"Constructing the road map of IT Infrastructure Reformation for a multi speciality hospital"

A dissertation submitted in partial fulfilment of the requirements
For the award of

Post-Graduate Diploma in Health and Hospital Management

By

Dr. Anurag Srivastava

International Institute of Health Management Research

New Delhi -110075

May, 2013

Invest2Care Technologies Private Limited

Certificate of Internship Completion

Date: 25th April 2013

TO WHOM IT MAY CONCERN

This is to certify that **Dr. Anurag Srivastava** has successfully completed his 3 months internship in our organization from January 21, 2013 to April 20, 2013. During this internship he has worked on **System Analysis** under the guidance of me and my team at **Invest2Care Technologies Pvt Ltd**

We wish him good luck for his future assignments.

(Signature)

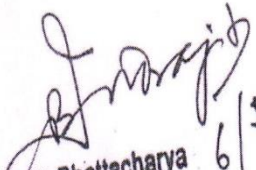NIRANJAN KUMAR (Name)

CEO, Invst2 Care Designation Technologies Pvt Ltd.

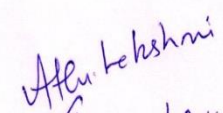# Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Anurag Srivastava**, a graduate student of the **Post- Graduate Diploma in Health and Hospital Management**, has worked under our guidance and supervision. He is submitting this dissertation titled **"Constructing the road map of IT Infrastructure Reformation for a multi speciality hospital"** in partial fulfilment of the requirements for the award of the **Post Graduate Diploma in Health and Hospital Management**.

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

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FEEDBACK FORM

Name of the Student: Dr. Anurag Srivastava

Dissertation Organization: Invest2Care Technologies Private Limited, Chennai

Area of Dissertation: Issue Analysis of Operational Hospital Information System, Back Office Support System & Data Mining and Reporting Application in a Multi Speciality Hospital

Attendance: **Regular**

Objectives Achieved: **Satisfactory**

Deliverables: Report on analyzing the existing IT System and Infrastructure . Propose options to move ahead to resolve the issues.

Strengths: Able to focus on details without losing sight of the big picture

Well organized, good problem solving skills

Suggestions for Improvement: Self Initiation

[signature]

Signature of Officer-in-Charge/Organization Mentor

Date: 25th April 2013

Place: Chennai

ACKNOWLEDGEMENT

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Abstract

"Constructing the road map of IT Infrastructure Reformation for a multi speciality hospital"

By

Dr. Anurag Srivastava

ABC Hospital, located in New Delhi with 750 beds, is a multispecialty hospital & known for one of the best e-enabled institution. The IT infrastructure is strongly supported by mainly 3 applications named as Pro-1 (product of Comp-X), Pro-2 & Pro-3 (Product of Comp-Y). Pro-1 is being used for Front Office and Patient Management. Pro-2 is being used for Back Office Management. Pro-3 is being used for Data Mining and Reporting.

The management of the hospital came across many technical and functional issues related with all the above mentioned applications, so management gave the responsibility of constructing a proper road map for reformation of IT infrastructure to our organization i.e. Invest2Care Technologies Pvt. Ltd..

The overall goal of this project is to improve the Patient Satisfaction, ensure smooth functioning of various departments, thorough visibility and utmost transparency of the technical, commercial implications of information infrastructure systems.

Activities related with the project are:

- To initiate a detailed system study in all identified departments especially Pharmacy, Patient administration, Front office, Billing, Centralized investigation reporting, Admission, Receiving and purchase etc.

- To come up with issues list per department / user.

- To categorize the issues as show stoppers, major bugs, minor bugs, suggestions to improve, enhancements, wish list etc.

- To prioritize the issues based on the business, functional and technical requirements.

- To evaluate the latest product to analyse in detail.

The major findings are:

- There were numerous customizations done in all the three applications in past 6-7 years which were not properly documented at that time.

- There is a distinct lack of pro-activeness from the department with respect to issues and requirements.

- There is a distinct gap in inter-departmental communication which hampers the exchange of information among departments.

- There is no proper License management system.

- There is no any proper issue log or issue ticketing system to record each and every issue happened in organization.

- There is a strong need of up gradation of existing applications because the existing products are almost obsolete in terms of technology.

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List of Abbreviations

I2C	Invest2Care Technologies Pvt. Ltd.
HIS	Hospital Information System
HMIS	Hospital Management Information System
OPD	Out Patient Department
CEO	Chief Executive Officer
ICD	International Classification of Disease
EMR	Electronic Medical Record
EHR	Electronic Health Record
HIT	Healthcare Information Technology
IT	Information Technology
OT	Operation Theatre
CIC	Central Investigation Centre
OTC	Over the Counter
GRN	Goods Receipt Note
PO	Purchase Orders

Part 1

<u>"Internship Report"</u>

1.1 Introduction to Internship Organization and its Profile:

Name of the Internship Organization: **Invest2Care Technologies Private Limited, Chennai.**

Invest2Care is a fast growing organization committed to see what they implemented really solves the key CHALLENGES of their clients.

The organization follows up and stays with the customer till they see THE MEANINGFUL USE of the implemented solution. Invest2care has been in the forefront of DESIGNING PRODUCTS for the Indian as well as global market. Invest2care is able to introduce sufficient flexibility in its product design to take care of all possible eventualities. Invest2care has positioned itself to provide a broad range of IT project services - systems development, legacy migration and consulting services.

The Company ensures innovative solutions and a delivery aimed at generating client delight. The organization takes away his CLIENT'S OPERATIONAL headache that comes across during the delivery, implementation and post training too. The Organization helps his clients in handling the CHANGE MANAGEMENT issues.

The organization was founded by Mr. Niranjan Kumar Ramakrishnan (Founder & CEO) in the year 2009.

Organization's Corporate Office:

  36/2, 1st floor, Balfour Road, Kilpauk Garden, Chennai, 600010

Branch Office:

  II floor, Rasi Scans Building, A.R IT Park, Ramanathapuram, 623501

Core Competences:

Management Consulting Services:

Invest2Care proudly offers the following services to various categories of healthcare players:

Return on Investment.

Operational Transformation.

Document Management.

Communication & Training Business Planning.

Business Strategy Development.

Community Management Systems.

New Business Development.

Market Research & Analysis.

Branding and business development.

Partnership Collaborations.

Performance Reporting & Improvement.

Sales Support & Account Management.

Hospital Management:

Life2Care is Hospital Information System (HIS) is designed to meet all the information needs within a hospital. 'LIFE2CARE' is a Hospital Management Solution for Multi-Specialty Hospital to cover a wide range of hospital administration and management processes. This is an integrated end-to-end Hospital Management System that provides relevant information across the hospital to support effective decision making for patient care, hospital administration and critical financial accounting in a seamless flow.

This includes diverse data types such as patient information, billing, finance and accounting, staffing and scheduling, pharmacy ordering, prescription handling, supplies, inventory, maintenance and orders management, diagnostic reports related to laboratory, radiology and patient monitoring as well as providing decision support. The ultimate objective is to build a network of interdependent centres such as the clinical laboratory, radiology department, pharmacy, and so on in order to effectively meet the needs arising within the hospital. Despite the fact

that these individual centres are autonomous, they are interdependent in terms of delivering services and to ensure effectiveness of providing care. All this can be achieved through Life2Care that have formed the cornerstone of today's modern hospital.

Life2Care Highlights: User Friendly, Template Designer, Seamless Workflow, Intuitive Work, Token Generator, Erx, Sms, Digital Signature, Palm Vein Biometric, Tally Based Accounting Integration, Touch Screen Integrated.

Life2Care Packages:

Life2Care Enterprise
Patient Registration
Appointment Desk
Doctor's Workbench
Patient Billing
Laboratory Management
Radiology Management
Admission Management
Ward task Management
Discharge Management
Electronic Medical Record
Customizable Reports
Template Management

Life2Care OPD
Patient Registration
Appointment Desk
Doctor's Workbench
Patient Billing
Laboratory Management
Electronic Medical Record
Customizable Reports

Life2Care Lab

Patient Registration

Appointment Desk

Patient Billing

Laboratory desk

Scan desk

Lab Inventory Management

Customizable Reports

Optional Modules

Pharmacy Management

Inventory Management

Biometric Identification Solution

Biometric Attendance Management

Tally Integration

Patient Kiosk

KIOSK Operator

Records Scanning

ICD Coding

Insurance Integration

ID Card Printing

Resource Management

Patient Management:

Patient2Care enables patient management process automated using Next Generation technology solutions for AFFORDABLE & User friendly integrated patient management solutions is the role of Patient2Care. Demonstrable ROI is the key in the success of HIT solutions globally especially in India. We at Invest2Care truly understand this. Patient is the Centre of Gravity of Health Ecology. Whether it is Cloud, Touch Screen Kiosk, Palm Vein based biometric sensor we adopt any proven technology - technique to bring in meaningful automation in healthcare industry. Any innovation should be focusing on the patient as the primary stakeholder.

Data Management:

Data2Care is the state of art technology comes with business process management and forms processing software enabling enterprises to digitize documents and automate manual processes, thus adding agility and flexibility for quick decision making on ever-changing market dynamics. **Data2Care** is a robust, yet easy to use web-based Enterprise Document Management Software built on the scalable and secure Microsoft .Net platform. The state of art technology comes with business process management and forms processing software enabling enterprises to digitize documents and automate manual processes, thus adding agility and flexibility for quick decision making on ever-changing market dynamics.

Data2Care Features

Store and Manage documents

Manage Batch Directory

Scan and Import

Assign indexes

QC Indexing

Enable Export

Generate Report

Key Benefits:

Integrated workflow

Multi level Search and retrieval

Authorized role based access control

Reduce paper handling and storage cost

Workflow Management

Audit log Management.

Cloud Computing Training:

Learn2Care Division of Invest2Care in collaboration with Leading and recognized organization, set up Centre of Excellence for Cloud Computing with the intention of developing Cloud Computing skills to meet the Globe demand for Cloud computing skills. Despite the growing adoption of information technology

(IT) there are still barriers to its optimal use, one of them being shortage of trained resources who understand the business as well as IT. To bridge this gap between supply & demand of trained resources Learn2Care has launched short term courses in the field of **IT for Cloud Essential Professionals**.

Cloud Computing is the next step in the evolution of the Internet as a source of services. Cloud computing is a general term for anything that involves delivering hosted services over the Internet. The service is fully managed by the provider (the consumer needs nothing but a personal computer and Internet access).

Significant innovations in virtualization and distributed computing, as well as improved access to high-speed Internet and a weak economy, have accelerated interest in cloud computing.

Health IT Training:

Health IT Technician training and certification course delivers regulatory requirements, healthcare terminology/acronyms, and an understanding of practice workflow while adhering to code of conduct policies and security best practices. It is designed specifically to prepare students for successful completion of the Healthcare IT Technician exam. With the aid of authorized courseware and certified experienced instructors, this course imparts the knowledge and skills required to confidently implement, deploy, and support healthcare IT systems in various clinical settings.

HIT Technician training is a vendor- and technology-neutral credential that validates the operational, regulatory and security knowledge necessary to provide hardware and software support in medical environments where electronic health record (EHR) systems are used.

1.2 Place of Engagement:

Placed as an IT consultant in ABC Hospital, New Delhi,

1.2.1 Project Overview –

Issue Analysis of operational HIS (**Pro-1**), Back office support application (**Pro-2**) & Reporting application (**Pro-3**) in ABC Hospital, New Delhi.

1.2.2 Major Activities Involved during execution of Project Assignment:

- At the initiation of the project, consulting team needs to identify all the departments who are using any of the three applications.

- After identification of all the relevant departments, team needs to identify all the key/power users of that particular department.

- Further, team requires to do in-depth interview of identified users, if possible all the users of a department otherwise at least power users of that department, and collect all issues related with any of the three applications whether functional or technical.

- Meanwhile the team requires getting the training of all the three applications from IT department users to understand the problems/issues of applications faced by users in their routine activities.

- Then the team needs to prioritize the issues as show stoppers, major bugs, minor bugs, suggestions to improve, enhancements, wish list etc.

- To categorize the issues into Application, Infrastructure, Administrative, Speed, License etc.

- Then the team requires getting the feedback of IT department on all the problems/issues faced by the users.

