

Analysis and Design Application for Quantifying IT Business Value

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ABSTRACT

North Sulawesi province is fostering regional development towards a society which has values, prosperous and competitive cultures. Information Technology (IT) has become a key enabler to accelerate region developments. To optimize IT utilization, local government using IT Blueprint as a general guidelines for conduct IT investing. By using *IT Valuation Matrix* method, all IT Business Value which derived from each IT investing type can be quantified in reasonable and responsible manner. *IT Valuation Matrix* method also provides best practices to assessing local government IT investment. This article shows the process of analysis and designs an application to quantify IT Business Value based on IT Valuation Matrix method. By using Disciplined Agile Delivery methodology, which based on agility and object-oriented approach, the application that meet IT Valuation Matrix method can be developed.

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1. INTRODUCTION

The business realization benefits of IT (or *IT business value*)^{[1][2][3]} defined as benefits or results obtained from an IT investment which can improve organization performance. IT business value is more than just provide a *benefit* in financially terms. The IT business value concept includes on how IT provides efficiency, effectiveness, increase productivity and create competitive advantage for a particular organization. This IT business value understanding follows Parker^{[4][5]}, where according to Bannister and Remenyi^[6] based on Porter^[7] definition about *value*. This article will follow IT business value definition proposed by Ranti^{[1][2]}.

The process for quantify (or compute) business realization benefits of IT was called IT investment analysis. According to Ranti^{[2][3]}, IT investment analysis was done based on several reasons, namely: to have a justification of IT projects, to enable organization assessing investment of various IT projects undertaken with limited resources, to provides a tools for controlling and monitoring IT investments that have been and will be done, and to enable organization create competitive advantage, developed new business, improve performance and productivity, and provide new ways for managing the organization.

The research problem for this article is how to develop an application to quantify (or compute) IT business value based on Ranti's IT Valuation Matrix method? The objective of this article is to demonstrate the analysis and design process of an application to quantify (or compute) IT Business Value based on Ranti's IT Valuation Matrix Method. This application can be used to compute IT business value which resulted from each investing conduct by non-profit organization such as local-government.

2. RESEARCH METHOD

Ranti^[1] develop an IT Investment analysis method based on the business value of IT. This method is called *IT Valuation Matrix*. Ranti^[1] also takes into account the financial and non-financial approach. (See Figure 1). Ranti^[1] framework begin with classifying the investment type according to the category of

mandatory, improvement, strategic and infrastructure, where each category have different focus, assessment, value and quantification process.

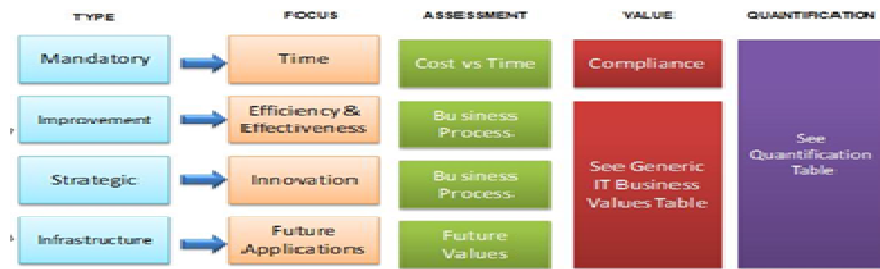


Figure 1. IT Valuation Matrix process method

Ranti's IT Valuation Matrix approach follows Information Economics (or IE), proposed by Parker [3][4]. IE using financial terms, such as Return on Investment (ROI) to quantify financial benefits while Ranti's not using ROI. However, both IE and IT Valuation Matrix using scorecard to quantify non-financial benefits. IE was used for profit organizations; while Ranti's IT Valuation Matrix was used for non-profit organizations.

Wowor and Karouw [8] using Ranti's IT Valuation Matrix method to quantify the identified IT Business Value for Local Government. Using case study approach for North Sulawesi Province, as service-oriented organization, Wowor and Karouw [8] expand Ranti's IT Valuation Matrix method with IT Business Value Identification and Classification phase, before Quantification stage. Wowor and Karouw [8] also added Clarification Process stage after conduct the Quantification stage for all identified IT Business Value. (See Table I).

