
- CobiT® v2 or older
- Not adopted
- Not known

**9. Please rate the maturity level of your CobiT® implementation.**

Note:
1.) Initial: Processes are disorganised and not standardised
2.) Repeatable but Intuitive: Processes are repeated but not formally defined
3.) Defined: Processes are documented and communicated
4.) Managed and Measurable: Processes are monitored and measured
5.) Optimised: Processes are Good Practices with focus on continuous improvement
*

| Initial 1 | Repeatable but Intuitive 2 | Defined 3 | Managed and Measurable 4 | Optimised 5 |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

**10. How would you rate the alignment between business and IT in your company?**

Note:
1.) Initial/Ad Hoc Process: Business and IT lack understanding
2.) Commited Process: Commited Business/IT understanding
3.) Established Focused Process: Good understanding between IT and Business
4.) Improved/Managed Process: Improved and Managed process of alignment
5.) Optimised Process: Complete alignment with integration of strategic planning of business and IT *

| Initial/Ad hoc Process 1 | Commited Process 2 | Established Focused Process 3 | Improved/Managed Process 4 | Optimised Process 5 |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

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## CobiT- Adoption, Benefits and Challenges

11. What were the reasons for an adoption of CobiT®? Please rate the following reasons from 1 (not a reason) to 5 (very important reason). *

| | not a reason 1 | 2 | 3 | 4 | very important reason 5 |
|---|---|---|---|---|---|
| Strategic alignment between business and IT | ○ | ○ | ○ | ○ | ○ |
| Delivery of business value through IT | ○ | ○ | ○ | ○ | ○ |
| Performance Management of IT | ○ | ○ | ○ | ○ | ○ |
| Manage IT capabilities effectively | ○ | ○ | ○ | ○ | ○ |
| Implementing structured risk management | ○ | ○ | ○ | ○ | ○ |
| Regulatory pressure / Compliance | ○ | ○ | ○ | ○ | ○ |

12. Which challenges did you face during the CobiT® implementation? Please rate from 1 (no challenge) to 5 (major challenge) *

| | no challenge 1 | 2 | 3 | 4 | major challenge 5 |
|---|---|---|---|---|---|
| Organizational resistance to change | ○ | ○ | ○ | ○ | ○ |
| Lack of resources (time or people) for the implementation of CobiT® | ○ | ○ | ○ | ○ | ○ |
| Lack of funding for the implementation of CobiT® | ○ | ○ | ○ | ○ | ○ |
| Difficulty evaluating benefits of CobiT® | ○ | ○ | ○ | ○ | ○ |
| Lack of top management support | ○ | ○ | ○ | ○ | ○ |
| Lack of internal skills for the implementation of CobiT® | ○ | ○ | ○ | ○ | ○ |
| Maintaining momentum / Project stagnates | ○ | ○ | ○ | ○ | ○ |

13. Do you track the actual cost of providing IT?

○ Yes
○ No

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## 3 Maturity of the CobiT processes

14. Which of the processes of "Plan and Organise" have you adopted? Please rate the maturity level of each process.

*Note:*
*1.) Initial: Processes are disorganised and not standardised*
*2.) Repeatable but Intuitive: Processes are repeated but not formally defined*
*3.) Defined: Processes are documented and communicated*
*4.) Managed and Measurable: Processes are monitored and measured*
*5.) Optimised: Processes are Good Practices with focus on continuous improvement*

| | Not adopted 0 | Inital 1 | Repeatable but intuitive 2 | Defined 3 | Managed and Measurable 4 | Optimised 5 |
|---|---|---|---|---|---|---|
| PO1: Define a strategic IT plan | ○ | ○ | ○ | ○ | ○ | ○ |
| PO2: Define the information architecture | ○ | ○ | ○ | ○ | ○ | ○ |
| PO3: Determine technological direction | ○ | ○ | ○ | ○ | ○ | ○ |
| PO4: Define the IT processes, organisation and relationships | ○ | ○ | ○ | ○ | ○ | ○ |
| PO5: Manage the IT investment | ○ | ○ | ○ | ○ | ○ | ○ |
| PO6: Communicate management aims and directions | ○ | ○ | ○ | ○ | ○ | ○ |
| PO7: Manage IT human resources | ○ | ○ | ○ | ○ | ○ | ○ |
| PO8: Manage quality. | ○ | ○ | ○ | ○ | ○ | ○ |
| PO9: Assess and manage IT risks. | ○ | ○ | ○ | ○ | ○ | ○ |
| PO10: Manage projects. | ○ | ○ | ○ | ○ | ○ | ○ |

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## CobiT- Adoption, Benefits and Challenges

**15. Which of the processes of "Acquire and Implement" have you adopted? Please rate the maturity level of each process.**

*Note:*
*1.) Initial: Processes are disorganised and not standardised*
*2.) Repeatable but Intuitive: Processes are repeated but not formally defined*
*3.) Defined: Processes are documented and communicated*
*4.) Managed and Measurable: Processes are monitored and measured*
*5.) Optimised: Processes are Good Practices with focus on continuous improvement*

|  | Not adopted 0 | Inital 1 | Repeatable but Intuitive 2 | Defined 3 | Managed and Measurable 4 | Optimised 5 |
|---|---|---|---|---|---|---|
| AI1: Identify automated solutions | ○ | ○ | ○ | ○ | ○ | ○ |
| AI2: Acquire and maintain application software | ○ | ○ | ○ | ○ | ○ | ○ |
| AI3: Acquire and maintain technology infrastructure | ○ | ○ | ○ | ○ | ○ | ○ |
| AI4: Enable operation and use | ○ | ○ | ○ | ○ | ○ | ○ |
| AI5: Procure IT resources | ○ | ○ | ○ | ○ | ○ | ○ |
| AI6: Manage changes | ○ | ○ | ○ | ○ | ○ | ○ |
| AI7: Install and accredit solutions and changes | ○ | ○ | ○ | ○ | ○ | ○ |

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## CobiT- Adoption, Benefits and Challenges

**16. Which of the processes of "Deliver and Support" have you adopted? Please rate the maturity level of each process.**

*Note:*
*1.) Initial: Processes are disorganised and not standardised*
*2.) Repeatable but Intuitive: Processes are repeated but not formally defined*
*3.) Defined: Processes are documented and communicated*
*4.) Managed and Measurable: Processes are monitored and measured*
*5.) Optimised: Processes are Good Practices with focus on continuous improvement*

| | Not adopted 0 | Initial 1 | Repeatable but Intuitive 2 | Defined 3 | Managed and Measurable 4 | Optimised 5 |
|---|---|---|---|---|---|---|
| DS1: Define and manage service levels | ○ | ○ | ○ | ○ | ○ | ○ |
| DS2: Manage third-party services | ○ | ○ | ○ | ○ | ○ | ○ |
| DS3: Manage performance and capacity | ○ | ○ | ○ | ○ | ○ | ○ |
| DS4: Ensure continuous service | ○ | ○ | ○ | ○ | ○ | ○ |
| DS5: Ensure systems security | ○ | ○ | ○ | ○ | ○ | ○ |
| DS6: Identify and allocate costs | ○ | ○ | ○ | ○ | ○ | ○ |
| DS7: Educate and train users | ○ | ○ | ○ | ○ | ○ | ○ |
| DS8: Manage service desk and incidents | ○ | ○ | ○ | ○ | ○ | ○ |
| DS9: Manage the configuration | ○ | ○ | ○ | ○ | ○ | ○ |
| DS10: Manage problems | ○ | ○ | ○ | ○ | ○ | ○ |
| DS11: Manage data | ○ | ○ | ○ | ○ | ○ | ○ |
| DS12: Manage the physical environment | ○ | ○ | ○ | ○ | ○ | ○ |
| DS13: Manage operations | ○ | ○ | ○ | ○ | ○ | ○ |

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## CobiT- Adoption, Benefits and Challenges

17. Which of the processes of "Monitor and Evaluate" have you adopted? Please rate the maturity level of each process.

*Note:*
1.) *Initial: Processes are disorganised and not standardised*
2.) *Repeatable but Intuitive: Processes are repeated but not formally defined*
3.) *Defined: Processes are documented and communicated*
4.) *Managed and Measurable: Processes are monitored and measured*
5.) *Optimised: Processes are Good Practices with focus on continuous improvement*

| | Not adopted 0 | Initial 1 | Repeatable but Intuitive 2 | Defined 3 | Managed and Measurable 4 | Optimised 5 |
|---|---|---|---|---|---|---|
| ME1: Monitor and evaluate IT performance | ○ | ○ | ○ | ○ | ○ | ○ |
| ME2: Monitor and evaluate internal control | ○ | ○ | ○ | ○ | ○ | ○ |
| ME3: Ensure compliance with external requirements | ○ | ○ | ○ | ○ | ○ | ○ |
| ME4: Provide IT governance | ○ | ○ | ○ | ○ | ○ | ○ |

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## CobiT- Adoption, Benefits and Challenges

### 4 Final Questions

18. How would you describe the effectiveness of CobiT® in general in your company? *

| not effective 1 | 2 | 3 | 4 | very effective 5 |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

19. What benefits did you realise due to the adoption of CobiT®? Please rate the following benefits from 1 (not realised) to 5 (fully realised). *

| | not realised 1 | 2 | 3 | 4 | fully realised 5 |
|---|---|---|---|---|---|
| Strategic alignment between business and IT | ○ | ○ | ○ | ○ | ○ |
| Delivery of business value through IT | ○ | ○ | ○ | ○ | ○ |
| Performance Management of IT | ○ | ○ | ○ | ○ | ○ |
| Manage IT capabilities effectively | ○ | ○ | ○ | ○ | ○ |
| Implementing structured risk management | ○ | ○ | ○ | ○ | ○ |
| Regulatory pressure/Compliance | ○ | ○ | ○ | ○ | ○ |

Finished? Submit your Survey

95%

# 16. Appendix Six

**IT Executives' Perception of CobiT: Satisfaction, Business-IT Alignment and Benefits**

Paper published at the Americas Conference of Information Systems, 2010. This is an earlier version of Paper 4.

# IT Executives' Perception of CobiT:
# Satisfaction, Business-IT Alignment and Benefits

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## ABSTRACT

Business-IT alignment has been one of the top issues in IT managers' minds for years. Because of its potential to help an organization improve its Business-IT alignment, IT governance has grown in popularity over the last years. However, little research exists on the topic. An international survey of 113 firms using CobiT was conducted to examine the users' satisfaction, impact on Business-IT alignment and perception on the benefits realized. The research concentrates on the evolution of these three factors as companies increase their implementation of CobiT. Results indicate that companies that have achieved higher implementation levels were more satisfied with the framework, experienced high positive impacts on their Business-IT alignment and received greater benefits in the areas of IT governance.

## KEYWORDS

IT Governance, CobiT, Business-IT Alignment

## INTRODUCTION

Over the last 30 years IT has become the backbone of businesses and for many companies it is now impossible to function without a solid IT basis. As a result of its increasingly central role in the enterprise, the IT function is changing, morphing from a technology provider into a strategic partner (Venkatraman, 1999). The new role of IT and the underlying infrastructure has to be managed and governed according to the principles of efficient management which apply to all areas of organizations. This shift in the focus and reliance on IT has generated attention towards the processes of IT governance.

A 2008 survey by PricewaterhouseCoopers found that 18% of companies had implemented IT governance processes and 34% were in the process of implementation. The survey concludes that usage has doubled over the previous two years. Some authors (Van Grembergen, De Haes, & Guldentops, 2003; Ridley, Young, & Carroll, 2004) have argued that IT governance's high acceptance is due to it being considered an appropriate control framework to help an organization ensure its Business-IT alignment. Research conducted by Weill & Ross (Weill & Ross, 2005) projected that organizations with high levels of IT governance could achieve more than 20% greater profits than organizations with low implementation of IT governance practices. However, Koch (2002) argues that IT governance is often more theoretical than practical, which may hamper the benefits governance provides.

While many organizations across the world are adopting IT governance little empirical research has been conducted (Liu & Ridley, 2005). The existing research focuses mainly on case studies and literature reviews and is often limited to specific geographic regions. Ridley et al. (2004) points out that there is a need for quantitative studies into IT governance frameworks such as the Control Objectives for Information and Related Technology or CobiT.

The research described in this paper uses empirical data gathered from a survey of major companies from across various industries sectors and geographic regions. It seeks to understand the following:

- How is the satisfaction with CobiT impacted by different levels of maturity of CobiT implementation?

- How is Business-IT alignment impacted as the maturity of the CobiT implementation increases?

- How does the perception of realized benefits develop as the maturity of the CobiT implementation increases?

The central question of this research is the consideration of how the different phases of the implementation influence the success of CobiT adoption, specifically with regards to benefits and satisfaction with CobiT. Additionally, since ensuring strategic alignment between business and IT is one of the major tasks of CobiT, the research examines the impact of the maturity of the CobiT implementation on the IT perceived Business-IT alignment.

This article begins with a literature review on IT governance, CobiT and its benefits. This is followed by a description of the methodological approach followed by a discussion of the results and the outcomes of the survey. Subsequently, limitations and future research are explored and conclusions are drawn.

## RELATED RESEARCH

The IT Governance Institute (ITGI) (2007) states that "IT governance is an integral part of enterprise governance and consists of the leadership and organizational structures and processes that ensure that the organization's IT sustains and extends the organization's strategies and objectives". Van Grembergen (2003) bases his definition of IT governance on the definition proposed by ITGI by saying that IT governance is driven by the top management and is used to control the development and implementation of IT strategy. IT governance has shown to be a critical success factor in achieving corporate success by providing information through the application of technology (Korac-Kakabadse & Kakabadse, 2001). Patel (2002) considers that IT governance will enhance organizational accountability, improving IT's return on investment. However, Korac-Kakabadse also stated that the benefits realized may vary from implementation to implementation.

Webb et al. (2006) suggests that IT governance focuses on the following five areas:

- **Strategic alignment** concentrates on the topic of alignment between IT and business.

- **Value delivery** encompasses how IT adds value to the business and how the expenses and the return on investment are optimized.

- **Risk management** assures a continuous operation of IT and deals with operational IT risks, mostly technological risks.

- **Performance measurement** monitors and controls the performance of IT towards the business goals.

- **Capability Management** manages all resources including people, data and technology.

Webb et al. (2006) adds to these the area of Control and Accountability. Control and Accountability implies leadership, control and accountability from personnel within the organization who have authority to govern.

These areas have been widely used in theory. Dahlberg and Kivijärvi (2006) create an assessment tool to measure the effectiveness of the implementation of IT governance based on these areas. Research by Gellings (2007) using these five areas of IT governance looked at three German banks to understand how outsourcing relationships were improved due to IT governance practices.

IT control frameworks are developed to promote effective IT governance. CobiT is an example of such a framework. CobiT is designed to support IT governance in managing and understanding the risks and benefits associated with information and related technology. In 2007 CobiT version four was released and it describes 34 IT processes with their associated tasks, divided across four domains: 1) planning & organization, 2) acquisition & implementation, 3) delivery & support and, 4) monitoring & evaluation (IT Governance Institute, 2007).

In reviewing the literature in this area only a few case studies have examined the benefits of CobiT and only one of these focused on Business-IT alignment. In that study De Haes & Van Grembergen (2009) explored six Belgium financial organizations and the impact on Business-IT alignment through IT governance. The study concludes that the IT governance maturity may have an impact on the maturity of Business-IT alignment

### RESEARCH DESIGN

For the three research questions listed in the introduction, three propositions were developed and are described in the section below. A description of the maturity levels used to understand the level of implementation of CobiT is explained prior to the propositions studied.

### Maturity Levels

The maturity model is a description of the level of 'adoption, adherence or maturity' of a company as it relates to the adoption of the CobiT framework. The CobiT maturity model is outlined in the IT governance guidelines (IT Governance Institute, 2007). Companies start the implementation process with the identification of it current state of maturity. Table 1 covers a brief description of each level of the maturity model.

| Level | Level Name | Description |
|-------|-----------|-------------|
| 0 | Non-existent | Management of processes is not applied at all |
| 1 | Initial / Ad Hoc | Processes are ad hoc and disorganized |
| 2 | Repeatable | Processes follow a standard, are documented and understood |
| 3 | Defined | Processes are documented and monitored for compliance |
| 4 | Managed | Management monitors and measures according to metrics established in the previous level |
| 5 | Optimized | Good practices are followed and automated |

**Table 1. Maturity Model Levels with Descriptions (IT Governance Institute, 2007)**

To assist in understanding the level of maturity of companies with regards to their Business-IT alignment Luftman (2001) developed the Strategy Alignment Maturity Model (SAMM). The model covers five levels of Business-IT alignment maturity: 1) Initial/ Ad Hoc, 2) Committed, 3) Established/ Focused, 4) Improved/ Managed and 5) Optimized.

### Satisfaction and Maturity

The importance of measuring satisfaction lies in the expectation-disconfirmation theory. This theory suggests that expectations combined with perceived performance leads to post-purchase/usage satisfaction. It holds that initially consumers have expectations about the product or service and that after using or implementing the product or service the performance and achievements are measured and compared with the expectations resulting in the level of disconfirmation. If the product performs at or above expectations (positive disconfirmation) post-purchase satisfaction will result. If the product falls short of expectations (negative disconfirmation) the consumer is likely to be dissatisfied (Oliver, 1980; Spreng, MacKenzie, & Olshavsky, 1996). Figure 1 shows the Expectation – Disconfirmation theory model.
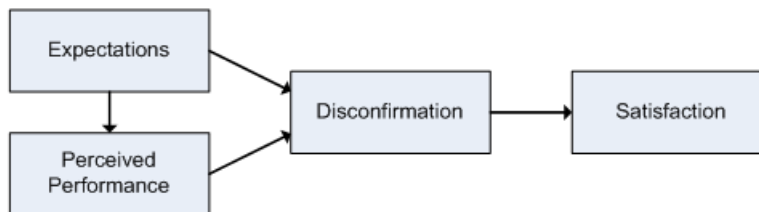


**Figure 1. Expectation-Disconfirmation Theory (Spreng et al., 1996)**

This research aims to understand which effect, if any, maturity levels have on the satisfaction of implementation. We propose the following:

*P1: There is a positive relationship between satisfaction of implementation and perceived maturity of the CobiT implementation.*

**Business-IT Alignment and Maturity**

Following on the research of De Haes et al. (2009), we explore the impact and relation of the implementation of CobiT and Business-IT alignment. This research aims to understand which effect, if any, the increase in the adoption of the CobiT model has on the perception of the Business-IT alignment. We propose the following:

*P2: There is a positive relationship between Business-IT alignment and perceived maturity of the CobiT implementation.*

**Realization of Benefits and Maturity**

Our research focuses on understanding the impact of CobiT on the six areas of IT governance which was discussed in the related research section above. The focus of our research is to understand the progression of the 'total impact of realized benefits' to the companies rather than the 'perception of the benefits realized' in the individual areas. Consequently, for each company, the benefit's impact of CobiT is averaged across the different areas of IT governance. Therefore, the following proposition is suggested:

*P3: There is a positive relationship between maturity levels of the CobiT implementation and perceived realized benefits.*

**METHODOLOGY**

**Design**

The online questionnaire was made available during the months of October and November 2009. This survey was announced in various CobiT dedicated internet groups and forums. One hundred and ninety one (191) IT Executives completed and submitted the survey. Only those using CobiT version four were considered in order to strengthen the reliability of the results. Out of the total number of respondents, 125 stated that they have implemented CobiT version 4, 19 had adopted version 3, and 2 were following version 2 or older. Forty five (45) respondents said that they have not adopted CobiT. From the 125 responses, 12 responses were identified as not valid and are excluded from the statistical analysis. Therefore, the total sample size was of 113.

The questionnaire addressed many aspects of CobiT, including its adoption, usage, implementation and maturity, as well as satisfaction and realized benefits. It also covered the topics of Business-IT alignment. The questionnaire used Likert and nominal scales with no open-ended questions.

The following four categories were used for the study:

1. Rate the perception of the maturity of each of the 34 CobiT processes (using a scale based on the Maturity Model.)

2. Select the level of satisfaction with the CobiT implementation (using a five point scale where 1 meant not at all satisfied and 5 meant extremely satisfied)

3. Choose the perceived level of Business-IT alignment (based on Luftman's (2001) SAMM levels with each level and their definitions displayed for further information.)

4. Magnitude of the realized positive impact in each of the areas of IT governance. (using a five point scale where 1 meant no benefits realized and 5 meant benefits realized to a great extent)

**Respondents' Profile**

Respondents were asked about their companies' industry, number of sites supported by IT, number of IT employees in the company as well as their title and their location. Table 2 shows the profile of the respondents.

| Industry | Percent |
|---|---|
| Financial and Banking | 35 |
| Technology | 22 |
| Telecommunications | 9 |
| Healthcare | 7 |
| Public | 7 |
| Manufacturing | 5 |
| Retail and Distribution | 5 |
| Utility | 4 |
| Other | 4 |
| Professional | 2 |

| Countries | Percent |
|---|---|
| United States | 16 |
| Germany | 8 |
| Switzerland | 6 |
| United Arab Emirates | 6 |
| Belgium | 5 |
| Australia | 5 |
| Other | 54 |

| Number of Sites | Percent |
|---|---|
| Over 100 | 29 |
| Less than 10 | 29 |
| 10-24 | 20 |
| 50-66 | 12 |
| 25-49 | 10 |

| Number of IT Employees | Percent |
|---|---|
| Less than 100 | 39 |
| Over 500 | 32 |
| 100-299 | 19 |
| 300-499 | 10 |

| Job Role | Percent |
|---|---|
| IT Manager | 35 |
| Executive Manager | 23 |
| Internal Auditor | 23 |
| CIO | 12 |
| Other | 7 |

**Table 2. Respondents' Profile by Industry, Country Number of Sites Supported by IT, Job Role and Number of IT Employees**

## RESULTS

An exploratory analysis was conducted for each variable to test for normality. Both the Kolmogorov-Smirnov and the Shapiro-Wilk showed significance for the perceived Business-IT alignment ($p < 0.001$) and for the realized benefits of CobiT ($p < 0.001$). As the data was non-normal, the Spearman's rho was used to test for correlations. Additionally, Kruskal-Wallis, a non-parametric one way analysis of variance was used to study the data. If the data using the Kruskal-Wallis showed significant differences between the groups, the Mann-Whitney U test was applied to understand if groups were statistically different.

