

# A STUDY TO VERIFY THE POSSIBLE REASONS FOR THE NON-USAGE OF MANAGEMENT INFORMATION SYSTEM (MIS) IN SELECTED MEDIUM SCALE INDUSTRIES

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## ABSTRACT

*MIS plays a crucial role in the management of any contemporary enterprise such as small, medium or large organizations. Over the past 10 years Management Information System has been receiving an increasing amount of attention, as the source for productivity improvements and cost reductions in their organizations. In this information age, data has become one of the most important resources to organizations. The effective and efficient management of large quantities of data is a common problem found in many industries. In this work, initially it was decided to carry out a survey to verify the implementation, usage and acceptance of MIS in 100 medium scale industries in and around Karnataka state. The study is exclusively based on the primary data collected through a sample survey is conducted on the respondents of the respective organizations by supplying questionnaires. The study reveals that as many as 73 (73%) out of 100 medium scale were making use of MIS in their organization. The study is extended to verify the possible reasons for non usage of MIS in the 27 medium scale industries, so the respondents were requested to provide a feedback on various factors which could be possible reason for non-use of MIS in their respective units by supplying the questionnaires. A five point Likert's scale was used. The respondents were supposed to give their rating ranging from 5, 4, 3, 2, 1 (5-Strongly Agree, 4-Agree, 3-Neutral, 2-Disagree 1-Strongly Disagree). After collecting the feedback, the average and standard deviation is calculated for each reason for non-use of MIS. It is noticed that the calculated value of standard deviation for each responses is not much, i.e. the smaller the standard deviation, the tighter the distribution of ratings around the mean and greater the consensus. So the collected feedback from the respondents for possible reason for non-usage of MIS is appropriate. To validate these results One-sample t-Tests were carried out with the help of Minitab statistical software.*

*Keywords: Management, Information System, Possible Reasons, Non-Usage, Medium Scale Industries:*

## INTRODUCTION

MIS plays a crucial role in the management of any contemporary enterprise such as small, medium or large organizations. Over the past 10 years Management Information System has been receiving an increasing amount of attention, as the source for productivity

improvements and cost reductions in their organizations. In this information age, data has become one of the most important resources to organizations. The effective and efficient management of large quantities of data is a common problem found in many industries. The information support for functional areas of management such as Production, Marketing, Finance, Personnel and Services is an absolute necessity. To stay competitive, many industries have sought to improve their existing system so that they can more readily compete with overseas industries. Hence, successful implementation of Management Information System may help the industries to compete with overseas market. In today's world of ever increasing complexities of business as well as management for every organization to survive and grow, must have an efficient and effective MIS which will improve the productivity of the industry. Hence it is essential to opt for a system which is very beneficial with minimum cost. Literature survey indicates that there is great demand in the Management Information System implementation initiatives by different fields irrespective the type of industries in India.

The literature survey has been carried out to identify the contributions of the researchers in the field of Management Information System. Song De-jun [06] has noticed that at present, China enterprise management information system (MIS) is facing a new stage of development in e-commerce era. He discusses the new requirements of e-commerce for (MIS), the new functions and new features of MIS under e-commerce environment, so puts up forward a new framework of MIS under an e-commerce environment. Bo Yan, Yiyun Chen and Guangwen Huang [01] have introduces the subsystems of the tax management information system. Then they establish the layer framework of tax management information system, including page framework, application framework and data framework. Tax revenue plays an important role in the national economy. With the development of taxation reform, there are increasing conflicts between the new tax system and old taxation measures.

Xiaopeng Guo and Wenjie Huang [08] have identified Campus grid management information system is the important part of digital campus infomationization construction. This article introduced the grid management mode and specific gird division methods, proposed the architecture of the campus grid management information system based on the grid management. College campuses generally have wide area, a lot of facilities. Zhenzhong Ge and Hongli Wang [09] have analyzed the necessity of the integration on the management information system based on Agent according to the globalization. They introduced how to construct the system and the steps in detail. They analyzed the technique that supports the system. The management information system has experienced the stage of single-item data processing, comprehensive data processing, processing and assistance of the system data. ZHOU Jian-Lan, SUN Zhi-Yu and LIU Xian-Rong [10] have stated that it is significant to research the work safe and emergency management information system (PSEMIS) in large-scale hydroelectric project. This paper analyses the reviews and China Three Gorges Project Corporation work safety and emergency management status and business needs, proposes the overall framework of the system design.

