CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

4.2 Data Analysis & Interpretation

4.3 Testing of Hypothesis

CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

The Information collected through schedule is analyzed in this chapter. Data analysis refers to the computation of certain measures along with searching for patterns of relationship that exit among data groups.

Interpretation is the result of analysis, which enables conversion of data in to statement, propositions, or conclusions, which ultimately completes the research objectives. This chapter deals with data processing, tabulation, presentation, analysis and interpretation of data.

4.2 DATA ANALYSIS

Data analysis deals with analysis of whole data collected through various techniques. The methods used for presentation of primary data are tabulation, percentage, and Likert scale. Hypothesis is tested by using spearman's rank correlation.

Data analysis is made in two parts-

Part I deals with analysis and data collected from EDP Manager, programmer, & head of departments.

Part II deals with hypothesis testing.

4.2.1 Status of Computerization in various departments:

The following table shows the level of computerization in various departments as Fully Computerized, Partially Computerization and Manual operations.

Table no.4.2.1

Status of Computerization in Various Departments

Department	Sub Departments	Fully Computerized	Partially Computerized	Manual	Total
General	1.General Administrator 2.Watch & Ward 3.Guset House	(1) 33.33%	-	(2) 66.67%	(3) 100%
Finance	1.Share Accounting 2.Cane Accounting 3.Harvesting Billing 4.Transport Billing 5.Deposit Accounting 6.Store Accounting & Costing 7.Financial Account 8.Sales (Sugar & By-Product)	(6) 75%	(1) 12.5%	(1) 12.5%	(8) 100%
Agriculture	1.Cane Development & Planting 2.Harvesting 3.Weigh Bridge 4.Transport Scheduling	(3) 75%	(1) 25%	-	(4) 100%
HRM	1. Selection & appointment 2. Attendance system 3. Payroll 4. Personnel Information System	(3) 75%	(1) 25%	-	(4) 100%

Engineering & Manufacturing	1. Laboratory 2. Plant Maintenance 3.Cane feeding 4 Juice Weighing 5. Boiler Atomization 6. Boiling House 7. PH. Control system 8. Plan atomization 9. Centrifugal atomization	(4) 44.44%	(1) 11.12%	(4) 44.44%	(9) 100%
Purchase & Store	1. Inventory Management 2. Production Planning 3. Sugar Godown 4. Sugar weighing system	(3) 75%		(1) 25%	(4) 100%
Civil	1.Civil & Irrigation 2.Sanitation	-	-	(2) 100%	(2) 100%
Distillery	1.Distillery Management	(1) 100%	-	-	(1) 100%
Co-generation	1.Co-generation	(1) 100%	-	-	(1) 100%
E.T.P.	1.E.T.P.(Effluent treatment plant) Management	-	-	(1) 100%	(1) 100%
Vehicle	1.Vehicle Management	-	(1) 100%	-	(1) 100%
Total and Average		(22) 57.89%	(4) 10.53%	(12) 31.58%	(38) 100%

(Source: Primary Data)

From the above table no.4.2.1 it is observed that the status of computerization in various departments.

The General department has three sub departments. In this department only one (33.33%) department (General administration) is fully computerized. The remaining two (66.67%) departments (Watch & ward, and Guest house) are workingmanually and there is no any unit is partially computerization.

The Finance department has eight sub departments. In this department six (75%) departments (Share Accounting, Cane A/C, Harvesting Billing,Transport Billing,Store A/C & Costing, and Financial Account) are fully Computerized.The remaining one (12.5%) department (deposit A/C is partially computerizedand also one (12.5%) department (Sugar & By-product) is working manually.

The Agriculture department has four sub departments. In this department three (75%) departments (Harvesting, Weigh Bridge, and Transport Scheduling) arefully computerized.The remaining one 25% department (Cane Development & Planting department) ispartially computerized.

The HRM department has four sub departments. In this department three (75%) departments (Attendance System, Payroll and Performance appraisal are fully computerization. The remaining one(25%) department(Selection & appointment) is partially computerized.

The Engineering & Manufacturing department has nine sub departments. In this department four (44.44%) departments (Laboratory, Juice Weighing, Boiler Atomization, and PH. Control System) fully computerized. One (11.12%) department (Cane feeding) is partially computerized.The remaining four (44.44%) departments(Plant Maintenance, Boiling House, Pan Atomization, and Centrifugal atomization) are working manually.

Purchase and Store has four sub departments. In this department three (75%) departments (Inventory Management, Sugar Godown, & sugar weighing System) are fully computerized. The remaining one (25%) department (Production planning) is worksmanually.

The Civil & E.T.P.(Effluent treatment plant) departments are not computerized i.e.100% work is done manually.

