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| Heriot-Watt University |
| Evaluating SSADM and RUP using NIMSAD framework |
| F21IF\_2016/2017 |
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| **11/25/2016** |

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# Introduction

In this report, I will be using NIMSAD framework to evaluate SSADM and RUP system development methodologies. By evaluating, I will look at differences and various similarities involved in both methodologies. Before the evaluation, I will look to explain a little about NIMSAD. Looking at the theoretical aspects of the methodologies, it is very interesting to analyse the similarities and differences between the mentioned methodologies due to the fact that they are so many of them around.

With all those methodologies, it is good to say that each and every one of them can be used and modified to suit the practical needs of the organisation. Therefore, this report will be only for academic perceptive. In this report, all the research will be based on educational books which are somehow similar to industrial applications.

This report has 3 main parts namely: Overview, Evaluation and outcome. The overview section will look at the SSADM and RUP in details so as to have an understanding of them. The evaluation section will look at SSADM and RUP methodologies in details using NIMSAD framework by analysing elements, stages, aspects and consequences. The outcome section will analyse all the findings and summarise everything that was discussed in the overview and the evaluation section.

# Overview

## SSADM

### Overview

SSADM stands for Structured System Analysis and Design methodologies. In the early 1980's, SSAD methodology was developed so as to help with System Analysis and Application Design. (Akem, 2012) SSADM makes use of both text and diagrams during the system development life cycle. (Beal, n.d.) This means that it is used from the initial stage of the project to the physical design of the application. In the mid-1970s, since there was no standard system method to use; most organisations used large scalable systems to help manage the accounting department, billing department and the human resource department. (Bill, 1989)

### History

SSADM was developed in the 1980s with the purpose of analysing and designing of application. During that time, SSADM was used mainly in the government computing projects. (Beal, n.d.) In 1981, Consultant from Learmonth and Burchett management systems developed SSADM version 1, this was an improvement from the one developed in 1980 by the addition of new modules and principles. (Bill, 1989)In 1983, Most organisation that were involved with system development started using SSADM because they realised that it was straight forward and also helps the organisation follow the path they have set for a particular project to follow. In 2000, CCTA made changes to the methodology resulting to an addition of six modules and fifteen repackaging of existing modules and also a change of name to the methodology from System Structured Analysis and Design to Business System Development. And after that, IEEE promoted SSADM to become a system development standard. (Cohen, 2013)

### Structure

SSADM has seven stages based on five module frameworks which help with the development cycle from the feasibility studies to the design study. By following this structure, the project is set to have certain stability because it helps provide plans, timescales controls and monitoring process. (Anon., 2014)

#### Feasibility study

This is also known as stage 0; this stage helps determine if the system meets the organisation requirements and also analysing the cost and benefits of the project. (Nora, 2008)

#### Investigation of the current environment

This is also known as stage 1; in this stage, the given requirements and the current system are evaluated so as to get a better understanding of the project. (IQ, 2013)

#### Business System Options

This is also known as stage 2, in this stage, the analyst evaluates all the possible outputs from previous stages so as to decide on the system design. (Fonseka, 2014)

#### Requirement Specification

This stage is also known as stage 3, this is a stage whereby all the functional and non-functional requirements are thoroughly evaluated and identified. (Fonseka, 2014)

#### Technical System Options

This is also known as stage 4; in this stage, the cost, performance and impacts of the project on the organisation are examined. (Fonseka, 2014)

#### Logical Design and Technical System Options

These stages are also known as stage 5 and 6; these stages work in parallel. In these stages, the project constraints are identified and also the functionality of the system is identified and also evaluated. (Fonseka, 2014)

#### Physical Design

This stage is also known as stage 6; this is a stage whereby all the logical designs are converted to physical design and then configured to satisfy the environment.

