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SRS Document Proposal Analysis on the Design of Management Information Systems According to IEEE STD 830-1998

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Abstract

A software development process generally consists of several stages ranging from analysis to implementation, which will result in need (requirement) of software. Results of analysis for different applications in a similar problem domain will usually produce similar definition needs. In the field of software engineering, especially in object-oriented software development, requirements for different problem domain have been developed. This research is to obtain a similarity (commonality) of the software requirements specifications, here in after in short-SRS. Management Information System (MIS) has been chosen due to several years has developed into concepts that are essential both in the scope of major agencies as well as small and medium scale. SRS is the identification of commonality for the MIS application which is focused on the function of customer service standards, particularly for the Management Information System. From this research it also can be concluded that the SRS commonality can be generated by capturing best practices from existing business processes.

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Keywords: Software Requirements Specification (SRS) commonality; Management Information System (MIS); the Users Requirements.

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1. Introduction

The Software Requirements Specifications Document (SRS's Document) is a written statement of something that can be done and that cannot be done by software. The document is only acting as a foundation or basis for an agreement between the parties-party software developers with software users. The Management Information Systems (MIS) is a complete management of these processes provides information for managers to support operations and decision making within an organization. Practice and research of information systems has been developed under a combination of scientific and economic reasoning that forms the foundation of modern community of western countries (Avgerou, 2000), whereas in developing countries is usually still a problem especially in the application of information technology uniformly (Avgerou, 2000). Unlike other types of systems, information systems should consistently closely related to the database, handle incoming data and conduct transactions, and provides an interface with external users (Nixon, 2000). Terms of SIM in this case related to functional requirements (FRs) and nonfunctional requirements (NFRs). Establish a basis for agreement between customers and product developers SIM about what can and cannot be done by the product. Complete description of the functions to be performed by the MIS in the SRS document will help potential users to determine whether the product license that will be designed will have to meet their needs or how the SIM to be modified to suit their needs (Avgerou, 2000). Preparation of SRS document forcing the various concerned groups within the organization to consider all the stringent requirements before the design process begins and then reducing the redesign, recoding, and re-test. That requires the use of inspection or review throughout the cycle (life cycle) MIS is an important factor in improving the overall quality of the resulting MIS (Anderson et al., 1998)

Preparation of SRS document before the design of MIS has several advantages, among others:

- Requirements in SRS documents can reveal omissions, misunderstandings, and inconsistencies early in MIS development cycle.
- Provide a basis for estimating costs and schedules and can be used to obtain the approval of bids or price estimates.
- Provide a basis for validation and verification.
- As part of the development contract MIS, SRS provides a basic document compliance with requirements that can be measured.

Several recent investigations revealed that some major problems today, especially in developing MIS is not technical but managerial. to avoid excess costs and delays that often affected many MIS projects, the improvement of MIS project should be managed the same with the increasing importance of technology in software development [5]. Rigorous specification early in the MIS development process can greatly reduce the cost of later development and maintenance, as well as provide an explicit means to manage risk and identify and meet safety requirements [6]. In this paper, first, presents some basic concepts in identifying software requirements, in this case its application in the design of MIS. Second, present a research proposal in the field about the importance of SRS document before starting the design process of MIS based on IEEE Std 830-1998.

2. Literature Review

2.1 Identify the basic concepts of software requirements

Identify some of the requirements is a step from the initial understanding of the scope of the context analysis of software functions obtained from potential users or that is based on system requirements.

(a) The software requires the input to understand the requirements.

The scope of the context analysis will discuss why the software was created and why it must meet specific technical, operational, and the consideration of feasibility, economic feasibility set some conditions in the software development process.

(b). Getting the requirements of software users.

An important step in understanding the software requirements is the elicitation of the information requirements associated with the end-user environment, experts, and customers of the product. Elicitation is one of the processes utilized by the analysts document software requirements specification (SRS) to collect and understand information which the evocation requirements involving fact-finding on the information obtained. Fact-finding will use mechanisms such as interviews with prospective users of the system, a list of questions the questionnaire, and observation of the operational environment where the software will be developed.

(c). Investigating a number of software requirements to system requirements.

These requirements were created to bring together software based on system requirements. Investigation techniques used to communicate how the software requirements can be tailored to the requirements of the system.

3. Research Method

Research to analyze the proposal on the SRS document management information system design is done by using primary data obtained from the research questionnaire distribution process. For the sampling method used is the technique of taking a non-probability sampling, which means the type of purposive sampling with sampling based on certain considerations in choosing a sample that aims to provide accurate data acquisition based on assumptions and expectations.