A cluster analysis was used to group the companies based on the maturity of each of the 34 CobiT processes. For this analysis, the hierarchical clustering was used because of its high acceptance in practice. Research has shown that the Ward method is an appropriate algorithm and can be relied upon to assign the cases to the groups correctly (Backhaus, Erichson, Plinke, & Weiber, 2008). The interval chosen was the Squared Euclidean distance. There were an adequate number of clusters resulting from the elbow method which analyzes the error sum of squares for each number of clusters. Based on this method, five clusters were identified, which follow the same attributes as that of the Maturity Model (see Table 1). Cluster one contains the respondents with the lowest maturity and cluster five the ones with the highest maturity. Table 3 shows the five clusters suggested and the number of respondents, maturity mean and median and standard error.

| Cluster Levels | Number of Respondents | Maturity (Mean) | Maturity (Median) | Standard Error |
|---|---|---|---|---|
| 1 – Initial | 16 | 1.44 | 1.00 | 0.814 |
| 2 – Repeatable | 20 | 2.05 | 2.00 | 0.224 |
| 3 – Defined | 28 | 2.61 | 3.00 | 0.497 |
| 4 – Managed | 27 | 3.04 | 3.00 | 0.192 |
| 5 - Optimized | 22 | 3.59 | 4.00 | 0.503 |

**Table 3. Characterization of Maturity Clusters**

As the study was concerned with how the nominated variables are impacted as the CobiT implementation increases, caution was taken with the choice of test measures. The Mann-Whitney U tests inflates the Type I error rate, so care was taken in the choice of comparisons made. Therefore the following three comparisons were conducted:

Test 1: Level 1 (Initial) cluster compared to Level 3 (Defined) cluster

Test 2: Level 3 (Defined) cluster compared to Level 5 (Optimized) cluster

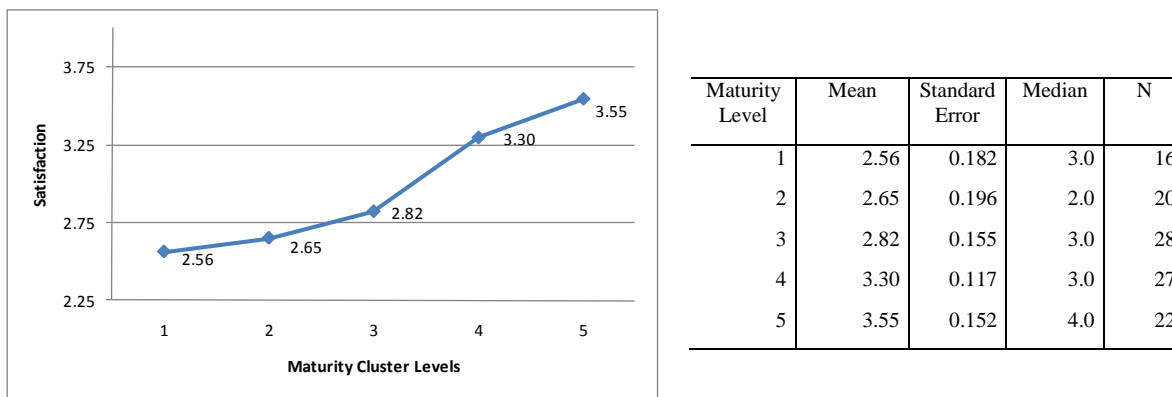Test 3: Level 1 (Initial) cluster compared to Level 5 (Optimized) cluster

As three tests were conducted, a Bonferroni correction is applied. This correction means that instead of using the critical level of significance of 0.05, all effects are reported at 0.0167 level of significance. All reported *p* values are using 1-tailed Monte Carlo *p* values with a confidence level of 99% and a number of samples of 10,000. This method is used because of the large sample size.

Lastly, *r* was used to measure the strengths of a relationship between variables (Rosenthal, 1991, p. 19). Cohen suggests that the sizes of the effect are small (0.1), medium (0.3) or large (0.5).

### Satisfaction and Maturity (P1)

First a correlation analysis is performed to investigate if there is a relationship between the CobiT maturity levels and the level of satisfaction with CobiT. The analysis shows that satisfaction with CobiT is significantly correlated with the CobiT maturity levels ($r=0.45$, $p<0.01$). This shows that as the CobiT implementation increases, the satisfaction with the framework also increases.

Figure 2 presents the means, standard error and medians for the perceived realized benefits. With the Kruskal-Wallis test satisfaction is significantly affected by the level of implementation maturity ($H(4)=24.48$, $p<0.001$).



| Maturity Level | Mean | Standard Error | Median | N |
|---|---|---|---|---|
| 1 | 2.56 | 0.182 | 3.0 | 16 |
| 2 | 2.65 | 0.196 | 2.0 | 20 |
| 3 | 2.82 | 0.155 | 3.0 | 28 |
| 4 | 3.30 | 0.117 | 3.0 | 27 |
| 5 | 3.55 | 0.152 | 4.0 | 22 |

**Figure 2. Descriptive Statistics of Satisfaction (n=113)**

As shown in Table 4, results from the Mann-Whitney test demonstrate that there is no significance between the satisfaction of the respondents when comparing Level 1 (Initial) with Level 3 (Defined) maturity of implementation ($U=194$, $r=-0.12$). Respondents of Level 5 (Optimized) had a significantly higher perceived satisfaction than respondents of Level 3 (Defined) ($U=158.5$, $r=-0.44$). Finally, when comparing Level 1 (Initial) with Level 5 (Optimized) significance can be determined ($U=65$, $r=-0.57$) and a large change is observed. However, even at Level 5 (Optimized) satisfaction remains weakly positive having a mean of 3.55.

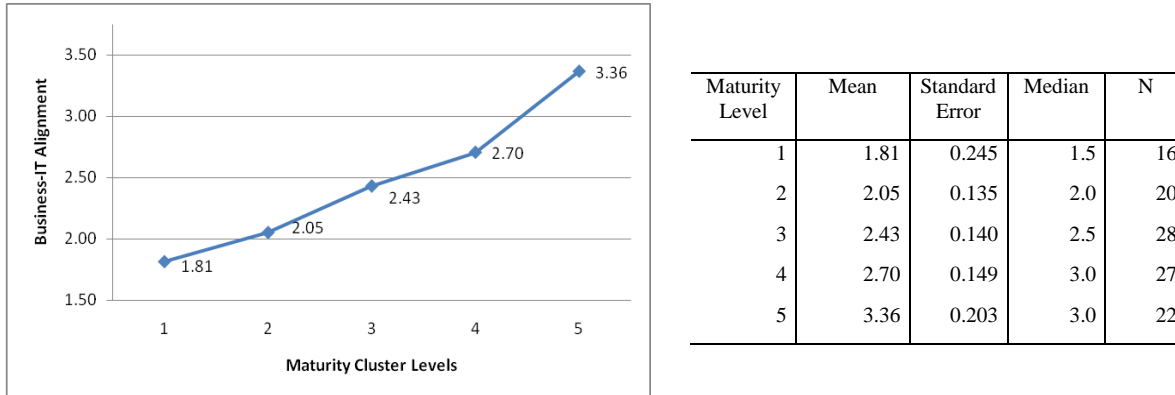| | Level 1 compared with Level 3 | | | Level 1 compared with Level 5 | | | Level 3 compared with Level 5 | | |
|---|---|---|---|---|---|---|---|---|---|
| | *U* | *p* | *r* | *U* | *p* | *r* | *U* | *p* | *r* |
| Satisfaction | 194 | 0.223 | -0.12 | 65 | 0.000* | -0.57 | 158.5 | 0.001* | -0.44 |

*significance at 0.0167

**Table 4. Mann-Whitney U Test Results for Satisfaction with CobiT at Distinct Maturity Levels (n=113)**

**Business-IT Alignment and Maturity (P2)**

When testing for correlation, it was shown that there was a significant relationship between Business-IT alignment and the levels of adoption of CobiT (r = 0.519, p <0.001).

Figure 3 displays the means and medians for the perceived Business-IT alignment. In general, Business-IT alignment is significantly affected by the maturity level of the implementation ($H(4)=30.70$, $p<0.001$). Mann-Whitney U tests were used to follow up on the findings.

| Maturity Level | Mean | Standard Error | Median | N |
|---|---|---|---|---|
| 1 | 1.81 | 0.245 | 1.5 | 16 |
| 2 | 2.05 | 0.135 | 2.0 | 20 |
| 3 | 2.43 | 0.140 | 2.5 | 28 |
| 4 | 2.70 | 0.149 | 3.0 | 27 |
| 5 | 3.36 | 0.203 | 3.0 | 22 |

**Figure 3. Descriptive Statistics of Business-IT Alignment (n=113)**

Table 5 shows the results from the selective comparisons. The comparison between levels Level 1 (Initial) and Level 3 (Defined) was significance with a small effect (U=135, r=-0.21). When comparing Level 3 (Defined) with Level 5 (Optimized) there was significance also with a medium to large effect (U=148.5, r=-0.47). Lastly, when comparing Level 1 (Initial) with Level 5 (Optimized) (U=49.5, r=-0.63) significance was observed with a large change. The greatest increase of the perceived level of alignment can be seen when comparing Level 3 (Defined) and Level 5 (Optimized) maturity level.

| | Level 1 compared with Level 3 | | | Level 1 compared with Level 5 | | | Level 3 compared with Level 5 | | |
|---|---|---|---|---|---|---|---|---|---|
| | *U* | *p* | *r* | *U* | *p* | *r* | *U* | *p* | *r* |
| Business-IT Alignment | 135 | 0.009* | -0.21 | 49.5 | 0.000* | -0.63 | 148.5 | 0.000* | -0.47 |

*significance at 0.0167

**Table 5. Mann-Whitney U Test Results for Perceived Business-IT Alignment at Distinct Maturity Levels (n=113)**

**Realization of Benefits and Maturity (P3)**

There is a positive and significantly large relationship between the realization of benefits and the maturity levels of CobiT (r = 0.549, p < 0.001). The means, standard error and medians for the perceived realized benefits are shown in Figure 4.

From the Kruskal-Wallis test we see that the number of realized benefits is significantly affected by the level of implementation maturity (H(4)=34.05, p<0.000).
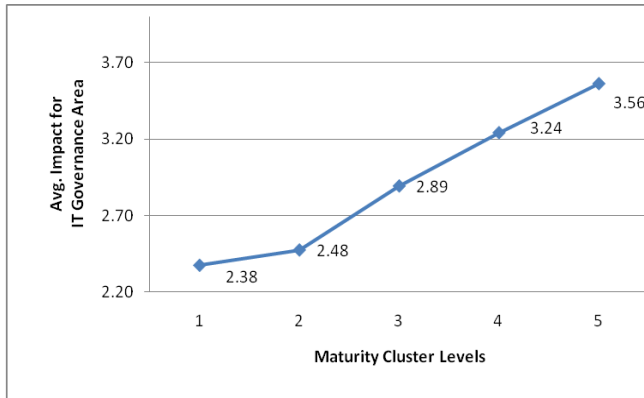
| Maturity Level | Mean | Standard Error | Median | N |
|---|---|---|---|---|
| 1 | 2.38 | 0.203 | 2.0 | 16 |
| 2 | 2.48 | 0.182 | 2.6 | 20 |
| 3 | 2.89 | 0.161 | 2.8 | 28 |
| 4 | 3.24 | 0.095 | 3.3 | 27 |
| 5 | 3.56 | 0.144 | 3.7 | 22 |

**Figure 4. Descriptive Statistics of Total Realized Benefits (n=113)**

The results of the Mann-Whitney test, shown in Table 6, demonstrates that between Level 1 (Initial) and Level 3 (Defined) there was significance (U=131.5, r=-0.34). Similarly when examining Level 3 (Defined) compared with Level 5 (Optimized) large significance can also be observed (U=137.5, r=-0.47). Finally, when comparing Level 1 (Initial) with Level 5 (Optimized) significance is also determined (U=48.5, r=-0.61) and a large change can be observed.

| | Level 1 compared with Level 3 | | | Level 1 compared with Level 5 | | | Level 3 compared with Level 5 | | |
|---|---|---|---|---|---|---|---|---|---|
| | *U* | *p* | *r* | *U* | *p* | *r* | *U* | *p* | *r* |
| Total Realized benefits | 131.5 | 0.008* | -0.34 | 48.5 | 0.000* | -0.61 | 137.5 | 0.000* | -0.47 |

*significance at 0.0167

**Table 6. Mann-Whitney U Test Results for Realized Benefits at Distinct Maturity Levels (n=113)**

## DISCUSSION

In this research we focus on CobiT and on factors such as satisfaction, Business-IT alignment and realized benefits. Three propositions are stated. In general, the results of the current study confirm P1. P1 states that there is a positive relationship between the usage of CobiT and the satisfaction with it. As proposed by the Expectation-Disconfirmation theory, the perceived satisfaction demonstrates how content the organizations are with the implementation of CobiT. Results from this study may indicate whether the adoption of CobiT is worth the effort and if the expectations of the users have been met. No significant difference in the satisfaction can be seen when comparing Level 1 (initial) to Level 3 (Defined) companies. At these levels post-usage satisfaction remains relatively low. However, a high increase in satisfaction is seen when comparing the later levels of adoption, specifically Level 3 (Defined) with Level 5 (Optimized).

Results from P1 also follow the findings of P2. P2 examines the impact of the increase in maturity on Business-IT alignment. Business-IT alignment is an approach which ensures an adequate congruence of the strategic goals of business and IT. As mentioned previously it is a central goal of CobiT and one of the reasons why organizations adopt it. The finding of this study supports the earlier case studies by De Haes et al. (2009) which used Luftman's (2001) SAMM to measure Business-IT alignment. The six Belgian companies studied had an average of 2.69 maturity. In our survey the overall average maturity of the Business-IT alignment across all organisations, based on the perception of the participants, was 2.52.

De Haes et al. (2009) propose that low maturity companies also have a low implementation of CobiT. The results from the statistical tests completed in this study confirm this and show a strong positive correlation between Business-IT alignment and the maturity levels. It reveals that as the level of CobiT implementation increases so does the level of Business-IT alignment.

As CobiT positively influences the alignment between business and IT, the importance of the adoption of CobiT is confirmed. Business-IT alignment has been shown to have a positive effect on business performance (Sabherwal & Chan,

2001); as well as providing a competitive advantage and increases profitability (Henderson, Venkatraman, & Oldach, 1996), as well as being one of the key factors for successful IT systems implementations (Boynton, Zmud, & Jacobs, 1994). Consequently CobiT could deliver major benefits to organizations, especially if implemented to a high level of maturity.

The final proposition P3 looks at the relationship between the maturity of implementation and the different areas of IT governance in order to understand the positive impact of CobiT. Based on the literature review, six major areas of IT governance have been revealed and through this survey respondents have been able to rate the degree of benefits received in the six different areas. In this research the results show that the degree to which the benefits are realized is influenced by the CobiT maturity level.

This research shows a strong increase in the realized benefits with increasing maturity levels. This increase is demonstrated to be statically significant. Findings suggests that the benefits of implementing CobiT can be seen more clearly in the later stages, rather than in the initial stages.

Overall, the companies that have achieved higher implementation levels were more satisfied with the framework, were experiencing a high positive impact on their Business-IT alignment and also received greater benefits in the areas of IT governance. However, companies do recognize less substantial benefits at the initial levels. There are a number of hypothesis of why this might occur. One hypothesis is that during the initial stages of implementation various organizational and process changes occur and during this time the company may not be able to identify the benefits that the implementation provides. Another hypothesis is that there are companies that adopt CobiT for marketing purposes or to comply with regulations and may not seek to find real benefits. Other companies implement CobiT because there is a genuine interest to improve their IT governance. In these companies there is a greater interest in the outcome of the adoption and greater management support which can drive the companies to a higher maturity level and to receive the various benefits. A final interpretation is that there may be a laggard effect of the benefits of CobiT than during the initial stages of implementation cannot be seen.

The impact of the phases of CobiT on the realization of benefits will be extended through future research, specifically by analyzing the realization of individual benefit in the different levels. This research would enable organizations to identify processes that are crucial for the realization of benefits. Future research would also need to examine the relationship between CobiT and other frameworks, such as ITIL in organization practice.

The limitations of this study are that it concentrates on CobiT version four and mostly from an IT perspective. A further limitation lies in the nature of empirical studies being dependent on the quality of data provided by the respondents. There is also a possibility that highly experienced users would have answered the questionnaire, since it was made available in a forum. As well, the results are based on perceived Business-IT alignment and only on the positive impact on the areas of IT governance rather than measure of the effectiveness or efficiencies of IT governance.

**CONCLUSION**

So far there have been few and limited academic studies on the issue of IT governance and there has been no major empirical survey at an international level. This empirical survey provides a strong basis for researchers and practitioners to understand the implications of the impact of the CobiT implementation in organizations. The 113 respondents to this study form a representative sample of the companies which have implemented CobiT and provide a global perspective on the issues they face.

The significance of the differences between the realizing benefits at the different levels of maturity show that the higher the maturity levels the greater the benefits realized. This is important for organizations to understand and to consider when planning their implementation process. Additionally the Business-IT alignment, as a major goal of IT governance, increases as the level of maturity of CobiT increases. Practitioners need to be aware that the benefits might not be 'visible' in the early stages of adoption. Organizations should not evaluate the success of CobiT on the first phases but rather on the latter stages of implementation and that organizational metrics should be tailored to this process. With the increase implementation of CobiT within the organization, learning effects are generated and through these additional benefits are realized and satisfaction increases.

This study provides a solid contribution to research and practitioners in the field of IT governance. The contribution to research is delivered through insight into the perception of effectiveness of CobiT, the perception of the progress through the maturity of the Business-IT alignment by managers and practitioners in IT. It starts to address a research gap and opens the way for future research. In practice the findings serve as a guideline for IT managers who are considering adoption or who already have adopted CobiT.

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# 17. Appendix Seven

**Mapping Improvements Achievable through the Adoption of CobiT**

Paper published at the Pacific Asia Conference on Information Systems, 2010. This is an earlier version of Paper 5.

# MAPPING IMPROVEMENTS ACHIEVABLE THROUGH THE ADOPTION OF IT GOVERNANCE

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## Abstract

*Various companies have implemented IT governance frameworks to improve their management and governance of IT. The benefits and areas of focus of IT governance have been only explored in theory. In this research an international survey of 113 firms using CobiT was conducted to understand the impact on the IT governance focus areas as companies increase their adoption of CobiT. Results indicate that companies which have achieved higher implementation levels experienced high positive impacts on all of the areas of IT governance, particularly in the later stages of implementation. Furthermore, the research maps out the IT governance areas which are most likely to display improvements at different levels of maturity.*

*Keywords: IT Governance, CobiT, Business-IT alignment, IT Governance areas*

# 1      INTRODUCTION

Information Technology (IT) has become the backbone of businesses and for many companies it is now impossible to function without a solid IT basis. As a result of its increasingly central role in the enterprise, the IT function is changing, morphing from a technology provider into a strategic partner (Venkatraman 1999). The new role of IT has to be managed and governed according to the principles of efficient management which apply to all areas of organizations. This shift in the focus and reliance on IT has generated attention towards the processes of IT governance.

It has been proposed that IT governance can be a critical success factor in achieving corporate success by providing information through the application of technology (Korac-Kakabadse and Kakabadse 2001). Patel (2002) considers that IT governance will enhance organizational accountability, improving IT's return on investment. Moreover, Weill (2004) suggests that an effective IT governance structure is the most important predictor of receiving value from IT.

Some authors (Van Grembergen et al. 2003; Ridley et al. 2004) have argued that IT governance's high acceptance is due to it being considered an appropriate control framework to help an organization ensure its Business-IT alignment. Research conducted by Weill and Ross (2005) projected that organizations with high levels of IT governance could achieve more than 20% greater profits than organizations with low implementation of IT governance practices.

However, Koch (2002) argues that IT governance is often more theoretical than practical, which may hamper the benefits provided. Korac-Kakabadse et al. (2001) added that the benefits realized would highly vary from implementation to implementation.

While many organizations across the world are adopting IT governance little academic based empirical research has been conducted (Liu and Ridley 2005). The existing research focuses mainly on case studies and literature reviews and is often limited to specific geographic regions. Ridley et al. (2004) point out that there is a need for quantitative studies in IT governance frameworks such as the Control Objectives for Information and Related Technology or CobiT.

The research described in this paper uses empirical data gathered from a survey of major companies from across various industry sectors and geographic regions. It seeks to understand the following:

- How does the perception of realized benefits develop as the maturity of the CobiT implementation increases for individual focus areas of IT governance?

- How does the perception of realized benefits develop as the maturity of the CobiT implementation increases for all areas of IT governance?

The central question of this research is the consideration of how the different phases of the implementation influence the success of CobiT adoption, specifically with regards to benefits brought forward due to implementation.

This article begins with a literature review on IT governance, IT governance focus areas and CobiT. This is followed by a description of the methodological approach followed by a discussion of the results and the outcomes of the survey. Subsequently, limitations and future research are explored and conclusions are drawn.

# 2      RELATED RESEARCH

The definitions of IT governance are broad and can often be considered ambiguous. Researchers have also understood that there is a difference between the terms stated in literature and the terms used in practice by consultants or IT executives (Cumps et al. 2006; Dahlberg & Kivijarvi 2006).

The field of IT governance is defined differently in the numerous articles and books written on the topic. Some of the prevailing definitions are:

- "IT governance is the responsibility of executives and the board of directors, and consists of the leadership, organizational structures and processes that ensure that the enterprise's IT sustains and extends the organization's strategies and objectives" (IT Governance Institute 2007, p.5).
- "IT governance is the organizational capacity exercised by the Board, executive management, and IT management to control the formulation and implementation of IT strategy and in this way ensure the fusion of business and IT" (Van Grembergen 2004, p.5).
- "IT governance is specifying the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT" (Weill 2004, p.3).
- "IT Governance is the strategic alignment of IT with the business such that maximum business value is achieved through the development and maintenance of effective IT control and accountability, performance management and risk management" (Webb et al. 2006, p.7).

The definition suggested by Van Grembergen (2004) addresses mainly the aspect of Business-IT alignment. Other definitions address other topics that include, beyond alignment, performance management, resource management, risk management as well as IT's value delivery. Therefore, IT government encompasses a broad spectrum of tasks, ranging from aligning IT with strategy and business goals to steering and guiding of the system's operation, including provisions for adapting the operational and organizational structure changes needed to fulfil the tasks.

These topics are known to be the IT governance focus areas. The IT governance focus areas as suggested by ITGI (2007) are:

- **Strategic Alignment,** which is concerned with the alignment of IT and business.

- **Value Delivery** encompasses how IT adds value to the business and how the expenses and the return on investment are optimized.

- **Risk Management** assures a continuous operation of IT and deals with operational IT risks, mostly technological risks.

- **Performance Measurement** monitors and controls the performance of IT towards the business goals.

- **Capability (Resource) Management** manages all resources including people, data and technology.

Webb et al. (2006) adds to these the area of **Control and Accountability**. Control and Accountability implies leadership, control and accountability from personnel within the organization who have authority to govern.

These areas have been widely used in theory. Dahlberg and Kivijärvi (2006) create an assessment tool to measure the effectiveness of the implementation of IT governance based on these areas. Research by Gellings (2007) using these five areas of IT governance looked at three German banks to understand how outsourcing relationships were improved due to IT governance.

These focus areas are also a focal point of IT governance frameworks. The de-facto IT governance framework is CobiT. CobiT helps develop IT governance by managing and understanding the risks and benefits associated with information and related technology.

It was originally developed by the Information Systems Audit and Control Foundation (ISACF), which is the research institute for the Information Systems Audit and Control Association (ISACA). The development of CobiT started in 1994, a first version was published in 1996 and subsequent versions followed in 1998 and 2000. In 2003 ISACF changed its name to IT Governance Institute (ITGI). While the first and second version of CobiT focused on auditing and controlling IT, the third version added management guidelines. In 2007 CobiT version four was released.

CobiT version four describes 34 IT processes with their associated tasks, divided across four domains: 1) Planning and Organization, 2) Acquisition and Implementation, 3) Delivery and Support and 4) Monitoring and Evaluation.