### Techniques

SSADM enables the management to make use of both the diagrammatic and non-diagrammatic techniques; of which when looking at the diagrammatic techniques, it includes:

#### Logical Data Modelling

This is a technique that involves the identification, modelling and documentation of requirements of the system. (Fonseka, 2014)

#### Dataflow Modelling

This is a technique that involves the identification, modelling and documentation of how information moves within the system. (Cohen, 2013)

#### Entry Event Modelling

This technique focuses on events that affect the entities and sequences of the system. When looking at the non-diagrammatic technique, it includes:

* + The documentation of the requirements.
  + Data analysis so as to examine all the information gathered.
  + Estimation of the project.
  + Analysing the project by looking at the cost benefit and risk analysis.

## RUP

### 2.2.1 Overview

RUP stands for Rational Unified Process. In 2003, RUP was created by Relational Software Corporation which is one of IBM division so as to give an adaptable process framework to the development team. RUP makes use of four phases of which each of those phases has to go through a set of stages before moving on to the new.

### 2.2.2 History

RUP was developed in 2003 but before that, there were other methodologies such as SSADM, Waterfall, Code and fix and more. But with the above-mentioned methodologies, none of them could provide a general framework for a team with different projects to share their experiences. In 1990, most organisations were in need of an object-oriented methodology to help with the rapid development of object-oriented programming languages; with that, James Rumbaugh and Ivar Jacobson came together to create a single methodology. Through that, the UML methodology was created. In 1996, RUP was created and it acquired the process written by Ivar Jacobson and other members. Therefore in 2003, two new disciplines were added to make RUP more customised and published. (Akem, 2012)

### 2.2.3 Structure

RUP has four stages based on two different workflows which help with the development steps. The four stages are inception, elaboration, construction and transition. The six workflows are engineering and supporting workflow. (Akem, 2012)

#### Inception

In this stage, the project team design the requirements and they make decisions on whether the project is worth doing or not. (Akem, 2012)

#### Elaboration

In this stage, the developers create project architecture by thoroughly analysing the project. (Akem, 2012)

#### Construction

In this stage, the project is developed and moved to the testing process so as to see if the projects goals are met. (Akem, 2012)

#### Transition

In this stage, all the changes identified in the previous stages are performed depending on the client feedback. (Akem, 2012)

### 2.2.4 Techniques

Using RUP, the project management team is able to make use of static structured workflows which is divided into two aspects namely the engineering and supporting workflow.

The engineering workflow is divided into six different steps and the supporting workflow is divided into 3 steps. (Anon., 2014) The engineering workflow involves:

#### Business modelling workflow

This is a workflow that helps breaks down the requirements of which it leads to the creation of the Business Use Case. (IQ, 2013)

#### Requirement Workflow

This is a workflow that helps breaks down things the system should do. (IQ, 2013)

#### Analysis and Design

This is a workflow that helps produce component and classes of the system together with interface methods. (IQ, 2013)

#### Implementation

This is a workflow that all the layers, codes, implementing component classes and objects are designed. (IQ, 2013)

#### Test

This is a workflow that helps test all the project iteration functionalities. (IQ, 2013)

#### Deployment

This is a workflow that helps release the installation and the user manual. (IQ, 2013)

The supporting workflow is divided into three different steps which involve:

#### Project management workflow

This helps with the management of the project.

#### Configuration and change management

This helps with the management of changes within the project. (Process, 2016)

#### Environment

This helps with the development kits of the project. (Process, 2016)

# Evaluation

NIMSAD stands for Normative Information Model-based Systems Analysis and Design. This framework gives the user of a certain methodology a clear understanding through critical analysis of problems. It is divided into four phases which help evaluate a specific methodology that solves situation of problems namely:

#### Problem Situation

This phase helps separate the thought and actions through analysing of what information could be used by the users and also to allow the effectiveness of the organisation information system. The important element of this phase is to identify and evaluate the person involved with the problem situation. (Yaghini, 2010)

#### Problem Solver

This phase focuses more on the user by allowing them to be clearer about their judgement on the problem situation so as to prevent them from making bad choices. (Yaghini, 2010)

#### Problem Solving

This phase helps the user understands the situation and analyses useful aspects so as to identify a suitable solution. This phase has three phases and also 8 stages namely:

#### Problem formulation

This has 5 stages namely:

* + Understanding situation of concern.
  + Defining prognosis outlines.
  + Defining problems.
  + Deriving notional systems.

