The Success of Student Information Management System: The Case of Higher Education Institution in Ethiopia

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The Success of Student Information Management System: The Case of Higher Education Institution in Ethiopia

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ABSTRACT

Information Systems (IS) implementation in higher education is a large investment. Such investments are expected to bring increased efficiency and effectiveness, as well as better quality services to stakeholders. Our literature search did not find student information management systems (SIMS) in Ethiopia or similar low-income countries. This research is work in progress. It attempts to bridge the literature gap for utilization and success factors of SIMS in a university context of low income countries. The study will address the research question: what determinant factors contribute to the success or failure of IS in higher education institutions in Ethiopia, with particular reference to SIMS? The study uses DeLone and McLean (1992, 2003) IS Success Model to identify the dimensions of IS success when applied to SIMS. We also investigate two new constructs top management support and user support that were found relevant in the study context.

Keywords

Student information management system, higher education institutions, IS Success Model, information quality, system quality, user support, top management support.

INTRODUCTION

Information system is defined as a ‘collection of subsystems defined by functional or organizational boundaries (Iivari, 1991). It supports decision-making and control in organizations (Lucas, 1981) by utilizing information technology to capture, transmit, store, retrieve, manipulate, or display information used in one or more business processes’ (Alter, 1996).

Like any modern business sector, Higher Education Institutions (abbreviated as HEIs) need to achieve and enhance quality in its functioning. But these institutions face challenges in the process of attaining the objective of becoming better quality HEI. McClea and Yen, (2005) stated that:

“In this sector the challenge begins with the institution’s admission department. The admissions department functions as the delivery point for quality inputs, which should eventually become even higher quality outputs. The department, then, must collect significant amounts of data about students as well as maintain the ability to effectively analyze and transform the data into pertinent information. This develops a new function for the admission department to perform – information technology. Information technology presently represents a critical success factor for numerous organizations. Higher educational institutions fall into this category and have sought the status of first movers in relation to the development and implementation of information technology throughout the areas of academia” (McClea and Yen, 2005).

The above points signify that information system has become an important part of the institution of higher education and one of the major areas where information systems plays a key role is the Admissions Department. SIMS is a software application for educational establishments to manage student data that includes student admission information, course information, information on academic grades and other student-related data. The business practices and processes, and the information that guides decision making in large areas of the academy, interact with and derive from these information systems (Suwardi, 2007). Its implementation is one of the largest investments (Suwardi, 2007) in higher education institutions. The benefits of information technology in higher education admissions derive from the essential need to increase efficiency, boost
productivity, and decrease costs while increasing applications and improving the quality of students accepted into educational programs (McClea and Yen, 2005).

Collecting, analyzing and transforming a growing student related data into pertinent information is difficult without the development and implementation of ICT-supported IS. Therefore, Universities and Colleges are currently investing on the development and implementation of SIMS to meet the requirements. Such investment on information systems is expected to bring increased efficiency and effectiveness as well as better quality services to the customers in the area. Therefore, the measurement of information systems success or effectiveness is critical to our understanding of the value and efficacy of management actions and IS investments (DeLone and McLean, 2003). In this regard, there should be research to identify factors that contribute to the success or failure of SIMS in HEIs in Ethiopia and other developing countries.

This research aims to make a contribution in addressing information system success factors for implementing and utilizing Information System in general, and SIMS in particular in Ethiopian university system from a national perspective, an area in which our search of the literature yielded little evidence of research activities. As it is stated by Anakwe, et al. (1999) many studies on IS implementation success have been undertaken but few have concentrated on Least Developed Countries (LDCs). They also added that “there is growing concern that implementation and utilization of IS are being undertaken with insufficient consideration of economic, social and political difficulties. Identifying the determinants for IS success within these differing settings is important in LDCs. This research project will therefore attempt to bridge the gap in the literature between the Information System utilization and IS success factors for its use in a university context of low income countries such as Ethiopia. The study will address the research question: what determinant factors contribute to the success or failure of IS in higher education institutions of Ethiopia with particular reference to SIMS?

The study uses DeLone and McLean model to identify the dimensions of IS success when applied to SIMS in the context of a HEIs. In addition to the six constructs of the original model, i.e., information quality, system quality, use, user satisfaction, individual impact, organizational impact; user support and top management support are considered to be relevant to the study area and added as moderating factors. Testing whether information systems success models like DeLone and MacLean’s can be extended to investigate SIMS's success within a low income country context is the interest of the study.