The Planning and Organization domain contains 11 control objectives dealing primarily with IT strategy and how IT supports the business objectives. In addition, it plans, communicates and manages the realization of the strategic vision from different perspectives. Typical management topics for this domain are the successful IT and business alignment, the optimal use of IT resources and an appropriate quality of IT for business needs (IT Governance Institute 2007; Olbrich 2008).

The focus of Acquisition and Implementation is on identifying, developing and acquiring the IT solutions needed, as well as implementing and integrating them into the business process to realize the IT strategy. Furthermore, in order to make sure that the life cycle is continued for these systems, changes in and maintenance of existing systems are covered by this domain (IT Governance Institute 2007). Typical management topics for this domain are the successful implementation of new systems or the delivery of new projects on time, within budget and with desired solutions that meet business needs (IT Governance Institute 2007; Olbrich 2008).

The Delivery and Support domain deals with acquired and properly running IT systems. It includes service delivery, management of security and continuity, service support for users, and management of data and operational facilities. The control objectives of this domain address the management of IT systems including change, incident, and problem management (Kairab 2004). Typical management topics for this domain are optimized IT costs, IT service delivery in line with business priorities as well as valuable and safe use of the IT systems (Olbrich 2008).

Lastly, the Monitoring and Evaluation domain deals with the assessment of the required quality and compliance of IT processes. From a control perspective, the functionality of IT systems has to be verified to ensure that the systems are functioning as intended. In addition, it addresses management's supervision of the organization's control process and independent assurance provided by internal and external audit. Typical management topics for this domain are the link of the performance to business goals, effective and efficient internal control by understanding IT's performance to detect problems (IT Governance Institute 2007; Olbrich 2008).

The 34 processes work jointly to help provide IT governance. How the increase of maturity of these processes impacts the IT governance focus areas has yet not been studied. However, few authors have concentrated on the benefits provided by the adoption of IT governance frameworks. Gomes and Ribeiro (2009) completed a case study on a high education institution which implemented CobiT. Due to the implementation of CobiT the institution improved their quality of services, reduced their execution time of tasks, reduced the number of incidents and reduced the number of reopened incidents. A study by De Haes and Van Grembergen (2009) explored six Belgium financial organizations and the impact on Business-IT alignment through IT governance. The study concludes that the IT governance maturity may have an impact on the maturity of Business-IT alignment.

This study builds on and contributes to the work on IT governance's impact on the IT organization and the business. Although studies in IT governance have examined some of the IT governance focus areas through case studies, there has not been an extended study of all of the focus areas of IT governance as the maturity of the implementation increases. Therefore, the related research leads into the following research hypotheses.

## 3    RESEARCH DESIGN

For the two research questions listed in the introduction, two hypotheses were developed and are described in the section below. A description of the maturity levels used to understand the level of implementation of CobiT is explained prior to the hypotheses studied.

### 3.1 Maturity Levels

The maturity model is a description of the level of 'adoption, adherence or maturity' of a company as it relates to the adoption of the CobiT framework. The CobiT maturity model is outlined in the IT governance guidelines (IT Governance Institute 2007). Van Grembergen et al. (2003) argue that this tool offers an easy-to-understand method to determine the current state of maturity by benchmarking the current state and the best practices and standard guideline. Table 1 covers a brief description of each level of the maturity model.

| Level | Level Name | Description |
|-------|-----------|-------------|
| 0 | Non-existent | Management of processes is not applied at all |
| 1 | Initial / Ad Hoc | Processes are ad hoc and disorganized |
| 2 | Repeatable | Processes follow a standard, are documented and understood |
| 3 | Defined | Processes are documented and monitored for compliance |
| 4 | Managed | Management monitors and measures according to metrics established in the previous level |
| 5 | Optimized | Good practices are followed and automated |

*Table 1.        Maturity Model Levels with Descriptions*

### 3.2 Realization of Benefits and Maturity

Our research focuses on understanding the impact of CobiT on the six focus areas of IT governance which were discussed in the related research section above. The focus on the benefits is dual. On one side the research focuses on the individual areas of IT governance and the positive impact perceived as organizations adopt CobiT. We propose the following hypothesis:

*H1: There is a positive relationship between maturity levels of the CobiT implementation and perceived realized benefits for individual areas of IT governance.*

On the other hand, the research also focuses on understanding the progression of the 'total impact of realized benefits' to the companies. Consequently, for each company, the benefit's impact of CobiT is averaged across the different areas of IT governance. The following hypothesis is suggested:

*H2: There is a positive relationship between maturity levels of the CobiT implementation and the overall perceived realized benefit for all areas of IT governance.*

## 4    METHODOLOGY

### 4.1 Design

An online questionnaire was made available during the months of October and November 2009. This survey was announced in various CobiT dedicated internet groups and forums. One hundred and ninety one (191) IT executives completed and submitted the survey. Only those using CobiT version four were considered in order to strengthen the reliability of the results. Out of the total number of respondents, 125 stated that they have implemented CobiT version 4, 19 had adopted version 3, and 2 were following version 2 or older. Forty five (45) respondents said that they have not adopted CobiT. From the 125 responses, 12 responses were identified as not valid and were excluded from the statistical analysis. Therefore, the total sample size was of 113.

The following two questions were used for the study:

- Rate the perception of the maturity of each of the 34 CobiT processes (using a scale based on the Maturity Model.)

- Express the magnitude of the realized positive impact in each of the areas of IT governance due to the use of CobiT (using a five point scale where 1 meant no benefits realized and 5 meant benefits realized to a great extent)

## 4.2    Respondents' Profile

Respondents were asked about their companies' industry, number of sites supported by IT, number of IT employees in the company as well as their title and their location. This is shown on Table 2.

| Industry | Percent |
|---|---|
| Financial and Banking | 35 |
| Technology | 22 |
| Telecommunications | 9 |
| Healthcare | 7 |
| Public | 7 |
| Manufacturing | 5 |
| Retail and Distribution | 5 |
| Utility | 4 |
| Other | 4 |
| Professional | 2 |

| Countries | Percent |
|---|---|
| United States | 16 |
| Germany | 8 |
| Switzerland | 6 |
| United Arab Emirates | 6 |
| Belgium | 5 |
| Australia | 5 |
| Other | 54 |

| Number of Sites | Percent |
|---|---|
| Over 100 | 29 |
| Less than 10 | 29 |
| 10-24 | 20 |
| 50-66 | 12 |
| 25-49 | 10 |

| Number of IT Employees | Percent |
|---|---|
| Less than 100 | 39 |
| Over 500 | 32 |
| 100-299 | 19 |
| 300-499 | 10 |

| Job Role | Percent |
|---|---|
| IT Manager | 35 |
| Executive Manager | 23 |
| Internal Auditor | 23 |
| CIO | 12 |
| Other | 7 |

*Table 2.        Respondents' Profile by Industry, Country Number of Sites Supported by IT, Job Role and Number of IT Employees*

# 5    RESULTS

An exploratory analysis was conducted for each variable to test for normality. Both the Kolmogorov-Smirnov and the Shapiro-Wilk showed significance for the individual benefits realized ($p<0.001$) and for the sum of the realized benefits of CobiT ($p<0.001$). As the data was non-normal, the Spearman's rho was used to test for correlations. Additionally, Kruskal-Wallis, a non-parametric one way analysis of variance was used to study the data. If the data using the Kruskal-Wallis showed significant differences between the groups, the Mann-Whitney U test was applied to understand if groups were statistically different.

A cluster analysis was used to group the companies based on the maturity of each of the 34 CobiT processes. For this analysis, the hierarchical clustering was used because of its high acceptance in practice. Research has shown that the Ward method is an appropriate algorithm and can be relied upon to assign the cases to the groups correctly (Backhaus et al. 2008). The interval chosen was the Squared Euclidean distance. There were an adequate number of clusters resulting from the elbow method which analyses the error sum of squares for each number of clusters. Based on this method, five clusters were identified, which follow the same attributes as that of the Maturity Model (see Table 1). Cluster one contains the respondents with the lowest maturity and cluster five the ones with the highest maturity. Table 3 shows the five clusters suggested and the number of respondents, maturity mean and median and standard error.

| Cluster Levels | Number of Respondents | Maturity (Mean) | Maturity (Median) | Standard Error |
|---|---|---|---|---|
| 1 – Initial | 16 | 1.44 | 1.00 | .814 |
| 2 – Repeatable | 20 | 2.05 | 2.00 | .224 |
| 3 – Defined | 28 | 2.61 | 3.00 | .497 |
| 4 – Managed | 27 | 3.04 | 3.00 | .192 |
| 5 - Optimized | 22 | 3.59 | 4.00 | .503 |

*Table 3.        Characterization of Maturity Clusters*

As the study was concerned with how the nominated variables are impacted as the CobiT implementation increases, caution was taken with the choice of test measures. The Mann-Whitney U tests inflates the Type I error rate, so care was taken in the choice of comparisons made. Therefore the following three comparisons were conducted:

Test 1: Level 1 (Initial) cluster compared to Level 3 (Defined) cluster

Test 2: Level 3 (Defined) cluster compared to Level 5 (Optimized) cluster

Test 3: Level 1 (Initial) cluster compared to Level 5 (Optimized) cluster

As three tests were conducted, a Bonferroni correction is applied. This correction means that instead of using the critical level of significance of 0.05, all effects are reported at 0.0167 level of significance. All reported $p$ values are using 1-tailed Monte Carlo $p$ values with a confidence level of 99% and a number of samples of 10,000. This method is used because of the large sample size.

Lastly, $r$ was used to measure the strengths of a relationship between variables (Rosenthal 1991, p.19). Cohen suggests that the sizes of the effect are small (0.1), medium (0.3) or large (0.5). In the next sections the following abbreviations are used: H corresponds to the Kruskal-Wallis statistic, U represents the Mann-Whitney U statistic, while SE is the Standard Error.

## 5.1 Individual IT Governance Areas and Maturity (H1)

The Spearman's rho analysis shows that there is a correlation between the CobiT maturity levels and each of the IT governance areas [Strategic Alignment r=.26 p<.01, Delivery of Business Value through IT r=.28 p<.01, Performance Management r=.32 p<.001, Capability Management r=.36 p<.001, Risk Management r=.37 p<.001, Control and Accountability r=.42 p<.001]. This shows that as the CobiT implementation increases, there is a positive increase in the impact in the areas of IT governance.

Table 4 presents the means, standard error and medians for the areas of IT governance. Kruskal-Wallis test show that the areas of IT governance are significantly affected by the level of implementation maturity [Strategic Alignment H(4)=8.85 p<.05, Delivery of Business Value through IT H(4)=9.08 p<.05, Performance Management H(4)=11.33 p<.01, Capability Management H(4)=16.17 p<.001, Risk Management H(4)=16.17 p<.001, Control and Accountability H(4)=19.54 p<.001]
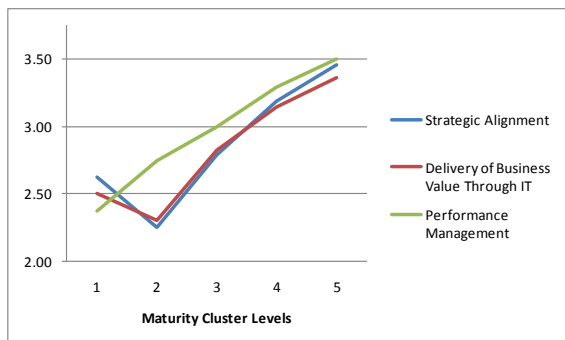


| Maturity Level | N | Strategic Alignment | Delivery of Business value through IT | Performance Management |
|---|---|---|---|---|
| 1 | 16 | M=2.63 | M=2.50 | M=2.38 |
|  |  | SE=.29 | SE=.22 | SE=.30 |
|  |  | Mdn=2 | Mdn=2 | Mdn=2 |
| 2 | 20 | M=2.25. | M=2.30 | M=2.75 |
|  |  | SE=.19 | SE=.23 | SE=.24 |
|  |  | Mdn=2 | Mdn=2.5 | Mdn=3 |
| 3 | 28 | M=2.79 | M=2.82 | M=3.00 |
|  |  | SE=.01 | SE=.20 | SE=.18 |
|  |  | Mdn=3 | Mdn=3 | Mdn=3 |
| 4 | 27 | M=3.19 | M=3.15 | M=3.30 |
|  |  | SE=.18 | SE=.15 | SE=.17 |
|  |  | Mdn=3 | Mdn=3 | Mdn=3 |
| 5 | 22 | M=3.45 | M=3.36 | M=3.50 |
|  |  | SE=.19 | SE=.20 | SE=.18 |
|  |  | Mdn=3.5 | Mdn=4 | Mdn=4 |

| Maturity Level | N | Capabilities Management | Risk Management | Control and Accountability |
|---|---|---|---|---|
| 1 | 16 | M=2.13 | M=2.38 | M=2.25 |
|  |  | SE=.27 | SE=.34 | SE=.32 |
|  |  | Mdn=2 | Mdn=2 | Mdn=2 |
| 2 | 20 | M=2.50 | M=2.40 | M=2.65 |
|  |  | SE=.20 | SE=.22 | SE=.27 |
|  |  | Mdn=3 | Mdn=2 | Mdn=3 |
| 3 | 28 | M=2.69 | M=2.71 | M=3.07 |
|  |  | SE=.19 | SE=.21 | SE=.22 |
|  |  | Mdn=3 | Mdn=3 | Mdn=3 |
| 4 | 27 | M=3.41 | M=3.33 | M=3.07 |
|  |  | SE=.12 | SE=.16 | SE=.22 |
|  |  | Mdn=3 | Mdn=3 | Mdn=3 |
| 5 | 22 | M=3.36 | M=3.73 | M=3.95 |
|  |  | SE=.20 | SE=.19 | SE=.20 |
|  |  | Mdn=3 | Mdn=4 | Mdn=4 |

*Table 4.          Descriptive Statistics for IT Governance Areas (n=113)*

As shown in Table 5, results from the Mann-Whitney test demonstrate that there is significance between all areas of IT governance when comparing Level 1 (Initial) with Level 5 (Optimized) [Strategic Alignment (U=98.5, r=-.39), Risk Management (U=78, r=-.49), Performance Management (U=79, r=-.48), Control and Accountability (U=55.5, r=-.59), Delivery of Business Value through IT (U=90.5, r=-.43) and Capability Management (U=64.5, r=-.55)]. Large changes can be observed in the areas of Capability Management and Control and Accountability, while medium to large changes can be identified for all other areas. Respondents of Level 5 (Optimized) had a significantly higher perceived impact than respondents of Level 3 (Defined) with a medium to large change in the areas of Control and Accountability (U=167, r=-.41), Risk Management (U=148, r=-.46), and a medium change in the area of Strategic Alignment (U=185.5, r=-.35). Marginal significance was observed in the areas of Performance Management (U=209, r=-.29) and Delivery of Business Value through IT (U=203, r=-.30). No significance could be observed for Capability Management. Finally, when comparing Level 1 (Initial) with Level 3 (Defined) significance can be determined only for Control and Accountability (U=55.5, r=-.59) with a medium change and Capability Management (U=64.5, r=-.55) with a medium to large change.

|  | Level 1 compared with Level 3 | | | Level 1 compared with Level 5 | | | Level 3 compared with Level 5 | | |
|---|---|---|---|---|---|---|---|---|---|
|  | U | p | r | U | p | r | U | p | r |
| Strategic Alignment | 204.000 | .312 | -0.08 | 98.50 | .007* | -0.39 | 185.50 | .007* | -0.35 |
| Delivery of Business Value Through IT | 182.500 | .154 | -0.16 | 90.50 | .003* | -0.43 | 203.00 | .017 | -0.30 |
| Performance Management | 147.500 | .025 | -0.29 | 79.00 | .001* | -0.48 | 209.00 | .018 | -0.29 |
| Capability Management | 112.500 | .002* | -0.43 | 64.50 | .001* | -0.55 | 225.00 | .042 | -0.24 |
| Risk Management | 175.000 | .115 | -0.19 | 78.00 | .001* | -0.49 | 148.00 | .001* | -0.46 |
| Control and Accountability | 132.500 | .011* | -0.35 | 55.50 | .001* | -0.59 | 167.00 | .002* | -0.41 |

*significance at 0.0167

*Table 5. Mann-Whitney U Test Results for IT Governance areas at Distinct Maturity Levels (n=113)*

## 5.2 Overall Realized Benefit and Maturity (H2)

There is a positive and significantly large relationship between the realization of benefits and the maturity levels of CobiT (r = .549, p < .001). The means, standard error and medians for the perceived realized benefits are shown in Table 8.

From the Kruskal-Wallis test we see that the number of realized benefits is significantly affected by the level of implementation maturity (H(4)=34.05, p<.000).



| Maturity Level | Mean | Standard Error | Median | N |
|---|---|---|---|---|
| 1 | 2.375 | .203 | 2.00 | 16 |
| 2 | 2.475 | .182 | 2.58 | 20 |
| 3 | 2.893 | .161 | 2.83 | 28 |
| 4 | 3.241 | .095 | 3.34 | 27 |
| 5 | 3.561 | .144 | 3.67 | 22 |
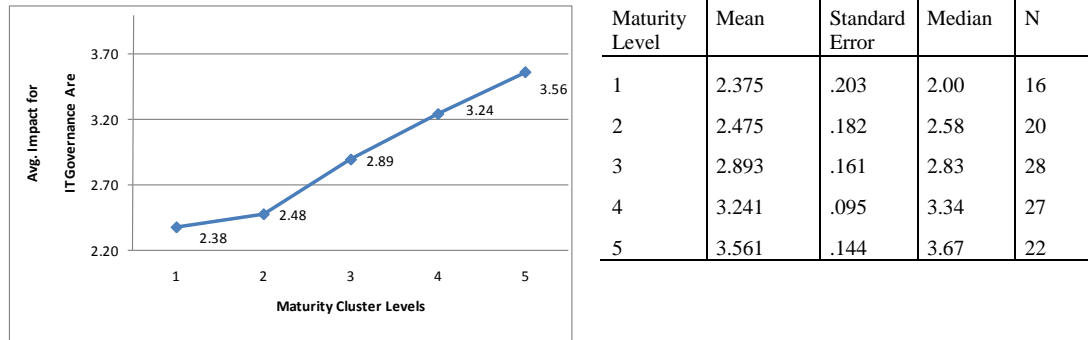
*Table 6. Descriptive Statistics of Total Realized Benefits (n=113)*

The results of the Mann-Whitney test, shown in Table 7 demonstrates that between Level 1 (Initial) and Level 3 (Defined) there was significance (U=131.5, r=-.34). Similarly when examining Level 3 (Defined) compared with Level 5 (Optimized) large significance can also be observed (U=137.5, r=-.47). Finally, when comparing Level 1 (Initial) with Level 5 (Optimized) significance is also determined (U=48.5, r=-.61) and a large change can be observed.

| | Level 1 compared with Level 3 | | | Level 1 compared with Level 5 | | | Level 3 compared with Level 5 | | |
|---|---|---|---|---|---|---|---|---|---|
| | U | p | r | U | p | r | U | p | r |
| Overall Positive Impact | 131.5 | 0.008* | -0.34 | 48.5 | 0.000* | -0.61 | 137.5 | 0.000* | -0.47 |

*significance at 0.0167

*Table 7. Mann-Whitney U Test Results for Realized Benefits at Distinct Maturity Levels (n=113)*

# 6 DISCUSSION

In this research we focus on CobiT and the benefits realized though its implementation. Two hypotheses are stated. In general, the results of the current study confirm H1. This hypothesis looks at the individual areas of IT governance and the impact that is perceived by IT executives when implementing CobiT. Based on the literature review, six major areas of IT governance have been revealed and through this survey respondents have been able to rate the degree of benefits received in the six different areas.

Results show that there is a general positive impact in all areas of IT governance as companies adopt and increase their usage of the framework. However, the positive increase in impact in the areas differs. In the initial stages a positive increase in the impact can be seen only in the areas of Control and Accountability and Capability Management. Marginal significance can be seen for Performance Management. In the later stages of implementation, a significant improvement can be seen in the areas of Control and Accountability, Risk Management, and Strategic Alignment. Marginal improvement when comparing these levels can be seen in the IT governance areas of Performance Management and Delivery of Business Value through IT. In this comparison, the only area that showed no significance was Capability Management, nevertheless, a statistical impact could be seen in the earlier stages.

There have been a few researchers who have looked into the impact of the CobiT implementation. Research of Gomes and Ribeiro (2009) showed in their single case study that improvements in the area of Capability Management could be observed. Their research followed an educational institution through their first year of implementation of CobiT. Since they compiled information for the initial

year, we can assume that the organization was in their early stages of implementation. Our results show that the area of Capability Management received a significant impact in the initial stages which is in line with the results shown in the case study research.

The findings of this study in the area of Strategic Alignment confirm the research by De Haes et al. (2009) which proposes that low maturity companies also have a low implementation of CobiT. Our study provides an additional insight into the impact in the area of Strategic Alignment. It demonstrates that an impact is likely to happen in the later stages of CobiT implementation.

As previously stated, research by Weill and Ross (2005) argues that companies with high level of IT governance could achieve more than 20% greater profits than organizations with low implementation of IT governance practices. Our research shows that a significant improvement in the area of Delivery of Business Value through IT can only be seen marginally in the later stages of implementation, which may concur with the results from research conducted by Weill and Ross.

An improvement in the area of Risk Management due to the implementation of CobiT can be seen in the later stages of maturity. This is of interest because IT projects are notorious for their high risks of failure. A Gartner (2009) study shows that 25% of IT projects fail completely and that an additional 40% are not delivered on time, on budget or with lack in functionality. There is a significant risk embedded in IT projects and the importance of Risk Management is therefore vital.

Control and Accountability is the only area of IT governance that shows significance in both early and later stages of CobiT implementation. CobiT is often used to address the requirements of compliance regulations such as the Sarbanes-Oxley Act (SoX) and Basel II (Pinder 2006). It is valuable to know that the implementation of CobiT has a positive effect in this area throughout its implementation.

While performance management is considered to be a crucial aspect of management (Neely 1998), the implementation of CobiT has only a marginal positive impact when comparing the earlier stages and the later stages.

Overall, the impact of CobiT on the IT governance focus areas is very diverse. Some areas such as Control and Accountability are thoroughly impacted, but areas such as Performance Management are only marginally impacted. Therefore, looking at the overall impact of the CobiT implementation would also be useful.

Hypothesis H2 looks at the general impact of CobiT on the IT governance focus areas. This research shows a strong increase in the realized benefits with increasing maturity levels. Findings suggest that companies which have achieved higher implementation levels were experiencing greater benefits in the areas of IT governance. However, at the initial levels companies recognize less substantial benefits. There are a number of hypotheses of why this might occur.

One hypothesis is that during the initial stages of implementation various organizational and process changes occur and during this time the company may not be able to identify the benefits that the implementation provides. Another hypothesis is that there are companies which adopt CobiT for marketing purposes or to comply with regulations and may not seek to find real benefits. Other companies implement CobiT because there is a genuine interest to improve their IT governance. In these companies there is a greater interest in the outcome of the adoption and greater management support which can drive the companies to a higher maturity level and receive the various benefits. A final interpretation is that there may be a laggard effect of the benefits of CobiT which during the initial stages of implementation cannot be seen.