Table 1. Clarification Process [8]

Category	Quantification Process	Clarification
Accelerating Process (APR)	(total completed tax notice x total working hours x total income) x time in month/years	The quantification amount mostly determine by working hours and type of service
Reducing Risks (RRI)	(total number of visiting tourists x visiting time (in days) x retribution cost) x percentage for Stakeholders sharing x time in month/years	The quantification amount mostly determined by number of taxpayer and how long taxpayers using the services

Disciplined Agile Delivery [9] developed by Scott Ambler [10]. As stated here [11], DAD is an enterprise-aware hybrid software process framework. Formal definition for DAD is a people-first, learning-oriented hybrid agile approach to IT solution delivery. It has a risk-value lifecycle, is goal-driven and is enterprise aware. The DAD process framework is a hybrid: i.e. it adopts and tailors strategies from a variety of sources [10]. See Figure 2 for The DAD Process Framework.

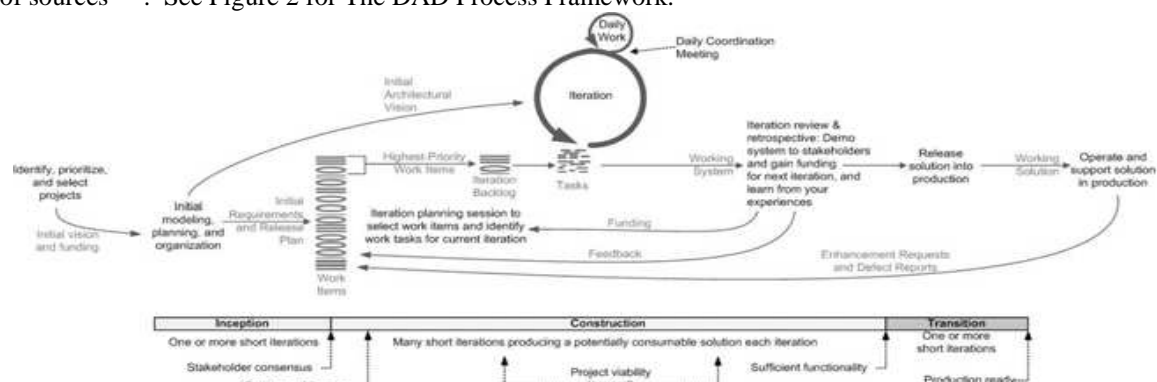


Figure 2. DAD Process Framework

To develop this application, our methodology was followed DAD framework. Begin with collect data to organize and classify requirements. We have used questionnaires and conduct interviews. We also used User Stories Card [12] technique to foster user requirements classification.

3. RESULTS AND ANALYSIS

This article show the analysis and design process for build application to quantify (or compute) IT business value based on IT Valuation Matrix, proposed by Ranti ^[1]. Following stages conducted by Wowor and Karouw ^[8], this application will compute two category of identified IT business value, which are Reducing Cost of (RCO) and Reducing Risk (RRI). The process running by this application is shown at Figure 3, using UML Activity Diagram.

