

## Services Modeling based on SOA and BPM for Information System Flexibility Improvement

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### ABSTRACT

The lack of identify services mechanism which is related to the development of information systems could be impact in wasting time, over budget and can not adapt to the changing environment. This phenomenon is happened by the belief that lack of capturing user requirement. This is due to consider the business environment is always running normally. In fact, the development of the system needs a way to anticipate the business environment that unpredictable changes. Therefore, the phenomenon on the need for modeling services can able to respond to the changing needs of users still have a chance in this study. It explores modeling services to synergize SOA and BPM. Several previous studies generally use a business driven approach, technical partially driven to develop the service modeling. This leads to the question of how a service should be modeled so that it can be applied in different contexts and business processes also. It is support user needs in diversity and heterogeneous system environments. This Conditions occurs in corporate university. The case studies in this research is a Learning Management System (LMS) in Academic Enterprise System (EAS). The research stages are: (1) Analysis of Synergy in SOA and BPM, (2) Analysis of User Experience in LMS Academic Enterprise System (L-EAS), (3) Analysis of Modeling Framework, (4) Proposed Framework that aligning SOA and BPM. The result of this study is proposed system framework based on services to increase the flexibility of information systems at LMS Academic Enterprise System (L-EAS).

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### 1. INTRODUCTION

SOA (Service Oriented Architecture) appears to offer adaptive and reactive to the environment as well as offering a solution to the complexity of business processes, systems and technology [1]. Service diversity in general can be viewed differently by business experts and IT experts, as well as the perspective of the process bisnis. phenomena this is supported by the belief that the absence of changes in user requirements for a services [2]. This is due to consider the business environment is always running normally. In fact, the development of the system needs a way to anticipate the business environment unpredictable changes [3].

SOA architecture embraces the bottom-up approach while BPM maintains a top-down process. If implemented in an enterprise [4] SOA without involving BPM, reusable and reliable service that can be created, remain unable to increase the speed even further [5]. BPM is a dynamic process optimization and

adaptation process, whereas SOA is a mechanism to create an agile service and provide a means to regulate the services [6].

## 2. STATE OF THE ART

User experience is the feeling experienced before, during, and after someone using a service or system [7]. These flavors include emotions, beliefs, preferences, cognitive impression, and many other factors. There are four factors that play a role in the user experience [8]: (1) Branding, which covers all elements relating to the design and the visual of a website, (2) Usability, ease of use of the website to the user. Navigation and accessibility are covered here, (3) Functionality, namely the technological aspects of the product or application (4) Content, or the content of such websites. It is just as important as a well-designed interface. Usability is the ability of a software / website to offer its interface with friendly to users. Usability of a site will have a direct effect to the experience of visitors to the site. Therefore, usability is an important factor in the design of a site. Therefore, the phenomenon on the need for modeling services are able to respond to the changing needs of users still have a chance to study. The process to minimize failure in requirement analysis using business process model and goal model has described in [9]. Relate to [10], it describe the development of software product line (SPL). On the other hand, according to [11], the software complexity could be measure with proposed framework. However, the previous study is not addressed the improvement of information system application in dynamic environment. The challenge is how to aligning business domain and technical domain in information system development phase.

## 3. RESEARCH METHOD

The purpose of this research is (1) Make Modelling Services for the service provider to synergize SOA and BPM (2) Creating a mechanism that can provide services to diverse user needs. The benefits of this research are (1) Assist developers in developing systems of enterprise systems. (2) Service providers can provide services that can respond to changes in the business environment to be used by a service consumer. This study is one study that explores modeling services to synergize SOA and BPM. Several previous studies generally use a business driven approach, technical partially driven to develop the service modeling. This leads to the question of how a service should be modeled so that it can be applied in different contexts different business processes and business pressures are quick to support user needs are diverse and heterogeneous system environments. But so far, have not seen any research service modeling using business driven approach and technical driven to accommodate the needs of a diverse and dynamic user and heterogeneous system environments. The benefits of this research can contribute in terms of: Service Service Provider can provide and manage services that are used by a service consumer and also can improve SLA (Service Level Agreement).

Research Method consists of four steps, such as:

- a. Analysis of Synergy of SOA and Business Process Management (BPM): This stage aims to get state of the art research related synergies SOA & BPM. In this stage, we explore literature that considers the stages of comparison, contrast, analysis, and synthesis. The results of this phase is the state of the art research.
- b. Analysis of User Experience Forum LMS Academic Enterprise System (L-EAS): This stage is done by spreading a brief questionnaire related to user experience using Forum in LMS Academic Enterprise System (L-EAS) The purpose of this phase is to determine the user experience on LMS Academic Enterprise System (L-EAS).
- c. Analysis Modeling of Framework that Synergies SOA & Business Process Management (BPM): This stage will use the conceptual literature which synergize SOA & BPM. The results of this phase is the mapping of the system environment and defining the system fleksibilitas.
- d. Proposed Framework that Synergy of SOA and Business Process Management (BPM): Services in amount of variety, will be combined and synergy in order to establish a service-based system. It aims to simplify management. This stage will focus on techniques to conduct merger and synergy with the use of orchestration and choreography. The Results in this stage is a framework that work to combine and synergize services.