- Further the team will try to get the access of trial version of Pro-1 version 2012 to review that product completely.

- Finally team need to prepare an Issue Analysis Report based on the entire exercise and present it to the management of the hospital.

1.3 Tasks with respect to various Departments:

Task given was mainly the department wise study; Recording of all identified issues / requirements; Understanding of the existing system, usage and work flow in detail; To get IT team's inputs / feedback for all the issues; and reporting & documentation of all the existing issues and requirements.

The various departments are as follows:

- ✓ Admissions
- ✓ Finance
- ✓ Pharmacy
- ✓ Purchase
- ✓ Receiving
- ✓ Heart Centre
- ✓ CIC
- ✓ OT Store
- ✓ Front Office and Billing
- ✓ OPD
- ✓ Investigations
- ✓ Discharge Department
- ✓ Dialysis Centre
- ✓ Nursing Station
- ✓ IT Department

1.4 Reflective Learning during Internship Period:

While working on this project first of all I learnt the documentation and reporting techniques and enhanced my skills in that.

During my whole internship I got so many chances to interact with users of different departments and to record their problems and issues. Due to this I got a chance to enhance my inter-personnel skills.

Part 2

Dissertation on "Constructing the road map of IT Infrastructure Reformation for a multi speciality hospital"

Chapter 1:

1.1 Introduction

ABC Hospital, located in New Delhi with 750 beds, is a multispecialty hospital & known for one of the best e-enabled institution. The IT infrastructure is strongly supported by mainly 3 applications such as Pro-1, Pro-2 and Pro-3. Pro-1 is being used for Front Office and Patient Management. Pro-2 is being used for Back Office Management. Pro-3 is being used for Data Mining and Reporting.

The management of the hospital came across many technical and functional issues related with all the above mentioned applications, so management gave the responsibility of constructing a proper road map for reformation of IT infrastructure to our organization i.e. Invest2Care Technologies Pvt. Ltd..

The overall goal of this project is to improve the Patient Satisfaction, ensure smooth functioning of various departments, thorough visibility and utmost transparency of the technical, commercial implications of information infrastructure systems.

Purpose of the project report document is to highlight the Hospital's detailed system analysis and technical status. Then we are supposed to extend our consulting service, to clearly articulate the functional needs of the hospital to be computerized for an efficient patient care as functional design document. Once the system study is complete consulting team would recommend the most economical solution by retaining the modules, which are functioning well and to list the new functions to computerize.

1.2 Scope of the Project:

- ➢ To initiate a detailed system study in all identified departments especially Pharmacy, Patient administration, Front office, Billing, Centralized investigation reporting, Admission and Receiving (purchase) etc.

- ➢ To come up with issues list per department / user.

- ➢ To categorize the issues as show stoppers, major bugs, minor bugs, suggestions to improve, enhancements, wish list etc.

- ➢ To prioritize the issues based on the business, functional and technical requirements.

- ➢ To get trial version of Latest application installed and review the product fully.

- ➢ To evaluate the latest product to analyse in detail.

- ➢ The complete study would be Qualitative.

1.3 Problem Statement:

Currently the hospital users are using mainly three applications, Pro-1, Pro-2 & Pro-3.

Pro-1 is mainly used in following areas:

1. OPD
2. Central Investigation Center
3. Casualty
4. Admissions
5. Nursing
6. Billing
7. Ordering
8. Stock Requisitions, Transfers, Acknowledgement and Administration
9. OT
10. Laboratory
11. Radiology
12. Discharge Department

Pro-2 is mainly used in following areas:

1. Store
2. Purchase
3. Receiving
4. Finance
5. Over the Counter (OTC) sale

Pro-3 is mainly used by IT department users to fulfil the requirements of various kinds of reports which are raised by the different departments.

Most of the departments of the hospital are facing various kinds of problems which can mainly be categorized as Application, License, Speed, Administration, Training and Infrastructure related issues. The major impacts of these issues are on efficient working of the end users of the hospital. These problems may also lead to User as well as Patient dissatisfaction if not be dealt with prompt and appropriate corrective measures.

Since most of the departments (especially Pharmacy, Labs, Finance, and Central Investigation Center etc.) are getting affected by these issues so it is so obvious that

proper functional flow of such a big organization is also getting affected in a wrong manner.

After getting complaints from almost all the departments of the hospital, top management decided to get rid of these problems as early as possible so that entire hospital's functional system could be on place and users as well as patient satisfaction can be achieved.

1.4 Objectives of the Study:

Following are the core objectives of the project:

Sr. No.	Objectives
1	Current status and issues of existing Hospital Information system
1.1	Pro-1 - Front office & Patient Management system
1.2	Pro-2 – Back office System
1.3	Pro-3 – Data Mining System
2	Current status and issues of existing Information Technology Infrastructure
2.1	Storage space
2.2	Configuration
2.3	Licenses
3	Analysis of all possible criteria to upgrade the IT Infrastructure
3.1	Evaluation of Impact of local Customisation over the period of 5+ years
3.2	Evaluation of User requirement
3.2.1	Immediate requirements
3.2.2	Future Wish list
3.4	Existing commitments/ Contractual obligations from either end
3.4	Evaluation of License requirements
3.5	Evaluation of Support terms from multiple vendors
4	Analysis of Alternative HIS solutions
5	Analysis of key stake holders (Human Resources) & impact of them in above decisions.

Chapter 2: Data & Method

2.1 Study Design:

Qualitative Analytical Study:

Need to identify all the existing issues in all the three applications and further categorise them in to various heads like administration issues, infrastructure issues, application issues, license issues & speed issues etc.; also categorise them as critical, high, medium, low and wish list.

2.2 Approach:

Identification & Prioritization

- ➢ Department wise Study
  - Based on importance & Issues
- ➢ User wise
  - Department process champions
  - Product Power Users
- ➢ Issues wise
- ➢ Show stoppers, major bugs, key functional flaws
- ➢ Enhancements & suggestions to improve

2.3 Data Collection Techniques:

In-depth Interview:

In-depth Interview of the departmental heads and at least all the power users of that particular department, by using an interview questionnaire and an issue log format, to gather all the existing issues and wishes regarding all the three applications.

Documentation of all the issues (Department wise) identified and Qualitative as well as Quantitative analysis of those identified issues.

The form of output of analysis done would be in form of different Graphs as well as description wherever required.

Chapter 3: Results & Findings

3.1 Department wise Application usage statistics:

#	Department Name	Total number of Users			Product Usage	
		IT login	Power	Concurrent	Name	Hours
1	Admission	50	45	8	Pro-1, Pro-2	24*7
2	Billing	35	25	20	Pro-1, Pro-2	24*7
3	CIC	20	8	12	Pro-1, Pro-2	10 – 11 Hrs/day
4	Dialysis	8	7	7	Pro-1, Pro-2	8-12 hours
5	Finance	30	20	25	Pro-2, Pro-1	Around 7 hrs/day
6	General OPD	8	6	6	Pro-1, Pro-2	3 hours
7	Heart Center	15	15	5	Pro-1, Pro-2, Pro-3	3-5 hours
8	OT Department	15	8	5	Pro-1, Pro-2, Pro-3	24*7
9	Purchase	14	10	12	Pro-2 (90%), Pro-1 (10%)	6-7 hrs/day
10	Receiving	14	5	4	Pro-2 (99%), Pro-1 (1%)	5 hrs/day

					Pro-1,	
11	Nursing Station	40	40	4	Pro-1, Pro-2	24*7
12	Investigations	45	38	11	Pro-1, Pro-2	7-8 hrs/day
13	Casualty	9	3	3	Pro-1, Pro-2	24*7
14	Pharmacy	45	18	21	Pro-1, Pro-2	24*7
15	Discharge Department	12	12	4	Pro-1, Pro-2	24*7

3.2 Department wise Issue & Impact list:

#	Department	Priority	Application	Issue Description	Impact of this issue	Issue Type
1	Finance	Wish List	Pro-2	**Searching Bank payment Voucher**- There is no option of searching of **bank payment vouchers by voucher amount or cheque number.**	User has to do more entries for searching a particular voucher and spend more time for filtering to retrieve the desired voucher.	Application
2		Medium	Pro-2	**Bank payment Voucher-** If user creates a voucher for bills which come from another department, e.g. GRN from receiving; the voucher number and voucher date can't be created by system itself before validation of voucher; whereas if user creates a voucher for bills directly related to finance department, e.g. payment of drug trials, the voucher number and voucher date are created by system even before validation.	User has to enter the voucher number and date manually in the printouts which he has taken before for reconciliation of all the entries of respective bills, otherwise he has to get that voucher validate first then only he can get the voucher number & date printed on the voucher. But in the later case if any human mistake was done earlier he cannot rectify. He has to first cancel this voucher then generate the new one.	Application
3		High	Pro-2	**Editing Sub-Account Head Master- Sub-account head master** can't be editted. **Account head master** can be edited provided if it does not contain any sub-account head master.	User has to contact IT department every time for this issue, and IT department has to contact vendor accordingly.	Application
4		High	Pro-2	**Bank Payment Voucher Entry**- If any user related with billing enters the wrong cheque date in receipts by mistake, than it can't be editted at finance user's end during making of vouchers for that receipt.	Finance user has to contact the other user who generated the receipt of that cheque, subsequently the receipt has to be cancelled and regenerated.	Application
5		Critical	Pro-2	**Licensing Issue-** Sufficient licenses are not available at time of critical usage	The most of the user's activities slow down as their major work associated with Pro-2.	License

6		High	Pro-2	**Run-time Errors-** Occasional Run-time errors pop up during the routine activities	Users get disconnected from the application in the middle of their work. They have to re-login to access the system again. During this process they can't get their access to Pro-2 easily because of limited number of licenses.	Appli cation
7		High	Pro-2	**Editting Narrations In Vouchers-** If user wants to edit the narration of the bank voucher then he needs to select one row of description and do changes in the narration. this process has to be repeated for each and every row. i.e. narration has to be editted by selecting every row one by one.	This repetitive step is time consuming. User has to spend more time for doing small changes in narration for voucher; also if he leaves any row to select and do changes for it by mistake then the desired changes in narration would not have been done.	Appli cation
8		High	Pro-2	**Multi Bank Voucher (MBV)-** the total amount, shown on front screen, only the net amount is displayed on front screen after doing all Credit and Debit amount calculation. User can't see the total credit & debit amount separately.	For knowing total Credit and Debit amount separately, user has to create the detailed report first and then he has to calculate total receivable and total payables separately. This whole process is time-consuming.	Appli cation
9		High	Pro-2	**Bank Payment Voucher (BPV) Entry-** multiple cheques are posted against a single bank payment voucher and only single credit entry is allowed in one BPV. But users require the break-up (multiple credit) entries in one bank voucher so that reconciliation would be easy.	Initially users have to generate a report from Foxpro and record all the credit entries from this report in an excel file and then consolidate all the amount into one credit entry and then they are able to make BPV. Again for reconciliation they need to refer to that excel file. In this whole process the possibilities of human errors are increased.	Appli cation
1 0		High	Pro-2	**Receivable Credit Card section-** when user double clicks on any amount to see its description then sometimes it differs from the	This leads to the problems during reconciliation process.	Appli cation

				amount shown on front screen. Users complained in IT dept. so many times for this issue. It's a frequently occurring problem.		
1 1		Medium	Pro-2	**Search-** User wants to search any data by typing any word of the group of words not only the first word. E.g. search "Receivable Credit Cards" by typing any of the three words not only first word.	User has to remember the first word of the group of words.	Appli cation
1 2		High	Pro-2	**Monthly Ledger-** Sometimes the Ledger balance amount is different from its description.	This leads to the problems during reconciliation process.	Appli cation
1 3		Wish list	Pro-2	**Monthly Consumption report-** the total of the entire amount is not done on the front screen.	User has to create the complete monthly consumption report for getting the total amount of monthly consumption which takes time.	Appli cation
1 4		High	Pro-2	**Monthly Consumption report-** User can get the consumption report Item wise only not department wise.	User face the difficulty in calculating each department's consumptions and subsequently in calculating the exact departmental expenses	Appli cation
1 5		Medium	Pro-2	**Monthly Consumption report**- In addition to above problem user wants only main department wise consumption report not all sub-department wise consumption report.	All sub-department wise consumption listing is not needed for reporting and further calculating the departmental expenses which is calculated for main departments only.	Appli cation
1 6		Critical	Pro-2	Two times in past the payment was done by system without validation.	This type of error may lead to unauthorized payment without cross-checking it.	Appli cation
1 7		High	Pro-2	**Sundry Creditors (Vendors)-** there are issues of duplication of vendor name along with vendor code, credit and debit account.	This may lead to confusion regarding vendor details.	Appli cation
1 8		High	Pro-2	**Voucher Entry-**Sometimes the narration of a voucher contains different vendor name and the content of that	This issue consumes time for cross-checking & verification.	Appli cation