The paper is organized in four sections. The first section develops the basis for the case study by introducing St. Mary's University College and its SIMS. The second section deals with the theoretical framework to be used in investigating the success or failure of SIMS. This section will present the DeLone and McLean (1992) information system success model, additional constructs to be added in the model which are determinant factors for the IS success in our context, definition of each construct and the hypothesis set for each of the constructs. The third section presents the methodology to be followed in studying the IS success factors. In this section the method to be applied, measurement instruments, and sample size as well as data collection techniques will be discussed. In the last section we present our concluding remarks and indicate the expected results and contributions of the study.

MOTIVATION AND STUDY BACKGROUND

Investment in the area of SIMS is a high priority in the case of Ethiopian HEIs. This is mainly because of the recent trend of expansion of HEIs and increase in student enrollment. As recently as the year 2005, there were only 9 public HEIs in Ethiopia. In the last three to four years 13 new public universities were built and made operational, raising the number of public HEIs to 22. In addition to this about 250 private higher education institutions have been established in the past ten years, most of which offer diploma and certificate programs. About 55 of the 250 private higher education institutions offer degree programs and 2 of the 250 offer post graduate programs. Therefore, a total of 263 new public and private higher education institutions have been established in the past ten years. This increased the total number of both public and private HEIs to 272. Partly because of this expansion, the average five year growth in tertiary level enrollment reached 27%. This expansion brought significant increase in student enrollment. In order to cope up with such expansions in student enrollment, institutions of higher education are making investment in the development and implementation of IS and it is a most recent phenomenon in the case of Ethiopia. Appropriate evaluation of these systems remains an important agenda for higher education management if they are to see a good return for their costly investment. Thus, our motivation is to conduct this study to help identify determinant factors that contribute to the success or failure of IS implementation and use in HEIs with particular reference to SIMS in Ethiopia using a specific case.

We selected St. Mary's University College mainly because of the experiences one of the co-authors as a staff member at the university college during its system development and implementation. Currently the researcher is also a primary user of the system.
St. Mary’s University College is a private HEI which was established in the year 2000. It is one of the two private higher education institutions that offer post graduate programs. It also offers degree, diploma and certificate programs in conventional mode (Regular and Extension face-to-face classes) as well as in distance education mode. There are a total of 22 departments in both conventional and distance education mode that offer degree, diploma and certificate programs. The total number of students in both modes is 40,393, of which 16,833 are degree students, with 20,545 diploma students and 3,015 Certificate students in both conventional and distance programs. The total number of full time academic staff is 206, and that of administrative staff is 778.

SIMS for the University College is developed in-house based on the requirement specification of the Registrar’s Office. The system is developed using PHP programming language with MySQL database. Apache Server is used to configure the system. After properly testing the SIMS it was implemented successfully in September 2008. The system supports functions including storing and processing students’ admission data, handling course registration, scheduling classes, entering and processing grades, generating grade reports and transcripts, processing graduation related data and generating statistical reports of different kind for multiple purposes.

SIMS interacts with an independent Exam Correction Software to automatically update its database with new additions and changes of course title, course code, and student data. It also automatically imports grades from the Exam Correction Software. SIMS also interacts with other three packages. One package is software that is used by 16 Coordination Centers of Distance Education at different regions to process and forward results of projects and term papers electronically to the main Registrar Office. SIMS automatically imports the results from the system. The other package is Exam Attendance Information System which is used by Exam Unit of Distance Education and Departments to incorporate and track student attendance on exam for the courses registered. SIMS also interacts with this system to automatically import exam attendance information. There is also finance software which is known as PayCol. SIMS automatically feeds students’ data to PayCol system.

Users of the system include all staff members of Registrar Office, finance office as well as the teaching staff in different departments. The total number of users of the system is about 292. The total number of students supported by the system, as it is stated above, is 40,393. The system has been in use for the past two and half years. At the initial stage of implementation there was data mismatch problem (including student data and course related data) encountered during data migration from the old system to the new one. It took a couple of months to solve this problem. There is no other major problem encountered except the minor ones which were corrected rather painlessly.