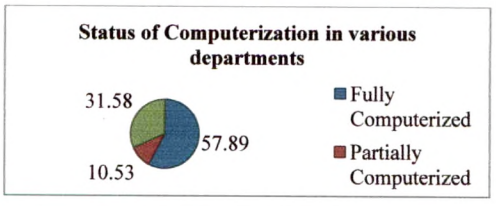
The Distillery & Co-Generation departmentsarefully computerized i.e. 100% work is computerized.

The vehicle department is partially computerized.

It has been concluded from the above interpretation is that themajority of worksare fully computerized i.e.57.89% in overall departments. 31.58%work is done manually in overall departments, and few i.e. 10.53% of work is done partially in overall departments.

Graph No.4.2.1

Status of Computerization in various departments



4.2.2Status of Software development in Last Five Years

The following table shows the year wise status of software development modules.

Table No. 4.2.2

Status of Software Development in Last Five Years

Sr.No.	Year	Total no of Software Modules Implementation	% of Computerization
1	2005-2006	2	7.89
2	2006-2007	8	28.95
3	2007-2008	4	39.47
4	2008-2009	2	44.74
5	2009-20010	2	50.00
6	2010-2011	3	57.89

(Source: Primary Data)

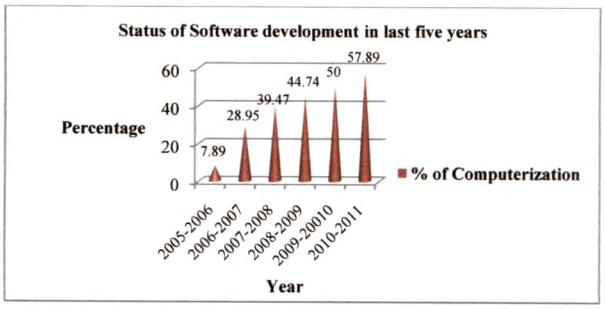
From the table no.4.2.2 it is observed that in year 2005-2006 and in year 2006-2007there are 7.89% and 28.95 % computerization is done respectively.

In year 2008-2009 there is 44.74 % computerization. In year 2009-2010 there is 50.00% computerization, and in year 2010-2011 there is 57.89% computerization.

So, from above table it is conclude that year wise % computerization is increased. There is 57.89 % of computerization is done from year 2005 to 2011.

Graph No.4.2.2

Status of Software development in last five years



4.2.3 Opinion of end users about sufficient availability of Hardware Infrastructure:

The following table shows that opinion about sufficient availability of hardware Infrastructure.

Table No: 4.2.3

Opinion of end users about sufficient availability of Hardware Infrastructure

Sr.No.	Hardware Name	Yes	No	Total
1	Computer system	13(61.90%)	8(38.10%)	21(100%)
2	Printers	13(61.90%)	8(38.10%)	21(100%)
3	Peripherals	9(42.86%)	12(57.14%)	21(100%)

(Source: Primary Data)

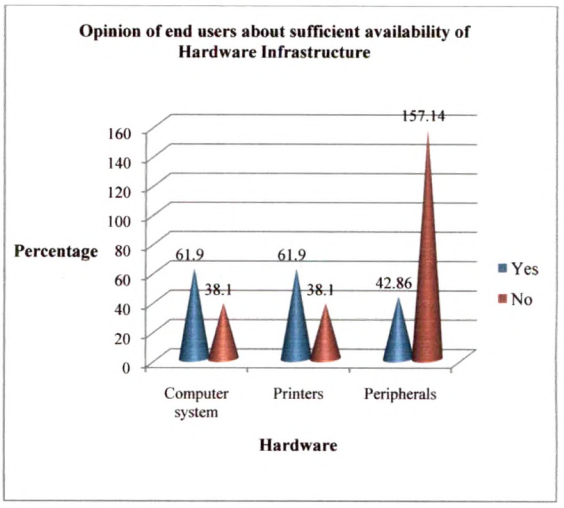
Information delivered by the above table no. 4.2.3 is about the opinions of the end users about sufficient availability of Hardware Infrastructure. Majority of respondents (61.90%) expressed that sufficient availability of Computer System and Printers. 38.10% of the respondents expressed that not sufficient availability of Computer System and printers.

Majority of respondents (57.14%) expressed not sufficient availability of peripherals. 42.86% of respondents express available sufficient peripherals.

It is clear from above information that most of the end users are agreeing there is not sufficient availability of peripherals.

Graph No. 4.2.3

Opinion of end users about sufficient availability of Hardware Infrastructure



4.2.4Availability of Software

Following table shows the Software availability i.e. Present status of software used and approach of software development.

