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Benefits, Opportunities, Costs and Risks Analysis of Information Technology Infrastructure Library Implementation

[1]Shelvy Arini, [1]Achmad Nizar Hidayanto, [1]Bobby Nazief, [2]Herkules and [1]Muhammad Baharudin Jusuf
[1]Faculty of Computer Science, Universitas Indonesia, Depok, 16424 Jawa Barat, Indonesia
[2]STMIK Palangkaraya, Palangkaraya, 74874 Kalimantan Tengah, Indonesia

Abstract: Information Technology Infrastructure Library (ITIL) has been well-known as a standard of Information Technology Service Management (ITSM) implementation in organizations. Even though, organizations require much resources in the application of ITIL, the implementation number is still increasing per-year. This study attempts to explore and explain the Benefits, Opportunities, Costs and Risks (BOCR) of the ITIL implementation. A deep literature review is conducted to produce the current understanding of ITIL implementation in term of those four aspects of BOCR. Those initial findings are classified by using Balanced Scorecard (BSC) perspective and then be validated by employing interviews with seven IT experts who involved directly in ITIL implementation in their organizations. This study contributes in theoretical and practical aspects. Fifty six BOCR factors are successfully validated. Furthermore, twelve of those factors are newly identified in this study. Those validated factors may be used by organizations as a future guidance in implementing ITIL in their organization.

Key words: Benefits, opportunities, costs, risks, ITIL, balance scorecard

INTRODUCTION

In this era of Information Technology (IT), the capability of organizations in aligning IT, business and costumer needs is a must for organization's success (Isal *et al*., 2016). The concept of ITSM become a way to ensure that costumer requirements are fulfilled all the times. Cater *et al*. (2006) argued that ITSM provides several real benefits for IT in organizations such as in term of adaptability, flexibility, effectiveness and efficiency of IT service to costumer. It also improves organizational processes, technology assets, vendor, staff advancement, etc.

ITSM is a part of service science which focuses on IT operations. The main concern of ITSM is on how IT meets costumer requirements by using IT itself. ITSM areas has been developing for >20 years and has been used in many organizations from various industries (Rudd, 2007). Several frameworks have been developed to support the concept of ITSM such as ITIL which is developed by UK government as a guidance map to improve IT processes quality (Pollard and Cater-Steel, 2009).

ITIL framework was firstly introduced by Central Computer and Telecommunication Agency which is now known as Office of Government Commerce (OGC) of UK government that attempts to develop a framework based on best-practices from various organizations which can be used to ensure the effectiveness and efficiency of IT service delivery (Van *et al*., 2008). By using best-practices as its base, ITIL is not only a theoretical framework but also a systematic-practical framework that was tested in various organizations (Tan *et al*., 2009).

The adoption of ITIL has been significantly increasing year-by-year. Furthermore, the study in ITIL area is also growing. Hubbert and Donnell (2009) found that ITIL adoption is rising to 30% per-year. Moreover, 64% IT professionals have a good trust towards ITIL best practices and believe that ITIL support their IT reputations. However in the context of Indonesia, there is still limited information about ITIL in Indonesia including the context of benefits, opportunities, costs and risks.

Several experts argue that implementing ITIL is not easy. For example, Iden and Langeland (2010) explain that ITIL implementation is a complex action which tightly depends on the characteristics and willingness of organizations. Therefore, understanding factors which are related to ITIL implementation is valuable, especially for organizations to produce benefits of ITIL implementation. These facts depict that the knowledge about ITIL implementation is still required to be explored, especially in the context of Indonesia and the fact that ITIL implementation is a complex action, portrays that there are

Corresponding Author: Shelvy Arini, Faculty of Computer Science, Universitas Indonesia, Depok, 16424 Jawa Barat, Indonesia

gaps in understanding how ITIL implementation is particularly about the factors that related to the implementation.

To produce a holistic view about this area and to close the knowledge gaps this study employs BOCR perspective by Saaty (2004) that has been used for various purposes (Fatih *et al*., 2015; Hidayanto *et al*., 2015). BOCR is an analysis approach which concern about the bipolar characteristic of an object which then be categorized into supporting attributes and rejection attributes (Saaty, 2004). This perspective is argued as an appropriate tool, since it able to expose long-and-short term impact; and the positive and negative sides of something (Liang and Li, 2008) such as in ITIL implementation.

Therefore, this study aims to validate the current understanding of what factors that relate with ITIL implementation through literature review and qualitative interview with ITIL implementation experts in Indonesia. Specifically, there are two questions addressed:

- What are the benefits and opportunities of ITIL implementation?
- What are the costs and risks in gaining benefits and opportunities of ITIL implementation?

