Analysis Of Models In Development In Information Systems

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Abstract

Development of information technology now requires organizations, companies or other institutions to follow these developments. One manifestation of the development of information technology is with the existing software that can simplify the data processing jobs. The software is in the form of information systems. Information systems can replace existing systems in the organization in terms of data processing. When the system will be developed into an information system required models in its development. These system development models provide detailed steps to produce a quality information system. There are many models used in system development such as Waterfall, Spiral, Rapid Application Development (RAD), The Open Group Architecture Framework (TOGAF), Zachman and COBIT. Each of these models provides different stages in system development. The main pillar of this model is the System Development Life Cycle (SDLC) which can be assumed as a classical methodology in system development. In this study the authors analyze some of the models used in system development Later this model can be used as a reference of a system analyst when will develop the system.

Keywords: SDLC, System Development, RAD, Spiral

1. Introduction

The role of Information Technology now in which an information system can not only help the work of a company or organization but also a step and strategy in use to achieve a goal of the company or organization. Currently in building an information system in need of a model that provides a good stage in order to produce a quality information system. Developing a system and adapting it to business needs a proper planning and system design [1], so that changes in the system environment affecting the performance of the information system can be accommodated and the organization can continue to run in accordance with its function [2]. In developing an information system, there are various models that can be used. Each of these models will describe the stages in the development of an information system. The purpose of all these models is the success of developing the information system in a timely manner, appropriate cost and according to the needs expected by the user [3,4,5]. To review the issues of timeliness and costs associated with the development of information systems it is important to discuss each stage in the development of information systems and analyze the gaps that have the potential to be penetrated from each stage. So that system development failures can be avoided and information produced from such systems can be guaranteed. In this study is discussed about the analysis and identification of models that are applied in developing information systems taken from several studies that have been done. These models will be useful for subsequent research in developing information systems.

2. Previous Research Study

In this study to analyze and explain how the concept of applying some models in the development of information systems. The authors take several studies that apply the RAD model,

and Spiral in developing information systems as a review.

1. Research conducted by Sandy Kosasi with the title of Application of Rapid Application Development In Online Bicycle Sales can be concluded that through the application of RAD (Rapid Application Development) method in producing online bicycle sales system can meet the needs of users significantly and provide added value to the achievement of goals and Target for UD. Polygon. In the RAD model the completion of each software module based on each stage of the RAD method can run well and smoothly and in a short time [6].

2. Research conducted by Utami Dewi Widianti under the title Development of Asset Information System In PT. Indonesia Telecommunication Industry (Persero) Web-based can be concluded that the system development model with waterfall is appropriate, because this model suggests the development approach sequentially and systemically for software development begins at the system level, continues to the analyst, then design, programming, testing and maintenance [7].

3. Research conducted by Abdi Darmawan and Muhammad Said hasibuan with the title Analysis and Design of Internal Quality Audit Information System Applications And Documentation Quality Assurance College (8). It is concluded that the spiral model can be seen clearly a significant step in generating an internal quality audit information system. Tahapa performed in sequence starting from the needs analysis, planning, final outcome planning, creation and validation and evaluation.

3. Research Methods

In this study the authors use the method of comparison research analysis of several models in the development of information systems described in the section below:

3.1 System Development Life Cycle (SDLC)

SDLC (System Development Life Cycle) is a step in the development of information systems / stages in the work done by systems analysts and programmers in building information systems. The most commonly used method is the system development life cycle (SDLC). SDLC is a classical methodology used to develop, maintain and use information systems. This method uses a system approach called the waterfall approach (waterfall approach), which uses several stages in

developing the system [9]. The stages in the SDLC (System Development Life Cycle) as follows:

1. System Planning Phase (system planning). The planning stage is the initial stage of system development that defines the approximate needs of resources such as physical devices, human, methods (techniques and operations), and budgets that are still general (not detailed)

2. System Analysis Phase (system analysis). The phase of system analysis is the research stage of an existing system with the aim of designing a new or updated system.

3. Design Phase / System Design (system design). The system design stage is the stage after the system analysis that determines the processes and data required by the new system. System design is divided into two kinds, namely general system design and detailed system design.

4. Implementation Phase / Implementation System (system implementation). Implementation or implementation stage is the stage where the system design is formed into a code (program) ready to operate.

5. Phase Maintenance / Treatment System. The maintenance / maintenance phase of the system is the stage that is done after the implementation phase which includes system usage, system audit, system maintenance, system improvement and system improvement.