Table No. 4.2.4

Availability of Software

Software Type	Software Name	Approach of Software
System Software	Not G.U.I Based(DOS operating system) as well as GUI based (windows)	Ready Made purchased
Application Software	A. General Application S/W	Ready Made purchased
	1.MS Office	
	2.Adobe Reader 9	
	3.Internet Explorer	
	B. Special Application S/W	In-House Developed
	1.General Administrator	
	2.Cane Accounting	
	3.Harvesting Billing	
	4.Transport Billing	
	5.Store Acc.& Costing	
	6.Transport Scheduling	
	7.Harvesting	
	8.Weighbridge	
	9. Purchase & Store	
	10. Attendance system	
	11. Medical & Sanitation	
	12. Boiler Atomization	Ready Made Purchased
	13 Lab Analysis	
	14. PH Control System	
	15. Juice Weighing	
	16. Distillery	
	17.Co-Generation	

Utility Software	1.Antivirus	Ready Made purchased
	2.Shri Lipi	
	3.Gist card & ISM	
Front End & Backend tool	FoxPro	Ready Made purchased

(Source: Primary Data)

From the table no. 4.2.4 shows that four types(System, Application, utilities and Front End &Backend tools) of software used.In this organization the system software is not window based i.e. Not GUI based (DOS). There are two types of application software used. General application software (MS Office,Adobe reader9 and Browser) and special application software (General Administrator, Cane Accounting, Harvesting Billing, Transport Billing, Store Accounting & Costing, Transport Scheduling, Harvesting, Weighbridge, Purchase & Store, Attendance System, Medical & Sanitation,Boiler Atomization, Lab Analysis, PH Control System, Juice Weighing, Distillery, Co-Generation are ready made purchased).Also the Utilities (Antivirus, Sheri Lipi and Gist card & ISM)and Front End & Backend tools (FoxPro) are used.

All the system software, General application software, and Utility software are ready made purchased. Some special application software (General Administrator, Cane Accounting, Harvesting Billing, Transport Billing, Store Accounting & Costing, Transport Scheduling, Harvesting, Weighbridge, Purchase & Store, Attendance system, and Medical & Sanitation) are In-House Developed and other (Boiler Atomization, Lab Analysis, Cane feeding, Juice Weighing, and Co-Generation) are ready made purchased. Front End & Backend tool software is also readymade purchased.

4.2.5 Opinion of end users about sufficient availability of Software Infrastructure:

The following table shows that opinion about sufficient availability of Software Infrastructure

Table No: 4.2.5

Opinion of end users about sufficient availability of Software Infrastructure

Opinion	Respondents	Percentage
Yes	9	42.86
No	12	57.14
Total	21	100

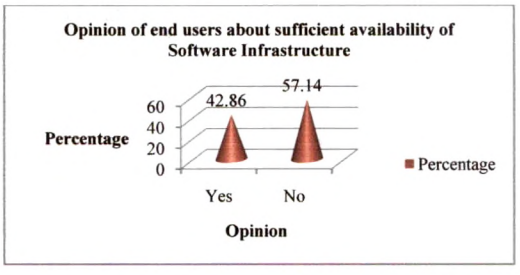
(Source: Primary Data)

Information delivered by the above table no. 4.2.5 is about opinions of the end users about sufficient availability of software Infrastructure. Majority of respondents (57.14%) express that not sufficient availability of software infrastructure and (42.86%) of the respondent express that available sufficient software infrastructure.

It is clear from above information that most of the end users are agree in present IT Implementation not sufficient availability of software infrastructure. It is also observed that most of the respondents require new versions of software.

Graph No: 4.2.4

Opinion of end users about sufficient availability of Software Infrastructure



4.2.6Opinion of end users about sufficient availability of Network Infrastructure:

The following table shows that opinion about sufficient availability of Network Infrastructure

Table No: 4.2.6

Opinion of end users about sufficient availability of Network Infrastructure

Opinion	Respondents	Percentage
Yes	7	33.33
No	14	66.67
Total	21	100

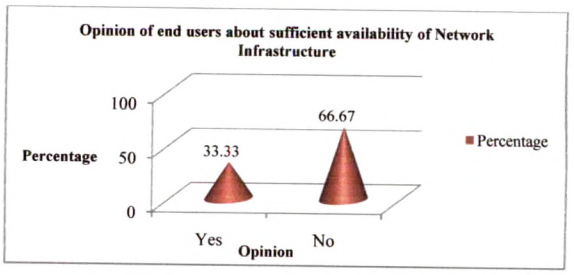
(Source: Primary Data)

Information delivered by the above table no. 4.2.6 is about opinions of the end users about sufficient availability of Network Infrastructure. Majority of therespondents (66.67%) express that not available sufficient networkinfrastructure and (33.33%) of the respondent express that available sufficient Network Infrastructure.

It is clear from above information that most of the end users are agree in present IT Implementation not sufficient availability of networking infrastructure.

Graph No. 4.2.5

Opinion of end users about sufficient availability of Network Infrastructure



4.2.7Frequency of Back-up System

For protection from natural and artificial threats, database Backup is taken. It is observed that the end users use pen drive, compact disks, magnetic tapes and mirroring and duplexing server for Back-up.The following table shows information about frequency of data Back-up system.