				voucher belong to different vendor	
1 9		Wish List	Pro-2	**Indent Generation-** There is no any facility of automatic Indent generation, if stocks are lesser than threshold level	User has to keep a check over the stock level every time and generate Purchase indents manually.	Appli cation
2 0		High	Pro-2	**Item Issue-** There is no any separate provision of department wise Item issue and item return to the vendor. i.e. returns to the vendor by department are also acknowledged under departmental item issues.	User can't differentiate between actual issues and vendor returns.	Appli cation
2 1	Purch ase	Low	Pro-2	**Purchase Order-** There is no any provision of generation of PO under different heads like PO related to inventory or PO related to service orders	User can't differentiate among different Purchase Orders.	Appli cation
2 2		Critical	Pro-2	**Purchase Orders-** Sometimes during printing of PO vendor name is changed with another vendor's name	There is high possibility of orders for any vendor exchanged with another vendor.	Appli cation
2 3		Critical	Pro-2	**Stock Ledger-** There is a conflict in stock level if issued stock has not been acknowledged at destination after issuing from store	If the destination point does not acknowledge the stock then this stock is not deducted from store by the system while it is physically transferred to the destination.	Appli cation
2 4		High	Pro-2	**Purchase Orders**- There is not sufficient space for adding more than one Email Id in Purchase orders.	User can't add the manufacturer's email id along with vendor's email id so that orders will reach at both the places simultaneously & consequently orders would be prepared by manufacturers by the time vendor reach there to pick the orders so that orders can be delivered as soon as possible.	Appli cation

25		Critical	Pro-2	**Licensing Issue-** Sufficient licenses are not available at time of critical usage	The most of the user's activities slow down as their major work associated with Pro-2.	License
26		High	Pro-2	**Run-time Errors-** Occasional Run-time errors pop up during the routine activities	Users get disconnected from the application in the middle of their work. They have to re-login to access the system again. During this process they can't get their access to Pro-2 easily because of limited number of licenses.	Application
27		High	Pro-2	**Pending PO-** Pending Purchase orders and Part Pending Purchase Orders expire automatically after validity date of PO even if the orders have not been delivered.	Users can't get the exact status about the pending orders.	Application
28		High	Pro-2	**Pending PO-** The status of Part Pending PO does not change even supplier supplies the part pending orders.	Users are not able to know the exact status of part pending PO.	Application
29	CIC	High	Pro-1	**Corporate Billing-** User cannot give print command for duplicate bill (necessary for corporate billing) after generating the original bill. User automatically gets logged out after printing the original bill.	User has to re-login the system and redo all the required steps again to reprint the bill, which is a time consuming process.	Application
30		Critical	Pro-2	**Printing-** Printouts are generated after a considerable amount of time after giving print command. User has to wait for a while so that the bill can be handover to the patient. Sometimes the print command gets dropped and user has to give the print command again.	It becomes a time consuming process to get even a single page of print.	Infrastructure
31		High	Pro-2	**System Speed-** Speed of the entire system is slow	This restricts the overall working speed of a user.	Speed

3 2		Critical	Pro-2	**License Issue-** Sufficient licenses are not available at time of critical uses	The most of the user's activities slow down as their major work associated with Pro-2.	Licen se
3 3		High	Pro-1	**Corporate Details-** List of various Corporate are not updated, the list even contains the name of obsolete corporate also.	Sometimes users do the billing under non-existing corporate or under the currently unavailable services by mistake, so that user has to cancel and regenerate the bills.	Appli cation
3 4		Medium	Pro-2	**Pin Codes-** Pin Codes of various areas (even all areas of Delhi) are not available in system.	User has to confirm it from patient or attendants and put some extra time and effort for it. This might lead to erroneous data as well.	Appli cation
3 5		Low	Pro-2	**Search-** Search for a patient's previous history in system can't be done by both fields of telephone number; it can only be done by landline number field (although a mobile number can be filled in that field).	The searching may be time consuming if user put the mobile number in the mobile number field.	Appli cation
3 6		Medium	Pro-2	**Past History Alert-** System does not prompt any pop-up/alert for the patients of kidney or liver transplant history so that without asking from patient user can give them the allotted discounts.	In the suspected cases of history of transplant user has to ask the patient about his previous medical history in front of others.	Appli cation
3 7		Low	Pro-2	**Urology Test Codes-** Some test codes related with Urology department do not prompt their respective names in drop down options to select it from their.	In these cases user has to type the complete name of that particular test.	Appli cation
3 8		High	Pro-2	**Billing-** At the time of billing when the items entered by mistake are deleted, they still appear in the printed bill.	User has to validate the printouts before giving it to patients.	Appli cation
3 9		High	Pro-1	**System-** System gets hanged.	This restricts the overall working speed of a user.	Appli cation
4 0		Critical	Pro-1	**Bar-code Printing-** Sometimes when command for printing the barcodes for samples are given the	User has to get the bill cancelled and regenerated so that commands for barcode	Appli cation

				barcodes are not printed.	printing can be given against it.	
4 1		High	Pro-1	**Patient Data-** Sample Collection user can't get the telephone number of patient.	Due to this if that user requires contacting the patient (as in case of wrong sample) he need to contact the billing user.	Appli cation
4 2		Low	Pro-1	Sometime some Symantec errors happen.		Infrast ructur e
4 3	Admi ssion	Mediu m	Pro-1	**Consultant enquiry:** When a patient comes for an enquiry, a search is performed on the consultant page to retrieve the consultant dairy, on that consultant page there is overlapping of information with one element of information which covers a part of another of the information of the same page (content overlapping)	Possibility of misleading or confusing information leading to difficulty in retrieval of information	Appli cation
4 4		Mediu m	Pro-1	**Consultant enquiry:** When a patient comes for an enquiry and search is performed on the doctor's dairy based on the patient enquiry, number of working days on which the Doctor is available is not visible on the Doctor's page	Coinciding days with the other Doctor's days can be misleading and can create confusion in giving appointments to the patients	Appli cation
4 5		High	Pro-1	**HIS login:** While the user is working on the HIS the webpage expires and the user have to re-login again for the continuation of the process	It retards the admission procedure as the user has to wait for the webpage to reload again	Appli cation
4 6		Mediu m	Pro-1	**HIS login-** When the user is working on the HIS, the system is very slow and causes trouble in the login process	It retards the admission procedure as the user has to wait for the webpage to reload again	Infrast ructur e
4 7		Low	Pro-1	**HIS login-** Sometimes when the user try to login the HIS system with their respective GAA number, the user could not get login with their GAA number in the system	As there is no on time access the process is put on halt	Appli cation

4 8		High	Pro-1	**SMS alert-** At present there is no confirmation for the bed allotment by SMS are being sent to the patient as the password of the SMS pack has been expired	With this only telephonic confirmation is done to the patient who further stretches the confirmation process as the one in the waiting list does not get updated. It would be good if it would resolve	Admin
4 9		High	Pro-1	**Booking and Bed Allotment-** Booking of bed is not done in HIS due to "There is an issue with the carry-forwarding the patient bed booking number also. Suppose in total 10 patients are booked and 5 patients got the bed, then the next day new patient booking along with last day 10 patients booking is shown"	Having this issue creates a false along with an extended and chaotic list	Application
5 0		High	Pro-1	**Speed-** Speed of the HIS is slow which delays the procedure	Due to slow speed of HIS the ongoing procedure gets postponed	Speed
5 1		Critical	Pro-1	**Corporate Patient Billing-** When the corporate patient admission is made, the billing is not suppose to be made by the patient but when the patient gets discharged and asked for the payment the company name is not visible for the first time in the billing section but when it is rechecked in the admission department, it appears as correctly entered	Due to this the bill is directly send to the patient which creates unnecessary chaos between the admission and the billing department	Application
5 2		Critical	Pro-1	**Printing barcodes for admission-**Presently the system is getting down/hanged in every 5 mins due which there is delay in the print out of the bar-coded unique registration number	With reference to this the waiting time of the patient at the admission desk is increased	Infrastructure

5 3		Mediu m	Pro-1	**Room plan entry-** The room plan is fixed for every room, but the room plan of the bed allotted is not picked up automatically, even while shifting the patient from one room to the other the room, plan is not picked up automatically by the HIS	This is a repetitive process as the room plan has to re-enter again by the user consuming a part of the time	Appli cation
5 4		Mediu m	Pro-2	**Leave entry approval-** While entering the leave status of the employees in the system, the approval for an employee takes place in two step and it is done manually by the employee	Doing the approval in two steps may get tedious and consumes an element of time	Appli cation
5 5		Mediu m	Speedm inor	**Stock acknowledgement-** The acknowledgement done in the status of stocks and inventories within the system takes place in two process	Getting done the receiving of stocks in two steps slow down the ongoing procedure	Appli cation
5 6	Billin g	Critical	Pro-1	**Final Bill-** When the patient is admitted to the hospital and the stay of the patient is for a longer duration then many bills are generated there is a mismatch among the bills difficulty in the re-calculation of the bill as there are many bills generated and	As there is a mismatch among the bills there is a possibility of that patient may get charged for those materials or facilities which he has not used or vice-versa	Appli cation
5 7		Critical	Pro-2	**Licensing Issue-** Sufficient licenses are not available at time of critical usage	The most of the user's activities slow down as their major work associated with Pro-2.	Licen se
5 8	Recei ving	Critical	Pro-2	**GRN Entry** - Part pending PO are automatically deleted from the system after the PO validity period. So the user can't get the alert about part pending PO after the validity period	Vendors can skip the supply the item against the part pending PO. Vendors have provision to supply items against fresh PO, even if there are earlier part pending PO items. This way the vendor avoids the 5 % penalty for the part pending PO after the validity period.	Appli cation
5 9		Low	Pro-2	**Credit GRN Entry** - The window for selecting an item to include that item in GRN is very small that user cannot	User has to pay more time to find the items for making a credit GRN and chances of error are	Appli cation

				see the complete name of the item without scrolling.	more.	
6 0		Wish List	Pro-2	**GRN Entry**- There is no any automatic window for GRN creation which contain all the items of PO automatically after entering the PO number	User has to pay more time in GRN creation.	Appli cation
6 1	Invest igatio ns	Critical	Pro-1	**Sample Receiving-** Sometime data about sample do not go to the respective station through system after receiving of sample (through barcode scanning) at sample receiving station.	Sample analysis user has to enter data about sample again. This may lead to the increase workload on user also possibility of error is increased.	Appli cation
6 2		Critical	Pro-1	**Patient Sample Report Generation-** Sometime data (reports of sample) do not migrate correctly from Analyzer to Pro-1.	User has to spend more time in cross checking of patient reports in Pro-1 with report directly generated by Analyzer. This may lead to errors due to skipping during cross-checking.	Appli cation
6 3		High	Pro-1	**Integration of Analyzer-** One analyzer in Haematology dept. is still left for integration with Pro-1.	User has to spend time in manually entering the analyzer reports into Pro-1.	Admi n
6 4		Critical	Pro-1	**System-** System (Computer) speed is very slow.	Routine activities of the department get delayed.	Infrast ructur e
6 5		High	Pro-1	**System-** Systems get hanged in between routine working.	Routine activities of the department get delayed.	Infrast ructur e
6 6		Critical	Pro-2	**Licensing Issue-** Sufficient licenses are not available at time of critical usage	The user's activities hindered because of some work associated with Pro-2.	Licen se
6 7		High	Pro-1	**Report Generation-** Sometimes errors of database failure occur during X-ray report creation.	User has to spend more time in the process of creating the report.	Appli cation
6 8		Critical	Pro-1	**System Speed-** System is very slow.	This may lead to hindrance in routine activities.	Infrast ructur e

