Providing More than Just Operational Benefits: An Empirical Research

Mauricio Marrone, Lutz M. Kolbe

Chair of Information Management, University of Göttingen

1   Introduction

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 second factor is the communication between the business and IS. Both points still have high relevance in today's Information Technology (IT) Department.

First, various IT departments have changed to a service mode of operation. Several studies have focused on the adoption of IT Service Management (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 %.

Second, the alignment between Business and IT is the number one priority of IT executives (Luftman et al., 2009). In fact, with the usage of ITSM there is a change impacting the Business and IT interaction and alignment. The relationship between the IT department and the Business is viewed as a supplier-customer relation (Zarnekow et al., 2005) due to a market orientation of the IT department.

So far, there have been few academic studies on this matter, yet 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 the Business-IT alignment by IT managers, and as expressed previously, how this perception develops as companies increase their adherence to the model. Therefore, this research, using empirical data gathered from a survey with major companies from various industries, sets out to understand the following:

- How is the Business-IT alignment 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?

In this context, this article 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   Literature review

ITSM 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). The most common approach to ITSM is ITIL, which is an operational de facto standard for IT Service Providers (IT Governance Institute, 2008).

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; Kießling et al. 2009). A summary of benefits of ITIL is shown in Table 1.

Table 1: Summary of Benefits of ITIL

Improvement of…	Hochstein et al., 2005	Potgieter et al., 2005	Kießling et al., 2009	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
Best Practice	X				
Financial Contribution Control				X	
Call Fix Rate				X	
Morale of IT				X	

An increase of benefits at the operational level is necessary to achieve superior profitability, but it is usually not sufficient. The reason for this is that the usage of best practices can be quickly imitated. The higher the usage of best practices, the more similar the companies are. Therefore, as proposed by Porter (1996), improvements created by best practice do not lead to improvements for any organization. Porter argues that a company should focus on both the operational effectiveness and the strategic positioning.

Therefore, IT departments that have implemented a best practice such as ITIL should have a dual focus. Rather than concentrating only on the benefits achieved by the implementation of best practices, they should also concentrate on their strategic positioning to develop a unique and valuable stance relevant to the customer, which in this case is the business. In other words, it is also important for IT department 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 p.204). Therefore, the strategies, objectives and goals are defined for both, IT and business plans, to create a mutual strategy.

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), as well as being one of the key factors for successful IT systems implementations (Boynton et al., 1994).

Attempting to understand whether ITIL contributes to this alignment, Kashanchi & Toland (2006) conducted an exploratory analysis. From data of three expert interviews they concluded that ITIL has the ability to support business strategy and to improve IT strategy.

Until now, there has been no research that has involved the benefits and the Business-IT alignment 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 hypotheses, which are presented in the following section.

3   Research Design

Rather than just analyzing the operational improvements, which may be achieved through the adoption of ITIL, attention should also be placed on the strategy segment. For the two questions listed in the introduction, a total of four hypotheses are described in the section below.

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 Kießling et al. (2009) 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.

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 in the previous level
5	Optimized	Good practices are followed and automated

Similarly, to understand on 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 following five levels of Business-IT alignment maturity are: Initial / Ad Hoc (1), Committed (2), Established / Focused (3), Improved / Managed (4), and Optimized (5). While various researchers have created assessment surveys that measure the alignment, this research favours the direct approach of focusing on the perceived maturity levels.

3.2 Business-IT Alignment and Maturity Level

This research 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: As the maturity level of ITIL increases, the perception of Business-IT alignment increases.

3.3 Number of Realized Benefits and Maturity Levels

The research 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. 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 stay nearly constant.

We also expect that the number of realized benefits that are supported by metrics will be used on the later levels of maturity, 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 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 to reach a greater audience. 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.

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 mostly contains questions whose answers are in Likert scale, nominal scale and open-ended response form.

The questions that were used for this study are the following three. 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.

Second, respondents were asked to choose the perceived level of Business-IT alignment. Each level and their definitions were displayed for the respondents as further information.

Finally, those surveyed had to select realized benefits that could be achieved due to the adoption of ITIL. These benefits are based on those found on the literature review. 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.

---

[1] IT Service Management Software provider, http://www.hornbill.com/
[2] Forum for ITSM Professionals, http://www.itsmf.co.uk/

4.2 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.

Table 3: Profile of responding organizations (n=503)

Industry	Percent	Countries	Percent	Number of Employees	Percent
Technology	31	United Kingdom	52	10000+	39
Public	23	United States of		1001-5000	20
Financial and		America	36	5001-10000	16
Banking	18	Canada	1	501-1000	10
Professional	5	India	1	101-500	9
Manufacturing	5	Ireland	1	< 100	6
Retail and		Other	9		
Distribution	5				

Industry	Percent	Number of Sites	Percent	Job Role	Percent
Other	4	10+	69	IT Manager	33
Utility	3	2-5	18	Process Specific	
Entertainment and		6-10	7	Manager e.g. Change	22
Hospitality	2	1	6	Service Delivery	
Healthcare	2			Manager	17
Telecommunication	2			IT Director -	
				Organisation Level	13
				HelpDesk / Service	
				Desk Manager	11
				HelpDesk / Service	
				Desk Operative	4

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 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 is applied.

