แบบจำลองมาตรฐานเอกสารขอบเขตงาน (TOR)

โครงการด้านระบบสารสนเทศ ตามมาตรฐาน IEEE 1062

A STANDARD TERMS-OF-REFERENCE (TOR) MODEL OF INFORMATION SYSTEM PROJECTS Based on IEEE 1062

ดุษฎี เทิดบารมี[1] ธาดา จันตะคุณ[2] และ เฉลิมเกียรติ ถืออาสนา[3]

[1,2,3]สาขาวิชาคอมพิวเตอร์และเทคโนโลยีสารสนเทศ คณะวิทยาศาสตร์และเทคโนโลยี มหาวิทยาลัยราชภัฏมหาสารคาม

dusadee@cs.rmu.ac.th, thada@cs.rmu.ac.th, chalermgrat@cs.rmu.ac.th

บทคัดย่อ

การวิจัยครั้งนี้เป็นการวิจัยเพื่อจัดทำแบบจำลองมาตรฐานเอกสารขอบเขตงาน (TOR)   โครงการด้านระบบ สารสนเทศ ตามมาตรฐาน IEEE 1062 ขบวนการวิจัยคือการวิเคราะห์องค์ประกอบ ซึ่งจะเริ่มจากการเก็บรวบรวมข้อมูล และศึกษา กฎระเบียบ กระบวนการการจัดหาซอฟต์แวร์ จากนั้นจึง จัดทำแบบสอบถาม หาค่าความเหมาะสม จากนั้นจึง ดำเนินการจัดทำแบบจำลองมาตรฐานเอกสารขอบเขตงานการจัดหาซอฟต์แวร์ขึ้น ผลที่ได้จากการวิจัย คือ เอกสารขอบเขต งานการจัดหาซอฟต์แวร์ ซึ่งประโยชน์ที่ได้จากงานนี้จะทำให้มีแนวทางการจัดทำเอกสารขอบเขตงานโครงการด้านระบบ สารสนเทศบรรลุเป้าหมายได้ตลอดช่วงระยะเวลาของแผนงาน รวมทั้งการกำหนดกิจกรรมย่อย ๆ ในการบริหารจัดการ โครงการด้านระบบสารสนเทศ

คำสำคัญ: เอกสารขอบเขตงาน การจัดซื้อจัดจ้าง ระบบสารสนเทศ

Abstract

This research was to model the standard terms-of-reference (TOR) in information system projects base on IEEE 1062. The study analyzed the organization's particulars by collecting data and investigating rules or procedures in software project management. After that, questionnaires were used to find the appropriate values and terms. The resultant TOR for information system projects of guides in creating objective documents and software project management. All projects can now be managed so that each process and project is clearly understandable and comparable.

Keywords: Terms-of-reference, Software project, Information system development

Analysis of Software as a Service (SaaS) For Software Service Offering Alternative: A Case Study of E-Office On-Demand Service of PT Telkom Indonesia

Achmad Nizar Hidayanto
Faculty of Computer Science
Universitas Indonesia
nizar@cs.ui.ac.id

Yoke Yuni Karnida
PT Telkom Indonesia
yoke@telkom.co.id

Genta Moerita
Faculty of Computer Science
Universitas Indonesia
genta.moerita@ui.ac.id

Abstract

Recent Internet technology development has enabled software to be delivered as a service, or well known as Software as a Service (SaaS). Through SaaS, customers no longer need to purchase software license, instead they only need to subscribe and access it via Internet connection. For service providers, SaaS adoption means they have to change their business focus from product-based into service-based, which requires some fundamental change in several aspects. This research based on qualitative method case study, evaluates benefits and risks of SaaS adoption by service providers and study how the providers implemented SaaS solution to their on-premise application. The object of this case study is an electronic business letter management software namely E-Office on Demand. Result of the study shows that service providers have successfully managed the risks of SaaS. However there are still some issues related to customization and integration in SaaS service. Complementary product and partnership between Independent Software Vendor and System Integrator give added value to the offered solution.