The impact of different phases of CobiT on the realization of benefits will be extended through future research, specifically by analysing the realization of individual benefits at different levels. This research would enable organizations to identify processes that are crucial for the realization of benefits. Future research would also need to examine the relationship between CobiT and other frameworks, such as ITIL, in organization practice.

The limitations of this study are that it concentrates on CobiT version four and does it mainly from an IT perspective. A further limitation lies in the nature of empirical studies being dependent on the

quality of data provided by the respondents. Also the results are based on the positive impact in the areas of IT governance. They do not measure the effectiveness or efficiencies of IT governance.

# 7    CONCLUSION

So far there have been few and limited academic studies on the issue of IT governance and there has been no major empirical survey at an international level. This empirical survey provides a strong basis for researchers and practitioners to understand the implications of the impact of the CobiT implementations. The 113 respondents to this study form a representative sample of the companies which have implemented CobiT and provide a global perspective on the issues they face.

Various researchers have proposed the different areas which would be impacted by the adoption of IT governance. This research looks at the six focus areas of IT governance: Strategic Alignment, Risk Management, Performance Management, Control and Accountability, Delivery of Business Value through IT and Capability Management, to understand if a positive impact could be perceived by those companies which have implemented CobiT. Results from this research show that at the initial stages of implementation, between Level 1 (Initial) and Level 3 (Defined), companies are likely to notice improvements in the areas of Capability Management and Control and Accountability. In the later stages of implementation, between Level 3 (Defined) and Level 5 (Optimized), companies are likely to observe an improvement in Strategic Alignment, Risk Management and Control and Accountability.

Overall, findings show that the higher the maturity levels the greater the benefits realized. This is important for organizations to understand and to consider when planning their implementation process. Practitioners need to be aware that benefits might not be 'visible' in all areas of IT governance at the early stages of adoption. Organizations should not evaluate the success of CobiT in the first phases but rather in the later stages of implementation. Organizational metrics should be tailored to this process. With the increasing implementation of CobiT within the organization, learning effects are generated and therefore, additional benefits are realized.

This study provides a solid contribution to research as well as practitioners in the field of IT governance. The contribution to research is delivered through insight into the perception of CobiT's effectiveness, the perception of the progress through the maturity by managers and practitioners in IT. It starts to address a research gap and opens the way for future research. In practice the findings serve as a guideline for IT managers who are considering adoption or who already have adopted CobiT.

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# 18.   Appendix Eight

**Searching for Mechanisms of Knowledge Integration in IT Operational Frameworks: the Case of ITIL**

Paper to be presented at the pre International Conference on Information Systems (ICIS) workshop, 2010. This is an earlier version of the discussion chapter.

**Searching for Mechanisms of Knowledge Integration in IT Operational Frameworks: the Case of ITIL**

**Abstract:**
The usage of IT Service Management frameworks such as ITIL has been on the rise. While there has been some research into the benefits that these frameworks provide, there has been no theoretical basis explaining why companies achieve these benefits. Taking a Knowledge-Based View of the firm provides an understanding of why organizations are able to create knowledge when implementing the frameworks. This research helps illustrate how IT Service Management frameworks can help in the knowledge integration process. Implications for practitioners and researchers are also discussed.

# INTRODUCTION

In today's dynamic environment managers aim to enhance their competitive advantage. It has been shown that process standardization has a positive impact on process performance and market success (Ramakumar & Cooper 2004; Swaminathan 2001). The usage of process standardization has demonstrated decreased risk, reduced cost, and improved effectiveness and transparency. However, there has been little empirical research on knowing how and why process standardization delivers such benefits (Davenport 2005).

In Information Systems (IS) the use of "best practices" or frameworks has been on the rise. Recent surveys have indicated an increase of implementation of IT Service Management frameworks such as ITIL (IT Infrastructure Library) (Deloitte 2003; IT Governance Institute 2008; Cater-Steel et al. 2006). A survey completed by PricewaterhouseCoopers (2008) concludes that 24% of companies are using the ITIL framework. This figure represents a rise of 54% compared to the same survey completed in 2006.

While there has been some research on the benefits that ITIL provides, the emerging theories of strategic management, such as the knowledge-based view (KBV) of the firm has not been applied as a theoretical basis in such studies.

The KBV argues that the most influential source of the firm is knowledge (Grant 1996b). In this paper, we put forward propositions on the relationship between the theory above mentioned theory and IT Service Management frameworks. The paper explores how these frameworks are able to generate and, more importantly, to apply knowledge and, therefore, create benefits for the business and IT organization.

In this research, we explore the potential of IT Service Management frameworks, specifically ITIL, to facilitate the integration of knowledge. We propose that integrating organizational and individual knowledge concepts can provide insights into how this framework leads to improvement of the IT organization and the firm. This endeavor aims at closing a gap since there has not been any research applying the KBV to IT Service Management frameworks.

The remainder of this paper is organized as follows. Section 2 reviews the relevant academic literature on IT Service Management and ITIL. We then examine the KBV, with emphasis on Grant's (1996b) four mechanisms for integrating specialized knowledge. Finally, we discuss the implications of the findings and conclusions.

## RELATED RESEARCH AND THEORETICAL FOUNDATION

IT Service Management can be defined as "a set of processes that cooperate to ensure the quality of live IT services, according to the levels of service agreed to by the customer" (Young 2004). Conger et al. (2008) add that ITSM "focuses on defining, managing, and delivering IT services to support business goals and customer needs, usually in IT Operations".

There are various concepts of ITSM. Several ITSM frameworks were developed using ITIL as a reference, such as Hewlett-Packard (HP ITSM Reference model), IBM (IT Process Model) and Microsoft's MOF (Bon 2007).The most common approach is the ITIL which is a de facto standard for IT Service Providers (Hochstein, Zarnekow et al. 2005; IT Governance Institute 2008).

ITIL was originally developed in the 1980s by the Central Computer and Telecommunications Agency (CCTA) in Great Britain. The most recent version of ITIL, which

was released in 2007, is ITIL version 3. It consists of five core service life cycle phases. These are (Office of Government Commerce 2007):

*Service Strategy (SeS)* establishes an overall strategy for the organization's planned IT services and IT Service Management practices.

*Service Design (SeD)* designs and develops new or changed services for the introduction into the live environment.

*Service Transition (SeT)* shifts new or changed services into the production environment while controlling the risks of failure and disruption.

*Service Operation (SeO)* performs the day to day operation of the processes which manage the services. This is where performance metrics are gathered as well as reported and where value is realized.

*Continual Service Improvement (CSI)* identifies and implements improvements to the IT services.

There are two main objectives of ITIL. The first is the introduction and the enhancement of customer orientation and service orientation (Buchsein et al. 2008). The second objective is the increased effectiveness in implementing business requirements, on the one hand, and increased efficiency in providing IT services on the other hand (Köhler 2007). The latter is achieved by describing the task fulfillment within the IT organization as process-oriented.

There have been a few studies on the benefits provided by the implementation of ITIL. Potgieter et al. (2005) completed research the effect of the implementation of ITIL on customer satisfaction and service quality. The researchers concluded that, on the research site, a large service unit of ICT in South Africa, there is a direct correlation between customer satisfaction, service quality and the use of ITIL. Spremic et al. (2008) monitored an IT Service provider in Croatia and applied various Key Performance Indicator (KPI) metrics before and after the implementation of various processes of ITIL. The study concludes that the IT service provider underwent improvements which may be attributable to the implementation of ITIL.

In the analysis of their six case studies, Hochstein et al. (2005) list four benefits: improvement of quality of IT services, efficiency and optimization of processes, transparency and comparability through process documentation and process monitoring. The researchers also consider the financial aspects of the implementation of ITSM. Marrone et al. (2010) conclude that the number of realized benefits due to the implementation of ITIL increases as the maturity of the implementation escalates.

## KNOWLEDGE-BASED VIEW OF THE FIRM

Knowledge represents "the meaningful links people make in their minds between information and application in action in a specific context" (Dixon 2000). Knowledge is a factor that has a significant impact on productivity, innovation, and product development, for instance (Spender 1996). While there are arguments about the correct definition of knowledge, for this research the definition above suffices. Strategically, knowledge is considered to be the most valuable asset of companies, and interest in knowledge is therefore increasing (Drucker 1994).

Grant (1996b) proposed the knowledge-based view of the firm (KBV), also known as the knowledge-based theory, using the resource-based view as a foundation. KBV is grounded in the strategic management literature and advances the resource-based view of the firm (RBV), firstly supported by Penrose (1959) and expanded by researchers such as Wernerfelt (1984), Barney (1991) and Corner (1991).

RBV refers to internal analysis and resources such as physical (e.g. machines, plant, etc.), human (e.g. know-how) and organisational capital (e.g. the firm's reputation) (Barney (1991). RBV regards an organization as internal and static, however, little dynamic. Managerial skills are considered to be the main resource as they carry the power to allocate resources. This and the decision-making process constitute the weakness of RBV. It does not imply enough learning and innovation of the whole firm; neither does it look at interfaces between individuals.

Promoters of KBV admit a gap in the resource-based perspective. Even though RBV sees knowledge as a generic source for sustainable competitiveness it fails to realise the different abilities of KBV. An enterprise is competitive if it combines different knowledge streams, applies these to certain tasks, integrates specialized knowledge of individuals and allows for new knowledge (Conner & Prahalad 1996; Grant 1996b; Grant 1996a; Sabherwal & Becerra-Fernandez 2003). RBV goes along well with knowledge companies which have human competence as a foundation of the business. KVB acknowledges the significance of human resources, competences and intellectual capital for competitiveness.

Knowledge should be distinguished from other resources due to its several dimensions (Kaplan & Norton 2001). Sveiby (2001) recognises knowledge as dynamic, personal and clearly different to data and information. Studies in knowledge management claim different characteristics of knowledge, such as tacit and explicit knowledge (Polanyi 1966). Explicit knowledge can be codified, articulated and transmitted to others through formal language or communication systems. Tacit knowledge is difficult to transfer and involves both cognitive and technical elements. The interaction of the two types of knowledge results in new knowledge (Nonaka & Takeuchi 1995).

According to Nonaka (1994), knowledge creation is a continuous process of spiralling interaction between explicit and tacit knowledge. It involves four different patterns of interaction which are socialization (tacit to tacit), externalization (tacit to explicit), combination (explicit to explicit), and internalization (explicit to tacit).

Grant (1997) states that knowledge is a strategically valuable input in production. According to him, tacit knowledge is integrated widely in an organisation and replicated internally. The ability to manage and organize procedures in a way that facilitates the generation and application of knowledge within the organization allows for a sustainable competitive advantage (Roos & Von Krogh 1999; Nonaka & Takeuchi 1995). Competitiveness is explained via knowledge creation, knowledge configurations and knowledge sharing. Based on the modes of knowledge conversion, Alavi and Leiner (2001) develop a framework of knowledge management processes that regard organizations as social collectives and "knowledge systems".

Knowledge-based resources have proved to be of social complexity and are neither imitable nor replaceable (Patton 2007). KBV supporters state that having diverse levels of knowledge and competence renders the companies more competitive and allows for better performance. Also, different parts of a company support and execute the company's knowledge: these are organisational scheme and policy, processes, documents, systems and the company's personnel.

## INTEGRATION MECHANISMS

According to KBV, the firm exists to generate conditions that can integrate the specialized knowledge of multiple individuals (Grant 1996b). Grant (1996b) identifies four integration mechanisms which are Rules and Directives, Sequencing, Routines, Group Problem

Solving and Decision Making. These mechanisms are to be supported by a base of common knowledge. These mechanisms economize communication and coordination. Each of these mechanisms is explained further:

*Rules and Directives:* As expressed by Van de Ven et al. (1976) *Rules and Directives* alludes to "impersonal" approaches for coordination that entail "plans, schedules, forecast, rules, procedures and policies, as well as information and communication systems". Aside from minimizing the need for communication, these mechanisms assist the transfer of tacit to explicit knowledge by acting like codification devices. Grant (1996b) argues that "Rules may be viewed as *standards* which regulate the interaction between individuals" (emphasis added). This informal communication helps specialists in one area of knowledge to create standards which can be followed by non-specialist (Demsetz 1988).

*Sequencing:* refers to allocation of tasks to members who have the appropriate knowledge of it. Therefore, activities are organized in time-patterned sequences which minimize the need for ongoing coordination. Therefore, the specialist's participation occurs separately in a pre-assigned period of time.

*Routines:* as defined by Winter (1986) are a "relatively complex pattern of behaviour ... triggered by a small number of initiating signals or choices and functioning as a recognizable unit in a relatively automatic fashion". In this way, individuals only need to understand their role in the routine in order to realize specialized knowledge in a coordinated way. They are able to support, without the need of *Rules and Directives,* relatively complex behaviours and interactions between individuals. March and Simon (1958) "regard a set of activities as routinized to the extent that choice has been simplified by the development of a fixed response to a defined stimulti". Individuals are, consequently, able to integrate their specialized knowledge without the need of communicating that knowledge.

*Group problem solving and decision making:* relies on methods which are nonstandard, high-communication methods. It allows for the combination of knowledge which was previously dispersed over various individuals in order to solve a problem or make a decision.

The first three mechanisms aim for efficiency of integration by avoiding the cost of communication and learning. The fourth may require integration through more personal and communication-intensive manners.

All methods of knowledge interaction need to be supported by a base of existent *Common Knowledge* (Grant 1996b). Four forms of common knowledge are common language between organizational members, commonalities in the individual's specialized knowledge, shared meaning and understanding among individuals, and recognition of individual domains.


## INTEGRATION MECHANISM IN IT SERVICE MANAGEMENT FRAMEWORKS

Particularly in the service industry, the primary source of competitive advantage is the continuous process of knowledge creation (Nonaka & Takeuchi 1995; Colurcio 2009). The growth of a firm is not sustainable without continuous redevelopment of knowledge based resources and capabilities because the organization would be less able to discover new business opportunities (Saarenketo et al. 2009). In the majority of the organizations, specialized knowledge is dispersed across various organization members, which causes a problem (Tsoukas 1996).

By using the findings of academic case studies and surveys completed on the benefits of the implementation of ITIL and CobiT, as well as the guidelines written on these frameworks, we are able to create connections between the four mechanisms of integration of knowledge and the findings. Results are as follows:

*Rules and Directives:* ITIL provides descriptions of a number of important IT practices, through comprehensive checklists, tasks and procedures and responsibilities aimed at the IT Organization (Bon 2007). Historically, ITIL was developed to establish a standard approach for efficiency and effectiveness. In their survey, Marrone et al. (2010) include that one of the benefits is the "Adoption of a common IT process methodology". We propose that it has an impact on the area of *Rules and Directives*, as it aims at developing set procedures inside the organization to improve its efficiency. This framework helps by converting tacit knowledge into explicit knowledge. It is through the creation of the procedures, following the ITIL guidelines, that companies are able to standardize and integrate their knowledge.

*Sequencing:* Particularly ITIL v3 approaches service management from the life cycle aspect of service. "The service life cycle is an organizational model providing insight into: the way service management is structured, the way the various components are linked to each other. The impact that changes in one component will have on other system components and on the entire system. ... [ITIL] focuses on the service life cycle, and the way service management components are linked" (Bon 2007). Based on this, we propose that ITIL, having a sequential structure, is able to integrate specialized knowledge of the organization without the necessity of communicating that knowledge. This way companies are able to economize on communication while still being able to integrate specialized knowledge.

*Routines:* In a survey carried out by Cater-Steel et al. (2009), they assert that, for ITIL, one of the top benefits of implementing the framework is that the roles and responsibilities are clarified. ITIL uses the RACI Model (Responsible, Accountable, Consulted and Informed) to help define their roles and responsibilities (Bon 2007). Through the establishment of clear roles in the organization, specialists are able to generate specialized knowledge in a coordinated way.

*Group problem solving and decision making*: ITIL recommends the creation of various groups, such as the IT Steering Group and the Support Group. The Steering Group is a formal group which is responsible for ensuring the alignment of the business and IT service provider strategies and plans. The Support Group is a group of specialists with technical skills and is responsible for providing technical support needed by all IT service management processes (Bon 2007). These are two examples of groups, proposed in the ITIL framework, which are responsible for decision making and problem solving.

As previously expressed, all of these integration mechanisms of knowledge depend on the existence of common knowledge. In the case studies completed by Cater-Steel et al. (2008) they cite a manager stating that "Standardization makes us more efficient and using common language, you get benefits out of using the same tools". Findings from the case studies conducted by Hochstein et al. (2005) state that due to the implementation of ITIL commonalities exist in the processes of the various support centers. In their example, processes in support centers in China were identical to those in the USA.

We can observe from various case studies that ITIL provides a common language which is the foundation, needed to support the knowledge interaction. From this basis, for all of the four integration mechanisms of knowledge, we can see that the implementation of ITIL is able to have a considerable impact in these areas.

**CONCLUSION**

Knowledge lowers the possibility of external imitation. Lasting improvements can be created through the expansion of the knowledge base used (Rivkin 2001). Previous studies have suggested various benefits achievable through the implementation of IT Service Management frameworks. However, theoretical development remains fragmented, and there has been no research on the factors that lead to these benefits. This study is an effort to add the effect of knowledge determinants to the impact that these frameworks have, not only on the IT organization, but also on the firm.

It is understood that frameworks as "best practices" contain knowledge which reflects the cumulative experience of hundreds of individuals and organizations around the world (Spafford, 2003). Based on Nonaka's (1994) modes of knowledge conversion, when these frameworks are implemented in the organization, new knowledge is created from the combination of the knowledge contained in the organization and the implementation of the framework.

At the same time, IT Service Management frameworks, such as ITIL, provide policies, procedures and tools that are inherently useful as enablers of knowledge generation and application. Therefore, these frameworks are able to have a positive influence on knowledge transfer. These frameworks influence the IT organization's resources and capabilities, and ultimately lead to improvement of a firm's competitive advantages.

Further research should develop and test a model which would show and prove the relations between the creation of benefits due to the implementation of such frameworks and the improvements achieved through knowledge integration. Of interest is to see if improvements are due to the knowledge integration that organizations receive benefits or if it is due to the implementation of "best practice" frameworks.

In this study, we have made contributions to both research and practice. For researchers, we have applied a new theory in the realm of IT Service Management frameworks. We have proposed that the four integration mechanisms of knowledge, inside the KBV, may be influenced by IT Service Management frameworks. Using this theory, the research also sheds light on why companies implementing IT Service Management frameworks are able to realize benefits through their implementation. As well, it suggests that if upcoming IT frameworks are able to guide the organizational transformation of knowledge there is a reasonable possibility that the implementation of the framework will positively affect the organization. Contributions to practitioners include the understanding of the benefits deriving from transforming the organizational knowledge from tacit to explicit, as well as by the implementation of the "best practice".

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# 19. Appendix Nine

**ITIL State of the Nation: Survey Findings**

Research report sponsored by Hornbill, written with my help.

# State of the nation Survey findings

# September 2009

**A research report sponsored by Hornbill Systems**

**HORNBILL**

# Table of Contents

## ITIL v3 : is the reality v2.5?

**The Majority of ITSM implementations are still maturing their v2 processes before moving to v3. Those that have moved to v3 only use the most commonly adopted v2 processes and not a life-cycle approach.** *The reality is an adoption of ITIL v2.5*

### 1. Executive summary

ITIL v3 was officially launched just 2 years ago in June 2007 after a 3 year development period. Much has happened in the world during those 2 years, which has slowed every business down considerably, yet this first major US and UK survey highlights that in ITSM things are still moving well. With over 500 respondents and 80%+ in Executive and Senior management roles, we have a fair picture of what's happening.

Over 50% of those adopting ITIL have already implemented ITIL v2, but interestingly 30% of those have done so in the last 2 years, the same period that v3 was available to us all. Only 13% adopted ITIL v3 from scratch, however 31% are upgrading to v3 currently, making a total of 44% following v3 and 33% are still considering or planning to move within the next 2 years. Of the 55% already with ITIL v2, over 32% are sticking with v2 for now, but introducing some of the v3 concepts. This would indicate that many are still intending to continue to mature their v2 processes before upgrading to v3.

ITIL has been around for more than 20 years now and yet the survey reveals that 46% still admit to having a medium to low level of maturity, with only 31% in the high to very high levels. It was discovered that the more ITIL processes adopted, the more mature the IT services delivered, and the more the key goals and objectives were met.

It would appear that for those that have migrated to v3, it has simply been of the existing, or popular, v2 processes and not all the processes, making it appear, yet again, that "cherry picking" of the processes is still dominant. Although the service lifecycle approach is the top driver for upgrading to v3, it transpires that this is not being implemented or achieved.

If they had the chance all over again to implement, the majority would have a greater focus on the people elements. By improving Attitude, Behaviour and Culture, people have a better overall understanding of the aims and can ensure that processes are adopted to meet the chief objectives of improved service quality and customer satisfaction.

"The survey shows that 13% of Service Management departments have implemented ITIL v3 from scratch. Whilst this appears to be a low number, taken within the context that it's within 2 years of v3 being launched, and most would take 6-12 months to read, train and prepare a plan for implementation, this shows a real determination to implement v3. The survey also highlights that we need to focus on educating the staff, ensuring our tools are ITIL compatible, and verifying our implementations to avoid half baked solutions and remaining in the silos of cherry picked processes. A life-cycle approach to managing Service Management is the way forward and the tide appears to be changing." *Malcolm Fry – Industry luminary*

"This research illustrates the reality of ITIL adoption. Two years after the introduction of ITIL v3, to see that its adoption is international but piecemeal rather than following the aim of the service lifecycle, is unsurprising yet still unfortunate. The value of service management and delivery should be good for industrial recovery & growth and yet corporate culture and people are still major hurdles - often tackled, but seldom overcome. Once again, we see that IT and the business are still in need of better alignment."
*Lisa Erickson-Harris, Research Director, Enterprise Management Associates (EMA)*

## 2. Background & Demographics

June 2009 marked the 2nd anniversary of the launch to the IT Service Management marketplace of ITIL v3. Much has been said and written about this latest release, but until now there has been no real evidence or research as to how the market reacted in terms of adoption. Hornbill, an IT Service Management software vendor, approached Ken Turbitt of SMCG and set about preparing a questionnaire to be promoted by Hornbill, *it*SMF, SDI, Pink Elephant and ITP Report online. Mauricio Marrone of the University of Göttingen contributed to statistical data analysis and findings. We wish to thank EMA and Malcolm Fry for their comments.