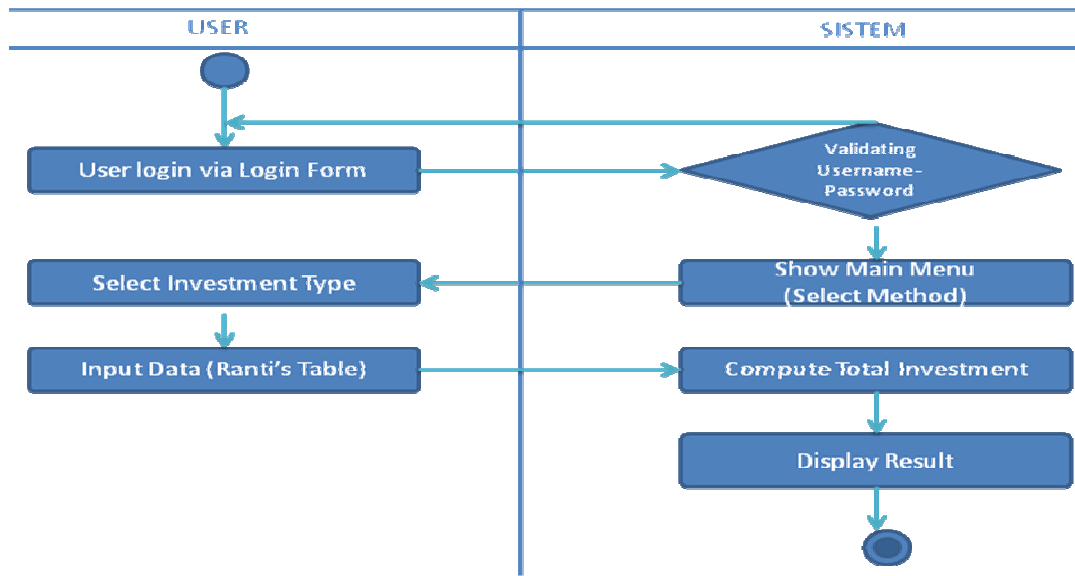


Figure 3. UML Activity Diagram for Application

3.1. Inception Phase

The main target of inception phase is to understand the scope and objectives of the project and obtain enough information to confirm that we must go on or no. Main result for this phase is User Requirements. User Requirements have major impact for application development. The artifact which produced user requirements list is called User Stories Card ^[12]. See Table 2 for User Requirements List, level of priority, feature that must be developing and application functionality.

Other artifacts which have minor impact but important also are Software Project Plan document. This document show application estimation in terms of size, the number of developers required, working time and costs required. Using Function Point Analysis technique which explained by Pressman ^[13], the application estimation process will be compute easily. Table 3 summarized the result.

Table 2. User Requirement List and Main Functionality

User	Priority	Feature	Function
Developing a system which discern user privilege	High	Log In for User Verification	To protect the security level of the system.
Developing a system that can provide comparison method	High	Select Method	To show all method for compute IT Investment
Developing a system that provide clear user interface	High	Input Data	To provide step-by-step interface following each method stage
Developing a system that can display result clearly and easy to read.	High	Display Result	To display result
Developing a system to see the result in graphical manner	Secondary	Display Result	To display result in graphical way

Table 3. Part of Inception Phase Artifacts

Software Estimation	
Total Adjusted Function Point	152.29
Lines of Code (LOC)	67000

Effort (in person-months)	11.71
Estimate Time Required	7 months

3.2. Construction Phase

Construction phase is the next stage in the software development lifecycle according to DAD. The target of this phase is to determine the base architecture of the system and building working application code follows the base architecture. The major artifact resulted from this phase activities is Software Architecture Document (SAD). Mostly, SAD document provides the architecture model for the whole software application system. For this research, author using UML 2.0^[14] as tools for application models as Fowler proposed^[15].

We used UML Use Case Diagram and Use Case Descriptions as functional requirements model. However, the complete list of UML Use Case Description is not presented in this paper. Figure 4 depicted UML Use Case Diagram as Functional View Model for this application. This use case model will guide through all construction process.