This study produces a pre-assessment of the benefits, opportunities, costs and risks of ITIL implementation from literature. Then, the findings from literature are validated using interviews with ITIL experts from various organizations. Furthermore, this study successfully validates fifty six BOCR factors of ITIL implementation.

This study is organized as follows. The research methodology is briefly explained in the next section. Then, synthesis of ITIL implementation benefits, opportunities, costs and risks from literature are presented in the third and fourth section. The findings from the qualitative interview with ITIL implementation experts are compared with the findings of the literature synthesis, then discussed and concluded. At the end, contributions are listed (Patton *et al*., 2001).

MATERIALS AND METHODS

Critical literature review and qualitative interview with ITIL implementation experts are two phases involved in this study. The first phase employs exploratory search approach by using tools such as Google Scholar, databases and Universitas Indonesia's library system. This approach is use to get a better coverage of related publications (Tamm, 2012). Some search terms such as "IT", "Service Management", "ITIL", "benefits", "opportunities", "costs", "risks" and "implementation" are used to draw relevant publications. More than ninety papers about ITIL implementation and BCOR were identified. Sixteen relevant papers were included in this study.

The second phase conducts descriptive-qualitative open interviews with ITIL implementation experts from various organizations in Indonesia. The descriptive method enhances the credibility of facts interpretation (Nazir, 2003). Furthermore, qualitative approach may generate a holistic, comprehensive and rich description (Atieno, 2009). Therefore, these descriptive-qualitative interviews are considered appropriate to answer the research questions of this study. This phase attempts to validate and corroborate the findings from the first phase. All the experts in this study must be ITIL certified or has a proper experience (>5 years) in ITIL related areas.

The data collected from the interviews, then analyzed by using the procedure by Neuman (2006): transcribing data, sorting and classifying data, codifying data then interpreting and elaborating data. After analyzing the data, all the ITIL implementations benefits, opportunities, costs and risks identified form the interviews then compared with the findings from the literature review.

Synthesis of benefits and opportunities of itil impelentation: Benefits are the condition in which organization get advantages (Saaty and Vargas, 2006). Twenty benefits of ITIL implementation were identified by more than of the selected literature. Hochstein *et al*. (2005) argued that costumer oriented IT services, standardization and transparency of services may be supported by ITIL. Furthermore, Cater *et al*. (2006) mentioned that ITIL helps organizations in measuring their infrastructure advantages, improving their internal communication and consistency of their IT.

Moreover, Broussard (2008) argues that ITIL increases business capabilities and IT security, reduces operational and asset costs, advanced business-IT alignment, improved change management and enhanced satisfaction of IT governance. Potgieter have a similar idea that ITIL implementation has a good potential to increase customer satisfaction and quality of the services, reduce costs and improve return of investment.

Several papers which use quantitative approach also find the similar facts. Spremic *et al*. (2008) argues that ITIL implementation leads to a more efficient in conducting routine procedures. Marrone and Kolbe find that ITIL may increase the maturity of IT in organizations (Lloyd, 2002). Furthermore, Egeler (2008) explains that ITIL helps

organization to focus to their customers and increases the organization's effectiveness, consistency and reliability of their services.

In term of opportunities, there are still limited number of papers in this area. Only two of ninety eight selected papers which focus on exploring the opportunities of implementing ITIL such as Broussard (2008), Kashanchi and Toland (2006). Twelve opportunities of ITIL implementation are successfully discovered. ITIL implementation opens new opportunities for organizations to do virtualization of their IT and helps them to do acquisition of technology in the future (Broussard, 2008). Moreover, ITIL leverages the opportunities in improving the alignment between IT and business (Kashanchi and Toland, 2006).

At this point, it can be understood that exploring benefits and opportunities of ITIL implementation is still worth and required for the future of organizations. Furthermore, only limited studies have explored about ITIL opportunities. Besides that in the context of study's object, all the studies mentioned above are not Indonesian's context studies. For example, Hochstein is a German based research, Broussard (2008) is a US based research and so on.

Synthesis of costs and risks of itil impelentation: Costs are defined as an unbeneficial condition which are resulted from something in an organization (Saaty and Vargas, 2006). Nine costs of ITIL implementation are found mentioned in the selected literature. Brooks (2006) classifies ITIL implementation costs into several areas as explained in this paragraph. In term of change and release management, Brooks (2006) argues that ITIL implementation requires restoration cost for a bad result, costs for change, release cost and training cost.