#### Solution Design

This phase has 2 stages namely:

* Performing logical design
* Performing physical design

#### Design implementation

This phase has only one stage namely:

* Implementing design

#### Evaluation

In this phase, every finding from phase one, two, three are evaluated. The evaluation is done in 3 stages namely:

* Problem situation.
* Problem Solver.
* Problem Solving.

These stages enable us to understand the quality of the output which was recorded from other elements.

### Problem situation

In this section, I will evaluate every element of NIMSAD framework in relation to SSADM and RUP methodology.

### SSADM

In this methodology, the first stage is feasibility studies therefore, it includes a planning stage of which the changes that the project would bring to the organisation is identified and also put into practice. This stage helps set boundaries so as to help the project team know what to do or include in the project even though boundaries are set.

SSADM does not provide steps for understanding the problems in hand before the feasibility study. This is known to be a problem because when problems are identified, problem solvers should be given steps on how to gain knowledge about the organisation whether they are an internal or external analyst.

NIMSAD framework emphasises that every methodology should not spend much time on analysing problems because in the case whereby the analysis should be performed in a big organisation, they may be no enough time to be able to accomplish a thorough analysis to the problem situation. Looking at the SSADM methodology, the identification of users or problem owners are not part of the problem situation, therefore, when following this methodology, it is inappropriate to use it because the problem solver is not able to see the problem from the owner's point of view. (Rouse, n.d.)

### - RUP

In this methodology, the first stage involves the understanding of the problem. This stage helps understand the problem in hand so as to build and understand solutions to the identified problems. RUP methodology focuses on the problem situation and that helps analyse and create possible solutions to the problem by involving the users' various point of views. Regardless of the methodology covering problem understanding stage, the methodology does not cover the client identification and the problem owner stage. Because of that, this may lead to bad problem formulation.

# User

When looking at users of different methodologies, it is important to understand and identify the aspect that has the most impact on the decision-making in the organisation. The methodology helps the user understand what type of skills and knowledge a user should have so as they should have a better understanding and use of the methodology and also understand their role in the task in hand.

#### SSADM Users

With all the phases of SSADM, the methodology does not emphasise on the user, therefore, it is hard to get knowledge of the problem in hand. This methodology focuses more on the development aspect rather than looking at the literacy aspect of the system. For delivering relevant system, this methodology underlines the fact that the interpretation of diagrams is important; but with that, the methodology does not give guidelines on how to handle the interpretations of outputs from different stages. (Nora, 2008)

Looking at SSADM, there is a high concern on knowledge and skills from the user because the methodology does not focus on the user; therefore, the responsibility goes to the analyst of which the analyst should perform that before the feasibility study.

#### RUP Users

With Rational Unified Process, even though it helps understand the problem at the start of the project, this methodology does not focus on the user. Therefore, it is hard to fully understand the problem in hand and also have a good solution to it so as to fully satisfy the user. (Nora, 2008)

The methodology focuses more on the scope of the system rather than the system literacy also for delivering a relevant system. The methodology breaks down the development into eight phases and two workflows. Looking at RUP, there is a high focus on problem-solving but less involvement of the user during the development of the system.

# Methodology

Look at all the methodologies, they should be able to focus on problem-solving of which they should be able to break down the problem and link them to different problem-solving properties. These aspects should proceed according to the eight aspects defined by the NIMSAD framework. In this section, I will elaborate those stages and look at how SSADM and RUP are in relation to them.