1. Introduction

The complexity of software management as a product and driven by the rapid improvement in Internet technology, causing the concept of software as a service to be developed. Software market has been moving from product-based business to service-oriented businesses. This drives the emergence of Application Service Providers (ASP), thus followed by the Software as a Service (SaaS) model.

Based on the analysis conducted by Woloski [1], SaaS benefits which have been perceived by the service providers and users such as cost reduction and implementation speed, resulting in a very positive acceptance by the market. The success of SaaS adoption by the market encourages more companies to

begin SaaS adoption to their business. On the other hand, although the claim of SaaS implementation benefits on variety of existing applications, SaaS still contains risks that are still questionable such as integration, security, and reliability problems, which must be well considered before adopting this platform into the existing systems.

This study intends to investigate the benefits and risks of SaaS adoption from the viewpoint of solution providers. The identification of SaaS benefits and risks for the solution providers, become the basis for further analysis of how providers that adopted SaaS can successfully take advantages and minimize risks from SaaS adoption in their application and investigate the source of value creation resulting from the benefits of SaaS adoption. In addition, this study will observe how solution provider's company can transform their on-premise application product to become a service application with SaaS model. The case study of this research is the E-Office On-demand application of PT. Telkom, which is an electronic application for official correspondence.

2. Software as a Service (SaaS)

SaaS first industry started in 1998 [2], with the emergence of Application Service Provider (ASP). ASP was originally built to provide alternative and solution to the limitations of software on the customer device (on-premise software) and acts as a broker from the software vendors who do not want to own and manage their own products. However, ASP was considered requiring high maintenance cost, support and upgrade needs. Because of this, ASP development which is called the first generation of SaaS is ultimately failed. The second generation of SaaS improves its previous technology by allowing users to access standard windows application software through the Internet.

Saas adoption has been studied by some researchers. Mertz et al [3] and Woloski [1] shows that

SaaS adoption has been more rapid than ASP. Mertz shows that SaaS solutions contribute as little as 1-2% in revenue in the enterprise content management (ECM) market and more than 75% in web conferencing market [3]. Woloski [1] showed that SaaS adoption increases rapidly by surveying related reports at major agencies in the world which are Gartner Inc., Forrester and Saugatuk Technology as the leading of provider or Platform. However, SaaS adoption also faces some barriers. For customers, SaaS Adoption Barriers are integration and customization, Total Cost of Ownership (TCO), and security. For solution providers the barrier in SaaS adoption is higher selling costs.

Considering the various aspects of the benefits that are owned by SaaS model, it is not surprising that this model can be more successful and grow. Besides promising greater benefits for users and providers, on the other hand there are risks to beware. In this study the description of the benefits and risks of adopting SaaS services research are from previous study conducted by Saaksjarvi, et al [4].

3. Paradigm shift in SaaS realization

Changes in corporate focus of providing software-based products become more service-oriented business is something not easily to be done [5]. Realizing that SaaS model requires fundamental changes and the paradigm shift that includes at least 3 (three) interrelated areas which are Architectural Services, Business Models, and Operational Structure [6, 7].

From application architecture viewpoint, there are three main components that must be met in order to have a good SaaS application architecture, namely: application scale, multi-tenant data efficiently, and customization capabilities. In term of application architecture, paradigm shift can be explained by the SaaS Maturity Model [6]. In this model, Level 1 is the ad hoc/custom which is considered as the least mature, Level II is configurable, Level III is configurable, multi tenant efficient, and Level IV is scalable, configurable, multi tenant efficient which is considered as the most mature.

From the business model side, the fundamental shifts that need to be observed is the change from software providing mechanism which is usually project-based software or software product, to subscription model with recurring revenue stream, which is more service-oriented.

In term of operational structure, SaaS providers not only have to be experts in building software and bringing it to market, they must also become experts in

operating and managing it. The SaaS providers need to monitor SaaS applications in order to maintain their performance and availability.

4. Value creation model in E-Business

Amit and Zott [8] explored theory of value creation in E-Business. They investigated 59 publicly traded e-businesses corporation in American and European. The proposed model was developed by combining theory of entrepreneurship and strategic management.