## 4. RESULTS AND ANALYSIS

Environmental conditions that have the characteristics of corporate university, has a specific uniqueness. The LMS in the corporate university requires a high adaptability to changing. According to the previous research that has been mentioned on the above analysis, it shown that so far no studies for

evaluating the Synergy between BPM with SOA. It can be represented and shown that SOA can have ability to reusable business services for the corporate university. This study will take a case study on the LMS Academic Enterprise System (L-EAS). Despite of it, the changes that occurs in this conditions are not predicted, and it always happened in the business domain and business function (functional area). Changes that occurs in both of it, will caused the effect of organizational changes in the scope of information systems. The impact in further changes is the information requirements which is derived from much of application. Relate to it, the changing information needs, will also influence the changing in software and infrastructure existing. Academic Enterprise System (EAS) is an enterprise system that used higher education institutions in managing and optimizing existing resources. EAS can cope with changes in policy and provide flexibility in responding to such changes. EAS can provide task and business processes that can be be reused. EAS provides software and business processes that have commonality, variability and specific in software features. If seen from the types of applications used by higher education institutions that have the characteristics of corporate university, it shown the intersection on business processes. These conditions allow the Policy that are common, but there are also specific to each business unit in corporate university.

Therefore, it allows a business process can be used for sharing (together). Therefore, if depicted in the Venn diagram will be described in Figure 1.

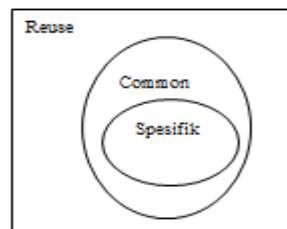


Figure 1. Venn diagram

Based on the Figure 1 above, it can be grouped set of business processes, and the notation of PB=Business Processes

- The set PB Common {.....}
- The set PB Common Specifications {U ..... ..}
- Association Task Specific {..... ..}
- Association Task Common {.....}
- Association Task Common Specifications {U ..... ..}
- Association Task Common Specifications {U ..... ..}

EAS environment that has elements parliaments as follows:

- Functional Areas (AF), an organization has AF1, AF2, ..... AFn
- Business Process, Business Process Each AF has PB1, PB2 ... PBN
- Role, is a business process that is performed and played.
- Task, is a real activity which will consist of sub-task

Definitions and Descriptions Flexibility Academic Enterprise System (EAS), EAS has the following definition:

- An organization is a group of non-consecutive collection of one or more AF (Functional Area):

$$Org = \{AF_1, AF_2, \dots, AF_n\}$$

- AF is a functional representation of a functional-owned by an organization and is defined as a set that consists of one or more Business Process (PB).

$$AF = \{PB_1, PB_2, \dots, PB_n\}$$

- WS (Work System) is one or part of the AF system is managed by an organization and consists of a minimum of a PB. In practice, the PB delegated to AF-AF, where PB is a joint member (wedge) from WS and AF.

$$PB \in WS \cap AF$$

$$WS = \{PB_1, PB_2, \dots, PB_n\}$$

- d. The intersection between the two Functional Areas, AF1 and AF2 occur if one or more business processes related to AF1 which is also associated with AF2 (the same WS).

$$AF_1 \cap AF_2 = \{ PB | PB \in AF_1 \wedge PB \in AF_2 \wedge PB \in WS \wedge PB \in AF_1 \wedge PB \in AF_2 \}$$

- e. Business Processes can be decomposed into Business Processes (PB) more specific.

$$PB_{generic} = \bigcup_{i=1}^n PB_i$$

We proposed Framework system which consists of software components that integrated one with each other. The software components are flexible and can plug n play according to user needs. Within the framework of this system, there is a mechanism that serves to accommodate the reusability and interoperability. This framework consists of four main layers, namely: (1) Common application layer, (2) Authentication Layer, (3) ESB (Enterprise Service Bus) layer, and (4) Specific application layer. The function of common application Layer is to handle variety in common function blocks and applications. ESB (Enterprise Service Bus) and serves to manage communication between applications. Specific Application Layer functions to handle specific applications that exist in every organization. The proposed framework of synergy SOA & BPM system shown in Figure 2.

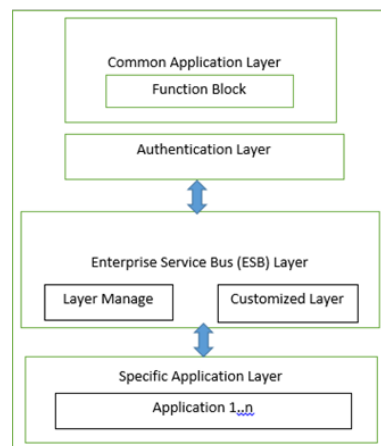


Figure 2. Proposed framework

According to Framework Mechanism in Figure 2 above, it proposed a framework that synergize SOA & BPM to accommodate the needs of LMS Academic Enterprise System (L-EAS) in corporate university. This framework consists of a layer of SOA and BPM Layer. Grouping SOA and BPM layer to accommodate the application of common and specific applications in the corporate university which has multiple business entities

### 5. CONCLUSION

The conclusions of this research is the changes that occur in conditions which is not predicted in the business domain and business function (functional area). Changes that occur in both will cause the effect of organizational changes in the scope of information systems. Further changes will affect the information requirements. The changing information needs, will also influence the change software and infrastructure. LMS Academic Enterprise System (L-EAS is an enterprise system that used in higher education institutions for managing and optimizing existing resources. It can provide task and business processes that can be reused. It also provides software and business processes which have commonality and variability layer. The types of applications used by higher education institutions are having characteristics in corporate university.

It shown the intersection on business processes. These conditions allowing common policy, but there are also specific to each business unit in corporate university. Therefore, it allows a business process can be used for sharing. In order to accommodate these conditions, the proposed Framework consists of software components are integrated with each other. The software components are flexible and can plug n play according to user needs. Within the framework of this system, there is a mechanism that serves to accommodate the reusability and interoperability

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