THEORETICAL FRAMEWORK

Background on the Model

Research over the past three decades has resulted in a number of approaches to the evaluation of IS success. Some of them include system usage, Information Value, user satisfaction and more recently service quality. Such varied approaches to IS success measures suggest lack of agreement regarding the question of what constitutes IS success. One of the commonly cited papers in the literature is that of DeLone and McLean (1992). In their paper, the authors synthesized 100 empirical IS success measures (published between 1981 and 1987) and proposed a model that incorporates several individual dimensions of success into an overall model of IS success. DeLone and McLean introduced six major dimensions or categories of IS success – system quality, information quality, use, user satisfaction, individual impact and organizational impact.

According to DeLone and McLean (2003), in the IS Success Model, “systems quality” measures technical success; “information quality” measures semantic success; and “use, user satisfaction, individual impacts,” and “organizational impacts” measure effectiveness success. As they have elaborated, an IS is first created, containing various features, which can be characterized as exhibiting various degrees of system and information quality. Next, users and managers experience these features by using the system and are either satisfied or dissatisfied with the system or its information products. The use of the system and its information products then impacts or influences the individual user in the conduct of his or her work, and these individual impacts collectively result in organizational impacts. According to Gable et al. (2003), the constructs/measures of the Delone and McLean model provided a holistic view across the organization—from a top management perspective, to that of data entry officers’—and provided a detailed categorization of success dimensions.

As it is stated in the introduction DeLone and McLean Information System Success Model is used as a theoretical framework for the study. This is mainly because the DeLone and McLean framework is widely accepted as one of the more complete IS evaluation frameworks and has been used extensively in empirical research (Ballantine et al., 1996). The model also enables us to evaluate the success of IS at different levels system, individual and organizational.
In 2003 the DeLone and McLean model was updated to reflect changes observed in the literature over the decade from 1992 to 2002. The updated model consists of six interrelated dimensions of IS success: information, system and service quality, (intention to) use, user satisfaction, and net benefits. As it is interpreted by Ballantine, et al., 1996, a system can be evaluated in terms of information, system, and service quality; these characteristics affect the subsequent use or intention to use and user satisfaction. As a result of using the system, certain benefits will be achieved. The net benefits will (positively or negatively) influence user satisfaction and the further use of the information system. The study doesn’t consider this model because it incorporated service quality and issues regarding customer satisfaction which are outside the scope of this research project.

**Our Additional Constructs**

This study adds two additional constructs to the Delone and MacLean model of IS success. ‘User support’ and ‘management support’ are defined as additional constructs on which an empirical study will be conducted. These additional constructs are added because they are expected to be the salient success dimensions and measures in the current implementation and use of Student Information Management System at St. Mary’s University College.

With the increasing role of end user computing and the expanding use of personal productivity tools, enduser support is considered a critical factor in IS success (e.g., Igbaria and Chakrabarti, 1990; Mirani and King, 1994 as cited in Alshawaf and Khalil, 2008). Many researchers found significant support for the relationship between personal computing success and user support (Mirani and King1994; Vijayaraman and Ramakrishna, 1990; Bergeron et al., 1990, cited in Hussein et al., 2005).

In order to provide end users with the necessary technical and logistical support, organizations have established and staffed internal specialized units or centers. The existence of such support units is expected to enhance user satisfaction and systems use, and consequently, improve organizational performance (Alshawaf and Khalil, 2008). In the study conducted by Chen (1997), it is found that technical support significantly affect user satisfaction level and it is taken as an important means for Information Centers to increase user satisfaction.

In their study on IS Success factors and IS organizational Impact, Alshawaf and Khalil (2008) found that organizational commitment to end user support and provision of required financial resources may enhance systems usage. Thus, in the automated environment where there is ICT-based Student Information Management System we believe that technical support to users of the systems would be crucial.

From the argument stated above we can conclude that user support can be considered as a moderating factor between system quality and information quality on the one hand and use and user satisfaction on the other. Because of the role it plays in organizations top management support is considered as one of the important factors that determine IS success. Top executives need to provide direction, participate in the process, show support for all the entities in the organization, and ensure that organizational members are satisfied with the changes that they make for new system (Davenport, 1998; Nandhakumar et al., 2005 as cited in Iffinedo, 1998).

According to Iffinedo (1998) "top management support refers to the extent to which top managers in the organization provide direction, authority, and resources during and after the acquisitions of IT systems, including ERP systems. Conventional wisdom suggests that when top managers support an IT project publicly, other organizational members usually interpret such moves positively and act accordingly".