From the data analysis, Amit and Zott [8] concluded four sources of value creation in e-business which are: Efficiency, Complementarities, Lock-In, and Novelty. Transaction efficiency presents when the cost per transaction decreases. Therefore, it implies that the higher the transaction efficiency gained, the lower the costs and hence the more valuable it will be. Complementarities occur when products are bundled together and offer more values compare to total value of having each of the product separately. Locking prevents customers and strategic partners turning to competitors. Novelty refers to innovation provided by the companies in terms of new products or services, new methods of production, distribution, or marketing, or the tapping of new markets, and the ways the companies operate business. Johansson and Mollstedt [9] revisited Amir and Zott's value creation model by using it as both value creation model and value evaluation dimension.

Christensen et al [10] explored value creation in e-Business particularly for examining the impacts of Internet-enabled business conduct in Norwegian enterprises. They concluded that at that time, the e-Business is in its infancy. Internet is only used for supporting the automation of existing business processes.

5. Research methodology
5.1. Profile of organization

PT Telekomunikasi Indonesia, Tbk is a service and largest network provider company in Indonesia. Of the 10 strategic initiatives of PT Telkom, one of which is to integrate enterprise solutions and develop information technology services. For corporate and business customers, Telkom provides enterprise solutions with the product name Telkom Solution. One of the products offered by Telkom Solution is TELKOM POINT or better known as the E-Office On-demand application. TELKOM POINT is an electronic office service (e-Office) provided for corporate customers of PT Telkom through Software as a Service

concept as a value added service from the network access that has been provided by PT Telkom [11].

5.2. Research model and framework

This research aims to analyze the characteristics of SaaS in point of view the provider. First, we assess the barriers of SaaS adoption in the case study. We use the SaaS Adoption Barriers from Woloski research [1] which consist of Integration and Customization, Total Cost of Ownership (TCO) model subscription versus traditional model, security concern, and high selling costs. Second, we analyze the benefit and risks of SaaS implementation. We adopt SaaS model of benefits and risks by Saaksjarvi [4]. Third we analyze value created by SaaS adoption by using Value Creation Model of Amit and Zott [8]. The analysis is conducted by evaluating four dimensions of e-business value creation model which are efficiency, complementarities, Lock-In and Novelty. Last, we evaluate the fundamental changes in order to gain success in SaaS implementation in terms of Architectural Services, Business Models, and Operational Structure [6, 7]. The SaaS paradigm shift realization is based on Amit and Zott [8].

6. Analysis and discussion
6.1. Sources of research data

Interview for the first part consists of 16 questions delivered in the form of structured interviews (using a script). These sixteen interview's questions are designed based on Saaksjarvi's research model which has been designed to observe the benefits and risks of SaaS in term of provider perspective, which consists of 6 questions for SaaS benefits, 6 questions for SaaS risks, and 4 questions related to SaaS adoption barriers. As we have mentioned, this study focuses on SaaS providers, the discussions are emphasized on benefits and risks from the provider perspective.

Structured interviews are conducted by using script toward respondents from System Integrator party which is PT. Telkom, and ISV/E-Office On-demand application developer which is PT. Codephile. From PT. Telkom's side, the key person appointed to be interviewed is represented by Senior Manager (SM) level from Enterprise Division, Products and Service Supply Management unit. While from Telkom's partners, which is PT. Codephile, the key person interviewed is the CEO of PT. Codephile. The following are first part of the interview's result.

6.2. SaaS adoption barries

The interview result of SaaS adoption barriers by the market shows that for E-Office On-Demand application service, Total Cost of Ownership (TCO) with SaaS model is become lower because customers do not require to invest in order to get this application. Whether the purchase is the software device, license or infrastructure, they just need to fairly allocate the subscription costs paid periodically in accordance with the number of users and usage. Besides, the cost component of investment in this SaaS model can be distributed within a number of customers, to possibly make a lower pricing.

In accordance with the safety factor, security is no longer an issue because it is anticipated and handled by the existing technology. Data security is anticipated by Telkom with virtualization on the server side and by making a "private cloud" that is separate from public Internet and the selection of proven reliability and safe platform. Whereas, adoption obstacles related with the high sale costs of this SaaS model anticipated with marketing efforts to reach wide market.