## MANAGEMENT INFORMATION SYSTEM

The MIS is an integrated user-machine system [02] i.e. having a combination of persons, machines, procedures and data base as its elements, which gather data from the intra and extra sources of an organization and after processing these data supply management information to the managers in an organization to support the decision making process of the management. The component of an information system [05] is shown in Figure 1.

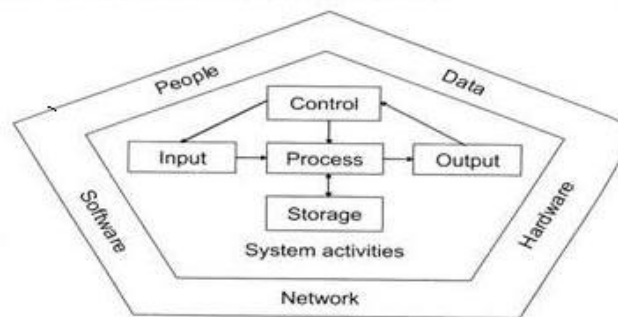


Figure 1. Components of Information System.

The term Information System is normally used when the organization is being considered as a whole with respect to its information requirements and information utilization and the reference is made to the total apparatus for handling the information within the organization in all respects. Machine elements in such systems are relatively closed and deterministic, whereas the human elements are relatively open and probabilistic in nature. The diagrammatic representation of the concept of MIS [03] has been shown in Figure 2.

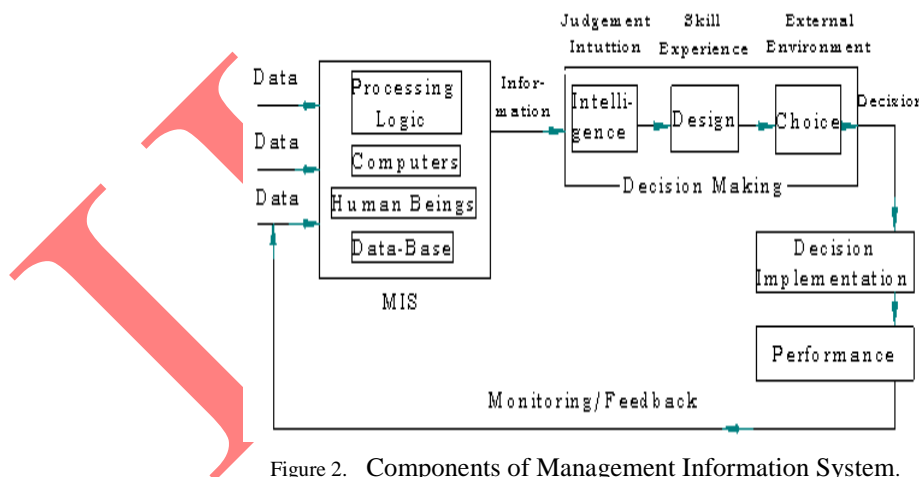


Figure 2. Components of Management Information System.

The main function of MIS is to right Information to the right person at the right place at the right time in the right form at the right cost. MIS mirrors the organizational operations by recording, processing and reporting transactions and helps in controlling the same. MIS should have a clearly defined framework of guidelines, policies or practices, standards, and procedures for the organization. It should be supportive of the institution's longer term strategic goals and objectives.

## OBJECTIVES OF THE STUDY

- To find out how many selected medium scale industries were making use of Management Information System effectively in their industries.
- To collect data from the respondents such as Executives, Engineers, Line Supervisors and Managers regarding the factors which may influence for the non-usage of Management Information System in their industries with the help of specific questionnaire designed for the purpose.
- To identify what are the possible reasons which might be a one of the possible reason for non usage of Management Information System in these industries.
- To meet all the respondents personally to get the questionnaire filled.
- Based on the responses obtained by the industries were converted in to quantitative data, which are further subjected to tabulation, analysis and interpretations.
- To create awareness among these industries which are not making use of MIS by highlighting the benefits and applications of the powerful tool “Management Information System”