The main purpose of the survey was to determine how wide, or not, the adoption of ITIL v3 was within the marketplace, and what the main drivers were for this. To establish the current baseline, the survey included questions about ITIL maturity levels, process adoption and benefits realization.
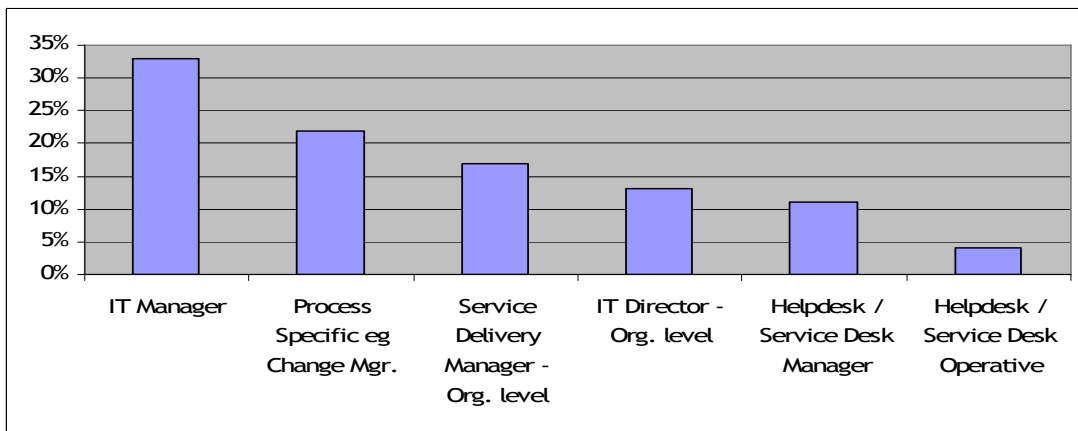


The survey was live for 2 months and captured just over 500 respondents, mostly in the UK (50%) and USA (38%). The majority of the respondents were from Management (96%), with the most senior, IT Directors/CIOs representing 13%.
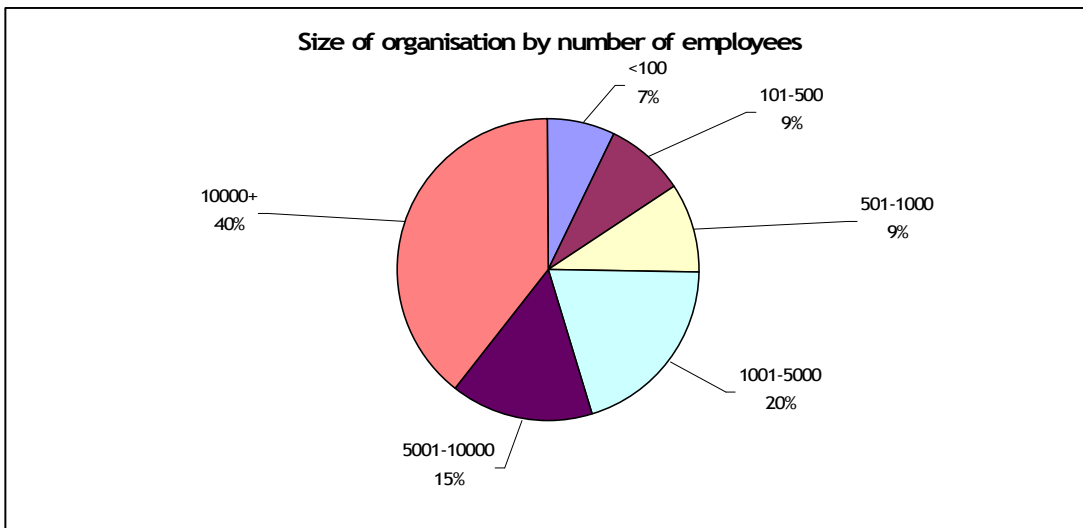


The size of organization was a wide mix, with 16% having fewer than 500 employees and 40% from organizations of 10,000 employees or more.

**Top sectors by country**
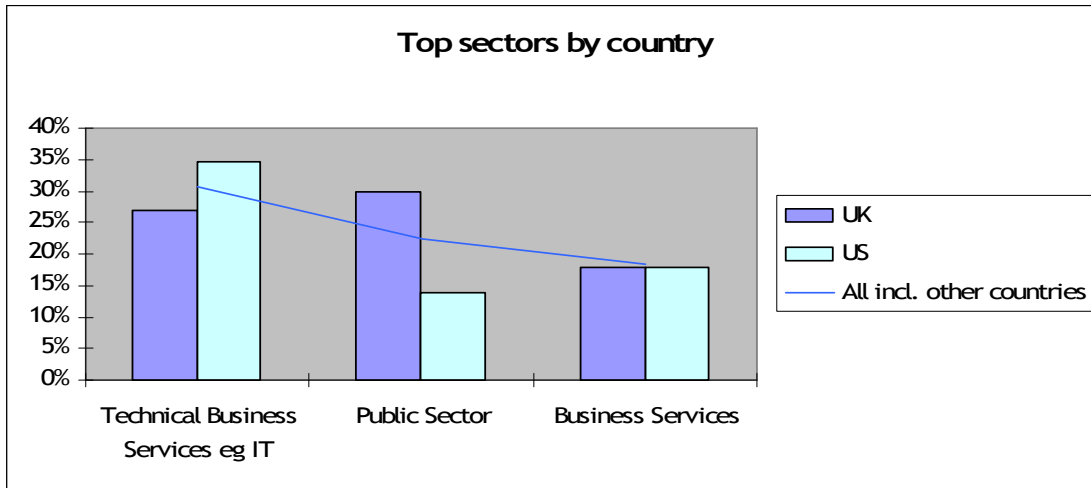
The Top three sectors represented within the survey were Technical Business Services (eg IT), Public Sector and Business Services (eg Finance). The respondents' sector spread would indicate that within the UK market the IT and public sector markets have adopted ITIL more than any other, with IT and other business services leading the way in the US.

## 3.    Overall findings for ITIL v2 and v3 implementations



**Which version of ITIL is being used?**
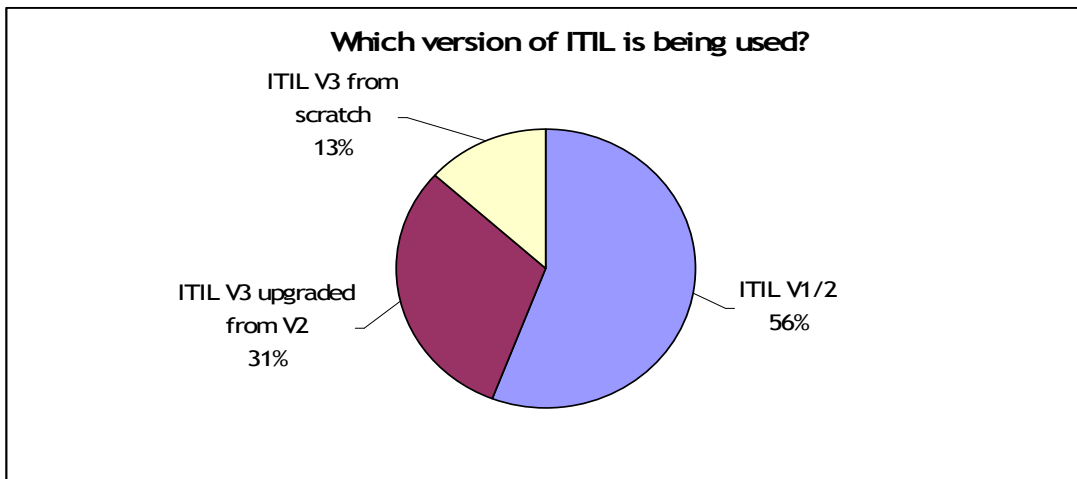
Of all the respondents using the ITIL framework, 56% are using v2, with 44% using v3. 13% have adopted v3 from scratch and 31% have 'upgraded' from v2. However, as we'll see later in the report, it is mainly the most commonly adopted v2 processes that have been upgraded.

**Maturity: which statement best describes your organisation?**

Very high level maturity; processes backed by metrics and continually improved 12%

New to ITIL, just started or in planning 13%

Reasonably high level maturity; processes documented, understood & monitored for compliance 20%

Medium level maturity; processes standardised, documented, understood 24%

Relatively low level of maturity; some processes, errors likely 31%
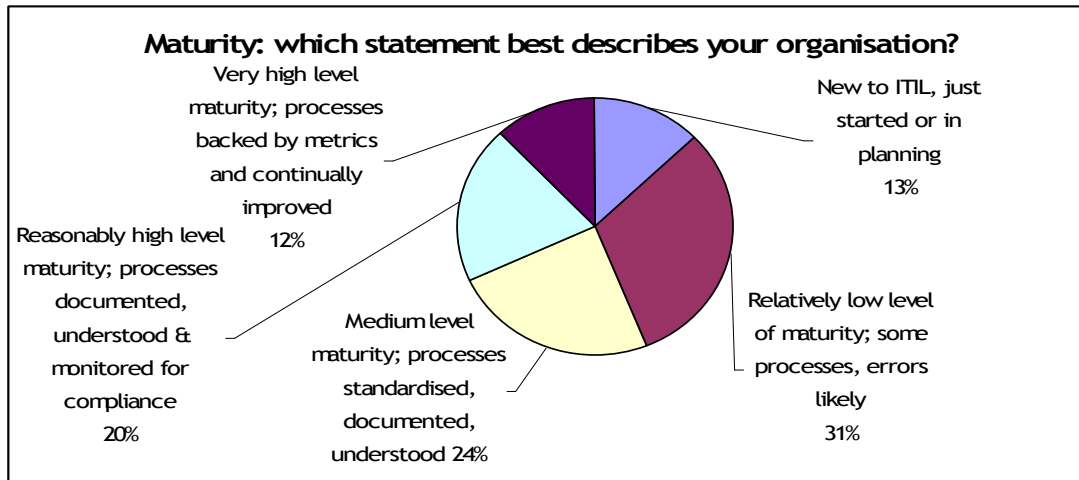
Only 32% of the respondents with ITIL claim to have a high level of ITIL (v2 or v3) maturity. 55% have medium to low maturity and 13% in this category are new to ITIL and just at the planning or implementing phase.

Drivers for ITIL Adoption – Service Quality and Customer Satisfaction

Businesses of today are almost totally dependent upon IT to survive, so the quality of service provided to the business client and end customer needs to be of paramount importance, especially in the current competitive market.

The top 5 reasons for adopting ITIL in the first place remain mostly as they have always been:

**Benefits of ITIL (pick 5)**

| Improving Service quality | Increasing customer satisfaction | Adopting a common IT process methodology | Improving interaction of IT with the rest of the business | Reducing downtime |
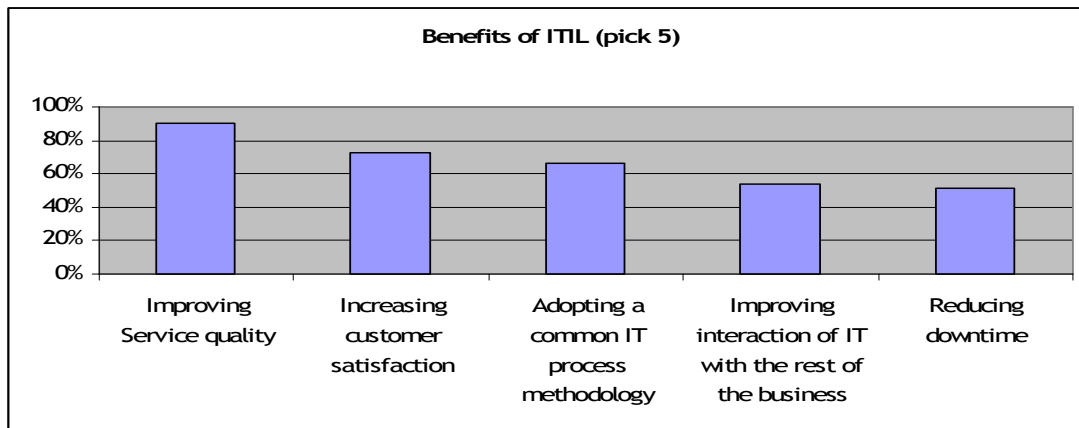
IT has traditionally focussed most of its efforts on implementing back office processes such as change management or CMDB and the value is not often directly visible to the customer. To realize the top drivers, IT needs to focus on its "shop window", the service desk. By ensuring that service desk staff understand the customer and can react according to business priority, IT can improve its perception, visibility and value within the business. Improving service quality leads to improved customer satisfaction and we can easily see how one impacts the other. ITIL is important in establishing stability and successfully delivering Business services that fulfill the clients' needs and demands. However we need to remember that our clients, the end users, need to be the focus of our attention throughout all process implementations and improvements. Customers' satisfaction and

their perception of service quality can be tackled head on, rather than working piecemeal at the processes and hoping that perception of service will eventually improve.

So what appears to be stopping us adopting a more mature ITIL and securing the benefits we all know we want?

Barriers to ITIL Adoption

**Barriers to ITIL adoption**
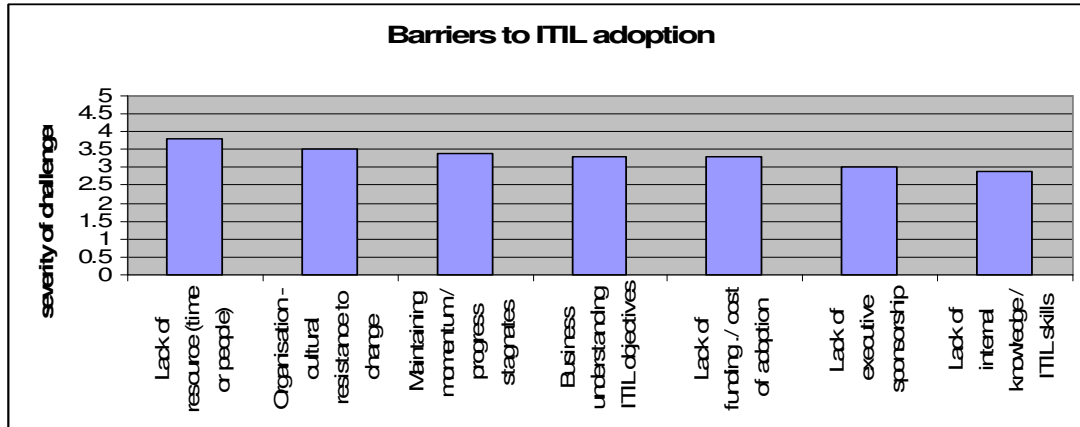


Interestingly the top result here was a "Lack of resource (time or people)" with "Organization – cultural resistance to change" being the 2nd most challenging element. In third place was "maintain momentum/progress stagnates". This tells us quite clearly, that it's not a lack of knowledge of the processes, it can't be blamed on the applications; the core is the PEOPLE element. For ITIL to succeed, we need the right people, with the right skills, and the right quantity to carry out the implementation and on-going tasks involved in implementing the processes.  Of equal importance is ensuring we implement Continual Service Improvement plans to keep on track and obtain the benefits we all know are attainable and sought by the business.

IT is finally on board

**Is IT represented on the board?**



No, 30%

Yes, 70%
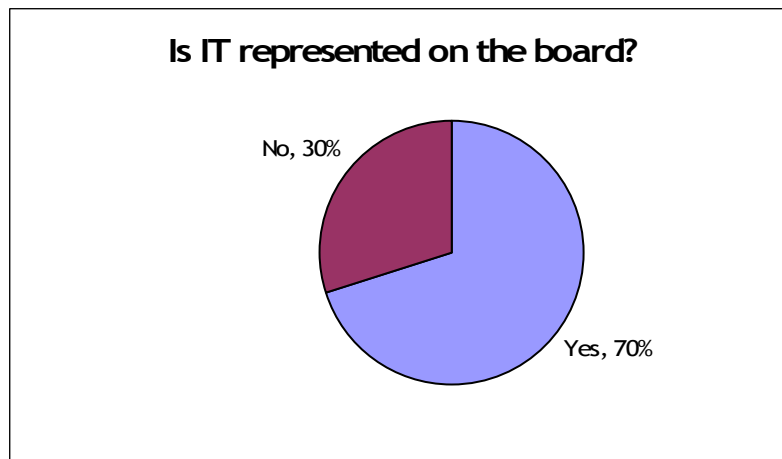
70% of organizations surveyed have IT board representation which is excellent news, as we are all aware that major initiatives, like adopting the ITIL framework, need senior level sponsorship and indeed support across all the main board functions. This is also a validation that IT is now considered essential to the business and worthy of direct board representation, rather than under the role of Finance or Operations Directors, to help drive strategy and the business forward.

## How frequently do IT and the business meet?
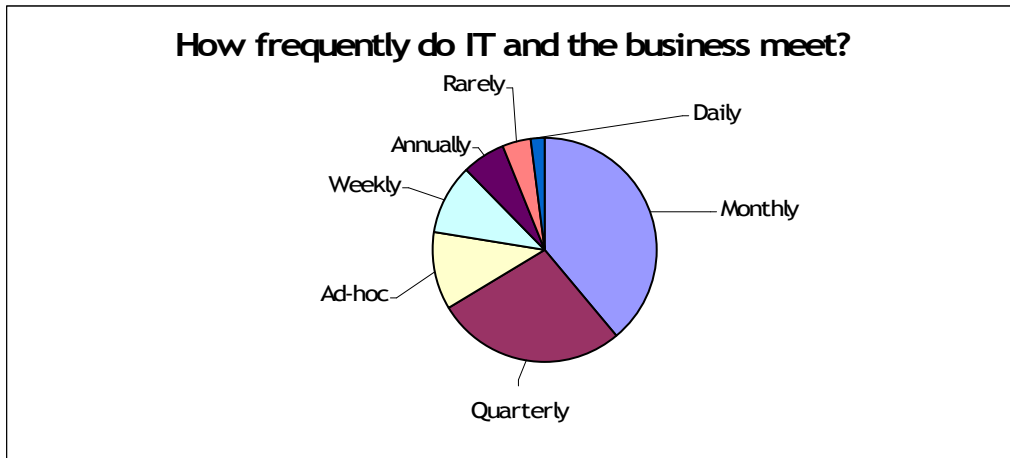


IT and the business hold planning meetings every day, week or month (50%), with the remainder meeting quarterly, or even less frequently. Those in the latter category are at grave risk of either being out of tune with the business needs and drivers, or delivering irrelevant services at the wrong time, making IT a likely victim of outsourcing.

All too often we hear of websites down, or the failure to deliver goods as a direct result of the IT/Business disconnect. The proof point is highlighted within the report. Respondents were asked to agree or disagree whether the output from IT and Business planning meetings were sufficient to enable IT to achieve its objectives.

## Do you believe that IT & Business Planning in your Organisation
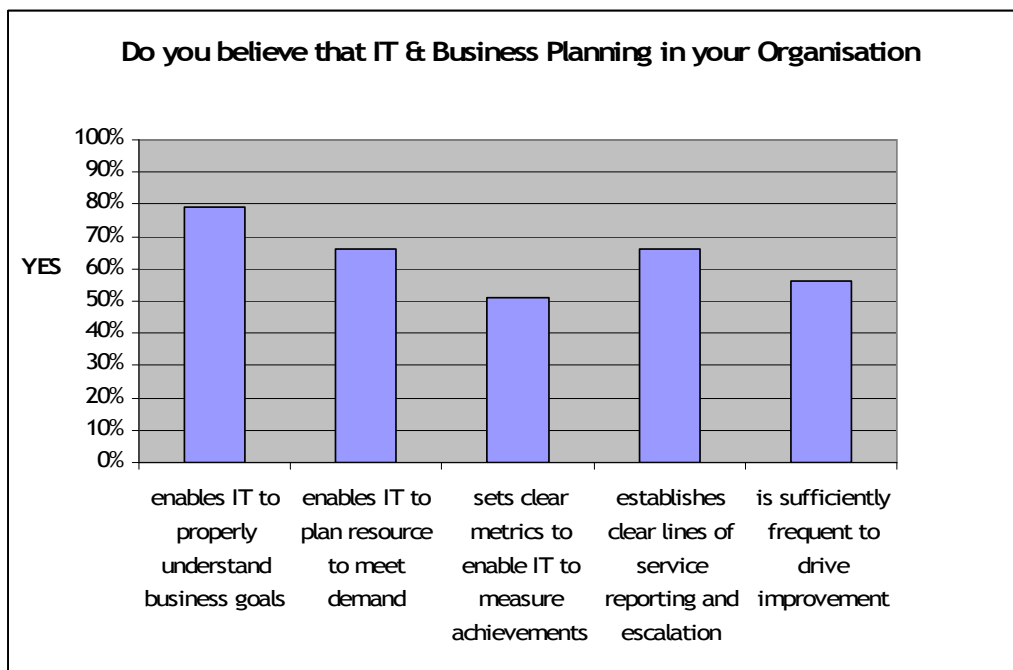


Although most (78%) agree that planning enables IT to understand business goals, it would appear that many (35%) struggle with planning resource to meet demand. A notable point of failure for IT lies in its measurement; only 51% believe they have clear metrics set to enable IT to measure achievements. "If you can't measure it, you can't manage it", comes to mind here!

IT/Business integration



**How would business execs describe relationship between IT and business?**

IT is somewhat reactive, with little focus on improving business use of technology
15%

IT is a law unto itself and the business has little knowledge of what it does
3%

IT is a strategic partner, measured in terms of its contribution to the business
23%

IT has a firm grasp of technology and works to deliver a stable infrastructure
18%

IT is an excellent business partner and always delivers appropriate levels of service
9%

IT is a competent business partner, ensuring critical services are available when needed
32%

The good news is that only 3% believe that IT is a law unto itself.  The other respondents are split fairly evenly, with a third indicating that their focus is more on the technology. Just under a third believe they have a competent business partnership, delivering critical services when needed. The remaining third classed themselves as excellent, or a strategic partner within the business. This infers that in many organizations, IT is still seen as a part of the business infrastructure and not as a business strategy enabler.

Over 54% do not charge the business for the delivery of IT, in fact 51% do not even track the cost of providing services; it is seen as an infrastructure overhead. Even those that do charge for the IT services, the majority (31%), allocate a cost per user for each service, or divide the costs evenly across all employees and departments (24%). This reflects the earlier findings that IT does not yet have metrics or designs in place to measure the services and therefore the costs versus value per service provided.

![HORNBILL logo]

### 4. ITIL v2 Findings – Mature and progress

Almost half (49%) of the total respondents have adopted ITIL v2, interestingly with almost 30% within the last 2 years, after v3 was released to the market. The majority of these (46%) adopted ITIL V2 between 2-5 years ago. Now it's a sweeping statement to say you have implemented ITIL v2, so digging a little deeper we see that the majority of adopters (65%) have implemented the Service Support processes and only 35% have implemented Service Delivery processes.
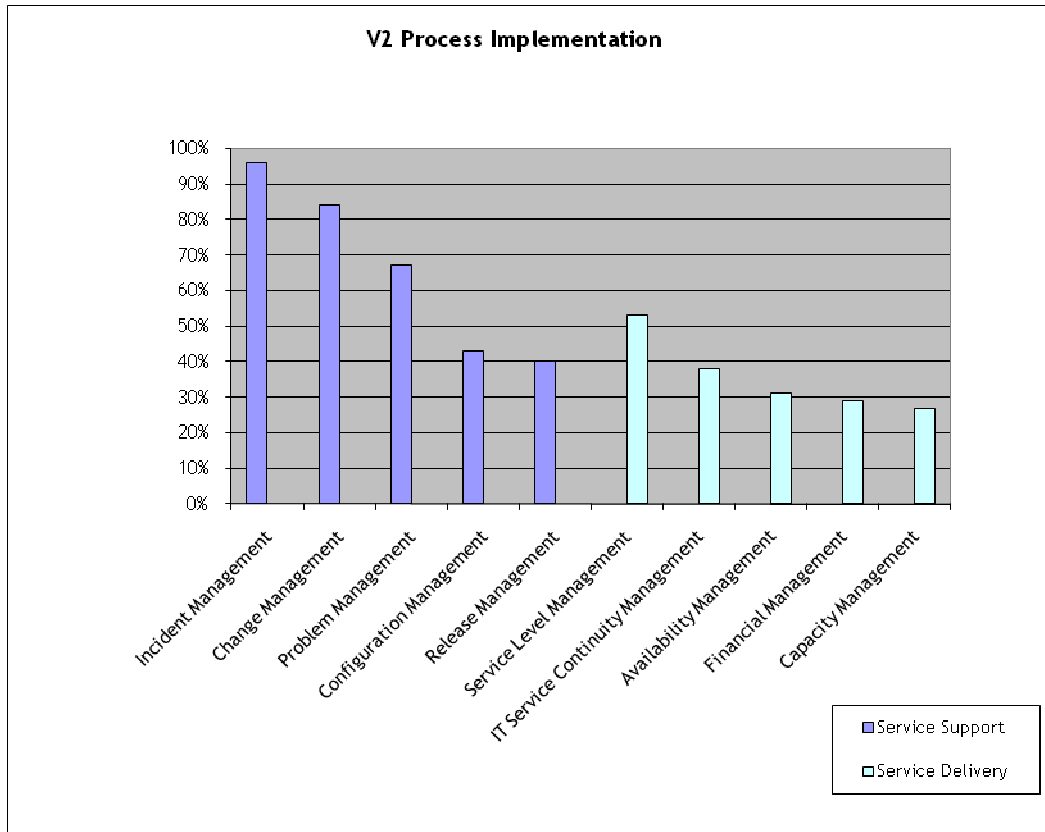


As expected, the most commonly adopted process is Incident management (96%), closely followed by Change management (84%), then Problem management (67%). Of the remaining Service Support processes, only 43% have implemented Configuration Management and 40% Release management.

