

# 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 its current state of maturity. Table 1 covers a brief description of each level of the maturity model.

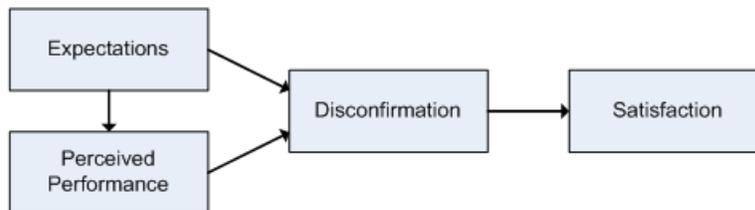
Level	Level Name	Description
0	Non-existent	Management of processes is not applied at all
1	Initial / Ad Hoc	Processes are ad hoc and disorganized
2	Repeatable	Processes follow a standard, are documented and understood
3	Defined	Processes are documented and monitored for compliance
4	Managed	Management 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:

*PI: 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	Countries	Percent	Number of IT Employees	Percent
Financial and Banking	35	United States	16	Less than 100	39
Technology	22	Germany	8	Over 500	32
Telecommunications	9	Switzerland	6	100-299	19
Healthcare	7	United Arab Emirates	6	300-499	10
Public	7	Belgium	5		
Manufacturing	5	Australia	5		
Retail and Distribution	5	Other	54		
Utility	4				
Other	4				
Professional	2				
		Number of Sites	Percent		
		Over 100	29		
		Less than 10	29		
		10-24	20		
		50-66	12		
		25-49	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

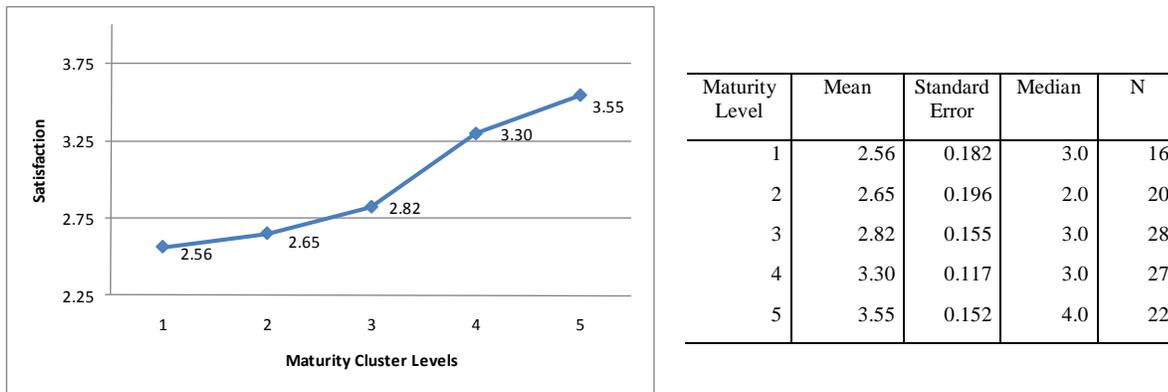
As three tests were conducted, a Bonferroni correction is applied. This correction means that instead of using the critical level of significance of 0.05, all effects are reported at 0.0167 level of significance. All reported *p* values are using 1-tailed Monte Carlo *p* values with a confidence level 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 ( $H(4)=24.48, p<0.001$ ).



**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		
	<i>U</i>	<i>p</i>	<i>r</i>	<i>U</i>	<i>p</i>	<i>r</i>	<i>U</i>	<i>p</i>	<i>r</i>
Satisfaction	194	0.223	-0.12	65	0.000*	-0.57	158.5	0.001*	-0.44

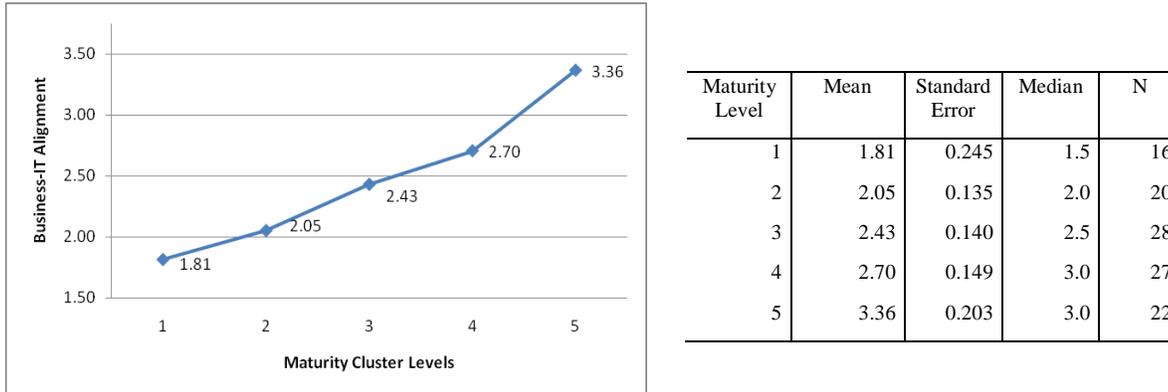
\*significance at 0.0167

**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.



**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		
	<i>U</i>	<i>p</i>	<i>r</i>	<i>U</i>	<i>p</i>	<i>r</i>	<i>U</i>	<i>p</i>	<i>r</i>
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 ( $H(4)=34.05, p < 0.000$ ).

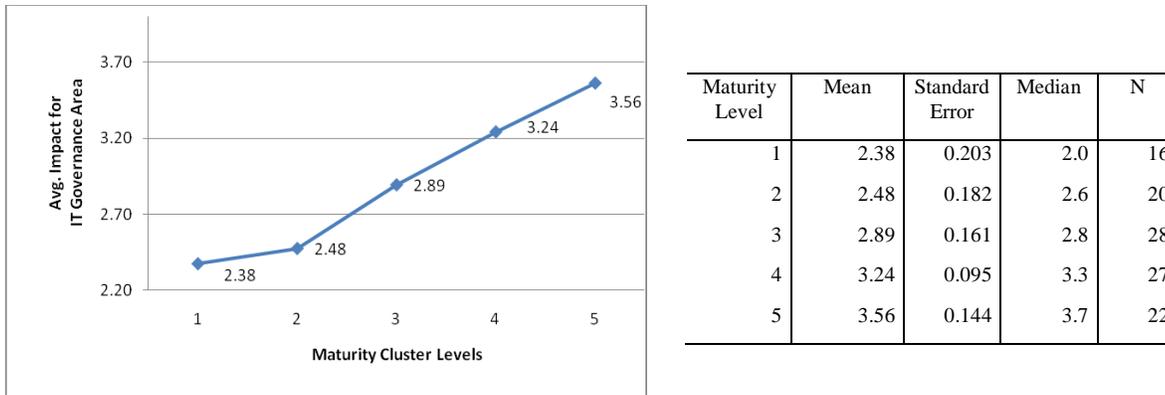


Figure 4. Descriptive Statistics of Total Realized Benefits (n=113)

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		
	<i>U</i>	<i>p</i>	<i>r</i>	<i>U</i>	<i>p</i>	<i>r</i>	<i>U</i>	<i>p</i>	<i>r</i>
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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