## METHODOLOGY USED FOR THE STUDY

This section elaborates the research methodology adopted in the present study and encompasses the sequence, methods, processes and all other activities carried out to accomplish the objectives of the research. There are two basic approaches to research. Quantitative approach involves the generation of data in quantitative form which can be subjected to precise quantitative analysis in a formal and rigid approach. The purpose of the research is to form a data base to infer correlations, characteristics or relationships of the population. This usually means survey research where a sample of population is studied to determine its characteristics and it is then inferred that the population has the same characteristics [09]. Qualitative approach to research is concerned with subjective assessment of attitudes, opinions and behaviors. Research in such a situation is a function of researcher’s insights and impressions and also supported by the earlier research in that field. Such an approach to research generates results either in non quantitative form or in the form which is not subjected to rigorous quantitative analysis.

The data has been collected by following case study approach research. The initial study has been carried out in the small scale, medium scale and large scale industries located in and around Karnataka state. A questionnaire was designed to test the usage of MIS in these organizations. These questions were framed in such a way that it covers all the core dimensions that have been considered as critical for this study. All questions framed were of closed ended type. The respondents are supposed to answer all the questions that have been supplied to them. In this regard, primary data was collected by way of survey of selected industries consisting of small scale, medium scale and large scale industries. The respondents from these industries were randomly selected involving line engineers, supervisors, managers and executives. These respondents were supplied with the questionnaires as discussed in Chapter 4 and interviewed for cross verification. A five point Likert’s scale was used. The respondents were supposed to

give their rating ranging from 5, 4, 3, 2, 1 (5-Strongly Agree, 4-Agree, 3-Neutral, 2-Disagree 1-Strongly Disagree). These data's was summarized, stratified and analyzed to arrive at conclusions. The statistical tools like descriptive statistics, normality analysis, validity analysis, One- Samples t-Tests are used in this study with the help of Minitab Statistical Package [04].

In order to check the readability, whether all the questions are being perceived properly in the right manner as they are supposed to be perceived or not, redundant questions if any, unanticipated responses or lack of clarity concerning concepts utilized in the questionnaire etc., were taken into consideration by conducting a questionnaire trail run. First the final version of the research instrument is tested on a sample of engineering students to validate the same for the purpose. This was done in two steps viz.,

1] The instrument was shown to experts who were asked to comment on its ability to measure the attributes sought in the study. The experts concurred in their opinion and thus its content validity was established.

2] The instrument had to be standardized and its readability coefficient calculated by administrating the questionnaire to a random sample of for fifty industries consisting of small scale, medium scale and large scale organizations.

To meet the objectives of the research the following process steps were taken

- Step 1 - A Data base was built from survey information, collected through questionnaire from the respondents of various small scale, medium scale and large scale industries to know the usage of MIS.
- Step 2 - The Data set is verified to ensure that it is free from bias and incorrectness.
- Step 3 - The feedback is collected to find out the influencing factor for non-usage of MIS in their industry.
- Step 5 - The Data in the data set was statistically analyzed with the Minitab Statistical Package to validate the results.
- Step 6 - The analyzed information was interpreted and recommendations were made further research in the area of MIS.

## SCOPE OF THE STUDY

It is observed from the literature review that management information system finds its application in all most all the areas. It is also observed that, Management Information System is used in different fields irrespective the type of the industry, the purpose for which it is used will be different with respect to the requirement that arises in those industries. Hence, it has been decided to carry out the research to find out how many different kinds of industries consisting of small scale, medium scale and large scale industries are making use of MIS in their organizations, if not what are the reasons for not making use of MIS. Also to create awareness to those industries what are the functions of MIS and how it will help them? Hence, the research work titled "A Study to verify the possible reasons for the Non-Usage of Management Information System (MIS) in Selected Medium Scale Industries" is carried out in and around Karnataka. Initially it is proposed to carry out know how



many medium scale industries out of 100 were using management information system in their respective industries. It is also proposed to carry out the study to know what are the possible reasons for the non-usage of management information system in these industries. Based on the survey carried out by the research scholar, all the responses obtained were converted in quantitative data, which were further subjected to tabulation, analysis and interpretations.