Table No.4.2.7

Frequency of Back-up system

Frequency of Backup System	Respondent	Percentage
Daily	13	37.14
Weekly	7	20
Occasionally	15	42.86
Total	35	100

(Source: Primary Data)

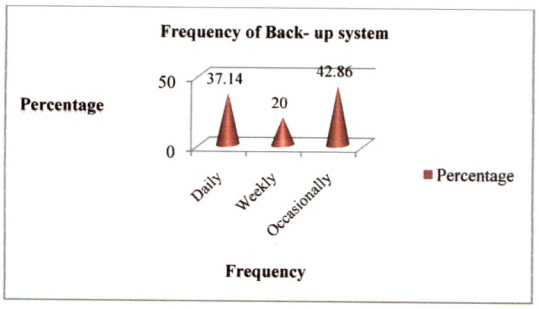
From the above table no.4.2.7 it is observed that frequency of Back-up system. Majority of respondents (42.86%) express that they take Back-up occasionally.

Some of the respondents (37.14%) express that they take daily Back-up. 20% respondents express that they take Back-up weekly.

So from the above table it is concluding that the majority of the respondent takes daily Back-up.

Graph No.4.2.6

Frequency of Back- up system



4.2.8Opinion of end users about applying system security measures

For protected from different security threats, various types of security measures are applied. The security measures like Physical access controls, software and database access control, network access control, and antivirus.

These controls protect data from viruses, unauthorized access and theft of data.

Table No.4.2.8

Opinion of end users about applying system security measures

Opinion	Respondent	Percentage
Yes	10	47.62
No	11	52.38
Total	21	100

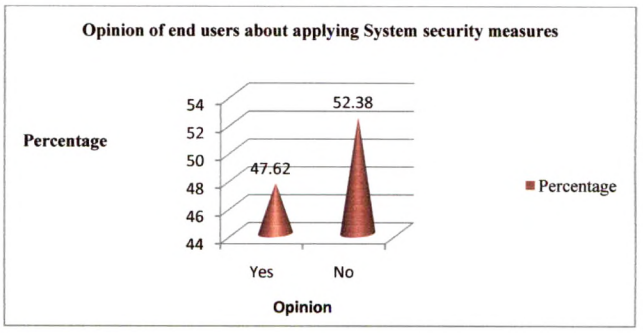
(Source: Primary Data)

From the table no. 4.2.8 it is observed that majority of respondents (52.38%) express that not apply security measures and (47.62%) respondents express that apply security measures.

So from above information it is conclude that majority of the respondents express that not apply security measures for protecting data.

Graph No.4.2.7

Opinion of end users about applying system security measures



4.2.9Status ofEffective & Efficient IT Implementation

The following table shows data about status of effective & efficient IT Implementation. This information is collected through EDP Manager and by observation.

Table No.4.2.9

Status of effective and efficient IT Implementation

Year	% of Effective and efficient IT Implementation
2001-2003	55
2004	60
2005	60
2006	60
2007	65
2008	65
2009	70
2010	75
2011	80

(Source: Primary Data)

The above table no.4.2.9 furnishes the information about Percentage of effective and efficient IT Implementation.

In Year 2001-2003 it is observed that there is 55% of effective & efficient IT Implementation.

In Year 2004, 2005, & 2006 it is observed that there is 60% of effective & efficient IT Implementation.

In Year 2007 & 2008 it is observed that there is 65% of effective & efficient IT Implementation.

In Year 2009 it is observed that there is 70% of effective & efficient IT Implementation.

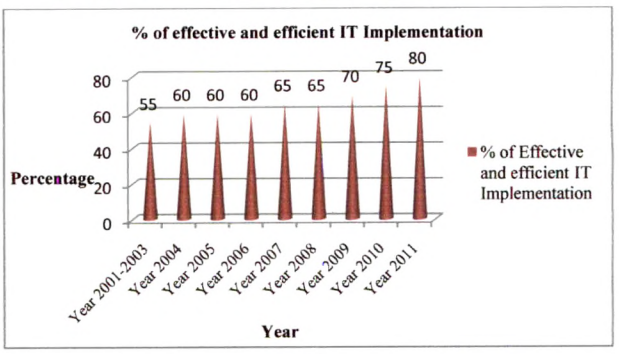
In Year 2010 there it is observed that there is 75% of effective & efficient IT Implementation.

In Year 2011 there it is observed that there is 80% of effective & efficient IT Implementation.

So from the above table it is concluding from above table % of effective & efficient IT implementation is increased.

Graph No.4.2.8

Status of effective and efficient IT Implementation



4.2.10 Status of IT Personnel

The following table shows that information about status of IT Personnel from year 2001 to 2011 and manpower position required for IT department.