6 9		High	Pro-1	**Report Generation-** User can't see the time of nurse orders for the X-ray to be done.	Problem arises when there are more than one X-ray orders in a day. User has to confirm from X-ray film first to get the desired report printed. This consumes time and chances of human errors are increased.	Appli cation
7 0		Critical	Pro-1	**Report Generation-** System does not automatically pick the date of execution of X-ray. It picks the date of report creation by default.	Sometimes it may happen that the report creation date is different from the date of test execution. User has to manually change the date in above case. E.g. If a test is done at 11:50 PM & report is created at 00:30 AM then the report creation date would be different from date of test done. This may lead to conflict especially in MLCs.	Appli cation
7 1		Critical	Pro-1	**Licensing Issue-** Suficient licenses are not available at time of critical usage.	The routine activities of users get delayed.	Licen se
7 2		High	Pro-1	**Server-** Problem of server down.	The routine activities of users get delayed.	Infrast ructur e
7 3	Heart Centr e	Medium	Pro-1	**Speed-** Speed of the HIS is slow which delays the procedure	Due to slow speed of HIS the ongoing procedure gets postponed	Speed
7 4	OT Store	Medium	Pro-1	**Stock Consumption Entry-** Quantity of item consumed by the OT needs to be mentioned in the HIS, but when sent to the main billing section for the final billing, the quantity of item consumed number then varies	If the quantity does not match among the departments, then double verification is to be done which consumes an amount of time	Appli cation
7 5		High	Pro-1	**Alerts-** There are no alerts for the products which are nearly to be expired or likely to be expired	With no alerts in the system, there is manual procedure done for the verification of expiry date, which in turn gets tiresome and tedious	Appli cation

					work to be done by the employee	
7 6		Wish List	Pro-1	**User interface-** Font size of the content on the page should be bigger	When the font size gets bigger, the clarity to the user increases and decreases the stress on the user	Appli cation
7 7		Mediu m	Pro-1	**Speed-** Speed of the HIS is slow which delays the procedure	Due to slow speed of HIS the ongoing procedure gets postponed	Speed
7 8	Gener al OPD	High	Pro-1	**Patient Search-** At present the user can search the patient and patient related information by using only one search field, like in case of female patients, additional search can be done by only husband's name	With issues like this, the user may have trouble in recovering the data of the patient or data of any other patient may get interchanged	Appli cation
7 9		Mediu m	Pro-1	**Speed-** Speed of the HIS is slow which delays the procedure	Due to slow speed of HIS the ongoing procedure gets delayed	Speed
8 0	Dialys is	Mediu m	Pro-2	**Licence-** Whenever an user has to enter for the leave in the system, the system shows that there is a limited access of the license	Having a limited license limit may delay the procedure for filling the leave form and it may give an improper information regarding the employee's leave status	Licen se
8 1		Mediu m	Pro-1	**Speed-** Speed of the HIS is slow which delays the procedure	Due to slow speed of HIS the ongoing procedure gets delayed	Speed
8 2	Nursi ng Statio n	Mediu m	Pro-1	**Barcode printing-** When an order is placed for lab investigation, the printed bardcode numbers are not clear	As the printed barcode numbers are not clear, it may not get scanned by the barcode scanner for which the barcode number printing has to be redone, which may consume a lot amount of time	Appli cation
8 3		Low	Pro-1	**HIS login-** Sometimes when the user try to login the HIS system with their respective GAA number, the user could not get login with their GAA number in the system	As there is no ontime access the process is put on halt	Appli cation

8 4		Medium	Pro-1	**Speed-** Speed of the HIS is slow which delays the procedure	Due to slow speed of HIS the ongoing procedure gets postponed	Speed
8 5		Medium	Pro-1	HIS- While working on the system, the system gets hanged in every 10 minutes in between the ongoing procedure	It possibly increases the waiting time of the patient and creates a fuzz at the counter	Infrastructure
8 6	Casualty	High	Pro-1	**System-** One system in the emergency department is not working and even after the complaint is being launched, no action has been taken	As there is only one system working in the emergency the work load on the remaininig one system is more which may put certain things on halt	Infrastructure
8 7		Critical	Pro-1	**Calls in night time-** When an emergency patient comes in the emergency department in the night time, there are moments when IT department staff is not available to take the calls	It slows down the process when an emergency patient is put on to wait	Admin
8 8		Critical	Pro-2 & Pro-1	**Stock Status-** Mismatch of Stocks in both applications i.e. sometimes stock level in Pro-2 is different from Pro-1.	This issue may lead to misunderstanding of current stock level.	Application
8 9		High	Pro-2 & Pro-1	**Issue to Patients-** If user clicks on generic drug name, he can't get all the available brands of drugs.	User would not be able to give the available brands of drugs due to not getting the complete list of available drugs.	Application
9 0	Pharmacy	High	Pro-1	**In-Patient Issues-** There is no any alert of previously given drugs to a particular patient if the user is giving a different brand of similar generic drug.	If the previous & current brands issued to a patient are of different price but they belong to the same generic then this may lead to a condition of conflict and patient dissatisfaction.	Application
9 1		High	Pro-1	**Re-Order Level (ROL) report-** ROL report generation process is too slow.	User needs to spend more time in generation of report.	Application

9 2		Wish List	Pro-1	**Stock Master Movement-** e.g. if a patient is issued 10 tablets of a medicine then in stock master movement it will appear in 10 rows while each row will contain 1 tablet of medicine, so 10 rows will be occupied by same record which can be shown in one row contains 10 tablets against a patient.	During reconciliation of stock movement there is a high possibility of errors by user because he has to do more calculations.	Appli cation
9 3		Wish List	Pro-1	**Stock Ledger-** Record of issuing a particular medicine to various patients appears row wise and each row contain patient registration number only, not the name of patient.	Reconciliation of stock of a particular medicine given to a patient is not so easy.	Appli cation
9 4		Wish List	Pro-2	**Stock Requisiton-** Under Requisition form, the window for selecting an item for making the Indent is very small and complete name of an item can't be seen without scrolling	User has to spend more time in seeing and selecting the exact item he wanted. This restrict his routine work as he has to make indents of more than 100 items usually in one requisition.	Appli cation
9 5		Critical		**Printing of Validated GRNs-** Skipping of prints during validated GRN printing after giving the command for printing all the validated GRNs collectively.	User needs to spend time on cross-checking the complete printouts for skipped GRNs and reprint separately the skipped GRNs.	Appli cation
9 6		Low	Pro-2	**GRN Validation-** During the process of validation of a GRN there is no any pop-up for confirmation of validation after clicking the validation tab.	Sometimes during the process of cancellation of validation of a GRN user presses the validation tab by mistake and validates the GRN which he wanted to cancel.	Appli cation
9 7		Critical	Pro-2 & Pro-1	**Item' MRP & Cost-** Sometimes cost exceeds the MRP of a particular item and user can't find this issue until he gets through the complete report.	User has to contact IT dept to resolve this issue if he could find this in report because it is very likely to skip these issues due to too many items with costs and MRPs.	Appli cation
9 8		Critical	Pro-2 & Pro-1	**Stock Level-** Sometimes the stock level for any item shows minus level.	It creates a confusion about the exact level of stock.	Appli cation

9 9		Critical	Pro-1	**Profit Margin Report-** Profit margin report for pharmacy department generated by department itself is differ from the same report generated by the Finance department.	This may lead to misunderstanding between the two departments on this issue.	Appli cation
1 0 0		Critical	Pro-1	**Reporting Tool-** There is no any in-built reporting system which is not edittable. User has to fetch the reports in txt format then migrate it into Access and then into Excel format.	This may make the report Non-transparent because any user can do changes in the report during migration of data from one format to another.	Appli cation
1 0 1		Critical	Pro-2	**Licensing Issue-** Sufficient licenses are not available at time of critical usage	The most of the user's activities slow down as the work associated with Pro-2.	Licen se
1 0 2		High	Pro-2	**Run-time Errors-** Occasional Run-time errors pop up during the routine activities	Users get disconnected from the application in the middle of their work. They have to re-login to access the system again. During this process they can't get their access to Pro-2 easily because of limited number of licenses.	Appli cation
1 0 3		High	Pro-2 & Pro-1	**System Speed-** Overall System Speed is too slow	Usual activities get delayed because of it, and users have to spend more time in waiting for system to run properly.	Speed
1 0 4		Wish List	Pro-2 & Pro-1	**GRN Search-** For any particular item, stock is not shown store wise after double clicking on that item's name.	User has to spend more time for searching store wise stock of a particular item by going through different windows.	Appli cation
1 0 5		Wish List	Pro-1	**GRN Printing-** GRN of one whole day can't be prited by selecting all of them at once and giving only one print command for all.	User has to spend more time for selecting each and every GRN separately and print them separately as there are more than 100 GRNs per day to be printed.	Appli cation
1 0 6		Wish List	Pro-1	**GRN-** The GRNs for all the sub-divisions of pharmacy are in a single series. There is no	During reconciliation of GRNs users face difficulty in counting the	Appli cation

				separate series according to sub-divisions of pharmacy. E.g. 1st GRN belongs to IP Pharmacy store, 2nd belongs to OPD pharmacy, 3rd belongs to Dispensary, 4th belongs to again OPD Pharmacy etc.	sub-division wise GRNs.	
1 0 7		Wish List	Pro-1	**Issue to Departments-** Issues to various dept. are also not in the separate series. (Department wise series)	During reconciliation of Issues to various departments users face trouble because there are all the departmental issues in a single list. i.e. no department wise issue list on front screen.	Appli cation
1 0 8		High	Pro-2 & Pro-1	**Server Down-** Server down issues are frequent.	Users face difficulty in their routine activities.	Appli cation
1 0 9		Critical	Pro-1	**Packing Details-** Sometimes the packing serial numbers are skipped to print.	Users can't reveal the Packing Serial Number consequently the status of packing of orders of that particular patient.	Appli cation
1 1 0		High	Pro-1	**Packing Details-** Sometimes if printer stuck and printout of any packing slip is not executed then user can't give the reprint command of that particular packing slip because in Print History the packing serial number is also not shown and user can't know which packing slip is to be printed.	User has to cancel that particular packing slip and regenerate that packing slip again to get the printout of the same.	Appli cation
1 1 1		Wish List	Pro-1	**Packing Details-** The name of the user, who has generated the packing slip, is not shown on front screen of packing details. i.e. no user wise listing option for packing slip is available on front screen of Packing Details.	User has to open EPR to reconcile the user wise Packing Details list, which is a time consuming process.	Appli cation