## CASE STUDY

The research study was conducted by preparing questionnaire having a list of 20 questions. These questionnaires were distributed to the respondents such as line engineers, supervisors, managers and executives of various selected medium scale industries in and around Karnataka.

Table I. Description of the Overall Sample Size

<i>Description</i>	<i>Total Number of Industries</i>
<i>The Questionnaires Issued</i>	<i>134</i>
<i>The Questionnaires Received</i>	<i>100</i>
<i>Percentage of Response</i>	<i>74.62%</i>

Table 1 gives the details of the entire sample who participated in the study. Total number of industries the questionnaire issued were 134, the total number of industries responded for the issued questionnaire were N=100 and the total percentage of response was 74.62%. The response received was convincing and found sufficient for further analysis. The figure 3 shows the distribution of the overall sample size of the study.

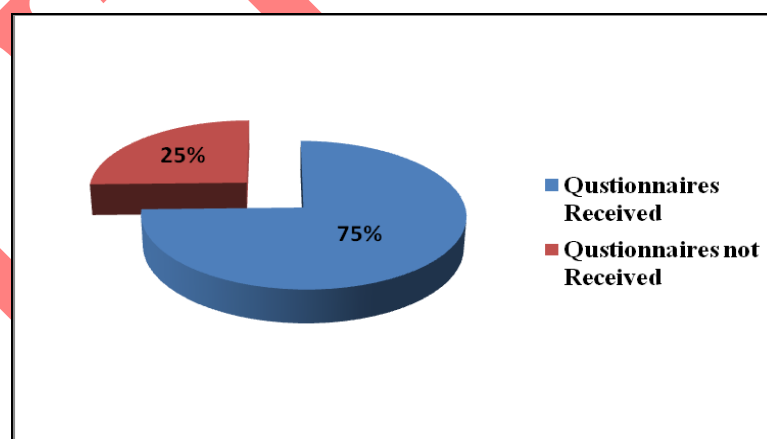


Figure 3. Description of the Overall Sample Size.

The overall sample of various 100 selected medium scale industries had to be first tested for its reliability and its validity for the questionnaire supplied to the respondents. A sample is called reliable when it gives the same results, applied to different persons or under different circumstances. Test and retest method is measured by calculating a statistic known as

Cronbach's coefficient alpha. Coefficient alpha measures reliability among a group of items combined to form a single scale or factor. The responses obtained were used to calculate the reliability (Cronbach's Alpha Coefficient) which was computed and is presented as shown in Table 2.

Table II. Cronbach's Alpha Coefficient Value.

	<i>Respondents of the Industries (N)</i>	<i>No. of Items</i>	<i>Cronbach's Alpha (<math>\alpha</math>)</i>
<i>Questionnaire (Devised Specifically for this Study)</i>	<i>135</i>	<i>16</i>	<i>0.993</i>

It is a statistic that reflects the homogeneity of the scale. Generally, reliability coefficient of 0.70 or more is considered good. However for this study the value obtained is 0.993, which shows that the data has satisfactory reliability and validity.

A. **Questionnaire Design for the Research:** The design of the Questionnaire was done keeping the following parameters in mind.

- To find out Implementation, Usage and Acceptance level of MIS in their organization, that is how many medium scale industries were making use of MIS in their organization.
- To verify the possible reasons for not making use of MIS their organization. The questionnaire was prepared on the basis of review of literature and many discussions with experienced academicians, consultants and professionals.
- The Top management's support and initiative as regards to the implementation MIS in their industry.
- The respondents of the industries selected were Managers, line supervisors, Engineers, Chief-Executives etc., so that I get the right information for research work.
- To know overall effectiveness of MIS utilization in their industry.
- The study was carried out in 100 Medium Scale Industries located in and around Karnataka. The study discusses the usage of Management Information System and level of acceptance in these industries. The main aim is to verify the usage of MIS and if not what are the factors hinders the usage of MIS in these industries. Based on the feedback obtained from the respondents, the conclusions were drawn and suggestions were given to implement the MIS in their organizations.

B. **Interpretations and Inferences:** The analysis was carried out with the help of bar charts, diagrams and basic statistical analysis. Since, our main objective was to collect the feedback information about the usage of Management Information System in the selected 100 Medium Scale Industries, the important parameters like awareness level, implementation level, top management support, expertise level have been discussed with the help of the Questionnaire.