Table No.4.2.10
Status of IT Personnel

Manpower position	2001 - 2003	2004	2005	2006	2007	2008	2009	2010	2011	R ed
Computer / EDP Manager	-	(1) 100%	(1) 100%	(1) 100%	(1) 100%	(1) 100%	(1) 100%	(1) 100%	(1) 100%	(1 1(
Software Programmer			(1) 50%	(1) 50%	(1) 50%	(1) 50%	(1) 50%	(1) 50%	(1) 50%	(2 1(
Computer Operator	4	6	8	8	8	8	8	8	8	-
Hardware Engineer	1	-	-	-	-	-	-	-	-	-
% of IT Personnel	-	50	75	75	75	75	75	75	75	1(

(Source: Primary Data)

The above table no.4.2.10 furnishes the information about IT Personnel and Percentage of effective and efficient IT Implementation.

In Year 2001-2003 there is one hardware Engineer and four Computer operators present.

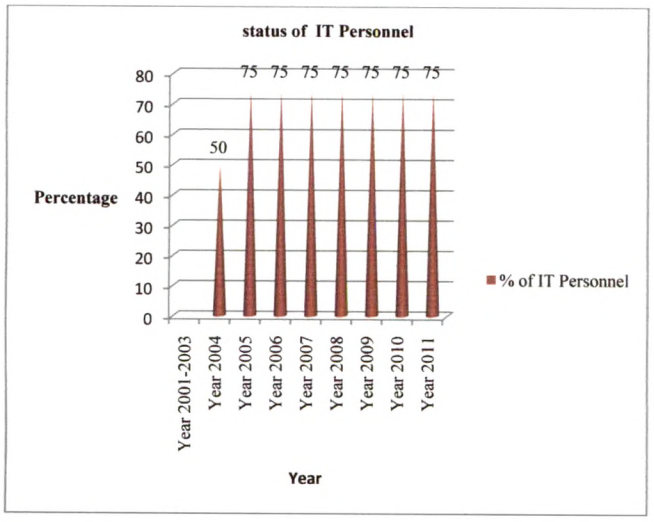
In Year 2004 there is one EDP Manager and 6 Computer operators present i.e. the % of IT Expert Personnel is 50%.

In Year 2005-2011 there is one EDP Manager, one programmer, and 8 Computer operators are present.

So from the above table it is conclude that as a norm there is one EDP manager and two programmers required but in this sugar factory there is one programmer and one EDP manager. So Inadequate IT Personnel is available.

Graph No.4.2.9

Status of IT Personnel



4.2.11 Status of IT Training Imparted:

The IT Training is organizes for updating their knowledge. Following table shows training areas and their frequency.

Table No.4.2.11

Present Scenario of IT Training Organized by Sonhira Sugar Factory

Sr. No.	Training Type		Monthly	Quarterly	Yearly	occasionally	Total
1	IT Basic	Respondents	(1) 4.76%	-	(8) 38.10 %	(12) 57.14%	(21) 100%
2	Recent trends in IT	Respondents	-	(1) 4.76%	(4) 19.05 %	(16) 76.19%	(21) 100%
3	System Security Audit	Respondents	-	-	(7) 33.33 %	(14) 66.67%	(21) 100%
4	Hardware and Networking	Respondents	-	-	(5) 23.81 %	(16) 76.19%	(21) 100%

(Source: Primary Data)

From the table no.4.2.11 it is observed that the frequency of IT training organizes for end-users.

In this table shows that the majority of respondents (57.14%) expressed that IT basic training is given occasionally. There are (38.10%) of respondents express that IT basic training is given yearly. 4.76% of the respondents express that IT Basic training is given Monthly and none of the respondents express that IT basic training given Quarterly.

In this table shows that the majority of respondents (76.19%) expressed that training of recent trends in IT is given occasionally. There are (19.05%) of respondents express that training of recent trends in IT is given yearly. 4.76%

of the respondents express that training of recent trend in IT is given Quarterly, and none of the respondents express that training of recent trends and IT is given monthly.

In this table shows that the majority of respondents (66.67%) expressed that System Security Audit training is given occasionally. There are (33.33%) of respondents express that System Security Audit training is given yearly, and none of the respondents express that system security Audit training is given monthly and Quarterly.

In this table shows that the majority of respondents (76.19%) expressed that Hardware and Networking training is given occasionally. There are (23.81%) of respondents express that Hardware and Networking training is given yearly, none of the respondents express that Hardware and networking training is given Monthly and Quarterly.

So it denotes that Sonhira Sahakari Sakhar Karkhana does not organize regularly training program.

4.2.12Opinion of end users about required MIS report generation

The following table depicts that the MIS Report generation and their Frequency. Two types of MIS reports are Shown Internal MIS and External MIS.