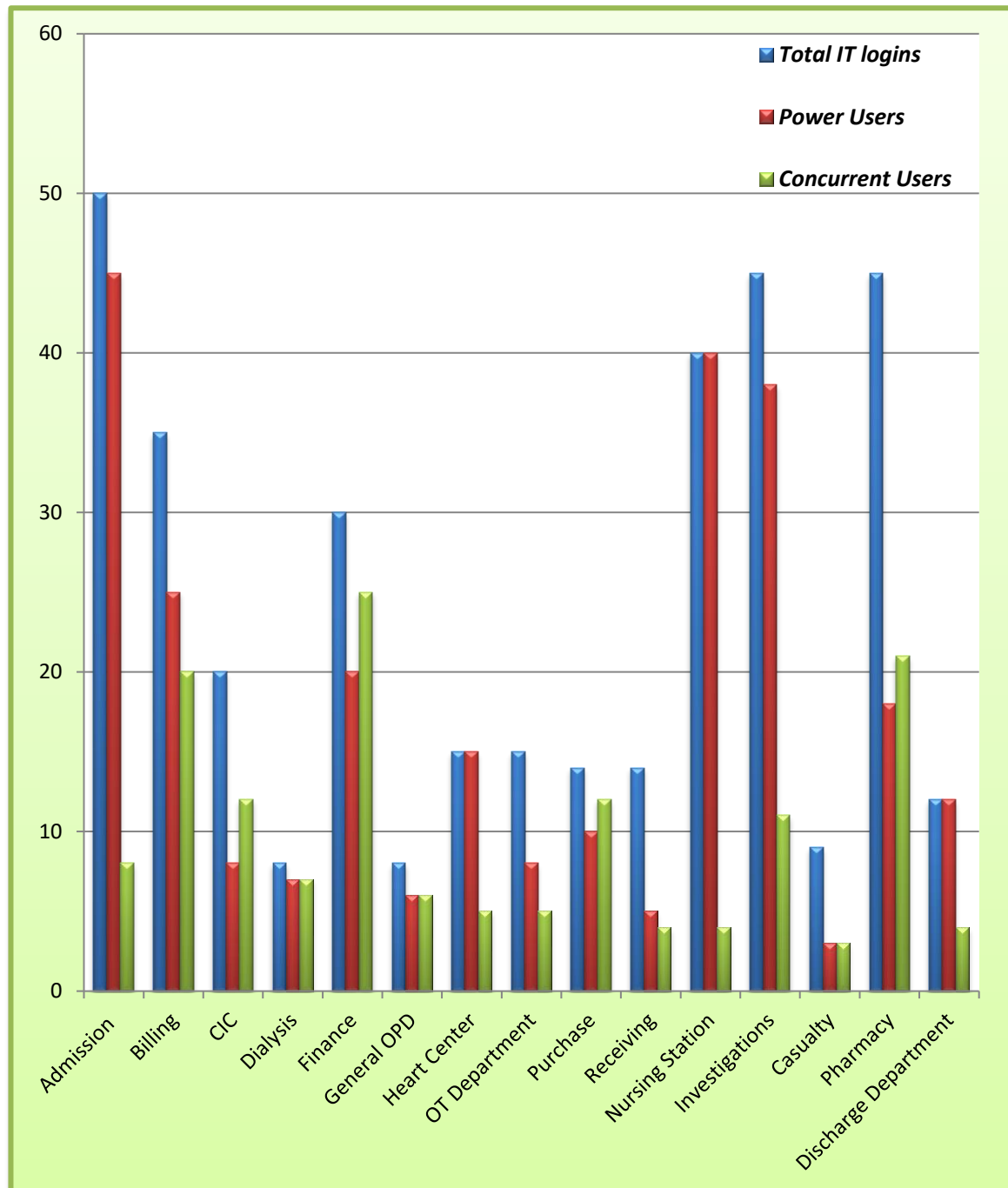|						
112		Critical	Pro-2 & Pro-1	**Non-Moving or Slow-Moving Item Report-** The reports do not run properly. Sometimes the users can't find any data regarding those items.	Users cannot get the exact status of slow or non-moving items. So there is high possibility of pooling of these items and even the chances are high for their expiry because of less or no use.	Application
113		Critical	Pro-2 & Pro-1	**Report Module-** The working speed of this module is very slow	Process of generation of various desired reports is a time consuming activity	Application
114		High	Pro-2 & Pro-1	**Monthly Master Ledger-** Sometimes there are errors in getting the monthly master reports	User cannot get the exact status of monthly masters	Application
115		High	Pro-2 & Pro-1	**Monthly consumption Reports-** Report generation process is too slow.	User has to spend more time in getting the exact monthly consumption status of various departments.	Speed
116	Discharge Department	Critical	Pro-1	**Discharge summary saving-** After preparing a discharge summary when the summary is prepared and is asked for saving the summary, server down error occurs on a daily basis	Whenever server down error occurs there is a delay in printing the discharge summary which may delay the handing over the discharge summary to the billing process and the patient may have to pay the additional charges	Application
117		High	Pro-1	**HIS licence-** Whenever the server gets up and the user have to re-login again, the system shows that HIS licence is exceeded	There is a delay in the printing of the discharge summary which further delays the discharge process of the patient	Application
118		Medium	Pro-2	**Licence-** Whenever an user has to enter for the leave in the system, the system shows that there is a limited access of the license	Having a limited license limit may delay the procedure for filling the leave form and it may give an improper information regarding the employee's leave status	Application

1 1 9		Wish List	Pro-1	**Formatting the content-** While preparing the discharge summary, the content cannot be made bold or underlined i.e. highlighting of the text can't be done, so word features are required for better presentation of the discharge summary	The discrimination between the text may not be done and snapshot of key issues is not possible	Appli cation

3.4 Sequence of Events:

Sr. No.	Sequence of Events	Remarks	Duration
1	Agreement signed between ABC HOSPITAL and Comp-Y (the then partner of Comp-X)	100 Pro-1 & 20 Pro-2 Licenses payable annually post warranty. This Agreement was valid for 3 years and support for the solution was for 5 years. This agreement was not renewed after initial 03 years and agreement became invalid as on Dec 2011.	Nov 2005 to Dec 2010; Even the minimum support term ended in Dec 2011.
2	Pro-1 Versions	Upgraded to P7 version	2007
3	Comp-Y and Comp-X Separation	The communication of this separation was purely verbal and implication of the same to ABC HOSPITAL was unknown. No impact analysis in terms of License, version control, support and in terms the finance of this event is carried out and documented.	2009
4	Pro-1 upgrade proposal	Proposal submitted now is for version Caché 2011.1.	Jan 2011 onwards
5	Hardware and back office upgrade	Storage, Server configurations, limited number of servers to manage multiple tasks caused huge performance issues and unable to handle the load. Hardware up gradation Proposal along with Pro-1 up gradation is with the management.	Jan 2011 onwards.
6	Hardware Up gradation	Currently IT department is proposing afresh proposal exclusively for hardware up gradation alone. The performance issues are reaching to their peak and across the organization is suffering	May-12
7	Latest version	Latest version is Caché 2012.1	Mar 30 2012
8	Pro-2, Pro-3	Comp-Y who was the partner of Pro-1 before Comp-X took it over in 2009, was the key representatives of Pro-1 and supplied following products to ABC HOSPITAL in 2005: **Pro-1 2007** – HIS (front office solutions, Patient Admin System); **Pro-2** – Back office solutions (Pharmacy. Receiving, Billing, Finance & HR – under implementation); **Pro-3** – Data mining and Report Generation tool. All the three products are using CACHE database which is proprietary DB of Comp-X.	2005

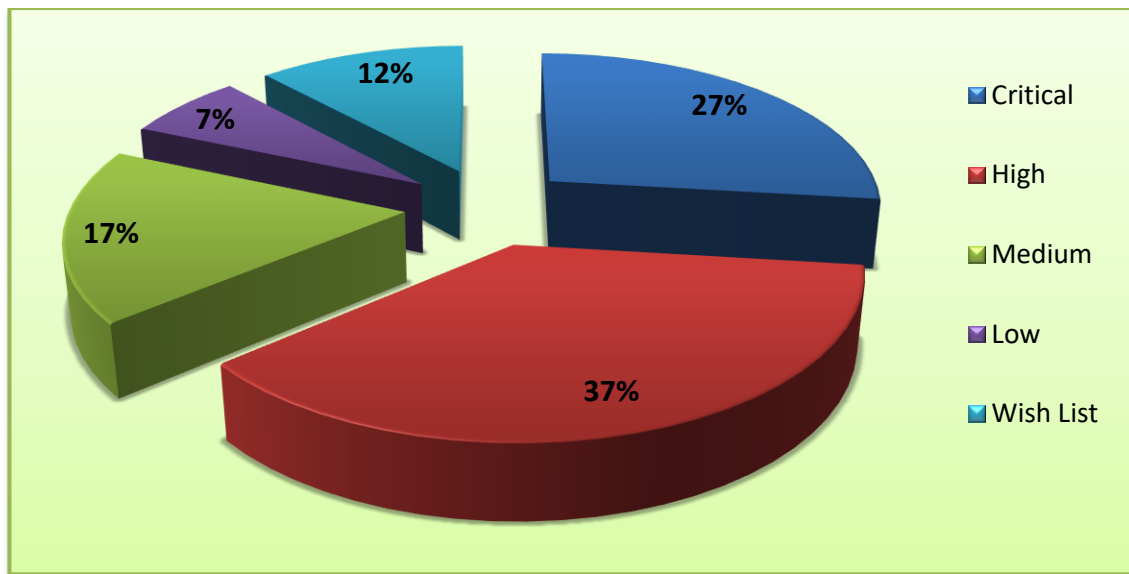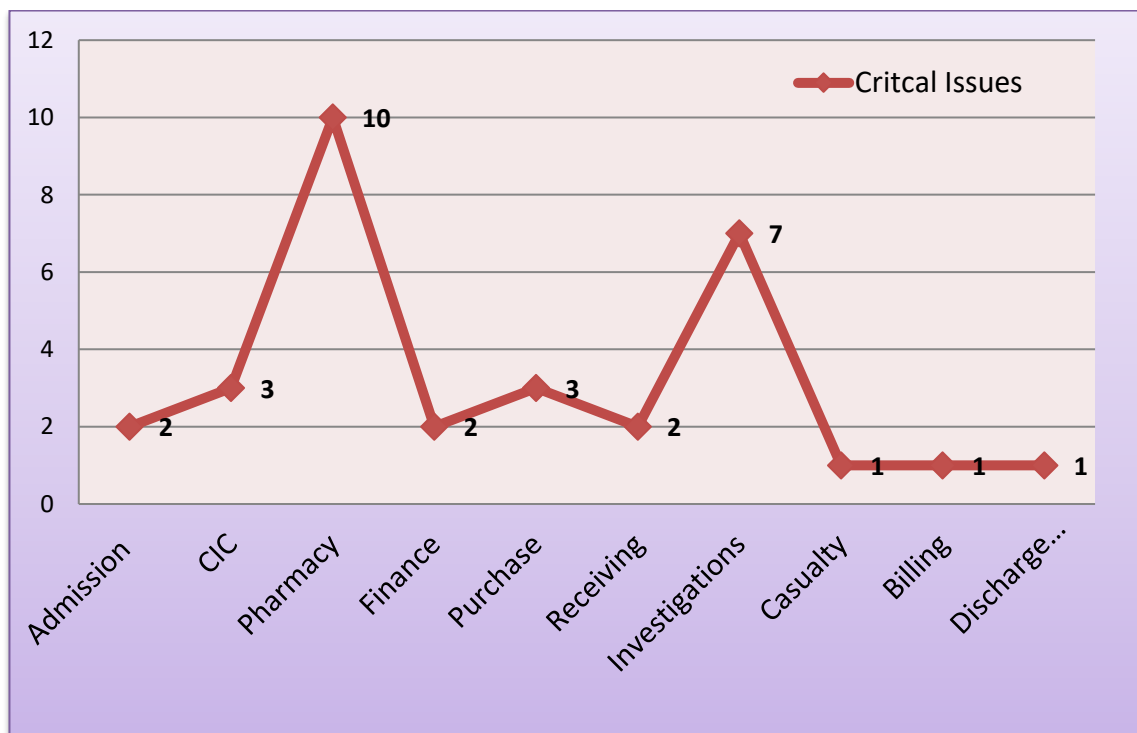| 9	Customization	Comp-Y and in house IT Department added lot of features and functionalities and plugged in to Pro-1 2007 (P7) over the period of 5 years and this version is not directly in up grading state to latest Cache 2012.1. Pro-2 was directly managed by Comp-Y and lot of local customization was carried out. Pro-2 does not meticulous in the maintaining any specific version. Any upgrading needs to be tested in live environment. Pro-3 gone through lot of changes over the period of time. Pro-3 upgrading is possible but for server upgrading as the physical separation of server to handle reporting and regular tasks are considered. All the three products are to be migrated to Cache 2012.1 now as all are on the same platform.	Until 2011