During the process of the interview with the Chief Executives, line supervisors, Engineers and General Managers, Engineers and the Workers of the organization in the implementation of MIS, many issues relating to the success factor for the effective implementation were discussed and noted down. Also based on the feedback information, found out what are the possible reasons for non usage of MIS in selected Medium Scale Industries. The questions during the research survey explicitly tested the following points. They were,

- Awareness level of employees about Management Information System, its usage and benefits. How many of the selected Medium Scale units were making use of MIS in their industry.
- Present system being used in their organization.
- Top management's support, participation and initiatives, as regards to the implementation of Management Information System in their industry
- Managers, Line Engineers and Workers expertise level in the process of Management Information System implementation.
- Finally, the reasons for the non-usage of Management Information System in these medium scale industries were identified.

*c. Results of Discussions:* In this section the data received from all the respondents of the medium scale industries are discussed for the questionnaire supplied and different analysis has been carried out to validate the results obtained. The information received by the respondents whether there is a usage of MIS and Computerization in the selected small scale industries are tabulated in table 2.

Table III. Usage of MIS and Computerization in Medium Scale Industries.

<i>Q. No</i>	<i>Questionnaire</i>	<i>Medium Scale Industries</i>		
		<i>Yes</i>	<i>No</i>	<i>Total</i>
<i>1</i>	<i>There is usage of MIS in our Organization</i>	<i>73</i>	<i>27</i>	<i>100</i>
<i>2</i>	<i>There is no computerization in our Organization</i>	<i>09</i>	<i>18</i>	<i>27</i>

It was observed from the Table 3 that the implementation, usage and acceptance of MIS is as much as 73 industries out of 100 selected Medium Scale Industries. Remaining 27 industries were not making use of MIS in their organization and these organizations are still to appreciate the potential of this powerful application of information system. An attempt is also made to create awareness to these industries such as what are the functions of MIS and how it will help them etc. It was observed from the Table 3 that there is no computerization in only 09 industries out of 27 Medium Scale Industries and there is a computerization in the remaining 18 industries. This reveals that, there are usage of computers in these industries but the transactions in the industry is not computerized. So in order to increase the computerization in these industries there is a dire need to build up computer culture by properly disseminating information about potential computer applications and the benefits thereof to the management.



To find out the most influencing factor for non-usage of MIS in those 27 medium scale industries, the respondents were requested to provide a feedback on various factors which could be possible reason for non-use of MIS in their respective units. A five point Likert's scale was used. The respondents were supposed to give their rating ranging from 5, 4, 3, 2, 1 (5-Strongly Agree, 4-Agree, 3-Neutral, 2-Disagree 1-Strongly Disagree) for each questionnaire supplied to them. After collecting the feedback, the average and standard deviation is calculated for each reason for non-use of MIS as shown in table 3.

Table IV. Possible Reasons for Non-Usage of MIS in Medium Scale Industries.

Q. No	Questionnaire	Medium Scale Industries	
		Average	Std. Dev
3	<i>We do not know much about potential usages of Computers</i>	2.49	0.78
4	<i>Financial Constraints is a reason for non-use of Computer/MIS</i>	2.67	0.97
5	<i>Trained Computer Personnel are not available</i>	2.50	0.93
6	<i>MIS is too expensive to use</i>	2.75	0.84
7	<i>Benefits from MIS are low</i>	3.26	0.71
8	<i>We have not heard of MIS</i>	2.35	0.78
9	<i>Decisions we make are mostly too simple to need a computer</i>	2.62	0.93
10	<i>We usually do not have time pressure when making decisions</i>	2.59	0.92
11	<i>We usually do not face "what if" questions when making a decision</i>	2.31	0.72
12	<i>MIS needs Continuous Updation</i>	3.08	0.86
13	<i>We are addicted to the Existing System</i>	3.00	0.97
14	<i>We do not want to change the existing system</i>	2.61	0.97
15	<i>Many MIS Modules were available</i>	3.20	0.97
16	<i>MIS works on Network</i>	3.13	0.96
17	<i>MIS may not do every thing</i>	3.31	0.95
18	<i>Skill required to use MIS is more</i>	2.91	0.82

The received feedback from the respondents reveals that the factors which influence (the average value is more than 3) for the non-usage of MIS in these industries are given in table 4.24 i.e. Q.No 7, 12, 13, 15, 16 and 17. The factors which may or may not influence (the average value is less than 3) for the non-usage of MIS are Q.No 3, 4, 5, 6, 8, 9, 10, 11, 14 and 18. To validate the feedback receive from the respondents, the One Sample t-Test analysis is carried out with the help of Minitab statistical software.