Zarrazvand and Shojafar (2012) identifies four main costs of ITIL implementation; change authorization costs, process-oriented activities costs, response-time costs and interruption costs. Moreover, Hochstein who use qualitative approach in his study finds that ITIL implementation requires planning and coordination costs, tools and system development and customization costs, training and employee costs, project communication costs and consultation and quality control costs (Stavric, 1987).

ITIL implementation has also several notable risks which successfully discovered. Saaty and Bagas describe risks as the negative impacts of a decision taken by an organization. Fifteen risks are generated from the selected literature. However, only two of the selected studies which explore about the ITIL's risks (Van *et al*., 2008). ITIL implementation requires much time to be understood by the organizations, since it changes organizations culture, it also need a huge amount of resources (Van *et al*., 2008).

Similar with the benefits and opportunities, the costs and risks of ITIL implementation are also still required to be explored. To get a better understanding of ITIL implementation, adding more studies to support more factors of the current findings are necessary and valuable.

RESULTS AND DISCUSSION

This study describes the BOCR factors of ITIL implementation based on the literature review and the validation with several ITIL experts in several organizations as shown in Table 1. Almost all the factors which are generated from the literature review are confirmed by the findings of the interview. Table 2 exposes all the identified factors based on literature review and interviews including how many interviewees who mention each of the factors.

In term of benefits factors of ITIL implementation, based on the interviews, there are six benefits which are new and have not been listed in any past literature such as increased transparency towards users (CB4), improved change management and optimized benefits (IB14), secure the relationship between processes (IB15), improved technical learning (LB1), develop new knowledge (LB2) and minimized employee dependency one another (LB3). Furthermore, all the ITIL experts agree with some factors in the literature review such as decreased IT change failures (IB3) and understandable communication structure and standard (IB13).

Improved technical learning (LB1) is the new benefits factors which are supported by all the experts as mentioned by interviewee 7: "at first, I do not have any background in ITIL. By implementing ITIL, I have been pushed to learn again." Furthermore, Interviewee 4 explained that ITIL implementation improve their practical learning: "it is more about practical learning."

Six of the seven experts also mentioned the three new benefits factors of ITIL implementation. It improves change management and optimize the benefits of change (IB14); "there are two types of changes, how to reduce risk of change and second about how to maximize the

Table 1: Research participants

IDs (Interviewee)	Experience (years)	Certification
1	9	Yes
2	10	Yes
3	12	-
4	9	Yes
5	6	-
6	7	Yes
7	6	-

Table 2: Identified factors of ITIL implementation

IDs	BOCR factors	E	N
Benefit of ITIL implementation			
FB1	Managed and controlled IT costs	5	-
FB2	Decreased IT operational costs	0	n/a
FB3	Decreased IT assets costs	3	-
FB4	Saving of organization's financial	5	-
CB1	Customer oriented IT services	6	-
CB2	Increased services understanding	4	-
CB3	Better IT org. communication	5	-
CB4	Transparency towards users	5	New
IB1	Improved IT services based on customer or process	6	-
IB2	Smoother SLA negotiation	6	-
IB3	Decreased failure of IT change	7	-
IB4	Consistency in accident log	0	n/a
IB5	Improved IT security	0	n/a
IB6	Decreased response time	5	-
IB7	Predicted/ consistent performance	6	-
IB8	Standardized, optimized and automation of processes	6	-
IB9	More efficient of routine procedures	6	-
IB10	Structured IT organization	6	-
IB11	Infrastructure and service focused IT organizations	5	-
IB12	Provided framework for IT outsourcing	4	-
IB13	Provided understandable structure for communication and standardization	7	-
IB14	Improved change management and optimized the benefits	6	New
IB15	Secure the processes connection	6	New
LB1	Improved technical learning	7	New
LB2	New knowledge from collected data	2	New
LB3	Minimized employee dependency	6	New
Opportunities of ITIL implementation			
FO1	Increased return on investment	3	n/a
FO2	Better costs management	5	-
CO1	Unlimited customer services	0	n/a
CO2	Improved customer satisfaction	0	n/a
CO3	Increased customer perception and organization image	4	-
IO1	Aligned IT and processes with business unit and goals	6	-
IO2	Managed quality, reliability and availability of services	7	-
IO3	Increased transparency	7	-
IO4	Improved IT gov. policy and goals	5	-
IO5	IT elements virtualization	6	-
IO6	Help technology acquisition	5	-
IO7	Resource optimization	3	New
LO1	Support culture change	6	-
LO2	Improved organization structure	3	New
Costs of ITIL implementation			
CC1	Socialization costs	4	New
FC1	Costs of planning and coordination	6	-
FC2	Costs of communication	4	-
IC1	Costs of authorization change	4	-
IC2	Costs of orientation processes	4	-
IC3	Costs of each response time	0	n/a
IC4	Costs of each interrupt time	0	n/a
IC5	Costs of consultation and QC	6	-
IC6	Costs of updating SLA	4	New
LC1	Development and customization costs of systems and tools	6	-
LC2	Training, certifications and employment costs	7	-
Risks of ITIL implementation			
FR1	Investment deficit in training and supporting tools	5	-
FR2	Fine and penalties	3	-
FR3	Cost deficiency	4	-
CR1	Dissatisfied customer	7	-
IR1	Too technical service procedures	5	-
IR2	Low understanding of the processes and how to control the processes	7	-
IR3	Rework	7	-
IR4	Delayed incident handling	5	-
IR5	Legal exposure	0	n/a
IR6	Service does not meet SLA	7	-
IR7	Security breach	4	-
IR8	Limited IT resources	4	New
LR1	Unrealized benefit	0	n/a
LR2	Effect of outsourced development	0	n/a
LR3	Time required for ITIL socialization	0	n/a
LR4	Low employee's morale	0	n/a
LR5	IT staff related-risks	2	New