While for customization and integration related problems, all respondents give responses that it is still the main issues in the SaaS service. But providers try to overcome the problems by limiting the integration process with customer's applications, to reduce complications level. Yet SaaS providers continue to develop their services so that integration and customization are no longer problem in SaaS service.

6.3. SaaS Benefits and Risks

Research data is analyzed related to SaaS benefits and SaaS risks. For evaluating SaaS benefits, the responses from respondents are classified into 3 (three) categories: Agree, Hesitated, and Disagree. For evaluating the SaaS risks, the interviews are more directed to risks anticipation that has been done not on the clarification of those risks. The respondents' answers are categorized in two (2) types: Already Anticipated and yet anticipated. Table 1 and 2 reports the benefits and risks of SaaS respectively.

In general, by examining data in the tables it can be said that SaaS model has provide benefits in terms of costs reduction (marketing/sales, implementation, maintenance, upgrades, etc.) compared to project-based model.

Table 1. SaaS Benefits for Providers

SaaS Benefits
1. **Economies of scale on production and distribution.** The Internet and infrastructure assets owned by System Integrator enables broad customer reachness with lower production and distribution costs than project based as the application is hosted and centered in provider side.
2. **Predictable cash flow.** The predictable cash flow occurs as the impact of payment with subscription scheme from users who use SaaS, where customers will pay a periodic subscription service same as phone, electricity, etc.
3. **Reach and strengthen potential customer basis.** The services provided online by internet-based, not limited by places and distance, and relatively fast in implementation. So it can reach a broad range of customers as Telkom capital assets infrastructure encompassed a very wide area in Indonesia.
4. **Shorter sales cycle.** Systems Integrator (Telkom) via their Account Manager (AM) directly acts as the distribution channel from the marketed products. In SaaS model, Systems Integrator acts as a point of contact for its customers thus enabling Telkom becomes the direct "owner" of the customer using SaaS service.
5. **Reducing maintenance and software version costs.** Cost is reduced as the applications hosted in the provider side. Besides, the support personnel to be involved for maintenance becomes slightly in lower number if compared to project-based model
6. **Creating entry barrier for competitors.** Combination of ISV's products software with the strength and experience in Systems Integrator's infrastructure services business has strengthened the position of E-Office On-demand. With this power, it will be quite difficult for competitors to compete in the same area.

Table 2. SaaS Risks for Providers

SaaS Risks
1. **Difficulty in managing partner network.** Risks are anticipated by developing good partnership between partners who work together.
2. **Reduce turnover from subscription fees revenue.** It is not considered as a risk because this subscription scheme will provide a more stable and predictable revenue streams. As well as low SaaS operating costs which gives more advantages to ISVs. For System Integrator, providing SaaS services will strengthen its position as a total solution provider.

Table 2. SaaS Risks for Providers (continued)

3. **Performance and scalability.** System Integrator anticipates this risk by establishing Service Level Agreement (SLA) which pledged to its customers. Besides, the level of performance is guaranteed by choosing infrastructure and proven reliability platform. While in terms of scalability, it is possible by a number of servers in the cluster to run E-Office On-demand application.
4. **High initial investment.** Telkom is a company which has excess capacity on the side of adequate infrastructure to launch SaaS service. As total, the investment costs, if any, do not have a great effect to the selling price because it is able to spread over a large number of customers. In the other hand, ISV (Codephile) with limited infrastructure assets chooses System Integrators (Telkom) which has strong capital infrastructure, thus it is a very good strategy.
5. **Customization.** Service provider designs generic functions, which are commonly required by the prospective customer so they can be mass-customization. Customization can be fulfilled to a certain level. With these conditions in which the customization is pretty limited, the SaaS model is suitable for applications that support common business processes.
6. **Upgrade process/application version.** It is anticipated by version changing. This version changing performed seamlessly so that customers will not feel the effects. The changes are relatively easy to do with low cost because performed on a centralized server. In the case of upgrades that affect the services such as the downtime, stick to the Service Level Agreement (SLA) which have been pledged.