### 1. One-Sample t-Test Analysis

The One-Sample T-Test procedure tests whether the mean of a single variable differs from a specified constant. A one-sample t-test is used to test differences between a sample mean and a hypothesized (null) value. A one-sample t -test comparing our sample mean to the population mean is appropriate.

Table V. One Sample t-Test Analysis for Overall Sample.

Q. No	Questionnaire	Test Value = 3					
		t	df	Sig. (2-tailed)	Mean Difference	95% CI of the Difference	
						Lower	Upper
3	<i>We do not know much about potential usages of Computers</i>	-6.685	134	0.000 (**)	-0.51111	-0.6623	-0.3599
4	<i>Financial Constraints is a reason for non-use of Computer/MIS</i>	-3.820	134	0.000 (**)	-0.32593	-0.4947	-0.1572
5	<i>Trained Computer Personnel are not available</i>	-5.953	134	0.000 (**)	-0.49630	-0.6612	-0.3314
6	<i>MIS is too expensive to use</i>	-3.094	134	0.002 (**)	-0.24444	-0.4007	-0.0882
7	<i>Benefits from MIS are low</i>	3.560	134	0.001 (**)	0.25926	0.1152	0.4033
8	<i>We have not heard of MIS</i>	-8.571	134	0.000 (**)	-0.65185	-0.8023	-0.5014
9	<i>Decisions we make are mostly too simple to need a computer</i>	-4.531	134	0.000 (**)	-0.37778	-0.5427	-0.2129
10	<i>We usually do not have time pressure when making decisions</i>	-4.832	134	0.000 (**)	-0.40741	-0.5742	-0.2407
11	<i>We usually do not face "what if" questions when making a decision</i>	-9.411	134	0.000 (**)	-0.68889	-0.8337	-0.5441
12	<i>MIS needs Continutous Updation</i>	1.017	134	0.311	0.08148	-0.0770	0.2399
13	<i>We are addicted to the Existing System</i>	0.000	134	1.000	0.00000	-0.1689	0.1689
14	<i>We do not want to change the existing system</i>	-4.510	134	0.000 (**)	-0.38519	-0.5541	-0.2163
15	<i>Many MIS Modules were available</i>	2.345	134	0.021 (**)	0.20000	0.0313	0.3687
16	<i>MIS works on Network</i>	1.481	134	0.141	0.12593	-0.0423	0.2941
17	<i>MIS may not do every thing</i>	2.858	134	0.005 (**)	0.23704	0.0730	0.4011
18	<i>Skill required to use MIS is more</i>	-1.135	134	0.258	-0.08889	-0.2438	0.0660

Table 5 shows the details of t-values, degrees of freedom, their respective significant values, mean difference and the 95% confidence interval for the difference in means (lower and upper). As shown in the Table 5 out of 16 questionnaires 12 questionnaires found to be significant (significant at both  $\alpha=0.05$  and  $\alpha=0.01$ ). They are Q. No. 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15 and 17. It is denoted with (\*\*) symbol and the corresponding significant values are

0.000, 0.000, 0.000, 0.002, 0.001, 0.000, 0.000, 0.000, 0.000, 0.000, 0.021 and 0.005 respectively. The Q. No. 3, 4, 5, 8, 9, 10 11 and 14 are the most statistically significant, next is Q. No. 7, 6, 17 and 15 are according to the order of priority of its significance among medium scale industries taking into consideration of all the respondents

Table VI. Implementation Happening and Future Plan to Implement MIS.