3.1. Independent Variable

In this study, the independent variables are assumed to have an influence on the design of management information systems are SRS document, as measured by Likert scale. A good SRS document should contain information about the introduction, a comprehensive and grouping requirements evenly about the software requirements specification. Researchers develop a scale based on the standard IEEE SRS documents that describe the content and quality required of a document, namely by presenting an outline of the specification of the needs of the recommended software.

The design of the preparation of items for the variable distribution proposal SRS document will be shown in Table 1.

Table 1. Item for variable distribution

Indicator	Total	Value (%)
Introduction to the requirements in the preparation of SRS	7	31.82 %
Overall description	5	22.73 %
Grouping requirements Evenly	10	45.45 %
Total	22	100%

Number of items and values have been determined based on the sources and materials researchers who will be prepared within the parameters of the study variables.

3.2. Dependent Variable

Dependent variable being analyzed is the design of management information systems. Scale used in this study is the scale management information system design, namely by identifying needs in the design of the software detailed management information based on IEEE STD 830-1998. Based on the IEEE STD 830-1998, detailed requirements in the design of software management information systems, among others, is the functional and nonfunctional requirements. The design of the preparation of items for the variable distribution of management information system design will be shown in Table 2.

Table 2. Distribution of management information system

Requirements Indicator	Total	Value (%)
Functional Requirement	5	29.41%
Nonfunctional Requirement	12	70.59%
1. Design Constraints	4	
2. System performance	4	
3. Assumptions & Dependencies	4	
Total	17	100%

Number of items and values have been determined based on the sources and materials researchers who will be prepared within the parameters of the study variables.

3.3. Preparation Research

Preparations made prior to the conduct of research includes the preparation of the measuring instrument. The preparation begins with a review of gauge theory and precise definition, and then created an operational definition for a proper explanation of the variables to be studied. This study aims to determine the relationship between SRS document on management of information system design based on the IEEE STD 830-1998. The first scale used in this research is the design of management information systems, by identifying needs in the software detailed design of management information systems based on IEEE STD 830-1998. The second scale is the IEEE standard that describes the content and quality required of a document, namely by presenting an outline of the specification of the needs of the recommended software.

3.4. Management Information Systems Design Scale

Based on the IEEE std 830-1998, detailed requirements in the design of software management information systems, among others, is the functional and nonfunctional requirements. Functional requirements of management information system consists of several main functions that are interconnected and support one another, as follows:

- Inserting rules & admin procedures and certification by the operator.
- Reception comments or complaints from external users.
- Calculation of the number of external users who provide comments.
- Registration for users who want to use the system facilities.
- Access information about the system.

Nonfunctional requirement is something related to design constraints, assumptions and dependency, system performance, as follows:

(a) Design constraints, including :

- Only admins and operators who can enter and manage data information in the system.
- Admin can manage and reply to comments, while the operator can only enter and change data information.

- System designed not to serve online registration certification.
- Designed system can only be accessed with one username with a password.

(b) Assumptions and dependencies, including :

- Users who will use minimal system already understand how to access.
- The system can only be accessed by hardware that is connected in a network the Internet.
- Designed a system that will require a web server.
- Designed system requires admin and operators as the manager of information data.

(c) System performance, including :

- The system can be accessed at least eight hours nonstop on the active working hours.
- View the system must be user friendly.
- Response time of not more than five seconds when the system is accessed.
- The system runs on any platform that supports a web-based applications.

3.5. Scale Preparation of SRS Document

A good SRS document should contain information about the introduction, a comprehensive and grouping requirements evenly about the software requirements specification. Researchers develop SRS document based on the scale of the IEEE standard that describes the content and quality required of a document, namely by presenting an outline of the specification of the needs of the recommended software. As for the parts that must exist in the SRS document is:

(a) Introduction to the design specification of software requirements, including:

- Software developers and users need to understand the purpose of designing the software requirements
- specification.
- Software developers and users need to know the products of the data collection systems.
- Software developers and users need to understand the application of the software being specified the contributions are appropriate, targeted results and objectives of the application.
- Software developers and users need to understand the definitions of all terms, acronyms and
- abbreviations required to properly translate the SRS.
- Required a complete list of all documents referenced in addition to the SRS.
- Summary required software requirements specification (SRS).
- Preparation of the required specification of software requirements (SRS).

(b) Overall Description of the software requirements specifications, including :

- It takes a description of the operation of the software in a variety of constraints.
- It takes a summary of the main functions that will use the software..
- Need description of the general characteristics of product users in terms of education level,
- experience and technical expertise.
- It takes a general description of the items that are limiting the options for developers.
- It takes a list of all the factors that affect the requirements stated in the SRS document.