6.5. Analysis of Value Creation Aspects

a. Value Creation of Efficiency Aspect

Partnership with Telkom gives advantage for Codephile as ISV in reducing cost and minimizing the risk of access to new markets because Telkom as a System Integrator has a large customer base with the support of a strong infrastructure. For Telkom itself, E-Office On-Demand service adds value to Telkom's existing services, completing a total solution from Telkom services (infrastructure and content). In addition, with this SaaS business model, each party can focus on their core competencies.

b. Value Creation of Complementary Aspect

The bundling of software products and ISVs with the infrastructure experience in business service owned

by Telkom as a System Integrator, provide benefits for each party, added value and strengthening the position of E-Office On-demand services provided for customers. It also gives a total one stop service solutions provided to customers including software application service, customization and integration, application implementation, hosting services and maintenance, and professional supports to handle the application. Cooperation on both sides also has impact on shortening application marketing cycle as Systems Integrator acts as a distribution channel of ISV.

c. Value Creation of Lock-In Aspect

Overall, the efficiency and complementary benefits created from SaaS service is likely attracting customers to use SaaS solutions and also retaining existing customers (Lock-In). By continuing to utilize Telkom's products and services of E-Office On-Demand, Telkom indirectly will be able to increase and retain its communication customers. In addition, SaaS potentials which increase the possibility to produce mass and continuous customization in order to fulfill customers' needs will make the application becoming more flexible and continuing to fit the needs of its customers.

d. Value Creation of Novelty Aspects

The new thing that was created with the SaaS model is mobility of the applications. It can be used wherever and whenever, not bound by time and place. The subscription scheme in software service delivery promising profits for customers because it can be freed from the investment and maintenance costs. For solutions providers (ISVs), SaaS model provides a solution for the distribution of the product. It becomes faster, efficient, and certainly in lower costs. With the emergence of technology, SaaS also provides plenty opportunities for customers to choose and obtain the necessary application they need with more affordable cost.

6.6. Analysis of SaaS Implementation

6.6.1. Application Architecture. Currently, PT. Telkom tries to improve the maturity level of E-Office On-Demand to level 2. By this architecture, Telkom provides each tenant a basic level instance which has been customized according to tenant's need. In this level, every instance is implemented in the same code to reduce SaaS application service need, so that every change will be easily applied to every tenant.

However customization facility in the application is still not available. The consideration is that SaaS solution's market condition in Indonesia is still in the awareness stage and corporate customers in Indonesia are still unfamiliar with self-customized application. Therefore, customer education is still highly needed.

6.6.2. Business Model. Business model changes from On-Premise to SaaS Solution. With SaaS adoption for the service of E-Office On-Demand application, there are changes in business model from project-based business into SaaS service. Significant changes happen in the internal of Codephile which make them not directly interacting with customer anymore. The collaboration between ISV and System Integrator has impact on roles and responsibilities division between both parties. Telkom acts as the infrastructure, marketing, sales, and billing provider. While Codephile has roles as software license provider, and be responsible for providing the application and developing the application to fit with customers needs. Customer pays for the service with subscription scheme to System Integrator.
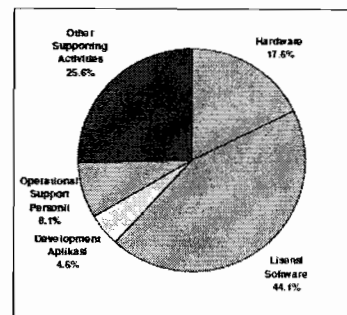
6.6.3. Operational Structure

Figure 1. Cost Structure of E-Office On-Demand Service

Total costs for E-Office On-Demand service is divided by number of customer according to targeted BEP that has been agreed before defining the application rent expenses per user (yearly or monthly). For now, the pricing offered from Telkom is Rp 125,000 per user/monthly which is also negotiable and will be decrease along with the increase of customer number.

The revenue sharing between Telkom and Codephile is calculated based on the contribution and initial investment load from each party. The agreement of revenue sharing is 68% for Codephile and 32% for Telkom with per user price. ISV portion is bigger because it has to pay for software license. The payment mechanism from System Integrator to ISV is by using Back-to-Back system.

