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Assessment of Information System Success by Using Delone and Mclean Information Success Model : Users Perspective

Case Study: Rwanda Energy Group Scada System

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Abstract:- The purpose of this study is to evaluate the performance of the information system with the help of Delone and Mclean access to information for users and executives. A study of the SCADA system on six criteria for system quality in the DeLone and McLean IS model (2003). The results of the study were based on a single survey where information was collected through interviews with the system administrator and system researchers, but also through a questionnaire from staff at the National SCADA System Monitoring Center. The results of the study showed that the system under study was successful through user feedback and that the six current IS systems were interconnected. The results of the study show that Rwanda's energy system SCADA is very important in monitoring and controlling the power infrastructure at the National Regulatory Authority.

Keywords:- *Information System Success Model, Delone And Mclean, SCADA System, Rwanda Energy Group, System Information.]*

I. INTRODUCTION

The information system (IS) is the first of its kind to be one of the most important in the field of information technology. Capacity building in IS infrastructure in one project is one to provide better service and provide better benefits. Technology extends to all sectors of the economy including energy. Energy is a key factor in economic growth and development. Energy is an important basis for social and economic development in the world economic development and is essential for sustainable development (BIAC Energy Committee, 2003). The Government of Rwanda (GoR) has stepped up its energy infrastructure and innovations based on its policy of achieving sustainable economic development. GoR is committed to providing quality services in the field of low-cost ICT (Rwanda: Strategy Strategy Paper, 2013). The Rwanda Energy Group (REG) is the national agency for the empowerment of all people living in Rwanda. Headquartered in Nyarugenge District, REG has different branches throughout the country (ewsa, 2010). A system for monitoring and collecting information (SCADA) is used for monitoring of industrial activities from remote areas, the SCADA system collects field data, puts it in a central computer center, and displays information to its users in writing, thus allowing the administrator to monitor or control the entire system from a central location in real time. The main reason for this study is to look at the SCADA data capabilities in REG. To achieve this research, we will move to a new way of providing information to DeLone and McLean.The way the information system is an expensive investment and therefore the failure of IS is considered an expensive failure. Rwanda Energy Group, like many other government agencies with multiple information systems (CIS, CUSTIMA, EBS, SCADA), cares for its customers, such as providing electricity, controlling the grid system and more. Sometimes, the system does not do what it is supposed to do and that causes people to lose the trust to services offered by the company and interution of power causes too much loss in the country. SCADA system is used to monitor and control industrial activities from remote areas. The system of using SCADA always includes a lot of tasks, for example, hearing signals, monitoring, human machines, management, and network.

II. PROBLEM OF STATEMENT

The study of the information system is a cost-effective investment and therefore the loss of IS is considered a costly failure. Rwanda Energy Group, like many other government agencies, has a large number of information systems (CIS, CUSTIMA, EBS, SCADA) to deliver services to customers, such as electricity trading, monitoring and monitoring of power systems and more. in particular, the systems will stop doing what they are supposed to do and that will lead to a huge loss to the institution in particular and to the country as a whole. SCADA is used to investigate and control the industry routes from remote areas. The system of using SCADA always includes a lot of work, for example, hearing signals, monitoring, human machine, management, and network ((Engin Ozdemir * Mevlut Karacor, 2005). Rwanda Energy Group has many grid infrastructure including electricity, station, pylon, fire equipment and protective equipment.These infrastructures may be damaged and REG

staff will not be notified unless the end users are notified. This frustration of the REG SCADA System for controlling monetary power causes huge losses of electricity. In addition the SCADA system operates on a high voltage line system but monitoring the voltage line system is still important.

III. LITERATURE REVIEW

An information system is a combination of tools, a system and a communication system, which can be used to facilitate business activities to increase productivity, and help institutions to make decisions. An information system (IS) is a technology (IT) system that sends accurate, reliable, and timely information. identified IS as a system that focuses on and distinguishes information and converts that information into information used in decision-making at different levels of the organization.In the past, cooperatives have benefited from IS control due to a lack of understanding of the true value of investment. It means a lot as long as success of IS is concerned because there are different partners of the information system. For IS users, success can be an improvement in IS activities from leaders in the field of mobility which can be a good indicator. The first method used in assessing IS focuses mainly on finances where comparable practical strategies are used and practical strategies are ignored. However, conventional monetary strategies are not enough to measure IS success and the reason for this is due to its strong and unique nature. Failure to find a viable relationship with IS's financial strategy has led to a shift in focus on better practices such as customer satisfaction. Why IS can be assessed at all levels, it is not possible to establish a general model to ensure that IS success is clear and transparent.