Grouping requirements equally, including:

- It takes a detailed description of all inputs and outputs of the system software.
- Required definition of some basic actions on the software in accepting and processing some input.
- Required definition of some basic actions on software to process and produce some output.

- Required performance requirements of human interaction with the overall software
- It takes determination logic requirements for information to be placed into a database.
- Required design constraints that can be charged through a standard form.
- Attributes needed a software system
- It takes organizing specific requirements.
- It takes additional comments to assist in documentation requirements.
- f. Required supporting information regarding the software requirements specification.

3.6. Test Measuring Instruments

Before being used to retrieve the research data on research subjects, the two scales that have been prepared consulted before the lecture. Once corrected later revised and approved then the next step is to carry out trials. The objective of this trial was to obtain validity and reliability and to test whether the items that had been developed could be used by the subject and did not result in a double interpretations. The test was conducted on July 23, 2010. Scale trials conducted by distributing questionnaires to 48 subjects namely software developers or users who have the educational background of informatics (computer) or at least have been studying a particular programming language in the Semarang City. The experiment was conducted in the area south of Semarang, namely Banyumanik, Srondol, Ngesrep and Tembalang. Into consideration in determining the place of sampling is that the South of Semarang is one area of education in the city of Semarang, particularly higher education, thus simplifying the researcher in menemukan respondents who have a background in educational informatics (computer) or minimal've never studied a particular programming language. In addition, the selected location is also close to the residence, thus simplifying the researcher researchers in collecting data because of limited number of researchers in terms of time and research costs.

3.7. Characteristics of Respondents

Based on sex, from 48 respondents obtained the male respondents were 37 men and female respondents were 11 people. With the percentage of each 23% female and 77% male gender, as shown in figure 1.

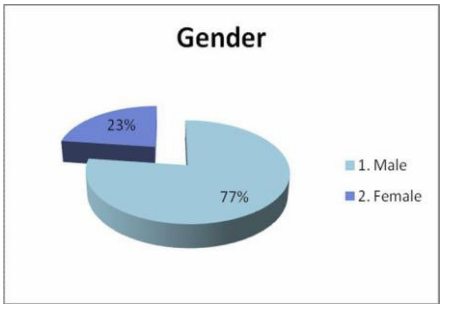

Fig 1. Diagram Percentage of Respondents Gender

Based on that education level has been completed giving the following results: respondents who had graduated from high school or equivalent amount to 17 people, totaling eight people diploma, Bachelor of 20 people. With percentages of 41% respectively for the last high school education, 17% for the last education diploma, 42% to 6% for graduate and postgraduate.

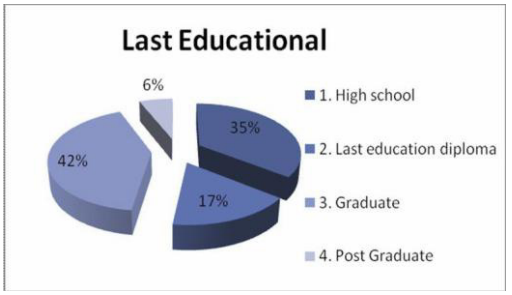

Fig 2. Diagram of Education Last Respondents Percentage

In this case the job classification of respondents are divided into: self-employed people numbered 3, PNS / TNI / police amounted to eight people, the private sector amounted to 11 people, students and 23 other people (consulting engineering) accounted for three people. With the percentage of each 6% for self-employed jobs, 17% for civil works / military / police, 23% for private sector jobs, 48% for students, and 6% for other work (engineering consultants).

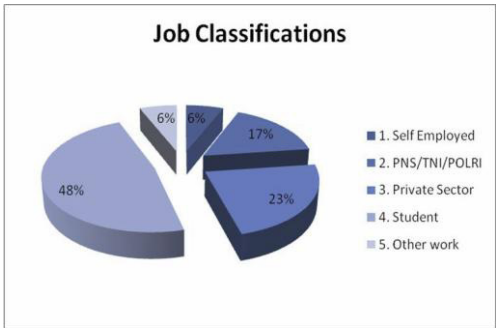

Fig 3. Diagram of respondents jobs

4. Results of Data Analysis and Interpretations

The accuracy of testing a hypothesis about the relationship of research variables is highly dependent on the quality of data used in the test. Therefore, the validity and reliability testing is needed to determine how accurate the measuring variables are credible or reliable.