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Total Cost of Ownership (TCO) E-Office On-Demand Application

The biggest cost component concerning E-Office On-Demand application is on the software license. The Total Cost of Ownership (TCO) will be beared by customers. With SaaS model, customers will have a bigger chance to get lower TCO. Figure 2 shows graphical representation of the comparison between TCO of on-demand (SaaS) application and on-premise application. The comparison is our evaluation result towards TCO estimation (in US dollar) from E-Office On-Demand application using TCO calculation table by Info Tech. With the assumption that customer number and usage period of E-Office On-Demand solution for five (5) years, it can be seen that cumulative cost or TCO on-demand is lower than TCO of the on-premise application. The cumulative cost in five years period for on-demand application is $228.000, while for on-premise application is $297.525. The cost reduction is possible because E-Office On-Demand application using SaaS model, where customers do not need to invest in infrastructure, personal training for application maintenance, etc.
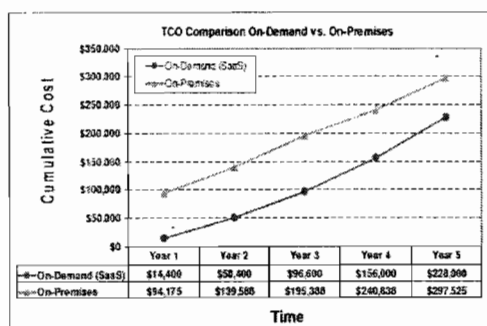

	Year 1	Year 2	Year 3	Year 4	Year 5
On-Demand (SaaS)	$14,400	$50,400	$96,600	$156,000	$228,000
On-Premises	$94,175	$139,588	$195,388	$240,838	$297,525

Figure 2. TCO Comparison of E-Office On-Demand vs On-Premise Application

Service Level Agreement (SLA)

Service Level Agreement (SLA) will be pledged by the ISV to System Integrator, then from System Integrator to its customers. The indicators and targets which are agreed between Codephile and Telkom refer to Service Level Guarantee (SLG). Instead of that, Telkom also provides restitution for customers if SLG is insatiable. The pledge of indicator and restitution have been prepared well by Telkom because its awareness on the service business, so the way to win the competition is by gaining customer satisfaction.

Contract Design

In the implementation of E-Office On-Demand, collaboration between Telkom and Codephile bounded by a two years collaboration contract, which included:
a. Solution planning/ application requirement fulfillment
b. The development of application
c. Application installation and service integration
d. The making of Blue Print, SOP and SMP
e. Application Usage Training
f. The development and maintenance of the application.

The agreement contract also arranges the responsibility of each party, business model, service price, provisioning mechanism, marketing/sales, installation process/integration, after-sale service, SLA, billing, Intellectual property rights, etc.

Marketing and Sales Procedures

Marketing and sales which are usually the responsibility of Codephile as ISV, with SaaS provisioning model, now mainly becomes the responsibility of System Integrator (Telkom). Even so in the agreement between Telkom and Codephile, there is still possibility that the marketing initiative can come from ISV. However when facing with the customers, E-Office On-Demand is the solution of Telkom. The advantages for ISV are cost reduction in marketing, sales, distribution and investment.

Provisioning

Provisioning facility is still not available in E-Office On-Demand application. It is still manually done by the solution provider. The provisioning process is started from customer request or agreement between Telkom through Account Manager (AM) with the corporate customer. Next, AM will follow-up the request by doing Joint Planning Session (JPS) with ISV. If the product is general, ISV can directly install the product. However if there are specific requests, then customizations need to be done according to customer's request. At the same time, Telkom prepares the infrastructure needed for the service. The next step is service integration before it can be used by customer. This provisioning mechanism considered as the most ideal mechanism for now, in the light of E-Office On-Demand in Indonesia is still in awareness level so the involvement of service provider is still highly needed and has to be dominant to educate customer about SaaS.

Billing

The billing mechanism on E-Office On-Demand is still manual. The payment is billed to corporation

customer, flat per user, periodically according to number of subscribers from the company.