3.4 Analysis:

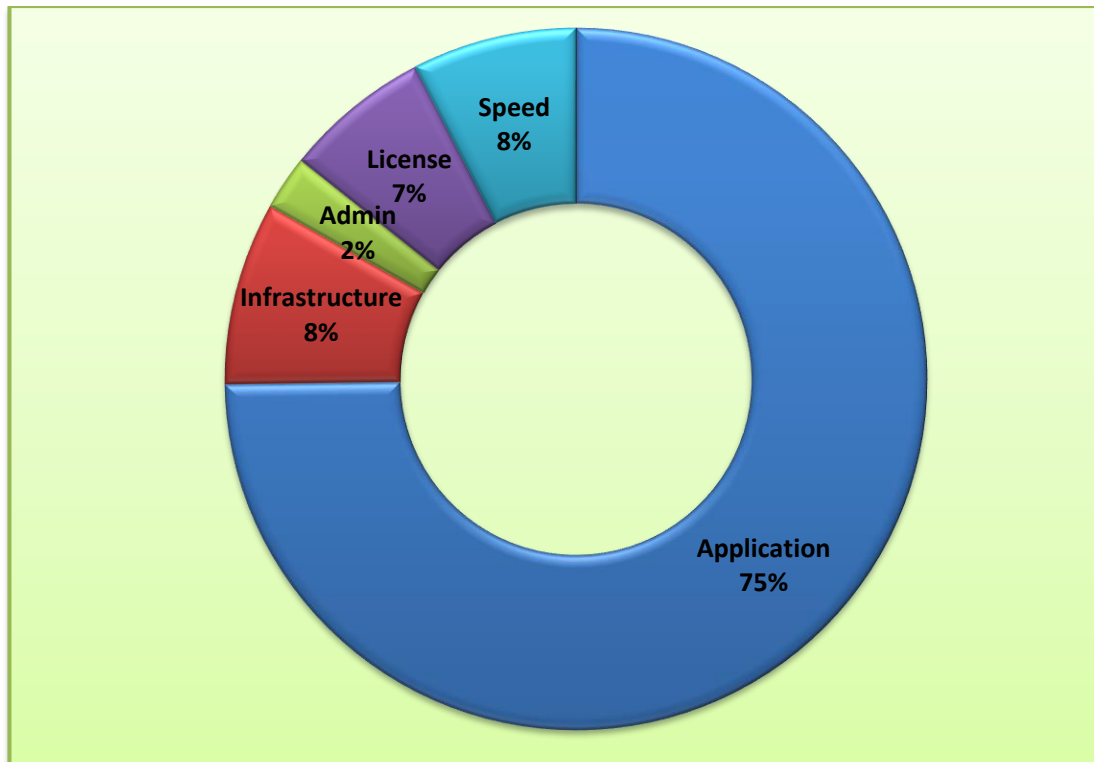### 3.4.1 Graph between Department and Users (Total, Power & Concurrent)

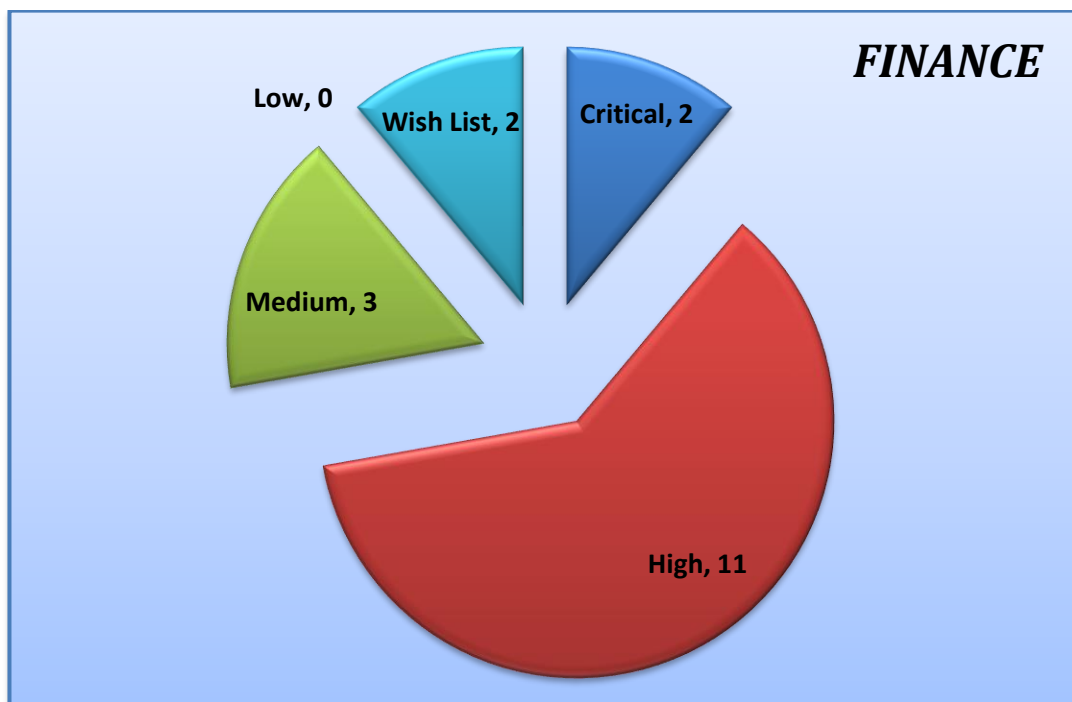**3.4.2 Graph between Departments & Total No. Of Existing Issues**
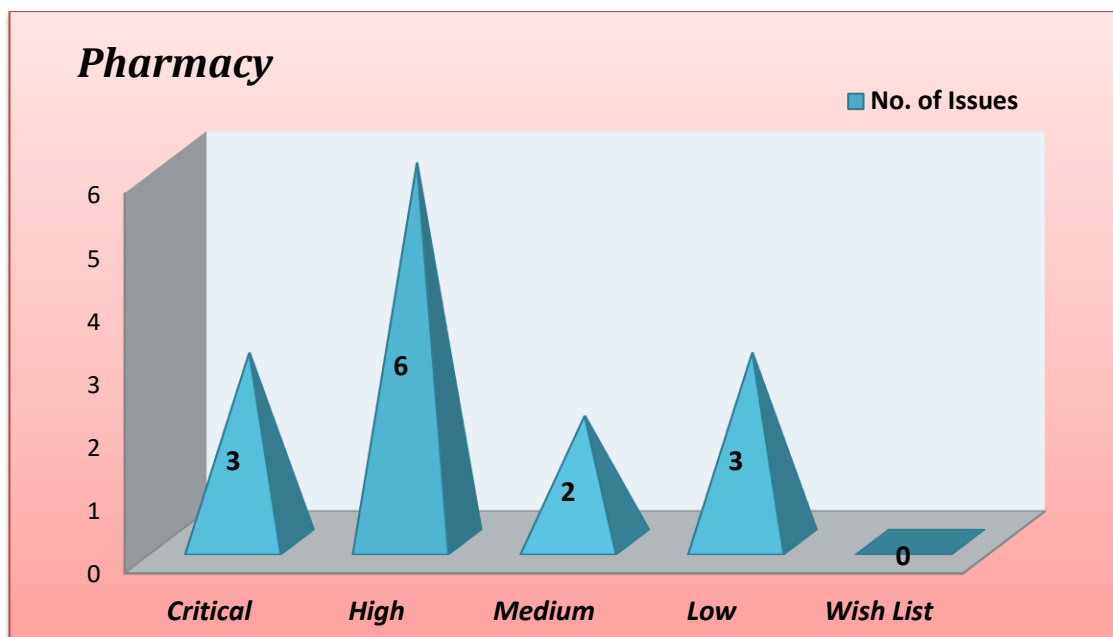
3.4.3 Priority wise Issues

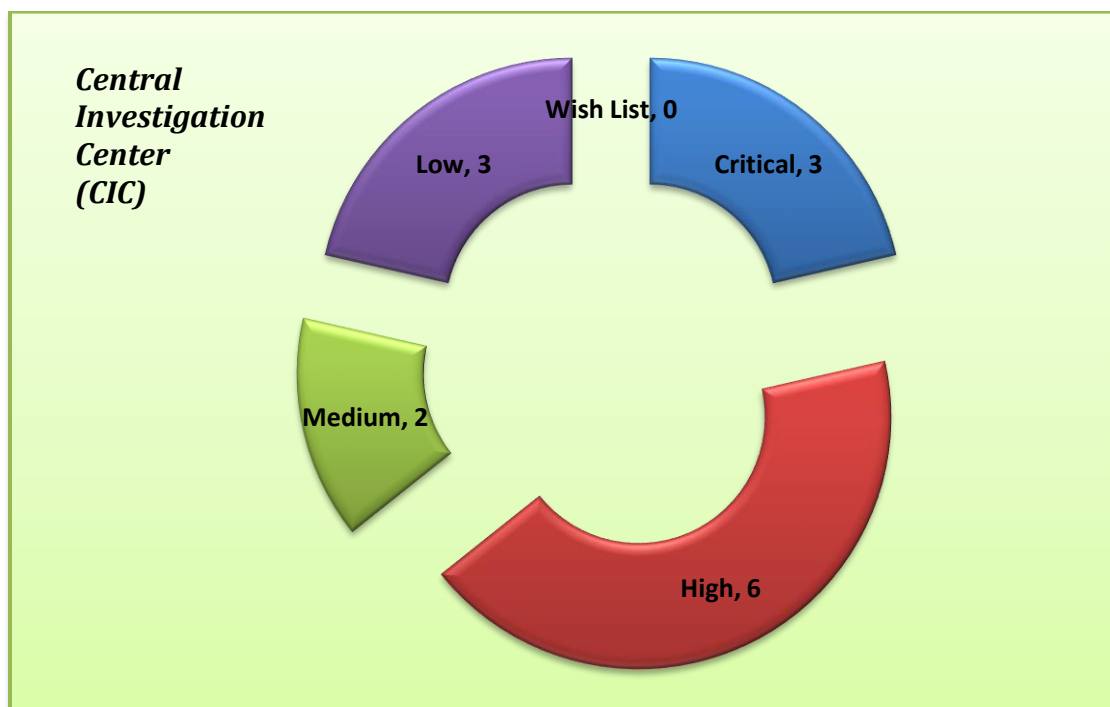

3.4.4 Department wise Critical Issues

3.4.5 Types of Existing Issues

3.4.6 Category of Existing Issues in Finance Department

3.4.7 Category of Existing Issues in Pharmacy Department

3.4.8 Category of Existing Issues in Central Investigation Center

Chapter 4: Discussion

4.1 Possible Reasons behind Issues:

❖ There may be a possibility of lack of proper communication between IT department users and other department users. E.g. absence of proper issues logging system. Because of this gap there are very chances of ignorance of problems and issues which users face in their routine work. Also lack of proper communication may cause harm to a good organizational culture.

❖ The current operational versions of all the products, i.e. Pro-1, Pro-2 and Pro-3, were implemented around 7-8 years back. So there is a distinct need of version up gradation of all the products because the technology used in those products are almost obsolete now a days and their support terms are also expired. Due to this, problems and issues may arise along with user dissatisfaction.

❖ In current scenario a combination of multiple products is operational in the organization. There are very high chances of technical and functional issues related with Integration of all the three products which can be a cause for generation of various issues.

❖ At the time of implementation, lot many customizations had been done in all products to meet the requirements of the organization. But no proper documentation of those necessary customizations was done at that time. Because of this a proper understanding of those technical changes is not present.

❖ Since the products were implemented a way back, so that the functionalities of the products were according to the requirements of that time. As the time passed, new functionalities were added in the applications so that so many changes happened in the products according to the changes in the requirements. But there is no any distinct record or track maintained of those changes and respective customizations in the applications.

❖ The up gradation of IT infrastructure/Hardware was also not properly done in accordance with the scaling of other infrastructure like scaling up of departmental users, increasing loads of data etc. This can also cause a variety of problems and issue in day to day working.

4.2 Possible Constraint:

❖ Decision making process at the level of top management is not so quick and takes considerable time.

❖ Huge Commercial involvement in any process usually delays the process of decision making and sometimes aborts it also.

❖ Since the organization is too big containing more than 1500 employees, so that it is quite tricky to satisfy all the employees at a time. That's why it usually takes considerable time to opt for the right decision.

4.3 Limitations of Study:

❖ Due to commercials and other involvements we could not get the access of trial version of latest Pro-1 i.e. version 2012.

❖ Analysis of key stake holders (Human Resources) & impact of them in the decisions of replacing the entire system with a new one could not be done because at that point the entire project had been suspended for the next phase.

Chapter 5: Conclusion

After conducting all the studies, in the end we can say that there is a distinct and a very strong need of reformation of IT infrastructure in terms of software as well as hardware part. The users are continuously facing enormous issues and problems in day to day working. Almost all the departments are affected.

For such a big organization with more than 700 beds and 1000+ employees, it is not a good situation to have all identified issues within the system and it is also not good for such organization to run a technically obsolete product whereas the technically much advanced versions of that product and products of other vendors are frequently available in market.

The organization is also facing some sort of inter-departmental communication issues and in long run this may also affect the organization in a wrong way.

Lack of proper documentation of changes happened in past also caused a big trouble for organization because there is no track of those changes or requirements of that time.

