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Computerization of Co-operative Sugar Factories in Western Maharashtra: Status Analysis

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Abstract

Cooperative Sugar Industry plays a pivotal role in the socio economic development of the country. India has been recognized as one of the leading sugar producing and consuming countries in the world. Unfortunately, modernization and automation of this sector is lagging behind and most of the practices followed are traditional ones. That is why the sector is not able to keep abreast in this era of globalization. With this prospective, the present study is undertaken to know the present status and problems in computerization in the cooperative sugar factories in Maharashtra. Requisite information is collected from select cooperative sugar units with the help of a structured schedule covering present status of IT and Problems in IT implementation. Results of statistical test indicate an ample scope for computerization at middle and top level management. Problems noticed in computerization process are similar in nature in all the sample units.

Key Words: IT, ERP, Modernization, TCD.

Introduction

Computerization in Sugar factories started late in 1980's. In the initial stage, computerization was considered as the most efficient facilitator and most of the sugar factories handled desktop computers for their correspondence and work related to typing. Subsequently, sugar factories realized the importance of computerizing various manual work and efforts were put for computerization of complex and highly repetitive activities which included pay-roll, sugarcane billing, transporter billing etc. During the initial stage, due to non-availability of a qualified manpower, the entire work relating to data processing was out sourced from software companies from nearby areas. Thus, the sugar factories were totally dependent on the software vendors and these services were

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economically viable. On realization of this, software vendors continue to play a major role. Because of the involvement of qualified persons, the sugar factories could minimize the investment on computerization and enabled most of the sugar factories to systemize their computerization set-up. The involvement of qualified persons also benefited sugar factories to computerize small applications, which were otherwise handled manually. The networking of various departments was initiated during late 1990's and the sugar cooperatives realized to strengthen the qualified staff to take care of various activities related to computerization. Thus, some of the applications were integrated and interfaced. However, integration of all the applications through a centralized data base remains distant dream for the entire sugar cooperative sector, except few during the last 5 years. With the availability of an integrated enterprise resource planning solution through various vendors as well as readymade customized product of the Vasantdada Sugar Institute, the sugar factories are encouraged to deploy integrated software solutions and this has resulted in an increasing awareness and importance for integrated software solutions. A positive development after 2005 onwards for integrated software solutions due to many factors including emergence of private sugar factories, need for reducing the cost of administration, cost of production so as to compete with the counter parts in the present deregulated market environment is felt inevitable .

Objective of the Study

The study aims to know the status of computerization and problems involved in computerization of co-operative sugar factories.

Hypothesis of the Study

The study intends to test the following hypothesis.

The Co-operative sugar factories are computerized more at operational level as compared to managerial and executive level operations.

Data and Methodology

The undertaken study has covered all the co-operative sugar factories operating in the Western Maharashtra. There are total 90 sugar factories in seven districts of the study area. The sample size of the sugar factories are eighteen of which twelve represents from small units and six are from large units. A proportionate stratified random sampling is used to draw eighteen sugar factories from the seven districts of the study area. The study

is based on secondary and primary data. The required primary information is gathered from ninety respondents. A structured scheduled is employed to collect primary information. The ninety respondents are equally represented from all the select sugar factories. The year 2008 is considered to be the study period. Analytical tools like mean, standard deviation, weighted average method and likert scale, are used to analyze and interpret collected information.

Analysis and Discussion

Computerization in Departmental Hierarchy

The functioning of the sugar factory is spread in six major functional areas and status of computerization is shown in the below table. The table No 1 reveals the computerization in departmental hierarchy. The data is collected from all departments of the co-operative sugar factories as per departmental hierarchy i.e. top, middle and operational levels of management. Data has been interpreted using measures of central tendency.

Table 1

Computerization in Departmental Hierarchy

Sr No	*Department*	*Top*	*Middle*	*Operational*	$\bar{x}$	*S.D*
1	**General Department**					
	Wtg. Average	26	31	50	35.67	12.66
	Rank	**3**	**2**	**1**		
2	**Finance Department**					
	Wtg. Average	35	57	81	57.67	23.01
	Rank	**3**	**2**	**1**		
3	**Agriculture Department**					
	Wtg. Average	31	53	76	53.33	22.50
	Rank	**3**	**2**	**1**		