Test Validity

a. Scale management Information System Design Based on the IEEE std 830-1998.
1). Hypothesis:
H0 : Invalid question item
H1 : Valid question item
2). Test statistic:

$$r = \frac{n\sum xy - \left(\sum x \sum y\right)}{\sqrt{\left[n\sum x^2 - \left(\sum x\right)^2\right]\left[n\sum y^2 - \left(\sum y\right)^2\right]}} \quad \text{..... (1.1)}$$

3). Significance level : á = 5%
4). Critical area / test criteria:
Reject Ho If *rhitung* > *rdf* or Sig. < á

5). Analysis

Table 4. Test Validity of the management information systems design scale

No	Indicator	Test Statistic Compute *r*	Sig.	Inf.
1	Y1	*0,458*	0,0030	valid
2	Y2	*0,688*	0,0000	valid
3	Y3	*0,452*	0,0030	valid
4	Y4	*0,745*	0,0000	valid
5	Y5	*0,733*	0,0000	valid
6	Y6	*0,337*	0,0240	valid
7	Y7	*0,545*	0,0000	valid
8	Y8	*0,733*	0,0000	valid
9	Y9	*0,745*	0,0000	valid
10	Y10	*0,576*	0,0000	valid
11	Y11	*0,733*	0,0000	valid
12	Y12	*0,682*	0,0000	valid
13	Y13	*0,688*	0,0000	valid
14	Y14	*0,745*	0,0000	valid
15	Y15	*0,545*	0,0000	valid
16	Y16	0,673	0,0000	valid
17	Y17	0,597	0,0000	valid

Retrieved sig. for all indicators <á = 0.05, so that Ho refused. Therefore, it can be concluded that the correlation of variables showed significant results on the question items, and items of data obtained from these questions are valid and can be used.

b. SRS Document scale
1). Hypothesis:
H0 : Invalid question item
H1 : Valid question item
2). Test statistic:

$$r = \frac{n\sum xy - \left(\sum x \sum y\right)}{\sqrt{\left[n\sum x^2 - \left(\sum x\right)^2\right]\left[n\sum y^2 - \left(\sum y\right)^2\right]}}$$

3). Significance level : á = 5%
4). Critical area / test criteria:
Reject Ho If *rhitung* > *rdf* or Sig. < á
5). Analysis

Table 5. Test of the SRS document scale

No	Indicator	Test Statistic Compute *r*	Sig.	Inf.
1	X1	*0,52*	0,0010	valid
2	X2	*0,52*	0,0010	valid
3	X3	*0,549*	0,0010	valid
4	X4	*0,692*	0,0000	valid
5	X5	*0,514*	0,0020	valid
6	X6	*0,386*	0,0220	valid
7	X7	*0,624*	0,0000	valid
8	X8	*0,92*	0,0000	valid
9	X9	*0,57*	0,0000	valid
10	X10	*0,623*	0,0000	valid
11	X11	*0,401*	0,0170	valid
12	X12	*0,623*	0,0000	valid
13	X13	*0,579*	0,0000	valid

14	X14	*0,521*	0,0010	valid
15	X15	*0,585*	0,0000	valid
16	X16	*0,579*	0,0000	valid
17	X17	*0,599*	0,0000	valid
18	X18	*0,464*	0,0050	valid
19	X19	*0,738*	0,0000	valid
20	X20	*0,714*	0,0000	valid
21	X21	*0,621*	0,0000	valid
22	X22	*0,671*	0,0000	valid

Retrieved sig. for all indicators <á = 0.05, so that Ho refused. Therefore, it can be concluded that the correlation of variables showed significant results on the question items, and items of data obtained from these questions are valid and can be used.

3.8. Test Reliability

a. Scale management Information System Design Based on the IEEE std 830-1998

1). Hypothesis:
H0 : Question item unreliability
H1 : Reliable question item

2). Test Statistic:.

$$r_{alpha} = \frac{c}{c-1}\left(1 - \frac{\sum_{j=1}^{c} S_j^{\,2}}{S_{total}^{\,2}}\right) \quad \text{..... (1.2)}$$

3). Significance level : á = 5%

4). Critical area/ test criteria:
Reject Ho if *ralpha* > *rdf* , or sig. value < á

5). Analysis.

Table 6. Reliability Statistics

Cronbach's Alpha	N of Items
.909	22

From table Rho Spearman with á = 0.05 obtained r value table = 0.3789 <ralpha = 0909, so that Ho refused. Therefore, it can be concluded that the reliability of research variables are met.

b. Scale SRS document

1). Hypothesis:
H0 : Question item unreliability
H1 : Reliable question item

2). Test Statistic:

$$r_{alpha} = \frac{c}{c-1}\left(1 - \frac{\sum_{j=1}^{c} S_j^{\,2}}{S_{total}^{\,2}}\right)$$

3). Significance level : á = 5%

4). Critical area/ test criteria:

Reject Ho if *ralpha* > *rdf* , or sig. value < á

5). Analysis.