Interestingly of the processes implemented the most mature appears to be Change Management. Change is recognized as being the best process to reduce unplanned outages of business services and therefore prevent loss of profit and erosion of margins. Change is also key for the recent focus many businesses have on Compliance and in particular legislations like SoX in the US. Next comes Incident and Release Management, followed by Finance and IT Service Continuity. Again this indicates that more resources and time needs to be spent on maturing Service Level, Problem and Availability Management if you want to continue and meet the benefit objectives of ITIL listed earlier (Improved quality and better Customer satisfaction).

**Have you considered upgrading from ITIL v2 to v3?**
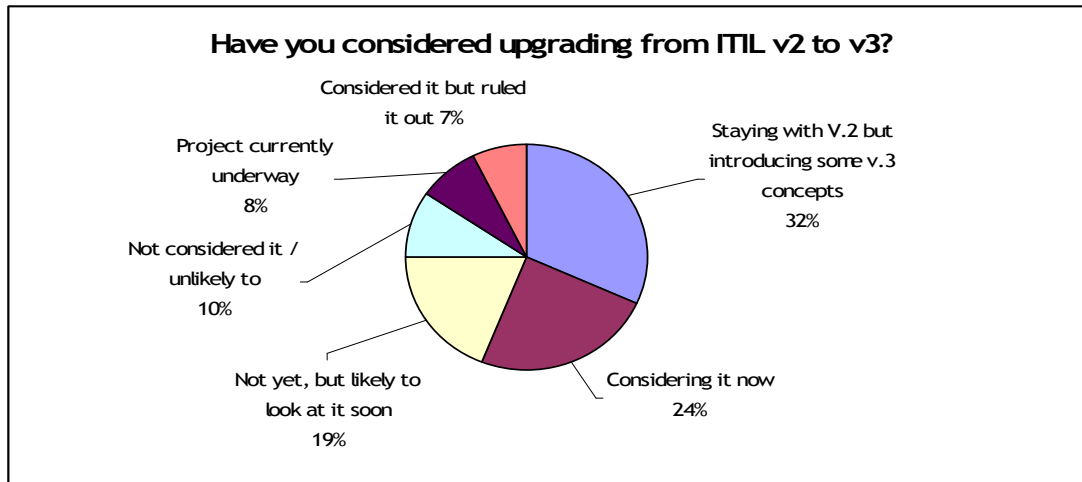


Of those with ITIL v2, 17% are unlikely to consider moving to v3, or have already ruled it out.  19% have not yet considered v3, but are likely to soon. 24% are considering upgrading and a further 8% already have a project underway.  32% are sticking with V2 for now, but introducing some of the v3 concepts.  However, it is good to see that there are plans within the next 12 months to implement Configuration Management (36%) and Release Management (34%). It would appear to suggest that many intend to continue to implement v2 and certainly to mature with v2 before considering V3.

Of those considering v3, 63% intend to do so within 2 years, and 17% within 12 months. This again highlights that many are committed to maturing their existing V2 processes before moving onto v3, and it also highlights that considerable planning is required for the migration.

So of those sticking with v2, what are the main reasons for not moving? 52% are still getting to grips with implementing and maturing v2.  Many (25%) think v3 is just too much for their current requirements, v2 is sufficient. Over 24% just cannot justify the added value to the business, perhaps this is because many are still not reaping the benefits of v2 whilst in their immature state.

**5. ITIL v3 Findings - Still cherry picking**

**Main drivers to adopting ITIL v3 over v2
(multiples selected per respondent)**
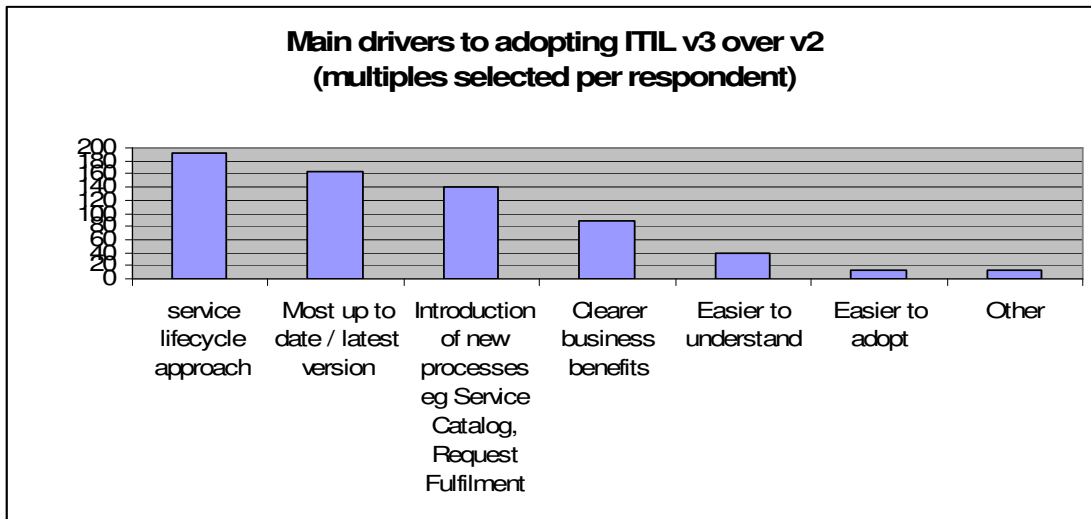
The good news for ITIL v3 is that 44% of ITIL adopters are either adopting v3 from scratch, or as a continual service improvement from v2. The Service Lifecycle approach in v3 appears to appeal most and was the most selected driver for adoption. Interestingly, many simply want to be up to date, ensuring their organization is in line with the latest version and ready to take advantage of the new processes within v3, such as Request Fulfillment, Service Catalog and Event Management.

So what are most popular v3 processes to date?:

**ITIL v.3 implementation by region**
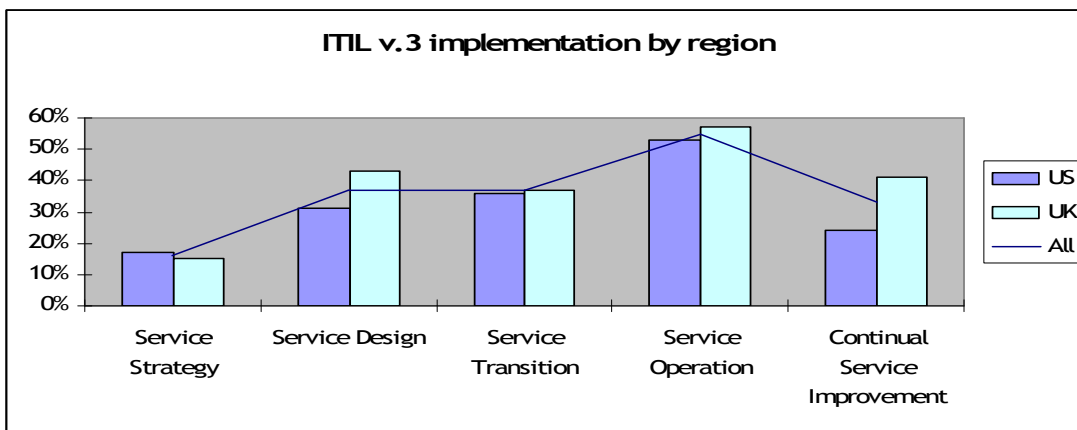
The research highlights that v3 adoption is not being carried out using a Life-cycle approach, but more of a siloed process approach, even though the top driver for adoption is the Service Lifecycle. Service Strategy is the least adopted and implementation of the processes within this life-cycle phase are low overall.

The UK is only marginally ahead of the US across most of the life-cycle phases, with the notable exception of Continual Service Improvement. Given that the UK market was exposed to ITIL much earlier than the US, this is no great surprise.

**Most popular V3 processes**

| Service Strategy | Service Design | Service Transition | Service Operations | Continual Service Improvement |
|---|---|---|---|---|
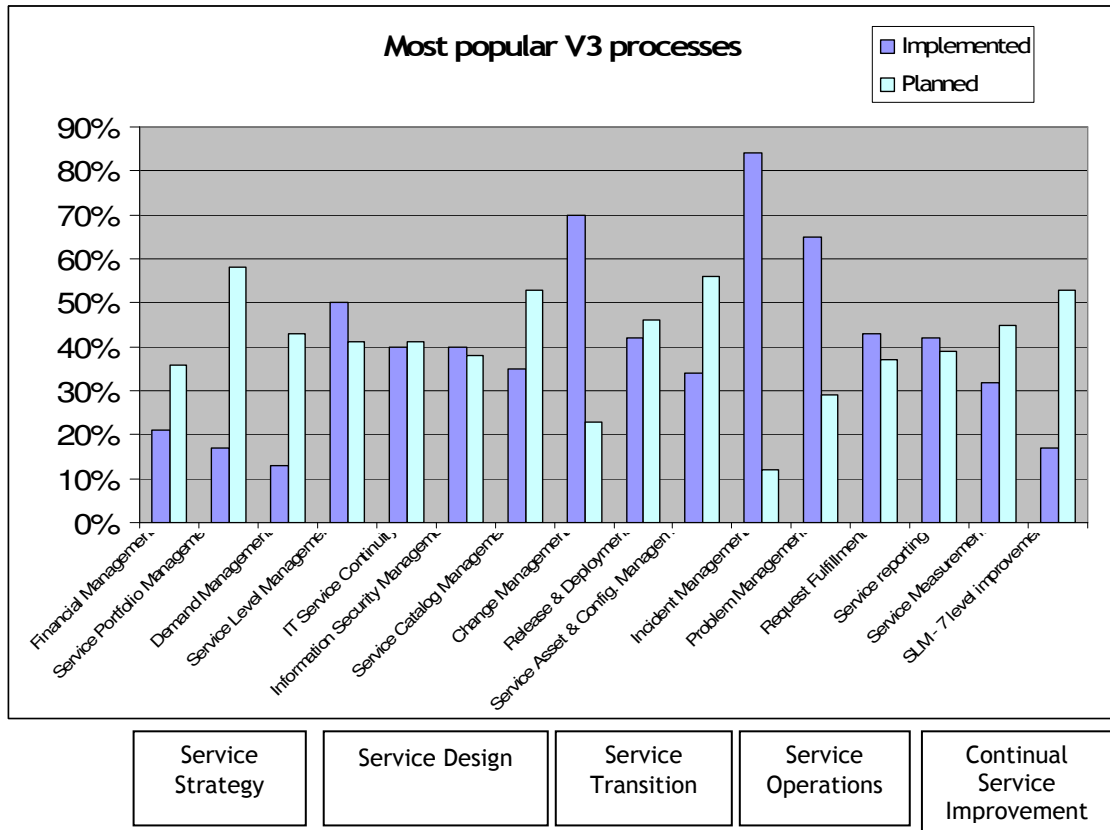
The research indicates that the most commonly adopted and mature v2 processes are updated to comply with v3 first. This is probably because it is easier to upgrade an existing mature process, than to revisit all the processes from a Business Service perspective and design the improvement from that standpoint.

We also know that the changes made to Incident and Problem management within v3 were minimal and therefore very easy to "upgrade" them. The ones with some major improvements, like Change, Release & Deployment and Request Fulfillment are at least in the top processes being implemented today.

The more strategic processes are still being planned in and, as expected, could not be implemented overnight in any case. However, the warning signs are there, that we may end up, like v2, with people just "cherry picking" favorite quick win processes, as opposed to meeting the strategic objectives of implementing a life-cycle approach to services. If that happens, then the v3 refresh approach will have been ignored and simply used to validate, or upgrade existing processes.

## 6. Deployment findings

The majority believe they have the skills necessary to implement Service Operations and Service Transition, which is hardly surprising considering these two books hold most of the content of ITIL v2 within.

The survey highlighted that training and new skills are required within their teams to enable them to start understanding and then working on the contents of Service Strategy and Service Design. This may explain why so many found these books difficult to understand and implement (see section 8 below). Whilst this leaves lots of opportunities for training organizations and consultancies, the issue remains that many are simply upgrading their existing processes to v3's recommendations and not taking a new strategic look at how they deliver services to the business.

IT has traditionally followed the 80/20 rule, with most of its resources focused on simply 'keeping the lights on' and little effort expended on innovation, working on new ways to enhance the business, perhaps into new markets, initiatives and client bases. When this occurs some major paradigm shifts take place, after all it was IT who "invented" the ATMs we all take for granted. Amazon and eBay, with E-banking and on-line shopping have revolutionized the way we enagage and do business, and all from IT focusing more on the Business enablers and less on business as usual.  The most worrying element is that they are not designing the V3 process upgrades into their services, but simply upgrading as one would an application, simply to be at the latest revision, without exploiting all the benefits the new version brings - taking a life-cycle strategic view.

<div align="center">We are still bad at measuring and metrics.</div>

One of the good news elements within the survey is highlighting that the old barriers between IT and the Business are beginning to be broken down. The survey highlighted that the majority (43%) believe Business and IT planning and communication is sufficient to enable implementation and ongoing management of the ITIL processes.  However, still over a third (35%) do not believe there is enough planning and communication between them, so plenty of room for improvement in the years ahead.  One reason for this could be because most (40%) do not believe they have the ability currently to define, capture and report on Service Quality. Since improving service quality is one of the main drivers for investing in ITIL, we need to have ways of proving how good or bad service quality currently is, and then monitor alterations over time, highlighting which processes are adding most value. Without this ability, communications within IT and between the business will be difficult if not strained. This area needs serious attention to ensure investments are made in the most appropriate areas to meet the main goals of improving Service quality.

**Have you implemented a Service Catalog?**
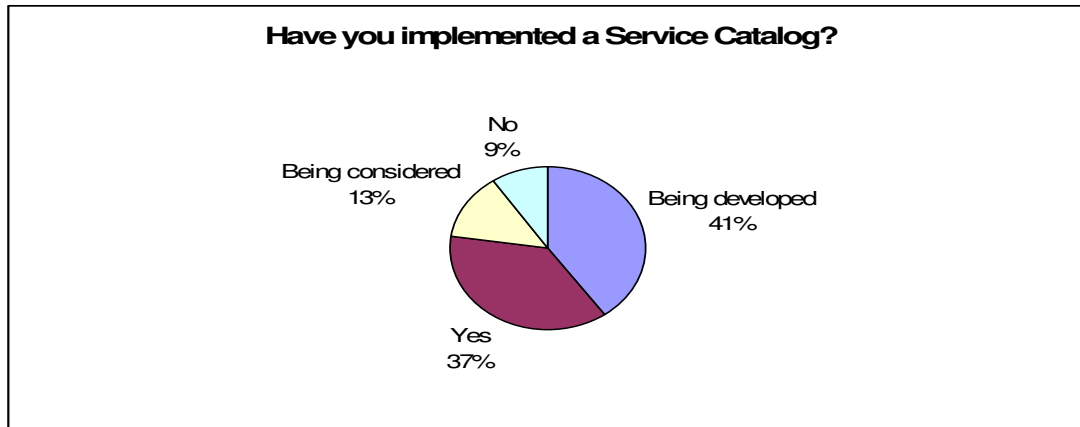


Looking at some of the key v3 processes which will aid the lifecycle approach to services we see that 37% have already implemented a Service Catalog and 41% are developing one currently.

In the majority of these cases (50%), IT owns the service catalog with the Service Delivery/Service Level manager being the close runner up at 41%. Only 7% declare that the Business owns this catalog, which is perhaps not that surprising, as according to V3 the business would own the Service Portfolio, and the appropriate service owners owning their part of the Service Catalog, a sub-set of the Portfolio. However, with only 17% of adopters implementing Service Portfolio Management and 58% still planning, there appears to be much work to do in this area.

We all know that understanding the services, defining them and capturing them into the Service Catalog is not an easy task. Defining these services jointly between IT and the business is the most common method (50%), but a close 2$^{nd}$ is IT defining the services in isolation (35%) and just 12% being defined by the business. We need to, again, work more collaboratively with the business and ensure we agree, define and document them together. This way both parties understand the impact and benefit of those services and can determine the resources required to support the business appropriately. It's a balance between what is requested and what can be delivered with the current constraints of funding, infrastructure and technology implemented. If both the Business and IT are aware at the outset, realistic expectations can be both set and met.

Whilst designing their service, the survey highlighted that, the majority (85%) mapped out their IT services focusing on IT service continuity for critical services (72%) and differentiated between business services and IT services (69%).

One of the other key areas focused on was the implementation of a Configuration Management System (CMS) or Database (CMDB). Whilst it is understood that the concept of the CMS is new and may consist of several CMDBs federated to other core data sources, the two were combined for the purpose of the survey.

## Do you have a CMS or CMDB?
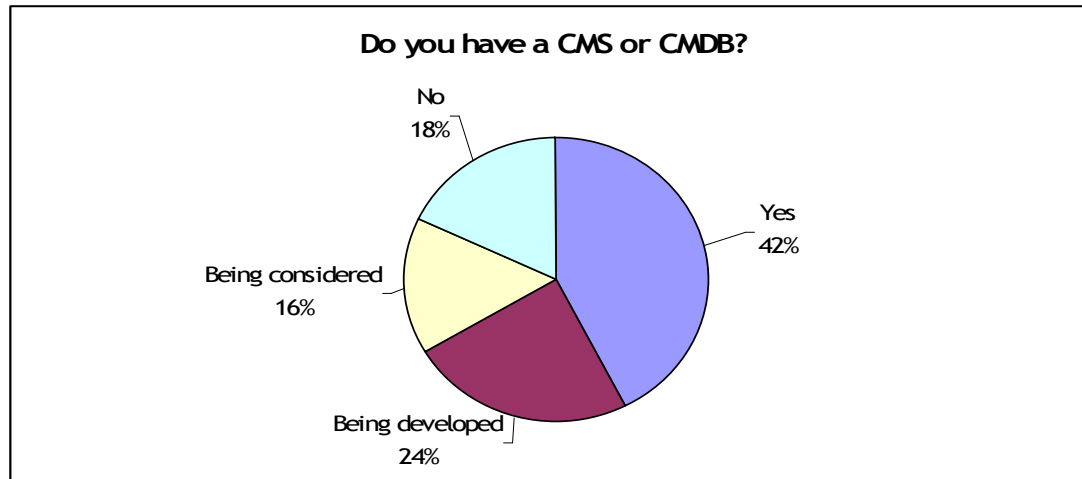


The survey highlighted that 42% have already implemented a CMS or CMDB and that almost a quarter (24%) are developing one currently. However it is interesting that 18% have not, or, are not currently considering this. Of those that have implemented, the majority have the relationship between CIs (78%) and the dependencies between IT services and the CIs (64%).

It should be noted that over one third do not consistently update through Change and Release Management, with 43% stating that their CMDB is not accurate. As the CMDB should be the trusted source of reference for IT to understand who it delivers services to, so we need to ensure that we have all the relationships and dependencies recorded, with regular updates and auditing to ensure it remains accurate and dependable. To facilitate this many, 55%, already have federation to other trusted sources, a trend we can see continuing over the next few years.

## 7. Realizing the benefits

**Having implemented ITIL, which benefits have you realised?**
**(select multiple)**
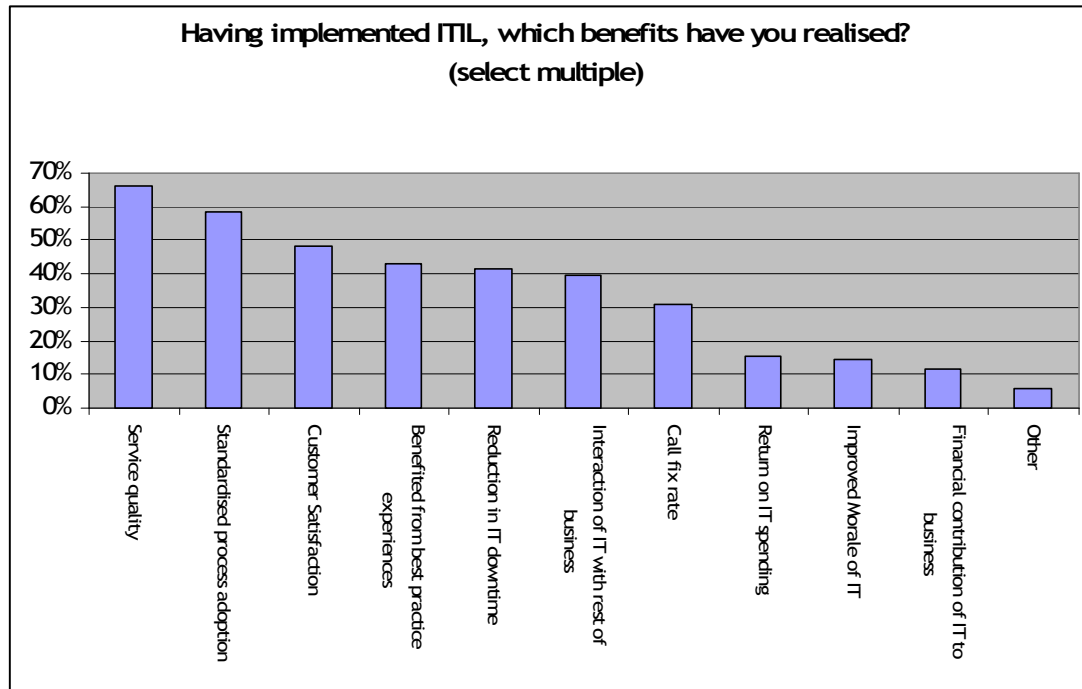


For those that have already implemented ITIL (v2 or v3) the top benefit realization was in direct correlation to the drivers. 66% of ITIL adopters saw an improvement in Service quality, 58% benefited from introducing standardized process and 48% saw improved customer satisfaction. These were closely followed by a reduction in IT downtime and benefitting from best practice experience of others.