King and Teo (1996, as cited in Hussein, Selamat and Anom, n.d.) found top management support facilitated the successful deployment of strategic IS applications, while lack of top management support was found to inhibit the strategic use of IT/IS. Igbaria et al., (1997, as cited in Hussein, Selamat and Anom, n.d.) in his test of a structural equation model on personal computing factors in small firms, found that management support has positive direct effects on perceived usefulness and perceived ease of use. In their study of the impact of organizational factors on information systems success, Hussein, Selamat and Anom (n.d.) found that a higher level of top management support relates to a higher degree of satisfaction in system quality, information quality, and overall user satisfaction. More importantly, commitment from supportive top officials is most likely to encourage employees to use an IS. Any form of support from top management may help employees to become involved in any IS applications adoption, implementation or utilization (Hussein, Selamat and Anom, n.d.).

We can infer from the above findings that top management support can be considered as a moderating factor that moderate a relationship between information quality and system quality on the one hand and use and user satisfaction on the other hand. Therefore, the modified DeLone and McLean IS success model and the relationship among the different constructs are as presented in Figure1 below.
Figure 1: Modified IS Success Model

Construct Definition and Hypothesis

System quality is a measure of the information processing system itself. Most measures in this category tap engineering-oriented performance characteristics. It consists of performance characteristics of the systems which include resource utilization, reliability, response time, ease of terminal use, data accuracy, reliability, completeness, system flexibility and ease of use.

In the case of Student Information Management System, ease of use, response time, communication with other system, flexibility and ease of learning are the major qualities that are valued by users of the Student Information Management System. Seddon and Kiew (1994) found in their path analysis that information quality and system quality are significant determinants of overall user satisfaction. The Technology Acceptance Model (Davis et al., 1989) predicts that perceived ease of use, as an aspect of system quality (DeLone and McLean, 1992) is a significant direct and indirect determinant of use, the indirect effect being channeled through perceived usefulness. It is expected therefore, that the higher the system quality, the better the success of Student Information Management System (SIMS) in terms of improved use and user satisfaction. This is represented by the following hypothesis.

H1a: SIMS quality will be positively related to the use of SIMS.
H1b: SIMS quality will be positively related to SIMS user satisfaction.

Information quality represents measures of information systems output. It is a function of the value of the output produced by a system as perceived by the user. Typical measures in this area include accuracy, precision, currency, output timeliness, reliability, completeness, conciseness, format and relevance (Bailey and Pearson, 1983). Other authors also included understandability, report usefulness, sufficiency, freedom from bias, comparability, and quantitativeness.

In this study, information quality is considered as having characteristics of accuracy, output timeliness, completeness, output clarity and format. The system should be able to provide detailed information about the student including, admission status, academic status, total courses taken and remaining, total terms attended and remaining, and grade deficiencies. Users should confirm that the information provided is accurate, timely provided, reliable, complete, and displayed in appropriate format. A positive conformance of these characteristics by the users implies that there is effectiveness in the use of SIMS. Seddon and Kiew (1994) also stated that information quality is a significant determinant of overall user satisfaction. This leads to the following hypothesis.

H2a: SIMS information quality will be positively related to SIMS use.
H2b: SIMS information quality will be positively related to SIMS user satisfaction.

Top management support is conceptualized as the involvement and participation of the executive or toplevel management of the organization in IT/IS activities (Jarvenpaa and Ives, 1991, cited in Hussien, et al., 2007). As it is stated before, there are a number of studies that validated the positive relationship between top management support and IS success. King and Teo,
(1996) found top management support facilitated the successful deployment of strategic IS applications, while lack of top management support was found to inhibit the strategic use of IT/IS. Igbaria et al., (1997) tested a structural equation model on personal computing factors in small firms and found management support has positive direct effects on perceived usefulness and perceived ease of use. Ang et al., (2001) examined 47 Malaysian public sector agencies on IT usage to support total quality management (TQM). In this study top management support for IT applications is found to be the highest predictor of IT usage. All these findings indicated that top management support has significant influence on IS success. All these findings enable us to develop hypothesis 3 which is stated as follows.

H3: The effect of system quality and information quality on SIMS use and user satisfaction is the positive function of top management support.