4	**Labour& Welfare Department**					
	Wtg. Average	23	34	69	42.00	24.02
	Rank	**3**	**2**	**1**		
5	**Engi. & Manufacturing Department**					
	Wtg. Average	24	27	36	29.00	6.24
	Rank	**3**	**2**	**1**		
6	**Byproduct Units**					
	Wtg. Average	24	27	31	27.33	3.51
	Rank	**3**	**2**	**1**		
	$\bar{x}$	**27.17**	**38.17**	**57.17**		
	S.D	**4.79**	**13.36**	**21.20**		

Source :(Primary Data)

The above table shows that, operational level computerization is given priority in all the departments because it takes **rank 1** followed by middle level **rank 2** and top level **rank 3**. The mean score of operational level computerization is 57.17 (maximum score could be 90). It shows that majority of the departments at operational level are computerized but still it leaves enough space for the computerization. Finance, agricultural and labour welfare departments are the most computerized departments found in all the sample units at operational level. By product, engineering and manufacturing and general management departments are less computerized focusing more at operational level.

The Standard Deviation of computerization at operational level is 21.20 which is significantly reflects variation in computerization at the different departments at operational level in the sample units. It might be due to the importance given for computerization by the management to the different departments at the operational level.

The mean score of computerization at the middle level is 38.17 and at the top level it is 27.17 (maximum score could be 90) and the standard deviations are 13.36 and 4.79 respectively. The SD is more in case of middle level and less in case of top level. It shows less consistency in the computerization at middle level and more consistency at the

top level. It can be said that computerization is more focused at the operational level and it leaves enough scope at the top and middle level management for computerization.

Problems in Computerization

The sugar factories under the study have different production capacities varying from 1250 TCD to 10000 TCD. For micro analysis of problems, researcher categorized these units in to two groups i.e. Small units. (1250 to 4000TCD capacity) and Large Units (Above 4000 TCD capacity). The problems are also categorized into three types viz. hardware, software and behavioral.

1. Hardware Problems

The following table presents hardware problems in computerization of the sample sugar units. The problems have been explored and its intensity was analyzed by using Likert scale. The hardware problems are categorized into twenty different types viz. printer, display, network card, HDD, Memory etc. whereas software problems are categorized in seven types viz. OS failure, program bugs, database, security and others. The behavioral problems are observed and grouped into six different dimensions viz. support and commitment of top management for computerization, employees' involvement in computerization and these are presented as per variables used to deal with problems of computerization.

Table 2

Hardware Problems Faced by Sample Sugar Units

Sr.No	*Particulars*	*Small Sugar Units*		*Large Sugar Units*	
		Wt Avg.	*Rank*	*Wt Avg.*	*Rank*
1	Display Problems	2.27	5	1.07	5
2	Color Related Monitor Problems	2.00	7	0.73	9
3	SMPS	2.53	4	1.07	5
4	HDD Bad Sector	1.87	8	0.80	8

5	Interface	1.33	14	0.80	8
6	CD Drive	1.73	10	1.20	4
7	Peripherals	1.40	13	0.73	9
8	Ram / Memory	2.13	6	0.87	7
9	Keyboard Problems	3.53	2	1.47	3
10	Mouse Problems	3.47	3	1.67	2
11	Printer Problems	4.00	1	1.73	1
12	Port Problem	1.27	15	0.67	10
13	Login Problems	1.20	16	0.73	9
14	Linking Problems	1.27	15	0.80	8
15	Transmission Delay	1.20	16	0.67	11
16	Data loss at the time of transmission	1.00	17	0.53	12
17	Cable Problems	1.60	11	0.80	8
18	Switch Related Problems	1.47	12	0.73	9
19	Connector Problems	1.80	9	1.00	6
20	Network Adaptor Problems	1.47	12	0.73	9

Source: (Primary Data)

The table shows the common hardware problems faced by the respective departments of the sample sugar units. The researcher has taken twenty problems for the study and a feedback was taken from the Heads of the IT Departments. These problems are analyzed using Likert scale on the basis of intensity of problem. In a small sugar units, printer, Keyboard, Mouse, SMPS and Display problems are found to have occurred frequently as

these are ranked between 01 to 05, whereas in the large units, Printer, Keyboard, Mouse, SMPS and CD drive problems occurred very often and these are ranked between 01-05.