Table No.4.2.12

Opinion of end users about required MIS report generation

Opinion	Respondent	Percentage
Yes	12	57.14
No	9	42.86
Total	21	100

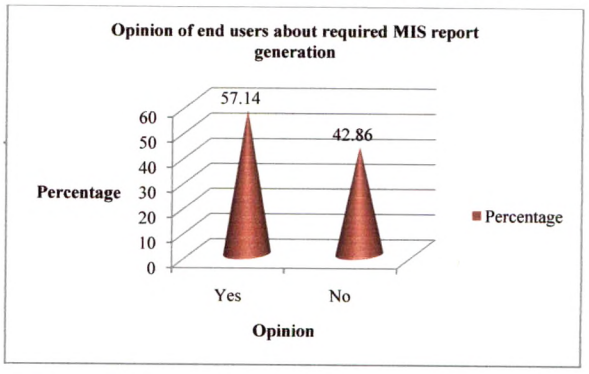
(Source: Primary Data)

From the table no.4.2.12 is observed that majority of respondents (57.14%) expressed that MIS reports are generated as per user requirement in a given system. 42.86% of the respondents expressed that MIS reports are not generated as per user requirement in a given system.

So from above table it is conclude that MIS reports are generated as per requirement.

Graph No.4.2.10

Opinion of end users about required MIS report generation



4.2.13Problem occurrences for implementing IT

The following table shows the information about problem occurred for implementing IT. There are main five categories like Leadership problems, management problems, Organizational Environment problems, Technical Problems and Personnel Problems.The sub category of Leadership problem is Interdepartmental co-ordination, Employee co-operation for implementing IT, and organizational support.

The Sub categories of Management problems are Strategic planning and financial support for Implementing IT.

The sub categories of Organization Environment problems are Organizational culture and changing technology.

The sub categories of Technical problems are Existing system and standardization.

The sub categories of personnel problems are Lack of trained staff available and training. And the data is collected through head of the department. A feedback is taken from end-users and has been assessed by using Likert scale.

Table No.4.2.13

Problem occurrences for implementing IT

Category of Problem	Sub Category of Problems	Wt. Avg.	Rank
Leadership problem	Interdepartmental co-ordination	4.83	6
	Employees co-operation(individual support) for implementing IT	5.00	5
	Organizational support	4.17	7
Management Problem	Strategic planning	4.83	6
	Financial support for Implementing IT	5.00	5
Organization Environment problems	Organizational culture	4.83	6
	Changing Technology	7.00	1
Technical Problems	Existing Systems	7.00	1
	Standardization	5.33	4
Personnel Problems	Lack of Trained staff available.	6.67	2
	Training	6.17	3

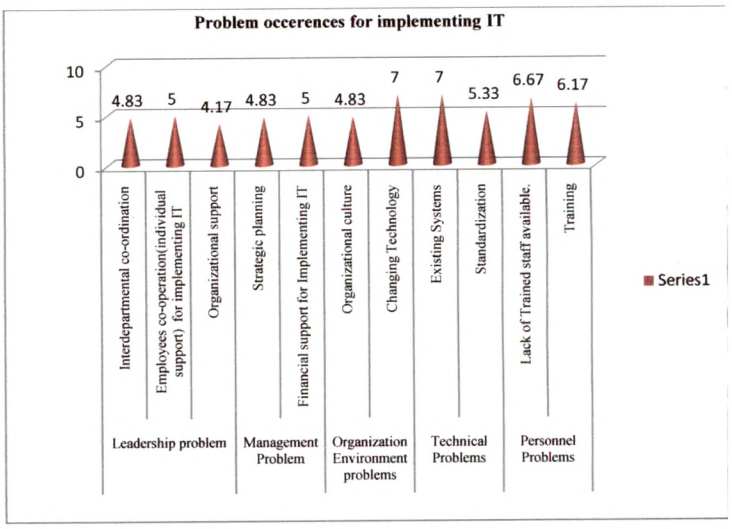
(Source: Primary Data)

The above table no.4.2.14 furnishes the information about problem occurrences for implementing IT. According to these respondents changing technology & existing system as they rank 1st. Lack of trained staff available, Standardization, and training type of problems as they rank 2nd, 3rd, and 4rd rank respectively. Financial support for implementing IT and employees co-operation for implementing IT as they rank 5th given .Whereas organizational culture, strategic planning, and Interdepartmental co-ordination as they rank 6th. The leadership problem like organizational support as they rank 7thgiven.

So form above table it has been conclude that Technical problem i.e. Existing system, organization Environment problem i.e. Changing Technology and Personnel problem i.e. Lack of Trained staff available and training are very problematic for implementing IT.

Graph No.4.2.11

Problem occurrences for implementing IT



4.2.14Performance of Sonhira sugar factory:

The following table shows the performance of Sugar factory and Percentage of Computerization. The Five parameters are taken for comparison.