User support is mainly concerned with the technical support and help given to users in terms of operating the information systems in the organization (Hussein, et al., 2005). As it is stated above there are many studies conducted in the area which confirmed strong relationship between user support and success in user computing. In an automated environment where there is ICT based Student Information Management System we believe that technical support to users of the systems is crucial. Users will most likely seek help in using the systems in their daily operations. Based on the evidences, it is possible to hypothesize the relationship between user support and IS success as follows:

H4: The effect of system quality and information quality on SIMS use and user satisfaction is the positive function of user support.

Use refers to the recipient consumption of the output of an information system. Some of the characteristics used to measure information use by different authors include: amount of use/duration of use, number of inquiries, number of functions used, number of records accessed, frequency of access, number of reports generated, regularity of use, use for intended purpose, purpose of use and motivation to use. In our context “Use” measures everything including data entry, data manipulation (edit, delete), grade report and transcript generation, statistical report generation, retrieving and any student related information and providing it to a third party. In this case, use is not voluntary. Therefore, for this study use for intended purpose, extent of use and number of system’s functions used are considered the most appropriate.

Dissonance theory by Fishbein and Ajzen (1975, cited in DeLone and McLean, 1992), suggests that IS use leads to user satisfaction. The findings of metaanalysis conducted by Bokhari (2005) lead to the conclusion that there exists a “medium” and significant positive relationship between system usage and user satisfaction (i.e., r = 0.2555). In addition to these, SIMS use is a direct antecedent of individual impact variables. Therefore, considering these relationships the following hypothesis can be made for SIMS use.

H5a: SIMS use has positive relationship with and leads to user satisfaction H 6: SIMS use will be positively related to individual impacts of the SIMS.

User satisfaction can be defined as the extent of which users believe the information system available to them meets their information and system requirements (Baroudi et al., 1983). User satisfaction is an often used measure of system success. Some of the characteristics which are considered as determinants of user satisfaction include: overall satisfaction, information satisfaction – difference between information needed and received, enjoyment, software satisfaction, and decision-making satisfaction.

In our context, user satisfaction is an important means of measuring the level of satisfaction of system users, i.e., employees of the university college while using the system in the process of data entry, data manipulation, report generation, information retrieval and provision to the required body (including the management, Ministry of Education, Education Bureaus, students, different departments, coordination centers). Some of user satisfaction characteristics which are relevant to the study are overall satisfaction level, extent of dependence on the system, increased status of employees, personal benefits gained, assurance of usefulness of the system.

Baroudi et al., (1986) suggest that if user satisfaction is interpreted as an attitude, the Theory of Reasoned Action (Fishbein and Ajzen, 1975, cited in DeLone and McLean, 1992) supports the model that user satisfaction will influence intentions to use the system and actual use. It is expected that the degree of user satisfaction can affect the amount of use of SIMS. In addition to this, since user satisfaction is a direct antecedent of individual impact variables the former affects the latter. Therefore, based on these relationships we establish the following hypotheses in relation to user satisfaction construct.

H5b: SIMS user satisfaction will be positively related to the use of SIMS.

H6: SIMS user satisfaction will be positively related to individual impacts of the SIMS.
The individual impact dimension is defined by DeLone and McLean (1992) as “the effect of information on the behavior of the recipient”. Some of the characteristics which are considered as determinants of individual impact include: information understanding, learning, accurate interpretation, information awareness, information recall, problem identification, decision effectiveness, improved individual productivity, and task performance. Those characteristics which are most relevant to the study are performance related issues.

According to Bokhari (2005), “The prime purpose of introducing IS into an organization is to improve not only individual decision-making performance but overall organizational efficiency and effectiveness. The expected gains in terms of organizational goals through IS implementation and adoption are concerned with the success of the system”. Therefore, the impact on individual performance should eventually have some organizational impact. Therefore, the possible hypotheses that can be built is the following:

H7: The impact on individual performance will be related to the organizational impacts of SIMS.

METHODOLOGY

A survey instrument will be used to gather data to test the relationships shown in the research model. Primary users of the system at the university college will be surveyed with a view to soliciting their views and assessment of the system being used. The target population includes all staff members of the Registrar Office and Finance Office, the teaching staff and the top management of the university college. The total number of respondents is expected to be 292. Three complementary methods will be used for collecting primary data: questionnaire, interview and direct observation of Student Information Management System and services. The questions are drawn from previously validated instruments and adapted to the current study context. Information on the instruments or measures is presented in Appendix A. The study will use perceptual measures to capture data on IS success factors. Perceptual measures are acceptable measures in most survey research. A five-point Likert scale will be used to represent the responses of the subjects.