Color Related Monitor Problems, HDD Bad Sector, Connector, CD Drive, Cable, Switch, Network Adaptor, Peripherals, Interface, Linking Port, Login, Transmission Delay, Data loss at the time of transmission and Ram / Memory are the problems occurred moderately in small sugar units whereas in large units the same problems did not occur frequently. The analysis further reveals that Mean($\bar{x}$)of the total problems in small units is 1.93 and SD (σ) is 0.85,denoting a little variation in the consistency of problem intensity and hence it is clubbed up first five ranked problems and computed Mean ($\bar{x}$) is 3.16 and SD (σ) is 0.72. The remaining problems computed mean ($\bar{x}$) and standard deviation respectively are 1.52 and 0.32, denoting the first five ranked problems are major and frequently occurred ones.

In a large units, Mean ($\bar{x}$) of the total problems is 0.94 and SD(σ) is 0.34.This shows a little variation in the consistency of problems intensity and hence, the first five ranked problems are clubbed up and the computed mean ($\bar{x}$) and SD are 1.4 and 0.31.The remaining problems' mean and SD are 0.78 and 0.15 respectively. This reveals a variation in the mean and accordingly the first five ranked problems are found to have occurred repeatedly. It further shows that though the problems appear to be the same in case of both the small and large units, yet the intensity of the problems in case of small units is high as compared with the intensity of the problems in case of large units.

2. *Software Problems*

The below table depicts software problems in small and large sample sugar units. Researcher has taken seven problems for the study and a feedback is taken from the Heads of IT Department and the same has been assessed using Likert scale on the basis of intensity

Table3

Software Problems Faced by Small Sugar Units

Sr No	*Particulars*	*Small Suger Units*		*Large Sugar Units*	
		WtAvg	*Rank*	*WtAvg*	*Rank*
1	OS failure problems	1.73	4	0.80	2

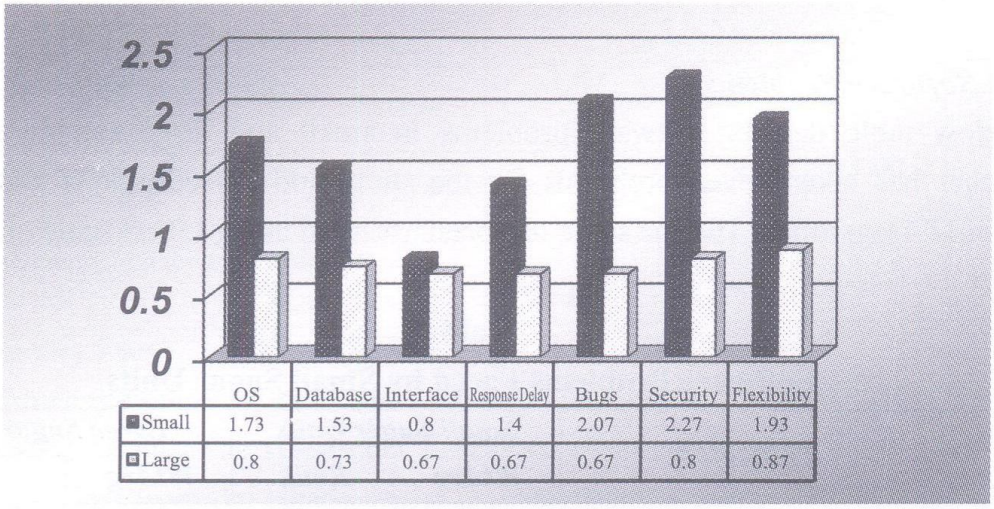
2	Database	1.53	5	0.73	3
3	Interface Problems	0.80	7	0.67	4
4	Response Delay	1.40	6	0.67	4
5	Bugs Problems	2.07	2	0.67	4
6	Security Problems	2.27	1	0.80	2
7	Flexibility	1.93	3	0.87	1

Source :(Primary Data)

The above table exhibits common software problems that are faced in the respective departments of the sample sugar factories. A feedback is sought from the Heads of the IT Departments and these are assessed using Likert scale on the basis of problem intensity. In small sugar units, security, bugs and flexibility problems are noticed repeatedly as these rank between 1 to 3 whereas OS failure, Database interface, interface problem and response delay problems occurred rarely and are ranked between 4 to 7. In large units, flexibility, OS failure and database interface problems occurred frequently and these are ranked between 01 to 03. In case of large units occurrence of OS failure, interface, database interface and response delay problems is found to be low. The presence of software problems in case of both small and large sugar units can also be viewed from figure No. 1

Figure No.1

Software Problems



3. *Behavioral Problems*

The behavioral problems that are faced by the sample co-operative sugar factories are depicted in table 4.