The all kinds of existed issues and problems cause dissatisfaction among users which may also reflect in the efficiency of those employees which in turn may be reflected in the efficiency of the organization as a whole.

Chapter 6: Recommendations

❖ Filling up the Communication gap with proper measures: The top management should take prompt measures to ensure a good inter-departmental communication so that each and every problem, faced by any user within the organization, can be recorded and corrected accordingly within time; as well as to ensure tracking of each and every issue arises in daily practices. E.g. introducing an issue log or issue ticketing system within organization by which user can record their problems in system and management can track the status of those problems.

❖ Tackling the license issues and the hardware infrastructure: Management should take immediate steps to resolve such kind of issues because these issues are faced by almost all departments. So the management should procure some more licences and try to keep the hardware infrastructure in place.

But the biggest challenge in resolving these issues is, that solution involves huge cost factor in it and management will need considerable time to take decision for it.

❖ Up gradation of the existing applications: Management may take the immediate decision of upgrading the entire applications to their latest version available with the vendors. This decision can help the organization in the process of getting technically advanced which may automatically address some of the existing issues with the old versions.

On the other hand this solution may bring the new kinds of issues because the difference between current operational version and latest available version is too much and the latest version may behave like a brand new product for the users.

Also it will definitely bring the change management challenges within the organization which may be very difficult to tackle with.

Also it would involve a huge cost factor which must be taken care of.

Management may also face some more problem in this option because of customizations done in past to deal with the user requirements of that time. New product may or may not be dealing with those additional customizations. In that

case cost implications of bringing those customizations into new product would be extremely humongous.

❖ Introduce a totally new product: Management may also think to purchase a brand new application according to their needs which will be totally different from the existing product.

Again there will be huge cost involvement and change management challenges. Because every new product has its own functionalities with a limited flexibility of customizations; and this may bring huge challenges of getting users acquainted with the new functionality. So that a proper change management policy and plan will be required to get a new product implemented and working successfully.

Chapter 7: References

- ❖ http://www.invest2care.com/aboutus.html

- ❖ http://www.invest2care.com/contactus.html

Appendix

A. <u>Questionnaire for interviewing the Departmental Users:</u>

Questions to be asked		
Sr. No.	**Key Inputs**	**Response**
1	Name of the department	
2	Number of Users	
3	Key (Power) Users	
4	Number of concurrent Users	
5	Product usage (Name)	
6	Product usage (Hours)	
7	IT Infrastructure Issues	
8	License Issues	
9	Training Issues	
10	Speed Issues	
11	Suggestions if any	
12	Communication Issues	
13	Key Issues of Department	

B. Format of filling the inputs of users regarding the issues:

Sr. No.	Department	Priority	Application	Issue Description	Impact of this issue	Issue Type
1.						
2.						
3.						

C. HIS Product Analysis:

1) Akhil Systems:

AN ISO : 9001 : 2008 Certified Company; installed Software in over 100+ hospitals in India and overseas since 1994.

Key Features: Provides open-ended adaptability & stability of Software; Multiple Tariff Lists with very flexible option for Rate Revision; Covers Medical Insurance Companies requirements; Pre-defined Multiple Medical Summary & Discharge Summary Formats; Powerful Search Engine for locating any type of information related to Patient; Graphical Presentation of the Data for Top Management; Interface with the International Classification of Disease Codes for maintenance of Medical Records of the Patients (with ICD-9, ICD-10, ICP, CPT); Interface with the latest Laboratory Equipments; Interface with the Bar Code Equipments.

Client List: Apollo Hospital; B.L.Kapur Hospital, New Delhi; Shri Moolchand Kharati Ram Hospital; Paras Hospitals, Gurgaon; Sri Balaji Action Medical Institute, New Delhi; Indian Spinal Injury Center, New Delhi; Almana Group Hospitals, Saudi Arabia; Alchemist Hospital; Sahara Hospital,Lucknow

2) __Paragon HIS- McKesson:__

America's oldest and largest healthcare services company,provide pharmaceuticals, medical supplies and information technologies to customers in every segment of the industry. McKesson has been focusing on healthcare for 180 years. Today we rank 14th on Fortune's list of the nation's largest companies, with over $123 billion in annual revenues

__Key Features:__ Paragon HIS is a completely integrated system of clinical, financial, physician and ancillary applications, addressing your needs for achieving meaningful use requirements of a certified Electronic Health Record (EHR), patient safety, revenue cycle management and more. A single-vendor approach eliminates the inefficiencies and "complexities" frequently found with multi-vendor solutions.

__Client List:__ Oakbend Medical Center, Texas; MedWest Health System, North Carolina; Twin County Regional Healthcare, Galax; Stanly Regional Medical Center, Albemarle;

3) __TACL- Talbros IT:__

TACL -IT Division is a part of the Talwar Group of industries; The company is ISO 9001:2000 certified; The company has its headquarters and software development center in Gurgaon; implemented various HMS (Hospital Management System) Modules in more than 25 hospitals in Delhi Region alone.

__Key Features:__ One Integrated View to Patients for Billing, Collection, Discharge Detail, Patient Medical History etc.; Package supports Adaptability & Scalability of software making it more robust; Authentication and verification of entries through Audit Trail Facility; Easy Query Handling for instant decision of Bed Allocation for Patients, and request for the Bed Transfers; Effective Search facility to search any type of information related to Patient history; Graphical Presentation of the Data for Top Management for analysis; Comprehensive Performance Reports; Built in Work Flow Management for all functional areas; Multiple Store Accounting; Interface facility with the Smart Card Technology; Interface with the Bar Code; Interface with various Laboratory Equipments for Data Capturing.

__Client List:__ Sardar Vallabh Bhai Patel Hospital; Lal Bahadur Shastri Hospital; Baba Saheb Ambedkar Hospital; Guru Gobind Singh Govt. Hospital; Pt. Madan Mohan Malviya Hospital; Rao Tula Ram Hospital; Babu Jag Jivan Ram Hospital; Maulana Azad

Dental College & Hospital; Sanjay Gandhi Memorial Hospital; Aruna Asaf Ali Government Hospital; Janakpuri Super Speciality Hospital; The Cradle Hospital (Apollo Group); Delhi Medical Council

4) Quintegra:

Founded in 1994; Quintegra is a SEI CMM assessed, ISO 9001-2008 Certified, public listed company (BSE, NSE & MSE) in India with offices in USA, UK, Germany, Africa, Malaysia, Singapore and India, having world-class development centers in India, Singapore and Malaysia. Quintegra Solutions Malaysia Sdn. Bhd., subsidiary of Quintegra Solutions Limited, India has been awarded MSC status in Malaysia.

Key Features: HMIS provides the benefits of streamlined operations, enhanced administration and control, improved response to patient care, cost control, and improved profitability. Flexibility has been built into the HMIS to allow easy customization. The HMIS features unparalleled flexibility & scalability, comprehensive report types, easy customization, intuitive visuals and interactive graphics that simplify complex data, dashboards-supported quality initiatives and comprehensive drill-down capabilities. The solution has been designed as a three-tier application built on the model-view-controller architecture. The interfaces to all external actors on the system are a part of the view tier. This includes the graphical user interfaces to the application, interfaces to equipment, interfaces to external software applications and also APIs. The HMIS addresses both HIPAA & HL7 requirements.

5) PARAS- Srishti Software:

Founded in 1997 and reconstituted in the year 2005 and headquartered in Bangalore, operations in USA, UK, Middle East, Africa, China, India and ASEAN Region.

Key Features: Bi-directional integration between business and clinical processes. Helps hospitals in resource optimization and plug revenue leakages; Multi-location product that enables centralized monitoring, intelligent decision making and improved audits & controls; On-demand application scalability that ensures non-obsolescence of solution as business grows

Client List: Center For Sight; Rajiv Gandhi Cancer Institute, New Delhi; AAR, Africa; Sri Jayadeva Institute of Cardiology

6) Vepro:

VEPRO is one of the leading IT companies in the health-care sector; 30-years history in the national and international solutions field; more than 4,000 customers worldwide; Since 1981, VEPRO AG, the leading IT solution provider in the medical sector, has been known for its innovative, reliable and forward-looking IT solutions.

Key Features: VEPRO's core competency is in medical information technology and in applications for image and film diagnostics. All VEPRO products and services are modular. They consist of multiple basic services and your choice of additional services and modules. Highly motivated IT specialists with years of experience guarantee stable IT solutions with unmatched transfer speeds, while continuously developing our product lines – PACS / EMR (Electronic Medical Record), VIS (VEPRO Information System) and VHP (VEPRO Health Portal) – at the highest possible technological level.

Client List: St. Antonius Hospital, Eschweiler; Markusovszky hospital of Szombathely, Hungary; Indira Gandhi Government General Hospital, Pondicherry;

7) Siemens:

Employees- 18,000; Revenue- (FY 2011)Rs 119,400 million; Group companies- 13; Existing factories- 21; Sales offices- 56; Centers of competence- 8; R&D centers- 11; SMART products- 30;

Key Features: Hospital IT solutions offer a broad portfolio of integrated IT solutions and consulting services for the health enterprise. Our highly adaptable solutions have been developed in order to meet both the clinical and business objectives of hospital. Siemens solutions help the organization manage information to make healthcare more patient-centric, accessible and transparent. Delivering the right information, to the right person, at the right time, can help to improve the delivery of healthcare services and make processes more efficient. Siemens' administrative, financial and archiving information systems consist of tools for patient access, management and back office controlling complemented by a comprehensive archiving and document management solution.

8) Religare Technologies- Healthfore / Magnum

Religare Technologies Limited is the IT services business of a large diversified Indian business group with presence all across the globe. The promoter group pursues aggressive business interests globally in IT products, Financial Services, Health Care, Wellness, Diagnostics and Aviation and Travel. Religare Technologies' Healthcare IT service offering ,HealthFore,aims to help healthcare providers achieve business objectives while providing quality patient care. Covering the entire gamut of healthcare operations for providers on all levels, HealthFore provides robust, scalable and efficient IT platforms across a wide spectrum of care delivery

Key Features: comprehensive Hospital Information System that Computerizes principal operations and administrative functions in a hospital. It is a modularly designed system enabling computerization in phases; With more than 45+ modules, Magnum HIS is a powerful, feature laden and extensively tested software that takes care of the simplest and most intricate functions in hospital, providing hospital the much needed competitive edge whether it is in increasing the revenue stream, cutting down costs, increasing quality of care or in helping the management get information at their fingertips; HealthFore's Magnum HIS enables the hospital to develop the organization and improve its effectiveness and quality of work. Magnum HIS addresses all major functional across the continuum of care. The development environment ensures that Magnum HIS has the portability and connectivity to run on virtually all standard hardware platforms, with stringent data security and easy recovery in case of a system failure; Magnum HIS provides the benefits of streamlined operations, enhanced administration and control, improved response to patient care, cost control, and improved profitability.

Client List: Aditya Birla Memorial Hospital, Maharashtra; Fortis Hospital, Bangalore; Gulf Diagnostic Centre, Abu Dhabi, UAE; Quality Healthcare Medical service, Hong Kong; North Dakota Department of Corrections and Rehabilitation, USA;

9) 21st Century Healthcare solutions

1,200+ man-years of domain expertise in healthcare processes & software systems, Healthcare Informatics Solutions have benefited over 500+ healthcare organisations

globally, headquartred in Amsterdam, Netherlands; transformative solutions improve the availability, accessibility and affordability of healthcare services.

Key Features: ICT-enabled clinical leadership in the region – unlimited specialty/doctor-based clinical screens and workflows; ICT-enabled empowered organization that handles the changing business dynamics of the hospital, which leads to reduced dependency; Personalized dashboards for CXOs, Clinicians, Managers, end users and patients; Experience a 100% revenue cycle management that promotes paperless environment; Attain high-level process maturity: lower cost, higher revenues, motivated employees and superior patient experience; Customize ICT systems according to needs and expectations of the organization; Configure workflows - clinical or administrative Provide personalized management dashboards and quality dashboards; Provide learning management tool and self-guided configuration tool;

Client List: Asian Institute of Gastroenterology, Hyderabad; Max Healthcare; Manipal Hospital; Goa Medical College; Chellaram Diabetes Institute, Pune; Jupiter Hospital, Thane;

10) Panacea- Softlink International:

SoftLink International is a technologically acclaimed company based in India and USA with global presences. Founded in 1997, Softlink enjoys technology partnerships with leading companies in healthcare and IT. In a decade of Product innovation and R&D, it has garnered customer base of over 125 healthcare institutions in 12 countries.