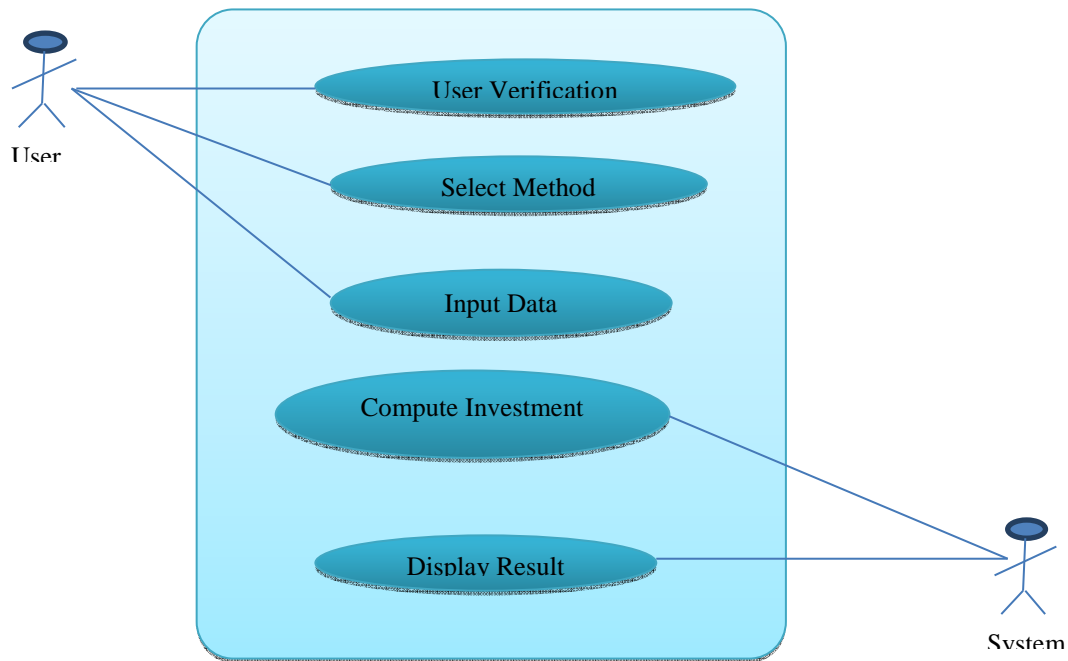


Figure 4. UML Use Case Diagram

Interface design is the process of defining how the system interacts with an external unit. The user interface consists of three basic parts. The first is the navigation mechanism, a way of giving instructions to the user and the system tells the system what to do, such as buttons and menus (see Figure 5). The second is the input mechanism, a way of capturing information system (e.g. a form to add news). The third is the output mechanism of how the system provides information to users or to other systems (e.g. reports, web pages). (See Figure 6).



Figure 5. Main Page Interface

Figure 6. Interface for Input and Output Mechanism for IT Business Value

3.3. Transition Phase

The main target of the construction phase is efficient and inexpensive development of the end product, that is, a version of the operational system that can be deployed to the end-user community. The designing and construction of this application is using IDE Microsoft Visual Studio. The application initial version develops only for client-server environment, while the latest version is developing for mobile-android user using emulator. Testing activities was not conduct yet. See Figure 7 for Coding Snapshot.

```
//Menghitung Total
private void gtotal()
{
    // Total Mengurangi / menekankan biaya dari
    long ttelekomunikasi = Int64.Parse(txtTotalTelekomunikasi.Text);
    long tperjalanan = Int64.Parse(txtTotalPerjalanan.Text);
    long tperemuan = Int64.Parse(txtTotalPertemuan.Text);
    long tcetak = Int64.Parse(txtTotalATK.Text);
    long toperator = Int64.Parse(txtTotalOperator.Text);
    long tkegagalan = Int64.Parse(txtTotalKegagalan.Text);
    txtTMengurangiBiaya.Text = Convert.ToString(ttelekomunikasi + tperjalanan + tperemuan + tcetak + toperator + tkegagalan);

    // Total Mengurangi Resiko
    long tkesalahanhitung = Int64.Parse(txtTotalKesHitung.Text);
    long tkehilangandata = Int64.Parse(txtTotalKehilangan.Text);
    long tkesalahandata = Int64.Parse(txtTotalKesData.Text);
    long tpenipuan = Int64.Parse(txtTotalPenipuan.Text);
    long tkesalahanaset = Int64.Parse(txtTotalKesAset.Text);

    txtTMengurangiResiko.Text = Convert.ToString(tkesalahanhitung + tkehilangandata + tkesalahandata + tpenipuan + tkesalahanaset);

    //TOTAL KESELURUHAN
    long tMengurangiBiaya = Int64.Parse(txtTMengurangiBiaya.Text);
    long tMengurangiResiko = Int64.Parse(txtTMengurangiResiko.Text);
    txtTotalKeseluruhan.Text = Convert.ToString(tMengurangiBiaya + tMengurangiResiko);
}
```

Figure 7. Coding Snapshot for Compute Total IT Business Value

4. CONCLUSION

This paper show the analysis and design process to develop application for quantifying IT business value which follow IT Valuation Method proposed by Ranti^[1]. As Wowor and Karouw^[8] conduct, process for



quantification and clarification can be done for category Reducing Cost of (RCO) and Reducing Risk (RRI). Some conclusions from the writing of this paper include:

- 1) The DAD process framework can be used as guidelines to analyze and design stand-alone, client-server and web-based application for non-profit organization, such as local government. This process framework promotes agile-approach and object-oriented paradigm, so can ensure software delivery. The DAD process framework relatively ensures software delivery faster, because this framework only have inception, construction and transition phase.
- 2) The DAD process framework ensures user involvement more with the using of User Stories Card technique to classify user requirements.

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