Since using a large quantity of Mann-Whitney U tests inflates the Type I error rate, only a selective comparison are carried out. The suggested comparisons are 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 are 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 are conducted, a Bonnferroni correction is 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). 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 J-T statistic.

5.1 Business-IT Alignment and Maturity Level (H1)

Of those surveyed, 442 declared their perceived business-IT alignment maturity level. 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 ($H(4) = 77.42$, $p < 0.001$). Mann-Whitney tests were also used to follow up this finding.

Table 4: Means and Medians of Business-IT Alignment (n=442)

	Level Medians			Level Means		
	Level 1	Level 3	Level 5	Level 1	Level 3	Level 5
Business-IT Alignment	2	3	4	2.2 SE=.25	2.8 SE=.12	4.1 SE=.14

Table 5 shows the results from the selective comparisons. It can be observed that between levels Initial (1) and Defined (3) there was significance ($U = 1382$, $r = -.21$). When comparing the Initial (1) with Optimized (5) significance can be observed with a medium effect size ($U = 330$, $r = -.55$). Lastly, comparing the Defined (3) with the Optimized (5) maturity level, significance can be observed ($U = 1620$, $r = -.44$). The greatest increase of the perceived level of maturity can be seen when comparing the Defined (3) and Optimized (5) maturity level.

Table 5: Mann-Whitney U test results for perceived Business-IT Alignment maturity levels (n=442)

	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	1318.5	0.011*	-0.21	329.5	0.000*	-0.55	1619.5	0.000*	-0.44

*significance at 0.0167

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 = 49957, z = 8.78, 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 ($H(4)$ = 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). Table 6 presents the means and medians for the perceived realized benefits.

Table 6: Means and Medians of Realized Benefits (n=503)

	Level Medians			Level Means		
… per company	Level 1	Level 3	Level 5	Level 1	Level 3	Level 5
Total realized benefits	0	4	5	1.0	4.1	4.9
				SE=.20	SE=.19	SE=.37
Total realized benefits backed by metrics	0	2	4	0.5	2.5	3.9
				SE=.14	SE=.17	SE=.37
Total realized benefits acknowledged by business	0	1	3	0.4	1.7	3.3
				SE=.14	SE=.16	SE=.41

As shown in Table 7, 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 (U = 981, r = -.61). One can also observe this when comparing the Initial (1) with the Optimized (5) level (U = 434, r = -.67). Finally, when comparing the Defined (3) with Optimized (5) level no significance can be determined (U = 2957, r = -.14). Yet, significance can be observed when examining the number of realized benefits that have been obtained by using metrics (U = 2530, r = -.24) as well as when observing the number of realized benefits that have been acknowledged by the business (U = 2512, r = -.24). There is a small change in the number of realized benefits on the later levels of maturity.

Table 7: Mann-Whitney U test results for total number of perceived realized benefits and maturity levels (n=503)

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

*significance at 0.0167

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 on 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.

6   Discussion

In this research we focus on ITIL and the benefits it provides to the IT department, specifically 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.

The results of H1 show that as the maturity of the implementation of ITIL increases, so does the level of 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 of the perceived level of maturity can be seen on the later stages of maturity, the Defined (3) and Optimized (5). This result confirms exploratory research (e.g Kashanchi & Toland 2006).

Additionally, results from H2a, H2b and H2c 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 it can be observed from 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, Defined (3) with the Optimized (5) level.

While no significant increase in the number of realized benefits can be seen in the later stages, on these levels a significant progress can be seen in two areas. These are: the usage of metrics to support the realized benefits (H2b) and the acknowledgement of the benefits realized by the business (H2c).

In the first area, researchers have shown that the usage of metrics leads to improved decision making and problem solving (Banker et al., 2004), allows the survival and prosperity of organizations (Kaplan & Norton 1996), and more importantly it encourages the renovation of strategy (Neely et al. 1994).

In the second area, the results indicate that benefits of ITIL are acknowledged by the business even on the later levels of the ITIL implementation. This result also concludes that there is a movement towards Business-IT alignment.

All results from this study suggest that ITIL does not only provide various operational benefits, but also contributes to the Business-IT alignment, which allows for IT to enable the business in its creation of a sustainable competitive advantage. Additionally, it points towards a greater control of IT processes, which would allow for IT to be able to respond to environmental uncertainty faced by the business. Furthermore, as proposed by Porter (1996), the strategic alignment, in this case between the Business and IT, makes operational improvements more effective.