Table 7. Reliablity Statistics

Cronbach's Alpha	N of Items
.894	17

From table Rho Spearman with á = 0.05 obtained r value table = 0.4429 <alpha = 0894, so that Ho refused. Therefore, it can be concluded that the reliability of research variables are met. Tests on the hypothesis proposed in this study were calculated using simple linear regression analysis. Before testing the truth of the hypothesis, first test the assumption. Assumption is a requirement that must be met before performing tests of hypotheses, as follows:

3.9. Normality Test

Test of normality distribution of research data using Kolmogorov-Smirnorv techniques Goodness of Fit Test. The result shows the management information system design variables showed KS Z value for 0270 is greater than á = 0.05, means the management information system design variables are normally distributed. Likewise SRS document variable for 0489 is greater than á = 0.05, means the variable is normal. Here are complete results analysis:

1). Hypothesis:
H0 : Normally distributed data
H1 : Data not normally distributed
2). Test statistic: sig. value KS
3). Significance level : á = 5%
4). Critical area/ Test criteria.
Reject Ho if sig. value KS < á
5). Analysis

Table 8. One-Sample Kolmogorov-Smirnov Test

	Management Information *Systems Design*	*SRS Document*
N	*48*	*48*
Kolmogorov-Smirnov Z	1.0000	*.835*
Asymp. Sig. (2-tailed)	*.270*	*.489*

From this table, One-Sample Kolmogorov-Smirnov Test with á = 0.05 obtained value for variable sig.KS management information system design = 0270> á = 0.05, while the value for variable document sig. KS SRS = 0489> á = 0.05, so that Ho is accepted. Therefore, it can be concluded that the assumption of normality is met.

3.10. Linearity test

Linearity test is intended to find out the relationship between the independent variables with dependent variables. Linear relationship suggests that changes in independent variables will tend to be followed by a change in the dependent variable with a linear shape. Here are the results of the analysis to test the linearity:

1). Hypothesis.
H0 : There is no linear relationship between the SRS document proposal and management information systems design
H1 : There is a liniear relationship between the SRS document proposal and management information systems design.
2). Test statistic:sig. value F
3). Significance level : á = 5%
4). Critical area/ test criteria:
Reject Ho if sig. value F < á
5). Analysis

Table 9. ANOVA Result

F	Sig.
58.401	.000[a]

a. Predictors: (Constant), SRS document
b. Dependent variable: Management Information Systems Design

From the Table 9, ANOVA with á = 0.05 obtained sig.F value = 0.000 <á = 0.05, so that Ho refused. Therefore, it can be concluded that there was a linear relationship between the proposal with the SRS document management information system design.

3.11. Homoscedasticity Test (equal variance)

Homoscedasticity data can be known through the scatterplot. If the data points spread randomly means no heterocedasticity. But if the dots form a certain pattern (quadratic, cubic, etc.), so that data has heterocedasticity properties. Here are the results of the analysis to test homoscedasticity.

1). Hypothesis:
H0 : variance is not same
H1 : variance is same
2).Test Statistic: sig. value
3). Significance level : á = 5%
4). Critical area/ test criteria:
Reject Ho if sig. value < á
5). Analysis

Table 10. Similarity test variants management Information System Design

Sig.
.003

From this table variant similarity test with á = 0.05 obtained sig. = 0.003 <á = 0.05, so that Ho refused. Therefore, it can be concluded that the assumptions homokesdastisitas (common variants) are fulfilled.

5. Conclusion

From the results of data analysis and interpretation of primary data field, a few conclusions can be draw as follows: first, SRS document before the design proposal, as a solution that can be applied in designing a management information system. By applying the SRS document, expected to minimize errors in the software design process and can facilitate both the developers and the users in understanding the overall system.

Second, though efforts SRS proposal on software design, particularly in management information systems, there are some differences of opinion between certain groups, but SRS has obtained a document proposing the standardization of IEEE is a professional organization which is engaged worldwide in the field of technology improvements. Some things to consider for future research are as follows: first, to improve the completeness of structure and reduce the ambiguity in the preparation of SRS document, should do the research involving many more samples of respondents who researched in the wider scope both in scale and district provincial scale.

Third, any approach that is used during the analysis process should be to minimize the ambiguities and inconsistencies with the system description specifies how to validate requirements and formal language.

Fourth, the need for improvement of the experimental procedure by not limiting the time of the experiment and conducted by a team of subject groups.

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