Disaster Recovery

Right now, the high availability level from E-Office On-Demand application is supported by clustered server. However, disaster recovery mechanism as a back-up facility is still not available. Corporately, Telkom already has policies related with IT infrastructure disaster recovery. Yet because E-Office On-demand application is still considered as a new application, its Disaster Recovery Scheme (DRS) is still not included on the policies. The adjustment is still on progress towards the policies. Network Operation Center (NOC) and Help Desk Telkom as the solution provider of E-Office On-Demand do not really need a new establishment of NOC, because the existing NOC has already covers it. In the operational of E-Office On-demand, NOC follows the mechanism of the existing fault handling and customer's infrastructure.

In order to assure the security of SaaS data and service on E-office On-demand application, technologically, is solved by creating an isolated environment through virtualization on the server side, provide the option in VPN usage, the usage of reliable platform and doing data back-up periodically. For data and service security, legally, to prevent data being given by the solution provider to another party especially competitor, both parties signed a confidentiality agreement.

7. Conclusions

From respondent's response to research questions related with SaaS benefits, it can be concluded that Saas Adoption has given a lot of benefits, either for customers and the service providers itself, particularly in reducing cost of investment. There also exists some risks faced customers and provider in implementing SaaS. However, result from respondent's responses showed that most risks have been anticipated by solution providers. SaaS benefits adopted by on-premise application from this study have also creating value triggered from some sources, which are Efficiency, Complementarities, Lock-In and Novelty. This result confirms the validity of Value Creation Model of e-Business from Amit and Zott.

To successfully implement and transform on-premise application to become SaaS solution, there are 3 fundamental areas of changes related to each other which include application architecture, business model, and operational structure. Some adjustments need to be taken in those areas to suit with SaaS platform. Another aspects need to be prepared to support SaaS

implementation are operational structure, related with provisioning mechanism, billing, NOC, Help Desk, and disaster recovery.

8. References

[1] M. Woloski, "Software as a Service", Master Thesis, Buenos Aires University, September 2008. Available at http://blogs.southworks.net/mwoloski.

[2] ..., "Software as a Service: Changing The Paradigm in The Software Industry", SIIA and Triple Tree Industry Analysis Series, Washington, D.C, 2004. Available at http://www.siia.net.

[3] S.A. Mertz, T. Eid, and C. Eschinger, "Market Trends: Software as a Service in the Enterprise Application Software Markets, Worldwide, 2007", Gartner, Stamford, CT, 2007.

[4] M. Saaksjarvi, A. Lassila, and H. Nordstrom, "Evaluating The Software as a Service Business Model: From CPU Time-Sharing to Online Innovation Sharing", *In Proceeding of the IADIS International Conference e-Society*, Qawra, Malta, 2005, 177-186.

[5] A. Lassila, "Taking A Service-Oriented Perspective On Software Business: How to Move From Product Business to Online Service Business", *IADIS International Journal*, Vol. 4, No. 1, 2006, 70-82.

[6] C. Frederick and C. Gianpaolo, "Architecture Strategies For Catching The Long Tail, Software As A Service Architecture Guidance Series", Blog Gianpaolo, 2006. Available at http://msdn.microsoft.com/en-us/library/aa479069(printer).aspx

[7] S. Kelkar, "SaaS: Sofware as a Service. Software and Development Challenges & Issues Seminar", Symbiosis Center for Information Technology (SICT) forum, 2008. Available at http://www.slideshare.net/paragliding2000/saas-presentation-at-scit-conference-presentation.

[8] R. Amit and C. Zott, "Value Creation in E-Busines", *Strategic Management Journal*, 22 (6/7), 2001, 493-520.

[9] N. Johansson and U. Mollstedt, "Revisiting Ammit and Zott's model of value creation sources: the SymBelt customer center case", *Journal of Theoretical and Applied Electronic Commerce Research*, Volume 1, Issue 3, 2006.

[10] G.E. Christensen and L.B. Methlie, "Value Creation in e-Business: Exploring the Impacts of Internet-Enabled Business Conduct", *In Proceeding of 16th Bled e-Commerce Conference*, Bled, Slovenia, 2003.

[11] S. Imam, "POINT, E-Office On-Demand Service PT Telkom", Enterprise Service Division, PT. Telkom, 2009.