The contribution to research is that it delivers insight into the perception of 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 department will receive various operational benefits in the early stages of implementation, and 2) in later stages of implementation the usage of metrics to measure the benefits as well as the benefits acknowledged by business will continue to increase. Also, 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 department.

7   Conclusion

Delivering tangible performance improvement is the goal of numerous IT managers. Yet, this must not be the main objective of the IT department. As a result, a distinction between operational effectiveness and strategy positioning must exist. As expressed before, both are essential, but they each work in a unique form.

Four principal observations from the study show that as the maturity of ITIL increases 1) the perception of the level of Business-IT alignment also increases, 2) so does the number of realized benefits, 3) the usage of metrics to measure the benefits of the implementation as well as 4) the number of benefits provided by IT that are acknowledged by the business.

Since ITIL may have a direct impact on the strategic positioning through Business-IT alignment, this results in a possible positive effect on business performance, competitive advantage and increased profitability. As well, there is an indirect impact from the usage of metrics and in the business acknowledging the benefits provided by IT on strategic positioning. It can be concluded that ITIL may contribute to both, the operational effectiveness as well as the strategy positioning of the IT department.

Limitations of this study are that the study concentrates only on the United States and United Kingdom and it over-samples the larger enterprises. Another

limitation is that empirical studies are dependent on the quality of data provided by the respondents. As well, the results are based only on the perceived Business-IT alignment and on those 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 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 (2001) Strategic Alignment Maturity Model (SAMM).

References

Banker RD, Chang H, Janakiraman SN, Konstans C (2004) A balanced scorecard analysis of performance metrics. European Journal of Operational Research 154:423-436

Boynton A, Zmud R, Jacobs G (1994) The Influence of IT Management Practice on IT Use in Large Organizations. Management Information Systems Quarterly 18:14

Cater-Steel A, Tan WG, Toleman M (2008) itSMF Australia 2007 Conference: summary of ITSM standards and frameworks survey responses.

Cervone F (2008) ITIL: a framework for managing digital library services. OCLC Systems & Services 24:87-90

Galup SD, Dattero R, Quan JJ, Conger S (2009) An overview of IT service management. Communications of the ACM 52:124-127

Henderson JC, Venkatraman N, Oldach S (1996) Aligning Business and IT Strategies. Competing in the Information Age: Strategic Alignment in Practice:21-42

Hochstein A, Tamm G, Brenner W (2005) Service-Oriented IT Management: Benefit, Cost and Success Factors In Proceedings of the Thirteenth European Conference on Information Systems, Regensburg

IT Governance Institute (2008) IT Governance Global Status Report 2008. Available at: http://www.isaca.org/ [Accessed July 30, 2008].

Kaplan RS, Norton DP (1996) Using the Balanced Scorecard as a Strategic Management System. Harvard Business Review 74:75-87

Kashanchi R, Toland J (2006) Can ITIL contribute to IT/business alignment? An initial investigation. Wirtschaftsinformatik 48:340-348

Kießling M, Marrone M, Kolbe LM (2009) Influence of IT Service Management on Innovation Management: First insights from exploratory studies In itAIS 2009 VI Conference of the Italian Chapter of AIS

Luftman J (2001) Assessing business-IT alignment maturity. Strategic Information Technology: Opportunities for Competitive Advantage 6:105–134

Luftman JN, Lewis PR, Oldach SH (1993) Transforming the enterprise: The alignment of business and information technology strategies. IBM Systems Journal 32:198-221

Luftman J, Kempaiah R, Rigoni EH (2009) Key Issues for IT Executives 2008. MIS Quarterly Executive 8

Neely A, Mills J, Platts K, Gregory M, Richards H (1994) Realizing Strategy through Measurement. International Journal of Operations and Production Management 14:140-140

Porter ME (1996) What Is Strategy? Harvard Business Review 74:61-78

Potgieter BC, Botha JH, Lew C (2005) Evidence that use of the ITIL framework is effective. 18th Annual Conference of the National Advisory Committee on Computing Qualifications, Tauranga, NZ

Rockart JF (1980) The changing role of the information systems executive: a critical success factors perspective.

Rosenthal DR (1991) Meta-Analytic Procedures for Social Research Revised. Sage Publications, Inc.

Sabherwal R, Chan YE (2001) Alignment Between Business and IS Strategies: A Study of Prospectors, Analyzers, and Defenders. Information Systems Research 12:11

Spremic M, Zmirak Z, Kraljevic K (2008) IT and business process performance management: Case study of ITIL implementation in finance service industry In Information Technology Interfaces, 2008. ITI 2008. 30th International Conference

Young CM (2004) An Introduction to IT Service Management. Gartner Research

Zarnekow R, Hochstein A, Brenner W (2005) Service-orientiertes IT-Management: ITIL-Best-Practices und Fallstudien. Springer.