*E: Number of Empirical Evidence (n = 7); *N: Novelty

change benefits" (Interviewee 2). Also, ITIL implementation secures the connection between processes (IB15): "ITIL ensures that between one process to another are collaborating to produce the service level" (Interviewee 2). Furthermore, ITIL implementation results on decreasing the organization dependency towards a certain employee (LB3): "if the system is fix and good, then whether the personnel come and go they will be able to adopt it fast" (Interviewee 4). In term of opportunities factors of ITIL implementation, there are two new opportunities factors of ITIL implementation based on the interviews: resource optimization (IO7) and improved organization structure and development (LO2). Moreover, there are two opportunities factors which are mentioned by all the ITIL experts: ITIL managed quality, reliability and availability of services (IO2) and increased transparency (IO3).

The study finds that ITIL helps organization to monitor and optimize their resource (IO7): "resources optimization is easy to be monitored" (Interviewee 1). Furthermore, this study produces a new factor explain that ITIL helps in structuring organizations (LO2): "organization is more structured with a clear responsibility for each of personnel" (Interviewee 6).

In term of costs factors of ITIL implementation, this study finds two more new costs factors of ITIL implementation. First, it requires socialization costs (CC1), then the implementation need additional costs for updating the organization's SLA (IC6). Furthermore, only one costs factor which is supported by all the ITIL experts called as training, certifications and employment costs (LC2).

More than half of the experts agree that ITIL implementation needs another socialization costs since it is usually different with their existing framework (CC1): "socialization to customers about the service" (Interviewee 3). The experts also explain that once ITIL is started to be implemented, organizations require to update

their SLAs which needs another cost of updating (IC6): "The objective of updating SLA is about CSI. Thus, it requires expense" (Interviewee 3).

In term of risks factors of ITIL implementation, this study also produces two new risks factors of ITIL implementation: limited IT resources (IR8) and IT-staff related risks (LR5). Moreover, there are three risks which are acknowledged by all experts; dissatisfied customer (CR1), possibility of rework (IR3) and inability to meet SLA (IR6).

More than fifty percent of the experts said that human resources become one risk that may become threat for the ITIL implementation (IR8); "limited resources are usually more about the availability of specialist in the organizations" (Interviewee 2). Moreover, the experts also explain that ITIL implementation should consider IT-staff related risk such as when the staffs have been trained they want a better position (LR5); "sometimes when employee have been trained and certified, they will have a better value and seek a better level" (Interviewee 2).

CONCLUSION

The purpose of this study is to validate the findings of current literatures about factors of ITIL implementation. There are four aspects which are explored; Benefits, Opportunities, Costs and Risks (BOCR). There are two phases used in this study, literature review phase and interview phase. The first phase attempts to identify the BOCR factors of ITIL implementation from the current literature, then all the findings of this phase are validated using the interview phase. As results, this study produces 56 factors includes 44 validated factors from the literature and 12 new factors from the interviews. Furthermore, this study finds that there are 13 factors from the literature which are not supported by any expert in the interviews. This study contributes in several aspects. The founded factors can be used by organizations to manager their expectation towards ITIL implementation. Furthermore in term of theoretical aspect, the findings of this study validate the past ideas about ITIL implementation factors and answers any doubt about it.

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