Table 4

Behavioral Problems Faced by Sample Sugar Units

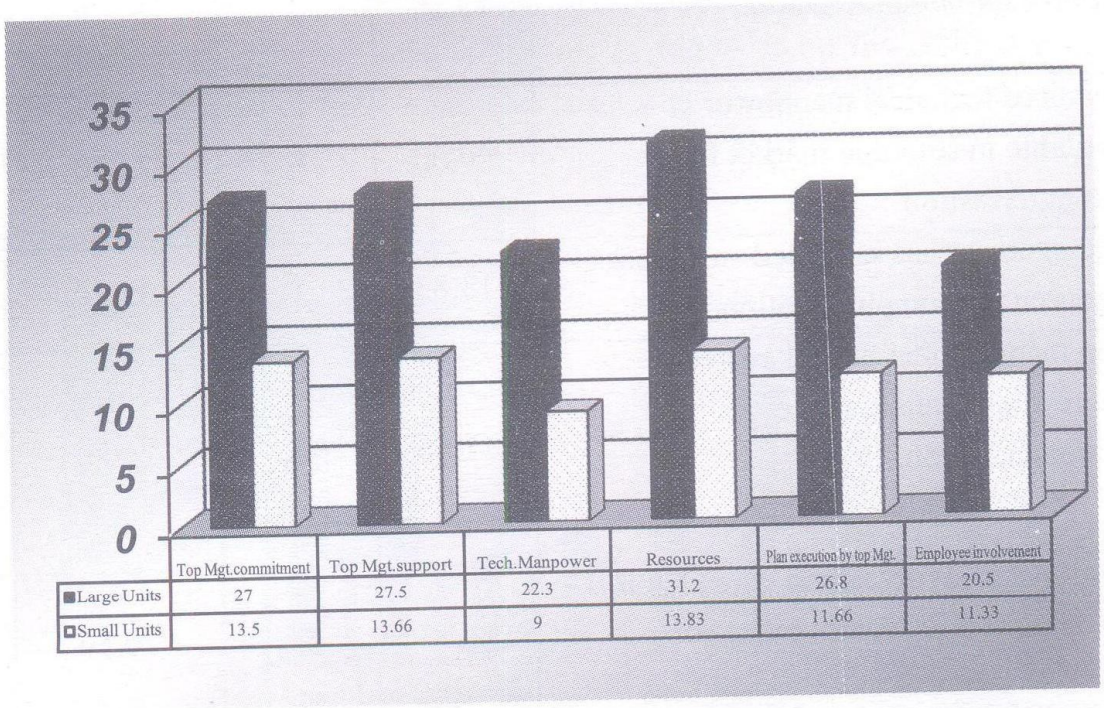
Sr. No.	*Parameter*	*Small Sugar Units*		*Large Sugar Units*	
		Wt Avg.	*Rank*	*Wt Avg.*	*Rank*
1	Top management has fully committed for computerization	13.50	3	27.00	3
2	Top management has extended full support for computerization	13.66	2	27.50	2
3	Required technical manpower is available in resource market for computerization	09.00	6	22.30	5
4	Management has allocated sufficient resource for computerization	13.83	1	31.20	1
5	Top management has taken keen interest in planning and executing computerization.	11.66	4	26.80	4
6	Employees involved and extended full co-operation for computerization.	11.33	5	20.50	6

Source: (Primary Data)

It is learnt from the table that out of the total six behavioral related parameters, allocation of sufficient resource for computerization is found to have had the highest intensity denoting insufficient resource allocation for the computerization. This has followed by support of management for computerization as the second highest problem and the commitment of the management is observed as the third highest problem followed by others. The availability of technical manpower is found to be the least intensity problem as far as the computerization of sugar factories is concerned. The analysis further discloses that there is a significant difference between small and large units with regard to the intensity of behavioral problems and the intensity of the problems is more in case of large sugar units as compared with the small units. The intensity of the problems between small and large units can also be seen from figure No 2.