Whilst this proves that ITIL has achieved the benefits of the main objectives sought, without the current ability to design and measure quality and satisfaction we cannot inform the business of the exact improvements, nor can we identify the key areas where most improvement was appreciated. Moving forward, we need to start working on metrics. The majority note changes to the processes and services being used and delivered, but few have metrics in place to back up and report on the results. The top 2 areas that have some focus are reported as being ensuring the standardization of process across all of IT (58%), and the call/fix rate (42%).

## 8.   Interesting Findings

The Books.

**V3 books are easy to digest / concepts easy to implement**
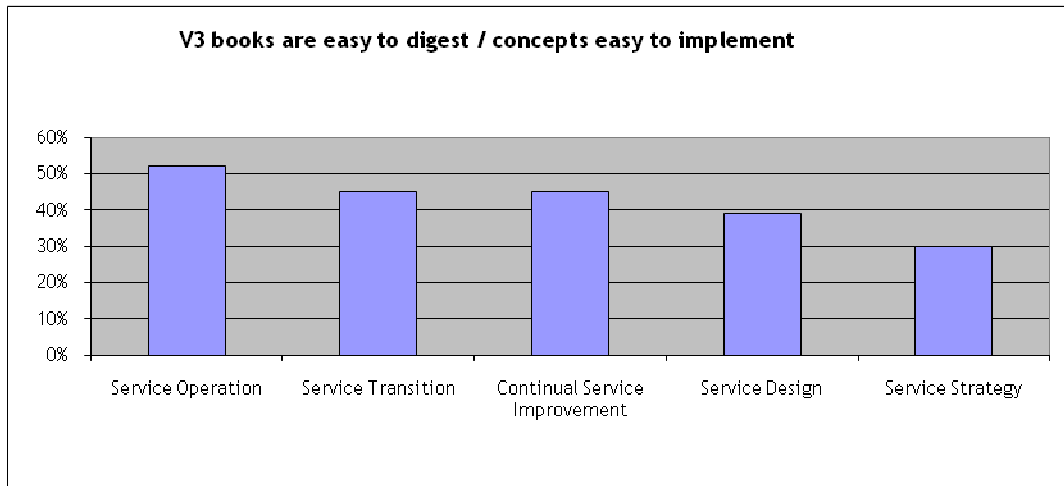
When ITIL v3 was launched, the new life-cycle approach was widely applauded as one of its most notable improvements.  However there was much criticism about the new Service Strategy book, with many declaring that it was too theoretical for practitioners, and was more suited to helping the business to understand what ITSM is all about. This was not the authors' intention; this book was put in place so that IT and the Business can work on a collaborative cohesive strategy from which they can start to design the services to underpin that strategy.

The findings within this survey indicate that Service Operations (52%), Service Transition (45%) and CSI (45) are easier to digest and contain concepts that are easy to implement, with Service Design (40%) and Service Strategy (30%) being the least easy. This probably explains why so many are implementing elements from the V3 Service Transition and Service Operations books and ignoring the life-cycle approach. People appear to simply be upgrading existing processes and aligning with the newly documented process additions.

54% believe that they will have implemented most, or all of the processes within each lifecycle process by 2014. So within 5 years the world should be a much better place in terms of IT quality and customer satisfaction, with ITSM improving business performance. Considering ITIL has been around for 20 years and has been widely adopted for 10 years, yet, most organizations have still not implemented all of ITIL v2, it is therefore interesting that the majority expect to have fully implemented V3 within 5 years.  Let's hope it's not wishful thinking, but that it becomes reality.

What would you do differently?

Hindsight is a great thing, if only we had it up-front, we'd all be better off! So the survey asked respondents what they would do differently, given the chance to implement ITIL all over again. Actually many do get the chance all over again as people move from company to company, however, as always the top answers fell into the categories of Communication and Education.

The majority (48%) would spend more time helping the business to understand the ITIL objectives and put much more effort into obtaining executive sponsorship, which should now be easier, considering the majority have an IT Director at board level. The culture

issue was third, with many underestimating the impact and resistance many people have towards change.

So what worked really well during the ITIL adoption that others could learn from and repeat? Educating key staff early in the project was top of the list, closely followed by enablers of this: running workshops with other departments and attending seminars and educational events. These go hand in hand with getting advice from colleagues & peers and working with a consulting organization.

The survey asked "what was the major influence in the selection of an ITIL tool?". The top answer was cost, followed by the ease of customization and use.

The majority were only somewhat satisfied with their current tool in production (43%) and over 20% dissatisfied or very dissatisfied with their current tool. The main reason for this dissatisfaction appears to be a lack of product functionality and difficulty in upgrades (55%), with many stating their organizations inability to make best use of the tool (24%).

## 9. Summary

Overall the findings were very interesting, showing a **13% adoption of ITIL v3 from 'scratch', another 31% upgrading from v2. It was perhaps surprising that 30% of those adopting ITIL chose to adopt v2 in the 2 years after v3 was published**; however, the maturity level in both v2 and v3 still leaves lots of room for improvement.

Adoption of ITIL v3 has largely mirrored the adoption of v2; contrary to its planned 'lifecycle' pattern, v3 adoption has been primarily led by the common processes of *Incident, Change, Problem and Service Level Management*. It could be said in conclusion that the current status, 2 years on of ITIL v3, that the majority are still adopting the common v2 processes, but with a v3 coat on – possibly ITIL v2.5 may be a more appropriate label.

One aspect of v3 that has certainly given IT food for thought is its orientation towards business services, moving IT away from a pure technology focus. What is now becoming apparent is the need to focus on People, for they are the enablers of process. The main drivers for implementing ITIL (v2 or v3) are the same; improve service quality and increase customer satisfaction. Process can only take you so far. It is people that make the difference between poor and excellent service. The service desk is IT's shop window and by ensuring that it is manned by the right staff, with the right attitude and the right tools, IT can tackle service quality and customer satisfaction head on, instead of expecting processes alone to make a difference.

The challenge for IT remains to demonstrate some quick wins to secure business attention, then forge ahead with the more strategic aspects of v3, complete the service lifecycle and show the world the true benefits of ITIL.

## Appendix

### About ITIL

ITIL is Best Practice IT Service Management which is used by many hundreds of organizations around the world. A whole ITIL philosophy has grown up around the guidance contained within the ITIL books and the supporting certification and qualification scheme.

The ethos behind the development of ITIL is the recognition that organizations are becoming increasingly dependent on IT in order to satisfy their corporate aims and meet their business needs. This leads to an increased requirement for reliable, high-quality IT services.

ITIL provides the foundation for quality IT Service Management through documented, proven processes that cover the entire Service Lifecycle. It is easy for organizations to learn, tailor and implement to suit their environment.

The widespread adoption of the ITIL guidance has encouraged organizations worldwide, both commercial and non-proprietary, to develop supporting products as part of a shared 'ITIL Philosophy'. The ITIL publications and supporting schemes are kept up to date with current best practice and changes within the marketplace through a regular review cycle to update content in collaboration with a wide range of international users and stakeholders in the IT service management community. ITIL Version 3 was formally released on 5<sup>th</sup> June 2007.

ITIL is aligned with various international quality standards including international standard ISO/IEC 20000 (IT Service Management Code of Practice).

### About OGC

ITIL was originally developed by the UK government organization CCTA (Central Computer and Telecommunications Agency) which in 2000 was merged into the Office of Government Commerce (OGC) an office of HM Treasury.

OGC are the owners of several best practice products and are committed to maintaining and improving the guidance, working with organizations internationally to develop and share business and practitioner guidance within a world-class best practice framework.

OGC have now established collaborative partnerships with two organizations to provide support for their ITIL portfolio. As the Official Accreditor APM Group provides accreditation services related to training, registration and the examination scheme. The Stationery Office (TSO) is the official publisher of all official ITIL library books. For further information on TSO please visit their website at www.tso.co.uk

OGC retain the rights to all IPR (copyright and trade marks) relating to ITIL though permits APM Group to use this within certain contexts on the ITIL work. Their predominant role in the official scheme is one of ownership and stewardship of the ITIL library content and qualifications. APM Group chair the Qualifications Board (the steering committee made up of representatives from the community who make decisions about qualification policy) and ensure decisions made are to the benefit of both ITIL and users alike. OGC are responsible for initiating the consultation and update process to the official publications library, though they may outsource the management of this project to TSO.

To find out more about the ITIL Qualification Scheme please visit the official ITIL website, where you are also able to download the appropriate scheme brochure. http://www.itil-officialsite.com

### About Hornbill

Service Management software from Hornbill enables organisations to provide excellent customer service while benefiting from the economies of consolidation on a single technology platform. Supportworks' service desk templates are designed for rapid deployment within any employee or customer support environment, including ITIL-compatible IT Service Management, IT Helpdesk, Customer Service, HR and Facilities Management with the flexibility to build additional desks at minimal extra cost.

Hornbill's customers experience the shortest possible time to value, with many achieving full ROI within 12 months or less. Our clients achieve more with existing resources, increasing operational efficiency by as much as 50%. Using the 'Human Touch' within Supportworks, service desks increase service quality, improve communication with the business, and achieve higher customer satisfaction ratings.

Hornbill's software supports thousands of commercial and governmental sites worldwide. Hornbill Systems was founded in the UK in 1995 and has US offices in Dallas and New York. Hornbill has earned many industry accolades including; Service Desk Institute "IT Service and Support Technology Supplier of the Year" for 2008, "Best Business use of Support Technology" with Sharp Electronics and "Support Excellence Award for Smaller Helpdesks" with Camelot in 2005. High profile customers include Atos Origin (Athens Olympics 2004, Torino Winter Olympics 2006 and Beijing Olympics 2008), Buckinghamshire Hospitals NHS Trust, London Borough of Waltham Forest, Greggs, London Metropolitan University, RSPB, Chubb Insurance, House of Fraser, Halfords, The National Archives, and Camelot.

**For more information about Hornbill's solutions please visit http://www.hornbill.com**

**About Service Management Consultancy (SMCG) Ltd**

SMCG is a joint venture with AGI and was founded to cater for the need in IT and the Business market for an independent consultancy that understands both the Business and IT elements within an organisation, and help them understand these services and improve upon them. SMCG is the first company to be awarded a license from APM group on behalf of the OGC to carry out ITIL assessments of vendors solutions. The assessment cover the Application, User documentation and Process models, and if shown to be compliant to ITIL the vendor will be awarded an OGC approved Trademark "ITIL Process Compliant".

AGI is a global leader in ITSM consultancy and professional services. AGI's thought leaders are renowned in the industry. AGI publishes thought leadership in ITSM around the world and its President is the recipient of the 2008 Lifetime Achievement Award for IT Service Management. For more information about AGI's services, visit www.aspect360.net or contact us at info@aspect360.net.

For more information please register with SMCG at www.smcgltd.com

**About Mauricio Marrone**

Mauricio Marrone is a PhD candidate in Information Management at the University of Göttingen in Germany. The topic of his research is on IT Best Practices and their effect on the performance of IT. With over seven years experience in the field of IT, he has worked with companies such as the Panama Canal Commission, Scottish and Southern Energy in England and Würth in Germany. He completed his Bachelor at Florida State University and gained a degree on Master of Business Administration at the University of Louisville.

**Glossary of Terms**

| | | |
|---|---|---|
| APMG | APM Group Limited | Partner to OGC and contracted as OGC's Official Accreditor for the ITIL qualification and accreditation scheme trading as APM Group. Also operate as an EI trading under APMG |
| EMA | Enterprise Management Associates | Founded in 1996, Enterprise Management Associates (EMA) is a leading industry analyst and consulting firm that specializes in going 'beyond the surface' to provide deep insight across the full spectrum of IT management technologies. We deliver research, analysis, and consulting services to two key client groups: Enterprise IT Professionals and IT Management Vendors. |
| ITIL | IT Infrastructure Library | The core OGC owned publications from TSO on which the ITIL official scheme is based |
| OGC | Office of Government Commerce | A UK government department (formally CCTA) who developed and owns the ITIL publications and official scheme |
| SMCG | Service Management Consultancy (SMCG) Ltd | Joint Venture with Sharon Taylor and Ken Turbitt. First officially licensed company to offer ITIL Compliant Assessments for vendor's tools. |
| *it*SMF | IT Service Management Forum | The itSMF® is the only truly independent and internationally-recognised forum for IT Service Management professionals worldwide. This not-for-profit organisation is a prominent player in the on-going development and promotion of IT Service Management "best practice", standards and qualifications and has been since 1991. |
| ITP Report | ITP Report | ITP has been publishing the ITP Report, a cutting-edge business-to-business industry report, since 2001 and has become a brand synonymous with delivering high levels of service to both its partners and readers. Ever since it was founded, ITP set about building strong relationships with the leading businesses in the IT and technology sectors, focusing on ITSM, IP communications and media, wireless and next-generation networks and business continuity management. |
| SDI | Service Desk Institute | The Service Desk Institute is the leading professional organisation for everyone working in the IT service and support industry. Dedicated to setting the standards for the industry, SDI delivers knowledge and career enhancing skills for IT service professionals and enables you to deliver exceptional results for your organisation. |
| ITSM | IT Service Management | A discipline for managing information technology (IT) systems, philosophically centered on the *customer's perspective of IT's contribution to the business*. ITSM stands in deliberate contrast to technology-centered approaches to IT management and business interaction. |

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# 20. Appendix Ten

**Research summary: Challenges, Processes and Benefits of an IT Governance Framework: A Large Scale Survey on CobiT**

Report on findings of the survey completed on CobiT. This report was also sent out to those IT executives who completed the survey.

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Wirtschaftswissenschaftliche Fakultät
Professur für Informationsmanagement
Prof. Dr. Lutz M. Kolbe

# Research summary:

# Challenges, Processes and Benefits of an

# IT Governance Framework:

A large scale survey on CobiT

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# 1   Introduction

Over the past years CobiT®'s adoption rate has been increasing at exceptional levels. CobiT® v4 has been out for almost four years, yet there has been little information available about its uptakes, benefits and challenges. Only little empirical academic research has been done, the existing research is mostly based on case studies and literature reviews. Therefore a web-based large scale survey is conducted by the University of Goettingen with 191 IT experts. Of those, 125 have stated that they have adopted CobiT version four. Ten answers are identified as not valid, so the following analyses are based on 115 respondents.

This research provides answers to several questions practitioners have such as:

- How mature are the 34 CobiT processes?
- What are the reasons for adoption?
- Which challenges face organizations when adopting CobiT?
- Are organizations realizing the benefits? How the maturity of the CobiT adoption does effects the realization of benefits?
- How is Business-IT alignment impacted by the maturity of the CobiT implementation?

First the respondents' profile is presented, followed by a descriptive analysis of the maturity of the 34 CobiT processes. After that the rating of the reasons for adoption, challenges and realized benefits is described. This part is followed by a correlation analysis of the impact of the CobiT maturity on the Business-IT alignment and the realization of benefits. This report ends with a conclusion of the results and an outlook.

## 2   Respondents' profile

The profile of the 191 participants is presented in the following.

**Countries/Continents**

Between the different continents there is a difference in the number of respondents, as showed in figure 1. North and South America are combined as America. It is noticeable that about half of the answers are from Europe. The country with the most respondents is the United States of America, followed by Germany. In Asia the country with the highest number of respondents are the United Arab Emirates. The continents America, Europe and Asia are adequately represented, although there are differences in the total number. Australia is not represented adequately. There are no relevant and valid answers from Africa.
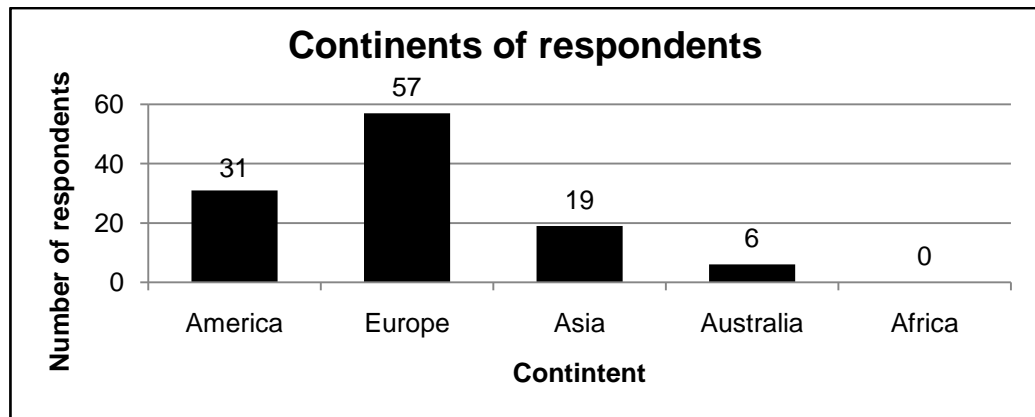


**Figure 1: Continents of respondents**

**Size**

Regarding the number of employees of the respondents' organizations, it is noticeable that there are no major differences between different sizes of companies, so that small- and medium-sized, as well as large companies are represented.
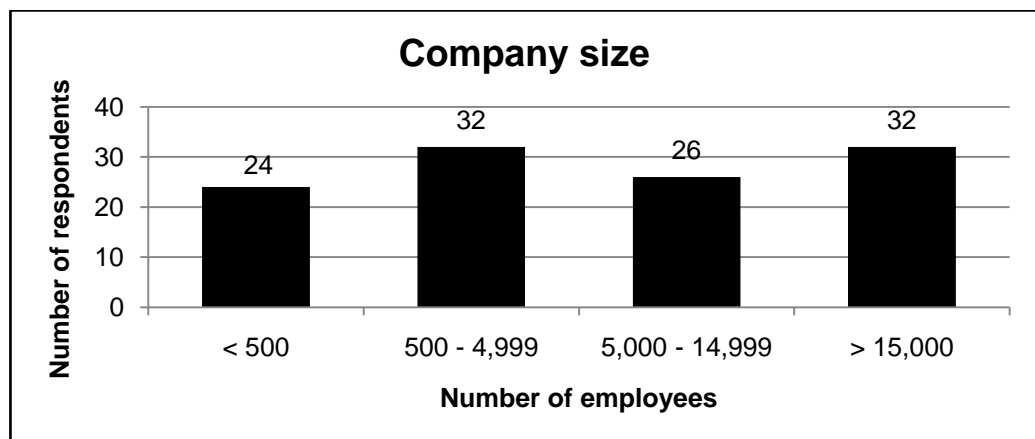


**Figure 2: Company size of respondents**

**Job positions**

Another interesting aspect is to regard the different job positions of the respondents. Most of the respondents are working in the field of IT, with 45 being IT Professional or Chief Information Officer (CIO). Most of the respondents that answered with "other" stated that they are working also with IT, but their job titles differ slightly between different companies. Furthermore it is noticeable that 20 respondents are working as internal auditors.
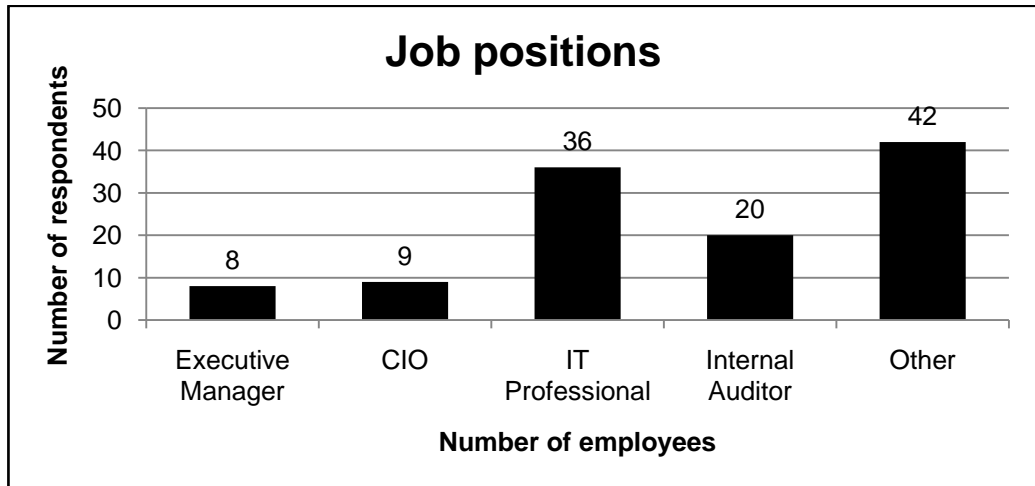


**Figure 3: Job positions of respondents**

# 3 Results

In this chapter the results of the statistical tests regarding the research questions are presented.

## 3.1 Analysis of reasons for adoption, challenges and benefits

A descriptive analysis about the reasons for an adoption of CobiT, the challenges faced due to the adoption and the realized benefits that are achieved as a result of the adoption, is performed.

**Reasons for adoption**

In the survey six different reasons for the adoption of CobiT has been rated from zero to five regarding the importance of the particular reason. In this case zero means that the particular aspect is not a reason at all and five stands for a very important reason. For this analysis the mean and the median of the reasons for adoption is calculated.
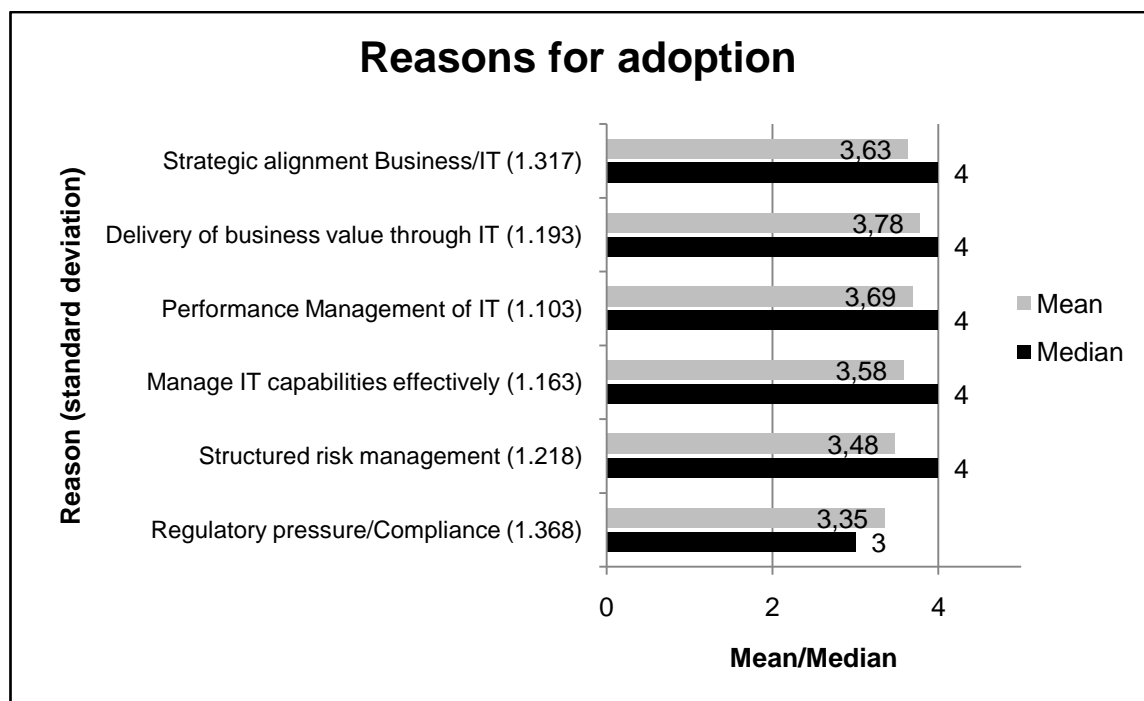


**Figure 4: Mean and median of reasons for adoption of CobiT**

According to this analysis, the most important reason is the delivery of business value through IT (Mean 3.78), followed by an achievement of performance management of IT (3.69). Strategic alignment between business and IT (3.63), which is stated in literature as central aspect is rated as less important than the two aforementioned. The least important reason out of the six reasons that have been inquired is the regulatory

pressure and the requirement of compliance (3.35). Aside from being the reason with the lowest mean, this reason is the only one with a median of three, while all the other reasons have a median of four. In addition all reasons are rated between a span of 3.78 and 3.35, so every reason is rated higher than the middle of the span, which would be three.