Table No.4.2.14

Performance of Sugar Factory

Year	% of Computerization	% of Sugar recovery	% of Reduced mill Extraction	% of Boiling House recovery
2006	7.89	11.50	94.63	90.81
2007	28.95	11.05	95.44	90.06
2008	39.47	12.75	96.13	91.37
2009	44.74	11.54	95.24	90.51
2010	50.00	11.65	95.51	90.40
2011	57.89	11.66	95.96	90.42

(Source: Primary Data)

From the above table no.4.2.14 furnishes that In Year 2006, 7.89 % of computerization, 11.50% of sugar recovery,95.44 % of reduced mill Extraction, and 90.06% Boiling house recovery.

In Year 2007, 28.95% of computerization, 11.05% of sugar recovery, 94.63 % of reduced mill Extraction, and 90.81% boiling house recovery.

In Year 2008, 39.47% of computerization, 12.75 % of sugar recovery, 96.13 % of reduced mill Extraction, and 91.37% boiling house recovery.

In Year 2009, 44.74% of computerization, 11.54 % of sugar recovery, 95.24 % of reduced mill Extraction, and 90.51% boiling house recovery.

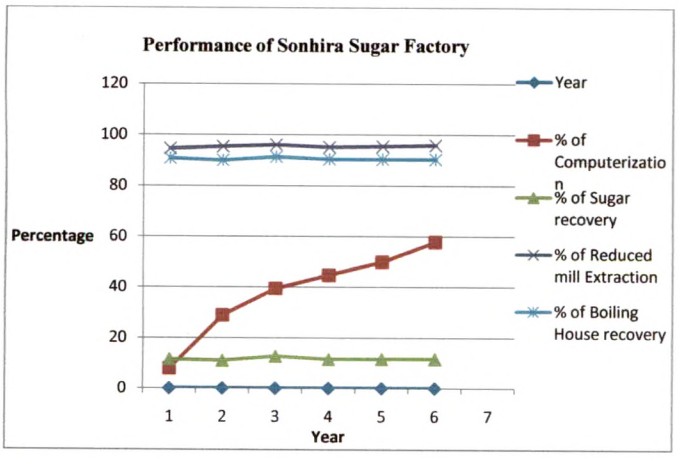
In Year 2010, 50% of computerization, 11.65 % of sugar recovery, 95.51 % of reduced mill Extraction, and 90.40% boiling house recovery.

In Year 2011, 57.89% of computerization, 11.66 % of sugar recovery, 95.96 % of reduced mill Extraction, and 90.42% boiling house recovery.

So from above table it is conclude that when increase computerization then increase sugar recovery, increase reduced mill extraction and increase boiling house recovery.

Graph No.4.2.12

Performance of Sugar Factory



Part II

4.3 TESTING OF HYPOTHESIS

1)H_0 Computerization improves the performance of sugar factory.

The table No **4.2.14**depicts analysis of percent of computerization with sugar recovery, reduced mill extraction,and boiling house recovery of five years (2007 to 2011).As mentioned in conceptual framework, sugar factories generally have 38 sub functional areas of management. And while calculating percent of computerization, the computerization done in these sub functional areas of management are considered. The hypothesis stated, the effort to gauze the relationship between extent of computerization its impact on sugar recovery, reduced mill extraction, & boiling house recovery.

a) Comparison of Percent of computerization and Sugar recovery

Table no.4.3.1

Percent of computerization and sugar recovery

Year	% of Computerization	Rank(1)	% of Sugar recovery	Rank(2)	d= (rank1-rank2)	d^2
2007	28.95	5	11.05	5	0	0
2008	39.47	4	12.75	1	3	9
2009	44.74	3	11.54	4	-1	1
2010	50.00	2	11.65	3	-1	1
2011	57.89	1	11.66	2	-1	1
					Σ	12

(Source: Primary Data)

Table No.**4.3.1**sugar factory have done 57.89 % of the computerization, carries first rank and sugar recovery is 12.75 % carries the first rank.

This is more specifically tested with the help of spearman's rank correlation as follows.

Correlation coefficient between percent of computerization and percent of sugar recovery.

$$R = 1 - \frac{6\sum d^2}{n^3 - n} \qquad R = 1 - \frac{6 \times 12}{125 - 5}$$

$$R = 1 - 0.6 \; R = 0.4$$

The calculation of R value shows R=0.4, which signifiespositive correlation between percent of computerization and sugar recovery.