In 1992, IS researchers DeLone and McLean took a step forward in their desire to win IS (DeLone and McLean, 1992). An example has been foundations in the works of Shannon and Weaver since 1949 and Mason since 1978. The submissions of DeLone and McLean are provided. a practical combination of different strategies from previous research and an attempt to show the relationship between the six functions of IS success (Sedera and Gable 2004).Two of the main contributions of the DeLone and McLean model was according to Seddon and Kiew (1996) that the model provided a classification scheme for IS success measures used in prior literature, and secondly it suggested interdependencies between the different success dimensions.

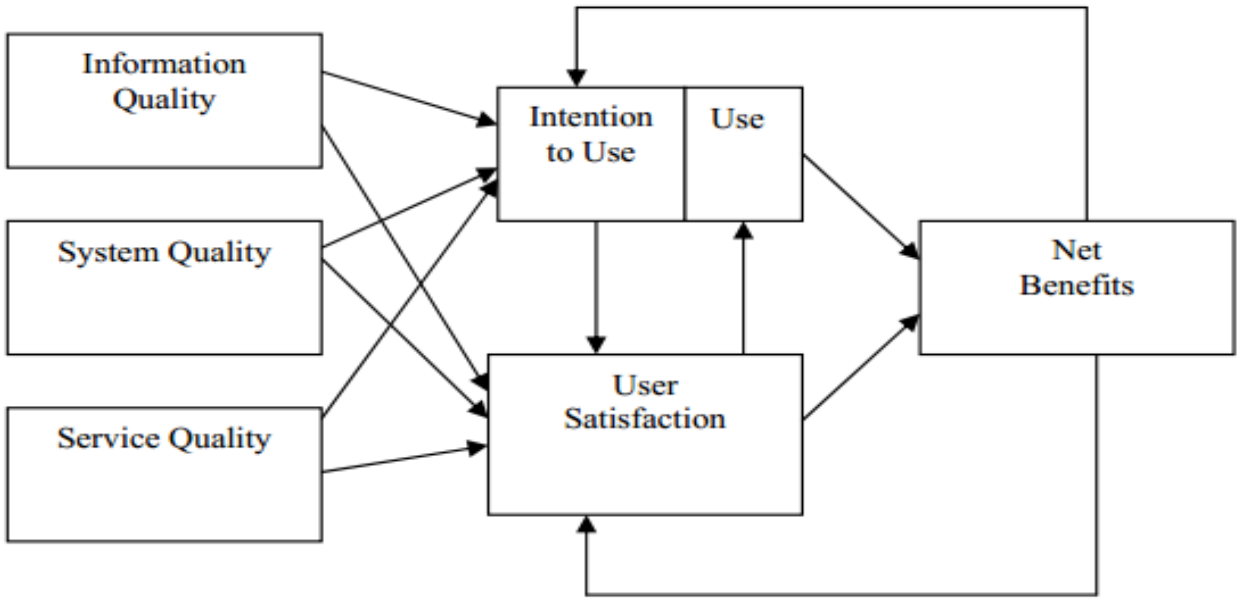

Fig 1:- Updated DeLone and McLean Information System Success Model
(Source: DeLone & McLean, 2003, p.24)

The SCADA system spreads extensively to systems that are used for conservation of non-regional resources, often spreading over thousands of square kilometers, rather than gathering information and monitoring necessary for system activities. The SCADA system is required for distribution systems such as water distribution and water treatment, oil and gas pipelines, power lines, and rail transport systems.

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IV. METHODS

The literature revealed the nature of the system used to measure system information. It became clear that DeLone and McLean's model was the right combination for measuring the success of the SCADA system. The use of this model suggested that data integration could be done using a research tool, as this was the method used in most previous studies using the model of DeLone and McLean (2002, 2003).The process leads to the development of the content of the research materials to measure the success of the SCADA System. The interview with the system administrator provided a lot of information about the SCADA system. In addition, questions were asked of users in different location.The population of this study includes the staff of the Rwanda Energy Group (REG), especially the staff of the National Supervision Agency (NSA) who use the SCADA System. The National Supervision Agency Department has 60 employees. It has a control room where staff have to monitor all activities on the power line such as control, power line management (high, middle and low voltage) and monitoring of power infrastructure.

➢ *Data Analysis and Models*

The well-known IS has been in use since 2009.The number of employees in the National Supervision Agency is 60. In this study, the researcher admitted a 95% degree with a 5% error and will use Slovin milk (Jeffry J. and Raymond B., 2012). :

$$n = \frac{N}{1 + Ne^2}$$

Where: n = sample size
N= total population
e = margin of error

Considering our total population which is equal to 60 people which is equal to my taget population, we calculate our simple size as follow :

$$Sample(n) = \frac{60}{1 + (60 * (0.05)^2)} = 52.17 \cong 52$$

The sample size of 52 employees where determined in whole National Supervision Agency employees.