**Challenges**

Comparable to the analysis of the reasons for adoption, the challenges that are faced during the adoption and implementation of CobiT are conducted and analyzed. The rating scale is set from zero (no challenge) to five (major challenge).
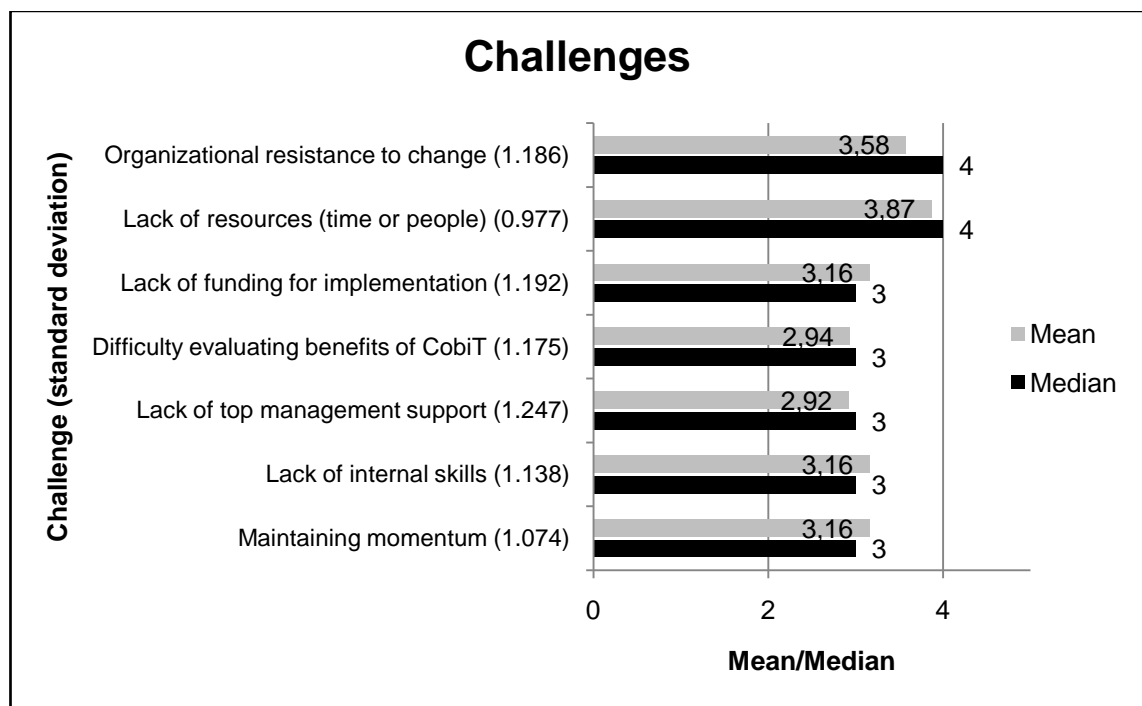


**Figure 5: Mean and median of challenges due to adoption of CobiT**

It is noticeable that two of the seven challenges are much higher rated than the other ones. This can be clearly seen by analyzing the median, because those two challenges have a median of four, while the other five result in a median of three. The lack of resources considering time and people (Mean 3.87) are stated as the biggest challenge, followed by the challenges of reorganizing the structure inside the company, what means dealing with an organizational resistance to change (3.58). The lack of support by the top management (2.92) and the problems evaluating the benefits and profitability of CobiT (2.94) are rated as least recognized challenges. The span of means is higher than the span of means of the reasons for adoption, being between 3.87 and 2.92.

**Realized benefits**

The reasons for adoption that have been analyzed before are also defined as benefits that could be achieved due to the adoption of CobiT. The same scale from zero (not realized) to five (fully realized) is used for this analysis.
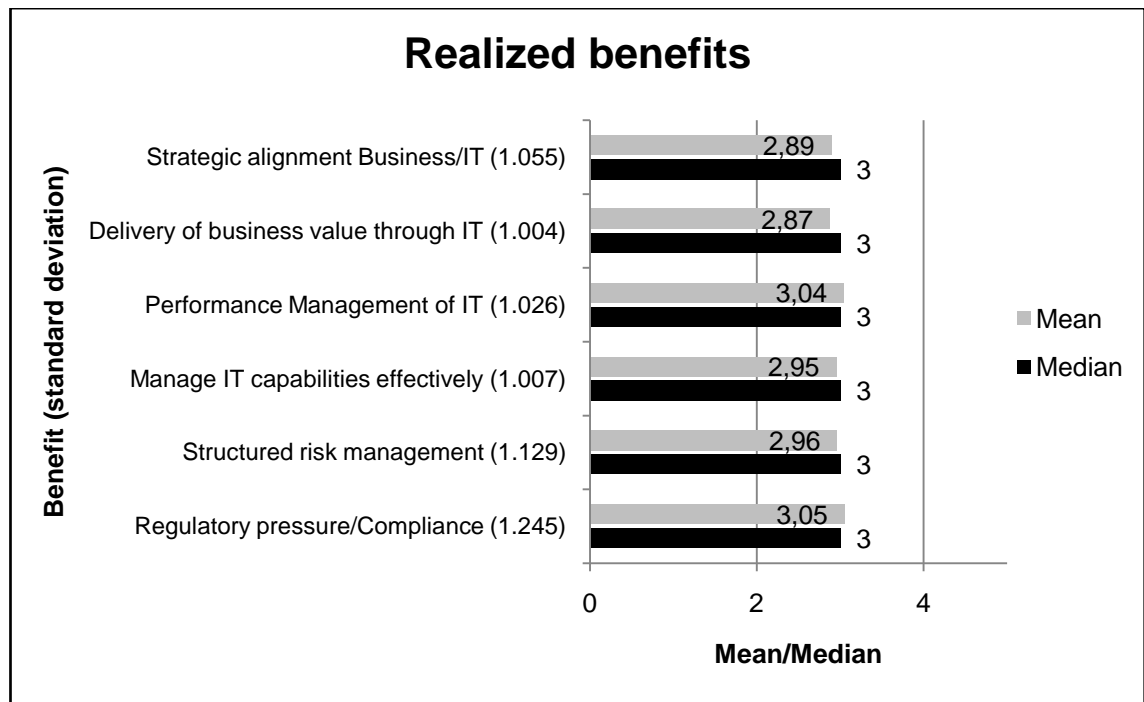


**Figure 6: Mean and median of realized benefits**

All benefits are stated as moderately realized, with a median of three. There are no major differences between the benefits. The benefits realized to the highest extent are the benefit of dealing with regulatory pressure and achieving higher level of compliance (Mean 3.05) and the benefit of enabling of a performance management of IT (3.04). The achievement of a delivery of business value through IT (2.87) and the improvement in the strategic alignment between business and IT (2.89) are the least realized benefits.

## 3.2 State of CobiT processes

Every process is rated with a maturity level based on the CobiT maturity model. Based on the single maturity levels of each process, an average maturity level for the level of the CobiT implementation in general is calculated. For each process an average maturity level is determined by calculating the mean and median. In the following the mean of the maturity level of each CobiT process is shown, divided into the four domains.
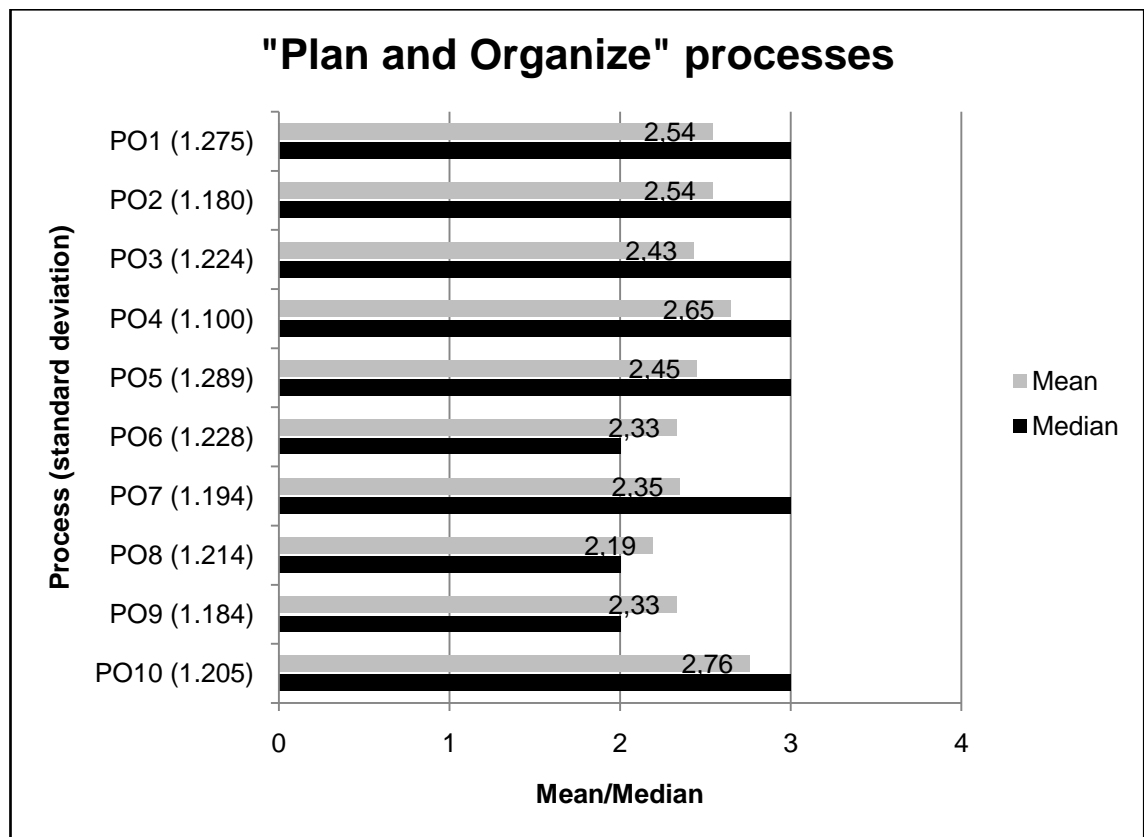
**Figure 7: Average maturity level of PO processes**

In the domain "Plan and Organize" the process with the highest maturity level is PO10 (Manage projects) with a mean of 2.76 and PO4 (Define the IT processes organization and relationships) with an average maturity of 2.65. The lowest rated process is PO8 (Manage quality) with 2.19. Apart from the processes PO6, PO8 and PO9 that have a median of two, all processes have a median of three.
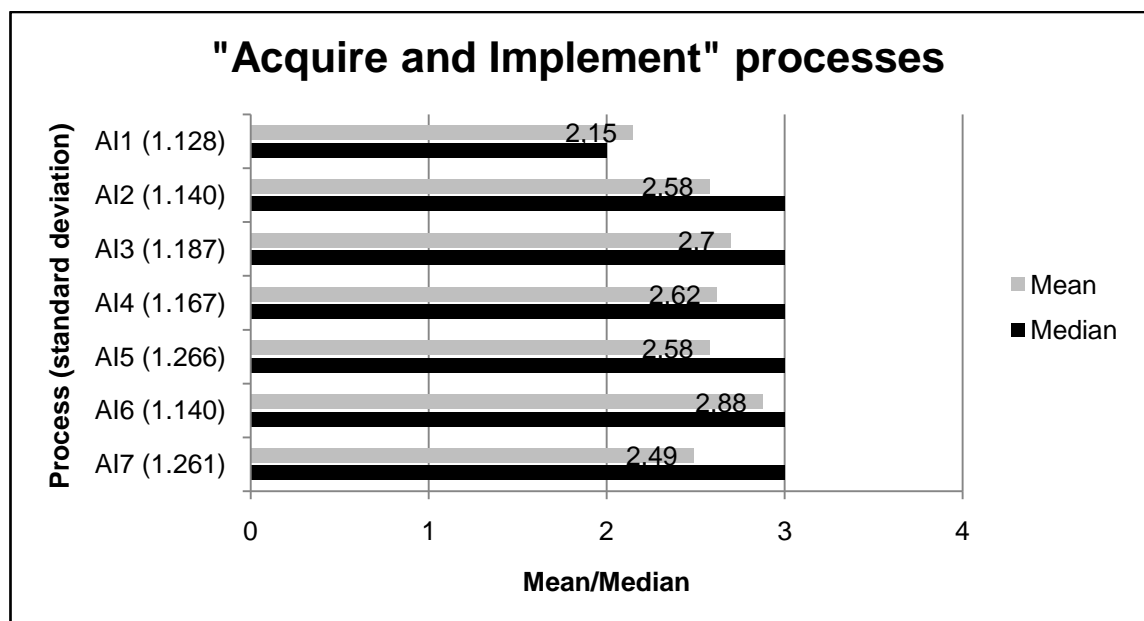


**Figure 8: Average maturity level of AI processes**

The process AI6 (Manage changes) with a mean of 2.88 and AI3 (Acquire and maintain technology infrastructure) with a mean of 2.7 are the processes with the highest maturity level in the domain "Acquire and Implement". AI1 (Identify automated solutions) is clearly the process with the lowest maturity level (Mean 2.15) and the only process with a median of two. All other processes have a median of three.
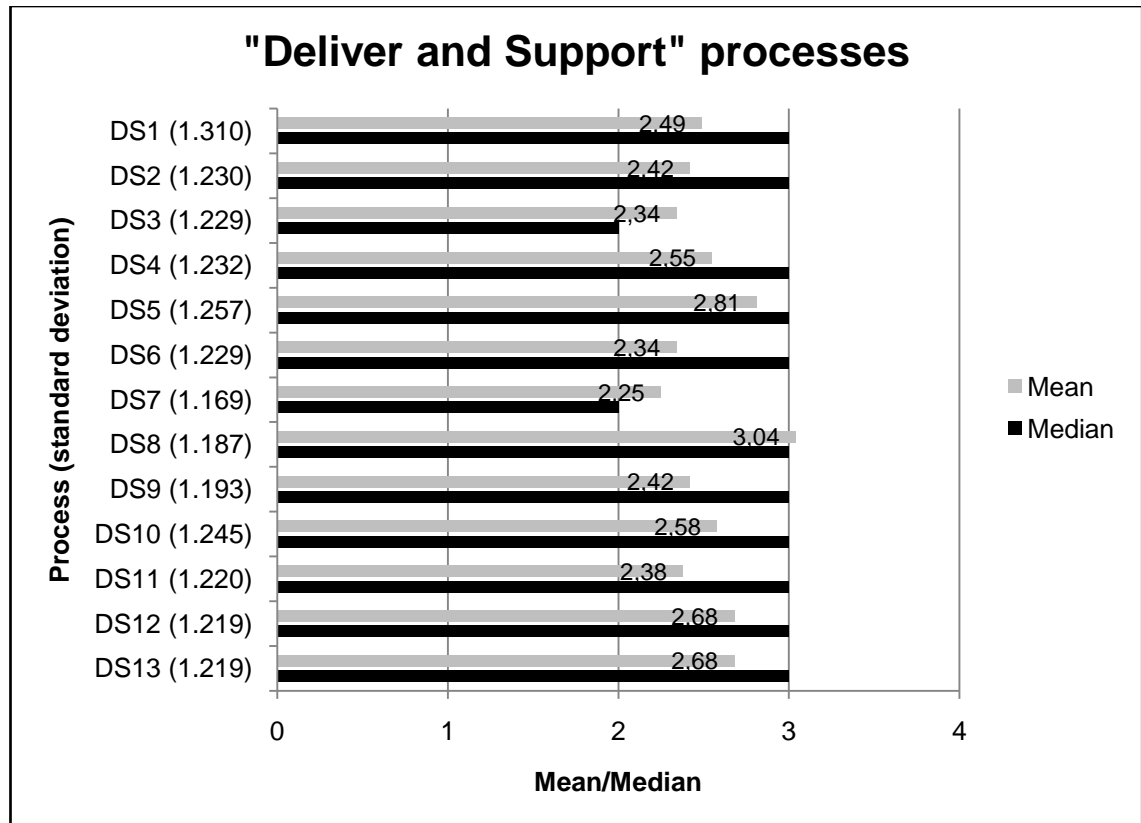


**Figure 9: Average maturity level of DS processes**

The most advanced process in "Deliver and Support" is DS8 (Manage service desk and incidents) with a mean of 3.04, followed by DS5 (Ensure systems security) with 2.81. The process with the lowest maturity is DS7 (Educate and train users) with a mean of 2.25. All processes aside from DS3 and DS7 with a median of two have a median of three.
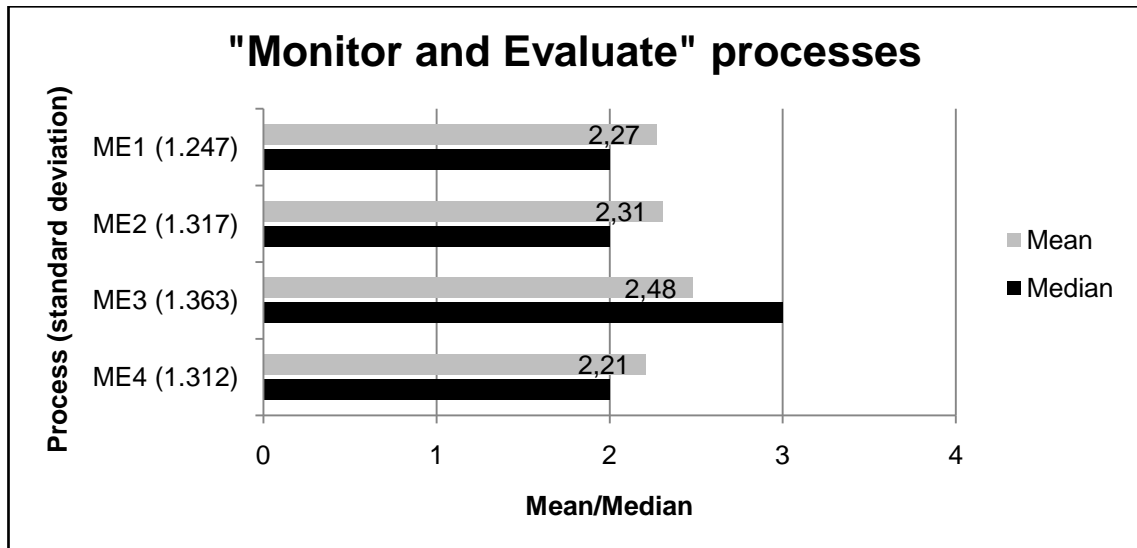
**Figure 10: Average maturity level of ME processes**

Three of the four processes of the domain "Monitor and Evaluate" have a median of two. ME3 (Ensure compliance with external requirements) is the only process with a median of three and is the highest rated process of this domain.

To summarize the analysis of the 34 CobiT processes, the three highest and lowest rated processes regarding the maturity level are the following:

**Average maturity of processes**

|  | Process | Mean | Median | Std. dev. |
|---|---|---|---|---|
| **1.** | DS8 | 3.04 | 3.00 | 1.187 |
| **2.** | AI6 | 2.88 | 3.00 | 1.140 |
| **3.** | DS5 | 2.81 | 3.00 | 1.257 |
| **...** | | | | |
| **32.** | ME4 | 2.21 | 2.00 | 1.312 |
| **33.** | PO8 | 2.19 | 2.00 | 1.214 |
| **34.** | AI1 | 2.15 | 2.00 | 1.128 |

**Figure 11: Three highest and lowest rated CobiT processes**

Analyzing the average maturity levels of each CobiT domain, it is noticeable that the processes for monitoring and evaluating are implemented to a low extent compared to the other ones. The domain with the highest maturity is "Acquire and Implement". Overall the maturity level is between two and three with a mean of 2.67 and a median of 2.74.
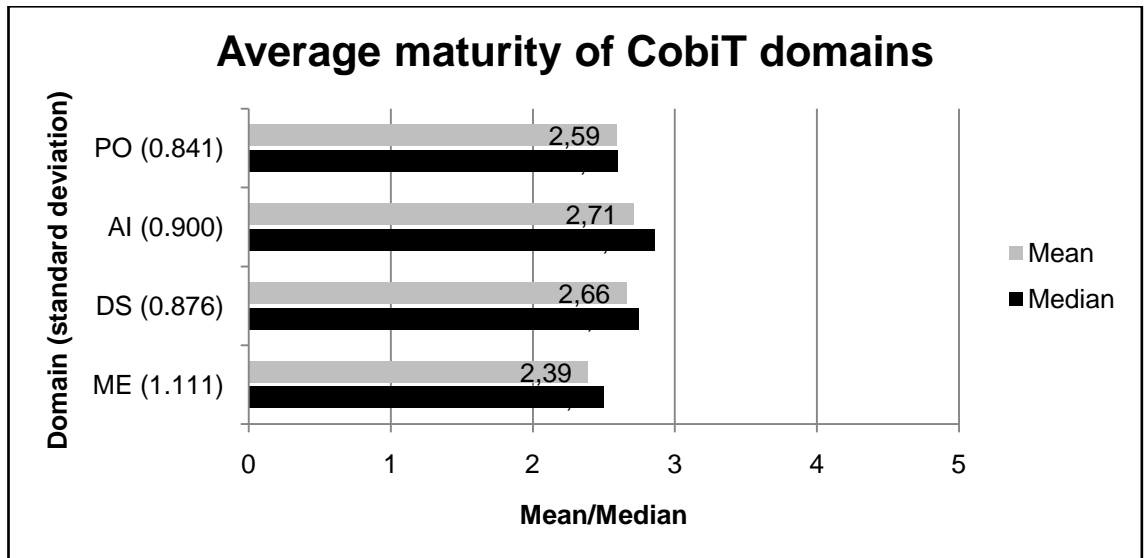
**Figure 12: Average maturity level of CobiT domains**

## 4   Conclusion

This research provides an overview of the implementation of CobiT in various organizations around the world. The high number of respondents enables representative analyses, so that practitioners are able to use the results to benchmark the maturity of their CobiT processes. Especially the processes of the monitor and evaluate domain seems to be adopted to a lower extent compared to the other domains.

It can be concluded that all of the reasons for an adoption of CobiT are mainly equally rated. Only the regulatory pressure is rated less than the other reasons. The analysis of the realization of benefits also results in no significant differences between the singular benefits. Analyzing the challenges, it is noticeable that the organizational resistance to change and the lack of resources of time or people are the most recognized challenges, when it comes to an adoption of CobiT.

The results of the survey will be further analyzed, especially considering the impact of the CobiT maturity on the Business-IT alignment and the realization of benefits. This will be part of an upcoming research article.