CONCLUSION AND FUTURE RESEARCH

The findings of this work in progress study will demonstrate the importance of IS success factors in determining the effectiveness of SIMS applications in the higher education environment. This paper will make four major contributions. First, it shares experience of measuring the success of IS in the context of higher education institutions of low income countries such as Ethiopia. Second, it indicates which factors can become dominant in the success of a system, especially when it is developed in-house. Third, the identification of success factors will help the top management to focus on these factors and make the necessary interventions. Fourth, it will open an opportunity and lessons learned for further research in the area. In general, this will be both a theoretical and practical contribution to the field of IS success when implemented in HEIs; in particular HEI in low income countries may benefit from the lessons learned. Since this is more of a model building study, a part of our future plan is to conduct empirical research to validate the constructs presented in the model.

REFERENCES


### APPENDIX A: INSTRUMENTS AND MEASURES

The instruments used in this study are adopted from different sources including Roldán and Leal (2003), Iivari (2005), Davis (2001), Ifinedo (1998).

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Possible Measures to be Assessed</th>
</tr>
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<tbody>
<tr>
<td>Systems Quality</td>
<td>The system is easy to use</td>
</tr>
<tr>
<td></td>
<td>The system demonstrated fast and consistent response time</td>
</tr>
<tr>
<td></td>
<td>The system is able to successfully communicate with other information systems</td>
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<tr>
<td></td>
<td>The system is flexible to change in response to new demands</td>
</tr>
<tr>
<td></td>
<td>It would be easy for to become skillful at using the system</td>
</tr>
<tr>
<td></td>
<td>The system provides faster access to information</td>
</tr>
<tr>
<td>Information Quality</td>
<td>The system enables to obtain more current and timely information</td>
</tr>
<tr>
<td></td>
<td>The system enables to get more accurate information</td>
</tr>
<tr>
<td></td>
<td>The system provides complete information</td>
</tr>
<tr>
<td></td>
<td>The system enables to obtain more orderly and clear information</td>
</tr>
<tr>
<td></td>
<td>The system produces the information in the desired format</td>
</tr>
<tr>
<td>Use</td>
<td>I use the system extensively/frequently/regularly</td>
</tr>
<tr>
<td></td>
<td>I use most of the system’s functions per day</td>
</tr>
<tr>
<td></td>
<td>I use the system for intended purpose like in support of customer service</td>
</tr>
<tr>
<td>User satisfaction</td>
<td>The overall satisfaction level with regard to SIMS use is better than expected</td>
</tr>
<tr>
<td></td>
<td>I have become dependent on SIMS</td>
</tr>
<tr>
<td></td>
<td>As a result of SIMS, I am seen as more valuable in this institution</td>
</tr>
<tr>
<td></td>
<td>I personally benefitted from the existence of SIMS in this institution</td>
</tr>
<tr>
<td></td>
<td>SIMS is extremely useful</td>
</tr>
<tr>
<td>Individual impact</td>
<td>I find the system useful in my job</td>
</tr>
<tr>
<td></td>
<td>Using the system makes it easier to do my job</td>
</tr>
<tr>
<td></td>
<td>Using the system improves my job performance</td>
</tr>
<tr>
<td></td>
<td>Using the system enhances my effectiveness in my job</td>
</tr>
<tr>
<td>Organizational impact</td>
<td>Amount of time reduced in producing and dispatching grade reports to students</td>
</tr>
<tr>
<td></td>
<td>Increased effectiveness in serving the customers (increased service effectiveness)</td>
</tr>
<tr>
<td></td>
<td>Staff reduction</td>
</tr>
<tr>
<td></td>
<td>Reduction in operating cost</td>
</tr>
<tr>
<td>Top Management support</td>
<td>Top management feels that the time and resources spent on the development of SIMS is wisely invested.</td>
</tr>
<tr>
<td></td>
<td>Top management is strongly in favor of the utilization of SIMS.</td>
</tr>
<tr>
<td></td>
<td>Employees are happy with the changes that top management decides on SIMS issues.</td>
</tr>
<tr>
<td>User support</td>
<td>Whether the organization has a special organizational unit to support end user while using SIMS.</td>
</tr>
<tr>
<td></td>
<td>The technical support given contributed a lot in effective utilization of the system.</td>
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