In its development SDLC equipped by sharing method of system development / some model in technique of system development among others.

3.2 Waterfall Model

This method can also be called the classic life cycle. This method requires a systematic and sequential approach in software development, starting from the system level and progress through analysis, design, coding, testing and maintenance [3,5]. This modeling involves the following activities:

1. Engineering and Modeling System / Information (System / Information Engineering and Modeling). This stage is also sometimes called Project Definition.

2. Support / Maintenance. After the software provided to the customer, may be found error when run in the customer environment. This maintenance can affect all previous steps.

3. Software Requirements Analysis. The needs collection process is intensified into the

software. The results should be documented and reviewed to the customer.

4. Design (Design). The design process transforms the needs into a form of characteristics that software understands before programming begins.

5. Program Writing (Coding). The design should be converted into a form that the machine understands (computer). Then done step writing program.

6. Testing. After the program code is finished, and the program can run, testing can begin. Testing is focused on the internal logic of software, external functions, and search for any possible errors.

7. Support / Maintenance. After the software provided to the customer, may be found error when run in the customer environment. This maintenance can affect all previous steps.
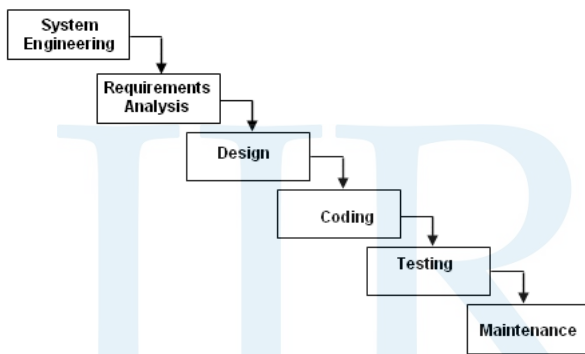

Figure 1. Step By Waterfall Model

Adventages : This method is still better used even though it is classified as archaic, rather than using a random approach. In addition, this method also still makes sense if the need is well known.

Deficiency:
1. In fact, it rarely follows sequential sequences as in theory. Iterations often occur causing new problems.
2. It is difficult for customers to specify all needs explicitly.
3. Customers must be patient, because the software will start when the design phase is complete. While in the stage before the design can take a long time.
4. Mistakes at the beginning of the stage result in very significantl in the next stage.

3.3 Rapid Application Development Model (RAD)

The RAD model is an incremental model of the software development process that emphasizes at least the development cycle. This model breaks down a project into small parts in which each part is built with a model similar to Waterfall. The main objective of this model is to complete a project by section, so that the planning process is also by part (although initially planning globally) [3.4].

Rapid Application Development (RAD) is a process of development of linear sequential software that emphasizes the development cycle in a short time. RAD uses iterative (recurring) methods in developing systems in which the working model (model works) of the system is constructed at the beginning of the development stage with the aim of defining the user's needs and subsequently removed. In the development of normal information systems, it takes at least 180 days, but by using the RAD method, the system can be completed within 30-90 days [11]. RAD model has 3 stages like in the picture below.
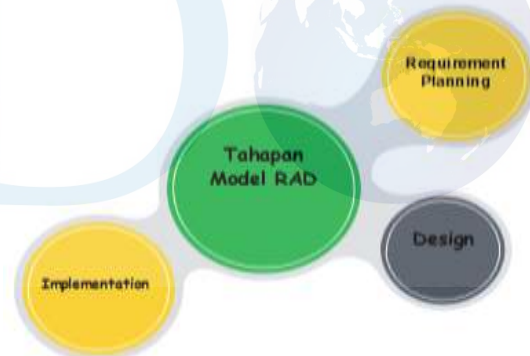

Figure 2. Step By RAD Model

1. Requirement Planning: Users and analysts conduct meetings to identify the objectives of the system and the information needs to achieve the objectives. At this stage the most important thing is the involvement of both parties.

2. System Design Process (Design System): At this stage the activities involved users determine to achieve the goal because the process is doing the design process and make improvements if there is still a mismatch between the user and analyst design. A user can immediately comment if there is a mismatch in the design, designing the system with reference to the documentation of user needs that have been made in the previous

stage. Outputs from this stage are software specifications that include general system organization, data structures and others.

3. Implementation (Implementation): This stage is the stage of the programmer who develops the design of a program that has been approved by the user and analyst. Before applied to an organization first done the testing process against the program whether there is an error or not. At this stage the user usually responds to the system that has been made and got approval about the system.