V. RESEARCH OBJECTIVES

The main purpose of this study is to look at the performance, quality and use of the SCADA system used by the Rwanda Energy Group in understanding the power infrastructure and requesting the REG to develop it. In particular, a review of the functioning of the existing IS system is underway. Evaluate the Rwanda Energy System SCADA systematically; The system is available; and is operational system. Review the criteria and methods used in the current research assessment system, the REG SCADA System, and present an example based on this assessment; Use a model based on it to be a tool for assessment; The overall goal is to review the REG SCADA System to see if it is doing what it is supposed to do by investigating Rwanda Energy Group team to improve it in order to satisfy customers and reduce electricity.

VI. RESULTS

Everyone seemed to be satisfied with the overall beauty of the system, as the number of respondents was over 78.8% satisfied or very satisfied with all three aspects of the system's quality. Regarding the feedback system, 88.46% were satisfied or very satisfied while about 7.6% were dissatisfied or very dissatisfied. In terms of user relationships, 69.2% were satisfied or very satisfied while 19.2% were dissatisfied or not very satisfied. Regarding the final point of this systematic training on the system, 78.9% were satisfied or very satisfied and 11.6% felt dissatisfied or very dissatisfied. Neutrality was between 3.8-11.5% for each item.

➢ *Information Quality*

Over 66.6% of respondents were satisfied with the information system, as opposed to everything else that was done. In terms of media quality, 71.2% of respondents liked it and 7.7% were dissatisfied. When we asked for adequate and complete information provided by the system, 76.9% were satisfied while 5.8% were dissatisfied. Responses to the latest data showed that 71.2% believed it was up to date. Those dissatisfied with the latest news are 5.8%. However there was a significant number of respondents who were dissatisfied or dissatisfied with the building and were between 5.8-7.7%, and it was different in everything.The respondents who sometimes or hardly always appreciate the Information quality of the system ranged 3.8-13.5% and varied within each item.

➢ *Service Quality*

The respondents seemed to be satisfied with the overall service of the system, as the total number of respondents was above 82.69% who were either satisfied or highly satisfied for all the three items of the service quality. For the item related to the availability of the system, 87.5% were among those who felt either satisfied or highly satisfied and those who felt either dissatisfied or highly dissatisfied were 3.8%. With regard to prompt service support, 82.7% of the respondents were either satisfied or highly satisfied and 13.5% were either dissatisfied or highly dissatisfied. On item of providing service needed, 78.8% responded as either satisfied or highly satisfied where as 11.5% responded as either dissatisfied or highly dissatisfied. Those who remained neutral on these concerns ranged between 3.8-9.6% and varied for each item in the service quality construct.

VII. CONCLUSION

The purpose of this study was to evaluate the Rwanda SCADA Energy System from users' prespective using the Delone & Mclean Information System (2003). Based on the results of the research, given earlier, we came to the following conclusions; the SCADA system is used to monitor and control the power system and infrastructure of Rwanda's energy sector, the SCADA system facilitates the day-to-day operations of the staff in the National Supervision Agency Department. Staff can identify the problem online and the SCADA System helps them make decisions. For example, in the event of a low frequency (<49 Hz), the SCADA system identifies the problem and the manufacturers choose to separate certain parts (power lines) to ensure a stable network. The respondents seemed to agree with the use of the system, as the number of respondents who were above 90.38% agreed or strongly agreed on all three aspects of using the system.The SCADA system provides adequate and complete information based on the results from the assessment. The results show that 66.6% of respondents were satisfied with the information provided by the SCADA system.

The energy team in Rwanda has a long way to go to make it easier for employees to perform their daily tasks such as disconnecting power lines in the event of a failure, opening and closing circuits at various stations if necessary. The results show that 69.2% of respondents agreed with the user relationship of the SCADA system.

Today, Rwanda's SCADA power plant is used to monitor and control electricity and power systems both at high and medium speeds (110KV and 75 KV).

SCADA will improve the quality of energy-related services in the energy group in Rwanda. In terms of service quality the average was above 4 the average was compared and the standard deviation of 4.11 and 1.07 confirms the agreement asked for the nature of the service. 82.69% of respondents agree with the quality of services provided by the SCADA system. Based on the experience of the respondents with experience over 5 years they have agreed or strongly agree with the quality of the SCADA service. According to the most frequently used SCADA system, almost 78.8% of respondents using SCADA every day agreed or strongly agreed with the quality of the service. As a result of this research confirm that, the SCADA system has improved service quality while an employee of the National Supervision Agency can monitor the power system and power infrastructure across the country and solve many problems. in the network in a very short time.

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