Hence H_0 is accepted. Therefore, concluded that the sugar recovery is directly related to percent of computerization.

b) Comparison of Percent of computerization and Reduced mill extraction

Table no.4.3.2

Percent of computerization and Reduced mill Extraction

Year	% of Computerization	Rank (1)	% of Reduced mill Extraction	Rank (2)	d= (rank1-rank2)	d^2
2007	28.95	5	95.44	4	-1	1
2008	39.47	4	96.13	1	3	9
2009	44.74	3	95.24	5	-2	4
2010	50.00	2	95.51	3	-1	1
2011	57.89	1	95.96	2	-1	1
					Σ	16

(Source: Primary Data)

Table No.**4.2.2**sugar factory have done 57.89 % of the computerization, carries first rank and reduced mill extraction is 96.13 % carries the first rank. This is more specifically tested with the help of spearman's rank correlation as follows.

Correlation coefficient between percent of computerization and reduced mill extraction

$$R = 1 - \frac{6\sum d^2}{n^3 - n} \qquad R = 1 - \frac{6 \times 16}{125 - 5}$$

$$R = 1 - 0.8 \; R = 0.2$$

The calculation of R value shows R=0.2, which signifies positive correlation between percent of computerization and reduced mill extraction.

Hence H_0 is accepted. Therefore, concluded that the reduced mill extraction is directly related to percent of computerization.

c) Comparison of Percent of computerization and Boiling House recovery

Table no. 4.3.3

Percent of computerization and boiling house recovery

Year	% of Computerization	Rank(1)	% of Boiling House recovery	Rank(2)	d= (rank1-rank2)	d^2
2007	28.95	5	90.06	5	0	0
2008	39.47	4	91.37	1	3	9
2009	44.74	3	90.51	2	1	1
2010	50.00	2	90.40	4	-2	4
2011	57.89	1	90.42	3	-2	4
					Σ	18

(Source: Primary Data)

Table No.**4.3.3**sugar factory have done 57.89 % of the computerization, carries first rank and boiling house recovery is 91.37 % carries the first rank.

This is more specifically tested with the help of spearman's rank correlation as follows.

Correlation coefficient between percent of computerization and boiling house recovery.

$$R = 1 - \frac{6\sum d^2}{n^3 - n} \qquad R = 1 - \frac{6 \times 18}{125 - 5}$$

$$R = 1 - 0.9 \quad R = 0.1$$

The calculation of R value shows R=0.1, which signifies positive correlation between percent of computerization and boiling house recovery.

Hence H_0 is accepted. Therefore, concluded that the boiling house recovery is directly related to percent of computerization.

2)H_0 Effective and efficient IT implementation is depends on expert IT personnel.

The table No **4.2.9 and 4.2.10**depicts analysis of percent of effective and efficient IT Implementation with Percent of IT Personnel of 10 years (2001 to 2011).Percent of effective and efficient IT implementation is a observed value from Overall IT Implementation in organization. The hypothesis stated the effort to gauze the relationship between percent effective and efficient IT Implementation and Percent of IT Personnel.

Comparison of Percent of effective & efficient IT Implementation and Percent of IT Personnel

Table no. 4.3.4

Percent of effective & efficient IT Implementation and Percent of IT personnel

Year	% of Effective & Efficient IT Implementation	Rank 1	% of IT Personnel	Rank 2	d =Rank1-Rank 2	d^2
2001-2003	55	9	0	9	0	0
2004	60	7	50	8	-1	1
2005	60	7	75	4	3	9
2006	60	7	75	4	3	9
2007	65	4.5	75	4	0.5	0.25
2008	65	4.5	75	4	0.5	0.25
2009	70	3	75	4	-1	1
2010	75	2	75	4	-2	4
2011	80	1	75	4	-3	9
					Σ	33.5

(Source: Primary Data)

$$R = 1 - \frac{6(\sum d^2 + A.F.)}{n^3 - n}$$

$$A.F. = \frac{m(\mathrm{m2} - 1)}{12}$$ m = No. of Times rank repeated.

$$A.F.(4.5) = \frac{2(4-1)}{12}$$

$$A.F.(4.5) = 0.5$$

$$A.F.(4) = \frac{7(49-1)}{12}$$

$$A.F(4). = 28$$

A.F. =A.F (4.5) +A.F. (4)

A.F=0.5+28

A.F. =28.5

$$R = 1 - \frac{6(33.5 + 28.5)}{729 - 9}$$

$$R = 1 - 0.52$$

$$R = 0.48$$

The calculation of R value shows R=0.48, which signifies positive correlation between percent of effective & efficient IT Implementation and Percent of IT Personnel.

Hence H_0 is accepted. Therefore, concluded that the Percent of IT expert personnel are directly related to percent of effective & efficient IT Implementation.

CHAPTER V

OBSERVATIONS, CONCLUSION AND SUGGESTIONS

5.1 Introduction

5.2 Observation

5.3 Conclusion

5.4 Suggestion

5.5 Infrastructure Required for Implementation Of ERP

5.6 Conceptual design of ERP System for Sonhira sugar factory

5.7 Scope for further research

5.8 Concluding remark