Figure No. 2

Behavioral Problems



	Top Mgt.commitment	Top Mgt.support	Tech.Manpower	Resources	Plan execution by top Mgt.	Employee involvement
Large Units	27	27.5	22.3	31.2	26.8	20.5
Small Units	13.5	13.66	9	13.83	11.66	11.33

Testing of Hypothesis

H_0: The co-operative sugar factories are computerized more at operational level as compared with the managerial and executive level activities. The following table shows computerization in the Departmental hierarchy

Table 5

Computerization in Departmental Hierarchy

Sr. No	*Particulars*	*Executive Level*	*Managerial Level*	*Operational Level*
1	$\bar{x}$	27.17	38.17	57.17
2	S.D	4.79	13.36	21.20

Source: (Primary Data)

The mean score of operational level of computerization is 57.17 which shows that majority of the departments at operational level are computerized but still there is enough scope for the computerization. The SD of computerization at operational level is 21.20 which is significantly more than managerial level and executive level. The mean score of computerization at managerial level is 38.17 and at executive level it is 27.17. The standard deviation is 13.36 and 4.79 respectively. The SD is more in case of managerial level and less in case of executive level. One way ANOVA is used to check the difference of mean score in various categories like computerization at executive, managerial and at operational level activities in the sample sugar factories.

ANOVA

	Sum of Squares	DF	Mean Square	F	P- value
Between the Groups	2764.000	2	1382.000	6.370	0.010
Within the Groups	3254.500	15	216.967		
Total	6018.500	17			

The calculated P-value is 0.010, which is less than 0.05, probability value. Hence null hypothesis is rejected at 5% level of significance.

Findings

The analysis and interpretation reveals the following broad findings:

- The study clearly tells that none of the sugar factories has undertaken computerization with scientific approach.
- Majority of the sugar factories have outsourced hardware maintenance and software development and they are fully depend on vendors.
- Hardware problems found in all units are similar and problems are noticed to have occurred frequently.
- These problems are mostly related to printer, keyboard, mouse, SMPS, display and CD drive and the problems related to keyboard, mouse, CD drives and printers are the result of improper handling by the users. The SMPS problems are due to improper earthing and electrical backup systems.
- The problems related to Software viz program bugs and flexibility, are found to have occurred repeatedly in small sugar units. On the other hand, flexibility, operating system failure and database interface related problems are found with the large units. These problems occur due to incorrect specification, ignorance towards acceptance testing and lack of training to users.
- Intrapersonal behavioral problems like resistance of an employee for computerization, lack of management support and involvement for computerization are observed in almost small and large sugar factories.
- It has been observed that the top managements of most of the cooperative sugar factories under the study are not aware about the benefits of computerization and almost all the units have followed orthodox manual procedures to manage their business operations. Most of them have not taken the advantage of latest information technology solutions.
- It is found from the interactions with the officials that prior to the computerization, the problems encountered were: timely non availability needed information in the desired formats; presence of inaccuracy in data processing and absence of classification and consolidation of data in the form of desired reports.

Conclusions

The analysis of the data pertaining to computerization of various systems and subsystems of co-operative sugar factories clearly indicates that there is an ample scope for enhancing computerization base in sugar units especially to strengthen Management Information and Decision Support Systems. The study reveals that computerization of MIS and DSS is still in its infancy stage, because of the lack of IT awareness and benefit of computerized information systems. It is interested to note that the computerization of operational activities has received good attention in almost all the units under study. The computerization in the sugar units would certainly influence with the involvement of top managements of all the sugar factories.

Besides the above mentioned factors, the involvement of regulatory agencies with mandatory and minimum standards in terms of technology deployment would also help as driving force for accelerating the process of computerization. The study carried out clearly indicates an urgent need to act and deploy standardized software solutions which would cover all the functional operational areas tasks and sub tasks under one umbrella.

Suggestions

Based on the findings and concluding remarks, the following suggestions are made for the improvement of computerization process in the sugar factories.

- In order to reduce IT implementation related problems, there is a need to follow a scientific approach in selection of hardware and software with the help of internal IT team and external experts from reputed Institutions and apex bodies.
- Regular training related to computer operations, trouble shooting and maintenance is the need of the hour, in order to reduce dependency on the hardware and software vendors.
- The sugar units need to change the mindset of the staff so as to speed up the process of computerization and this may bring a turnaround in the overall performance of the sugar co-operative factories.
- The necessary infrastructure such as proper electrical supply and back up provision needs to be strengthened. This would obviously reduce to some extend frequent hardware and software failures.

- ERP systems need to be introduced for in cooperating necessary changes as smoothly as possible.

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