Some Adventages of RAD Model:

1. Each major function may be modified within a certain period of less than 3 months and may be discussed by a separate RAD team and then integrated so that the time is more efficient.
2. RAD follows the usual system development stages, but has the ability to reuse the existing components (reusable object) so that developers do not have to create from scratch and shorter time.

Weakness of RAD Model:

1. Large and scaled projects, RAD requires sufficient human resources to create a good number of teams.
2. RAD requires developers and customers to commit to the rapid fire activities required to complete a system in a short time. If the commitment does not exist then the RAD project will fail.

3.4 Spriral Model

The model takes an important part of the waterfall model and prototyping, adding new elements of risk analysis (3.4). This model has 6 important activities, namely:

1. Customer Communication is communication between developers and customers.
2. Planning is the determination of alternatives and limitations.
3. Risk Analysis is an alternative analysis and identification / risk-solving.
4. Engineering is the development of the next level of product.
5. Construction and release is installation, and provides support including with user training and documentation creation.
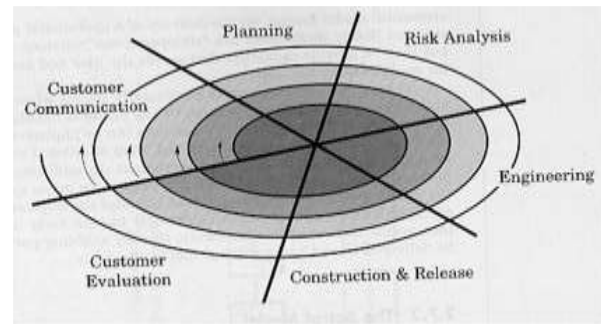6. Customer Evaluation is the assessment of engineering results.

Figure 3. Step By Spiral Model

The spiral gives an idea that the more iterations are enlarged, thus indicating the fuller version of the software used. During the beginning of the circuit, objectives, alternatives and constraints are defined and risks identified and analyzed. If risk analysis indicates there is uncertainty about needs, then prototyping should be made in the engineering quadrant. Simulations and other modeling can be used to define problems and improve needs. The customer evaluates the engineering results (quadrant customer evaluation) and makes suggestions for improvement. Based on customer feedback, the next phase is planning and risk analysis. After risk analysis, always check whether the project is forwarded or not, if the risk is too large, then the project can be stopped.

Adventages: This spiral model is the most realistic approach to large-scale systems. This method uses an evolutionary approach, so customers and developers can understand and react to a possible risk. This model requires direct assessment of technical risks, so it is expected to reduce the occurrence of greater risks. In every phase of evolution, prototyping can be used.

Disadvantages: It may be somewhat difficult to convince large customers that this evolutionary approach can be managed. It requires its own expertise. In addition, if the main risk is not found, then the problem may appear later. So that requires the ability of management and risk assessment (risk assessment) is high enough.

4. Results

Some models in the development of information systems that are included in the life cycle of information system development are widely used by the organization when will do the development of the system such as giving the result that is:

1. Waterfall model (waterfall) is very effective used to build information systems for a large scope. This is because in the waterfall provides stages and approaches sequential starting from the beginning to the end. This

model can produce a system with good quality.

2. Spiral models can also be used to build systems in a large scope. This is because the iteration in this model is widespread. Large systems will face a lot of risk, therefore in this model there is a risk analysis that can help system developers in identifying possible risks

3. (Rapid Application Development) RAD Model is more suitable to be categorized into incremental model category. This is reasoned because the RAD model although initially has a sequential form of the model but modified for the development process can be accelerated by using component-based which is a hallmark of the incremental model. The purpose of this component based on RAD is that the process of work can be accelerated by dividing the program into the smallest parts that each section has its own team responsible. As an alternative to the SDLC RAD can be used as a reference to develop an information system that is superior in terms of speed, accuracy and lower costs.

5. Conclusion

From the comparative analysis of system development models that have been discussed above can be drawn conclusion that is:

1. System Development Life Cycle (SDLC) is the basis of system development with Rapid Application Development (RAD), Spiral and waterfall model which provides detailed stages in information system development

2. RAD model is an alternative to SDLC can be used as an alternative in the development of a superior information system with a short time impact on the low cost

3. Waterfall and spiral models can also be used as an alternative in the development of information systems in a large scope. The scope of the intended large is the information system that there are input output in large numbers, require large fees and information systems required by large organizations. This is because in this model provides sequential and systematic stages from analysis to maintenance phase.

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