Q.No	Questionnaire	Medium Scale Industries		
		Yes	No	Total
19	Is MIS implementation happening in your organization	05	22	27
20	Future plan to implement MIS in your organization	07	15	22

It was observed from the Table 6 that the implementation of MIS is happening in 05 medium scale industries. So it is a good sign that they are realizing the value of MIS. The remaining 22 industries are yet to initialize the implementation of MIS in their respective organization. It was also observed that, 07 medium scale industries having a plan to implement MIS in near future. So it is also a good sign that few industries realizing the importance of MIS. The remaining 15 industries yet to take the initiation to implement MIS in their respective organizations.

In management of almost all operational activity, the information forms a major input and as such for effective implementation of futuristic information system in overall system, it is essential to modify the existing management. An effective Management Information System supplies accurate, relevant and timely information to the manager of an organization. An attempt is also made to create awareness to those industries which are not making use of MIS such as what are the functions of MIS and how it will help them? Even the study identifies the problems faced in the successful implementation of MIS in the selected industry. It is observed that, "Management Information System" is used in different fields irrespective the type of the industry, the purpose for which it is used will be different with respect to the requirement that arises in those industries.

## CONCLUSIONS

It was observed that due to enormous potential in the Management Information System, the study was carried out in 100 selected medium scale industries to know the percentage implementation, usage and acceptance of MIS in their respective units. As per the survey conducted by the research scholar, it has found out that as many as 73 (73%) out of 100 medium scale industries were making use of MIS in their organization. The study is extended to find out the possible reasons for inadequate usage of MIS in the remaining 27 medium scale industries, so the respondents were requested to provide a feedback on various factors which could be possible reason for non-use of MIS in their respective units. After collecting the feedback, the average and standard deviation is calculated for each reason for non-use of MIS. It is noticed that the calculated value of standard deviation for each response is less. So the collected feedback from the respondents for possible reason for non-usage of MIS is

appropriate. The study also found out the most influencing factors i.e. possible reasons for non-usage of MIS in 27 medium scale industries are Q.No 7, 12, 13, 15, 16 and 17. The remaining factors did not influence much for the non-usage of MIS in the respective industries. To validate these results one-sample t-Test is carried out with the help of Minitab statistical software.

Finally, the main reason for the non-use of MIS in these industries are due to the limited use of computers, unawareness of potential activities which a computer can handle & incomplete or no information about MIS & its benefits, lack of awareness and inadequate training provided to employees are noticed. In order to increase the usage of MIS in these organizations, there is a dire need to build up computer culture by properly disseminating information about potential computer applications and the benefits thereof to the employees. The management should invest money to procure computers and related systems which are required and proper training should be given to the employees to create awareness about MIS. This in turn, increases the usage of MIS in medium scale organizations.

## REFERENCES

- [1] Bo Yan, Yiyun Chen and Guangwen Huang, "Layer Framework of Tax Management Information System", IEEE-2009.
- [2] C.S.V Murthy, "Management Information Systems-Text and Applications", Himalaya Publishing House, Mumbai 2007.
- [3] Dr. D.P. Goyal, "Management Information System", AICTE Continuing Education Program, 1996,
- [4] Meyer, Ruth K. and David D. Krueger, "A Minitab Guide to Statistics", 3rd edition, Upper Saddle River, NJ: Prentice-Hall Publishing, ISBN 978-0-13-149272-1, 2004.
- [5] O'Brien and James A, "Management Information System: A Managerial End User Perspective", Galgotia Publications (P) Ltd., Delhi 1991.
- [6] Song De-jun, "Constructing new Model of Management Information System under E-commerce Environment (ECMIS)", IEEE-2009.
- [7] Tim S. McLaren, Milena M. Head and Yufei Yuan, "Supply chain management information systems capabilities. An exploratory study of electronics manufacturers", Information Systems and e-Business Management Springer-Verlag 2004.
- [8] Xiaopeng Guo and Wenjie Huang, "Research of campus grid management information system", First International Workshop on Education Technology and Computer Science, IEEE-2009.
- [9] Zhenzhong Ge and Hongli Wang, "The Construction of the Dynamic Management Information System Based on Agent", International Joint Conference on Artificial Intelligence, IEEE-2009.
- [10] ZHOU Jian-Lan, SUN Zhi-Yu and LIU Xian-Rong, "The Analysis and Design of Work Safety and Emergency Management Information System in Large-scale Hydroelectric Project", IEEE-2009.