### SSADM

#### Situation of concern

In NIMSAD framework, this stage helps understand the problem and also analyse it so as to understand how to fix it. With SSADM, it does not provide ways to analyse the thinking aspect of the project; therefore, the business analyst must be matured enough to know and identify boundaries that are set and also different aspects that must be taken from the organisation. With that, it is hard to predict if the experience of the analyst will be good enough to help the analyst with the understanding of the situation in hand. (Rouse, n.d.)

#### Performing Diagnosis

SSADM focuses on diagrammatic and non-diagrammatic techniques to express the situation of concern. But SSADM does not provide methods to analyse the situation of concern; therefore, the analyst is given the duty to come up with ways to analyse the situation of concern. (Fonseka, 2014)

#### Defining prognosis

SSADM gives the analyst techniques that identify system and business requirements. Since SSADM does not provide methods to analyse the problems, it is hard to get to the state that is required because SSADM analyses only the system requirement was given but not the expected state of the system. (Fonseka, 2014)

#### Defining problems

In SSADM, problems are defined in the system options stage through investigation of the current system using the given requirements. Due to the fact that SSADM does not offer a critical analysis of the problem in hand, the problem in hand is set to continue to all the remaining stages of the methodologies.

#### Deriving existing system

SSADM give users a solid backbone to fully understand and implement the system specification. But the problem is that users that are not experienced enough will mostly be confused on how to make the proper decision due to the fact the methodology has not provided the user with much information in the previous stages.

#### Performing conceptual design

SSADM gives the analyst a good understanding of the system requirements while documenting the system desired.

#### Performing physical design

SSADM does not provide physical design to every output from various stages so as to design the final system.

#### Implementing design

SSADM does not perform implementation.

### RUP

#### Situation of concern

In NIMSAD framework, this stage helps understand the problem and also analyse it so as to understand how to fix it. With RUP, the user is provided with a better way to understand the problem in hand. (Akem, 2012)

#### Performing Diagnosis

In the second stage of RUP, the analyst will be able to analyse the problem so as to understand the solution. Even though the analyst has a good understanding of the problem, the stage still does not involve the user in the process. Therefore, it is hard for the analyst to get a thorough understanding of the system because the user is not really involved in the process. (Akem, 2012)

#### Defining prognosis

RUP does not provide the analyst with much technique to help identify the system and business requirements. Therefore, it is really hard for the analyst to gather information that will help him understand what the system is all about in details. (Akem, 2012)

#### Defining problems

In RUP, the problems are identified in the inception stage and from there, the problem will be broken down and then solutions create solutions to problems. The only problem with the methodology is that the user is not really involved to clarify the problems. The analyst will try finding solutions to the given requirements. (Akem, 2012)

#### Deriving existing system

RUP does not provide users with a good understanding of the problem so as to know what they have to improve in the current system. (Akem, 2012)

#### Implementing design

RUP does not perform implementation.

# Overall Evaluation

While looking at the two methodologies, RUP can be seen as a complete methodology comparing to SSADM. Because SSADM focuses the preferred system on the design stage while RUP takes the preferred system from the inception stage to the transition phase; which somehow guarantees that the system requirement and problems.

Looking at both methodologies, the system analyst is bound to perform some background research on the systems because both methodologies do not provide ways to get deep know on problems of the current system.

# Conclusion

Looking at the two methodologies, it is clear to understand that they do have some similarities as well as differences. But most of their differences lies on the way each methodology handles problem situation. Because SSADM focuses more on the system development while RUP focuses on other aspects of development. While evaluating both methodologies, I can conclude that both methodologies are good to use depending on the situation the analyst is facing.

This report has been structured in a way to give an overview of SSADM and RUP in relation to the NIMSAD framework. The report elaborates on how NIMSAD framework can be used to evaluate SSADM and RUP through the evaluation of each methodology in relation to the stages of NIMSAD framework.

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