Key Features: Record, view and manage all patient-related non-clinical and clinical information from the time of admission till the time of discharge on a continuous basis; Schedule all appointments, across patients, doctors and hospital locations; View hospital occupancy details; Store and view lab results and send them to wards automatically; Store and manage diagnostic images; Print prescriptions with the help of a huge drug database; Prepare daily reports on patient registrations, bills, receipts and discharges; Conduct various kinds of analyses like facility-wise revenue, doctor-wise registrations, accounts receivables analysis and patient category analysis; Prepare reports with statistical analysis in various types of graphs and charts; Export graphs to Microsoft Word, Excel, PowerPoint and other Windows applications;

Client List: Max Heart & Vascular Institute, New delhi; Apollo Hospitals Ltd., Chennai; Christian Medical College, Vellore; Nanavati Hospital, Mumbai; Spandan Heart Institute, Nagpur; University of Mississippi, USA; University of Michigan, USA;

11) e-Sushrut- CDAC:

Centre for Development of Advanced Computing (C-DAC), founded in 1988, is the premier R&D organization of the Department of Electronics and Information Technology (DeitY), Ministry of Communications & Information Technology (MCIT) for carrying out R&D in IT, Electronics and associated areas.

Key Features: e-Sushrut is modular, thus ensuring sustained benefits through changes in technology, protecting and providing optimal returns from the investment. It is modeled on a unique combination of a 'patient centric and medical staff centric' paradigm, beneficial to the recipients and the providers of healthcare; Portable across a variety of platforms; Easy GUI interface; Audit logging of transactions; Comprehensive user security;

12) Wipro:

Wipro Ltd (NYSE:WIT) is a global information technology, consulting and outsourcing company with 140,000 employees serving over 900 clients in 57 countries. The company posted revenues of $7.37 billion

Key Features: HIPAA 5010/ICD-10,Legacy system modernization,Remote health monitoring,E-health initiatives,Payer CRM initiatives,Health insurance exchanges,Health information exchanges

13) Seed Healthcare:

PALASH Healthcare Systems (PHS) provides commercial and clinical software solutions for medium and small healthcare provider facilities with a focus on various faculties of medicine such as Diabetes, IVF, Dental, Ophthalmology, Cardiology and Psychiatry along with multi-specialty healthcare providers for management of Electronic Medical Records, MIS and enterprise wide resource planning

Key Features: Integration of all the departments by one 'mouse click',Maintain a better Patient relationship,Empower employees with web-based functionality,Easy access to patient information,Provide timely and accurate information,Gain strong financial controls,Accurate doctor appointment and scheduling,Instantly create, update & retrieve medical records,Manage pharmaceutical stockpile,Increase productivity and minimize training with this easy-to-use solution

14) Napier Healthcare:

Napier was established in 1996 as a Healthcare IT Products and Services Company. Napier is an ISO 9001:2008, ISO 27001:2005 certified and HIPAA compliant company. Napier was conferred with many prestigious awards such as Frost & Sullivan- Healthcare IT Company of the year 2009, 10 & 11, IBM Beacon Award 2011- Best Industry Solution for Healthcare and IBM Public Sector 2008 Top Star Award. Napier is headquartered in Singapore with its Global Development Center in Hyderabad and a Business Office in Tanzania.

Key Features: Napier's Hospital Information Management solution delivers a web based, modular, scalable and tightly integrated system that is built around the core functions supporting hospital administration, financials and patient management. The modular approach allows hospital to add on other supported clinical and ancillary solutions that allow hospital to build a system to meet the complete health information system and budgetary requirements. It also allows the organization to achieve requirements for an electronic health record, patient safety, revenue cycle management and more. Developed using healthcare industry standards like HL7 messaging and DICOM, solution allows seamless integration with the third-party IT solutions.

Client List: Care Hospital Group; Jigme Dorji Wangchuck National Referral Hospital, Bhutan;

<u>**Case Study:**</u>

"Comparison between TrakCare's Version 2007

& Version 2012"

1.0 Introduction:

TrakCare (a unified healthcare information system) is the product of InterSystems Corporation. InterSystems Corporation was founded in 1978, & is privately held Software Company with offices in 25 countries and corporate headquarters in Cambridge, Massachusetts.
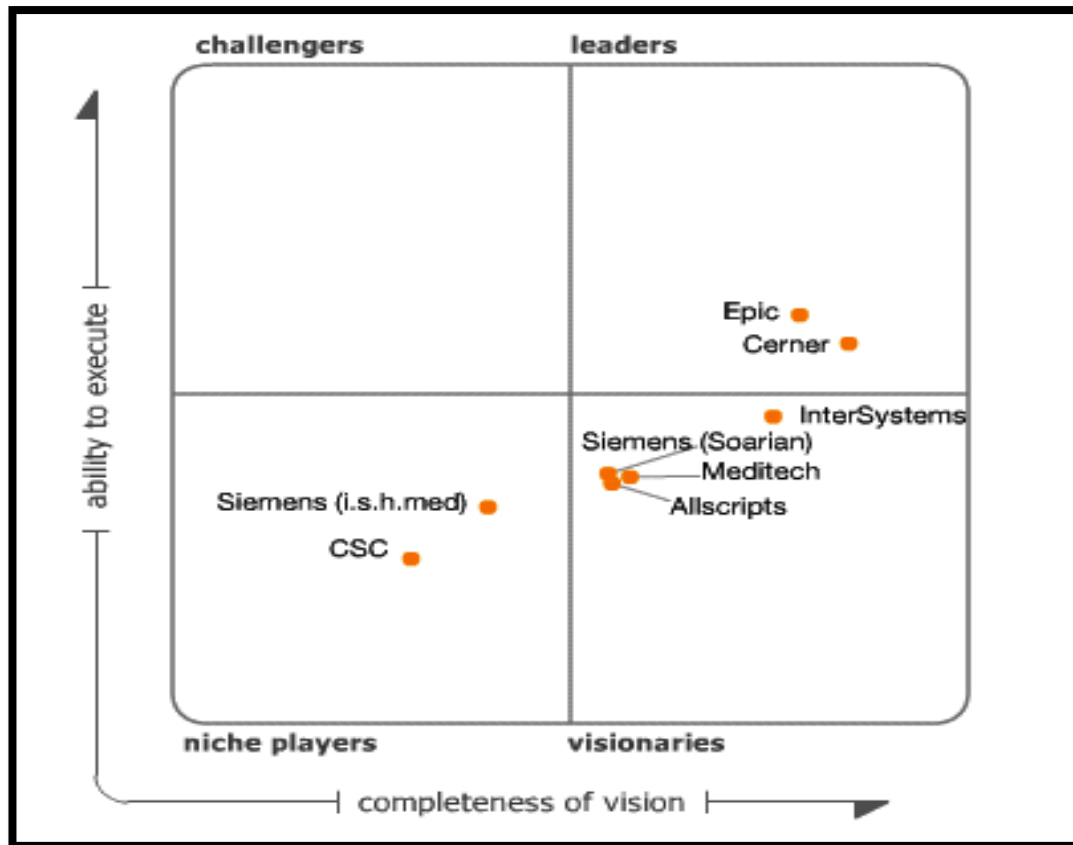
TrakCare creates a complete view of each patient's history, provides secure access to records at every point of care and on any Internet-connected device, integrates easily with other applications, and delivers real-time active analytics that drive informed actions.

This system includes clinical, administrative, laboratory, and community care capabilities, unified by a single data repository. Each patient's consolidated history can be shared securely across all care settings.

TrakCare is the world's leading Internet-based healthcare information system. It enables authorized healthcare professionals to look at a complete patient record from anywhere they have access to the Web.

Today, in leading healthcare organizations in 25 countries, InterSystems' TrakCare is enabling the vision of connected healthcare to become a reality. It is making the delivery of healthcare more effective and efficient – by improving safety and outcomes, keeping costs under control by eliminating duplicate tests and other redundancies, expediting billing, and maximizing bed utilization.

According to the results of Gartner's comprehensive evaluation of vendors of integrated enterprise EHR systems for the global market, InterSystems' TrakCare lies in the Visionary quadrant of the Magic Quadrant.

Purpose of this study: Hospital is currently using the Version 2007 of TrakCare & facing numerous issues with this version. One of the recommended options to resolve those issues is up gradation of the existing system from version 2007 to version 2012. That's why there was a need of doing this study.
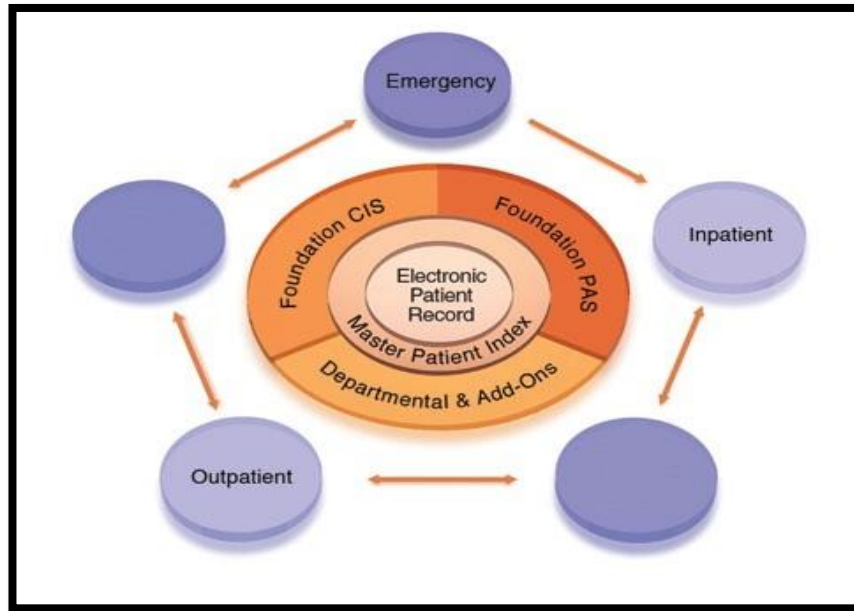
2.0 Methodology:

  ➤ Discussion with the members of IT department of hospital.

  ➤ Discussion with the End users of various departments.

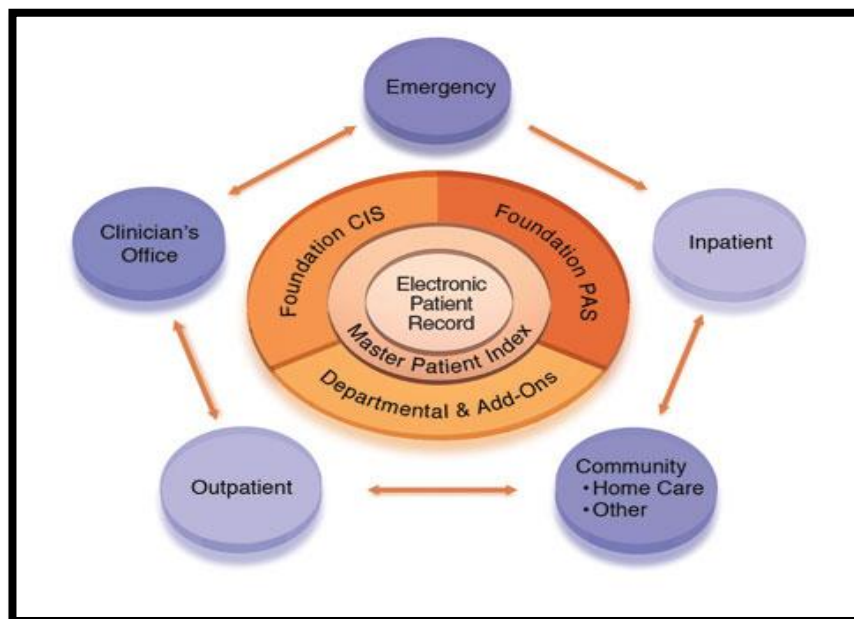 ➤ Review of available literature about TrakCare and Cache.

3.0 Findings:

3.1 Continuum of Care:

TrakCare supports the entire continuum of care, providing the right information to the right healthcare professional at the right time.
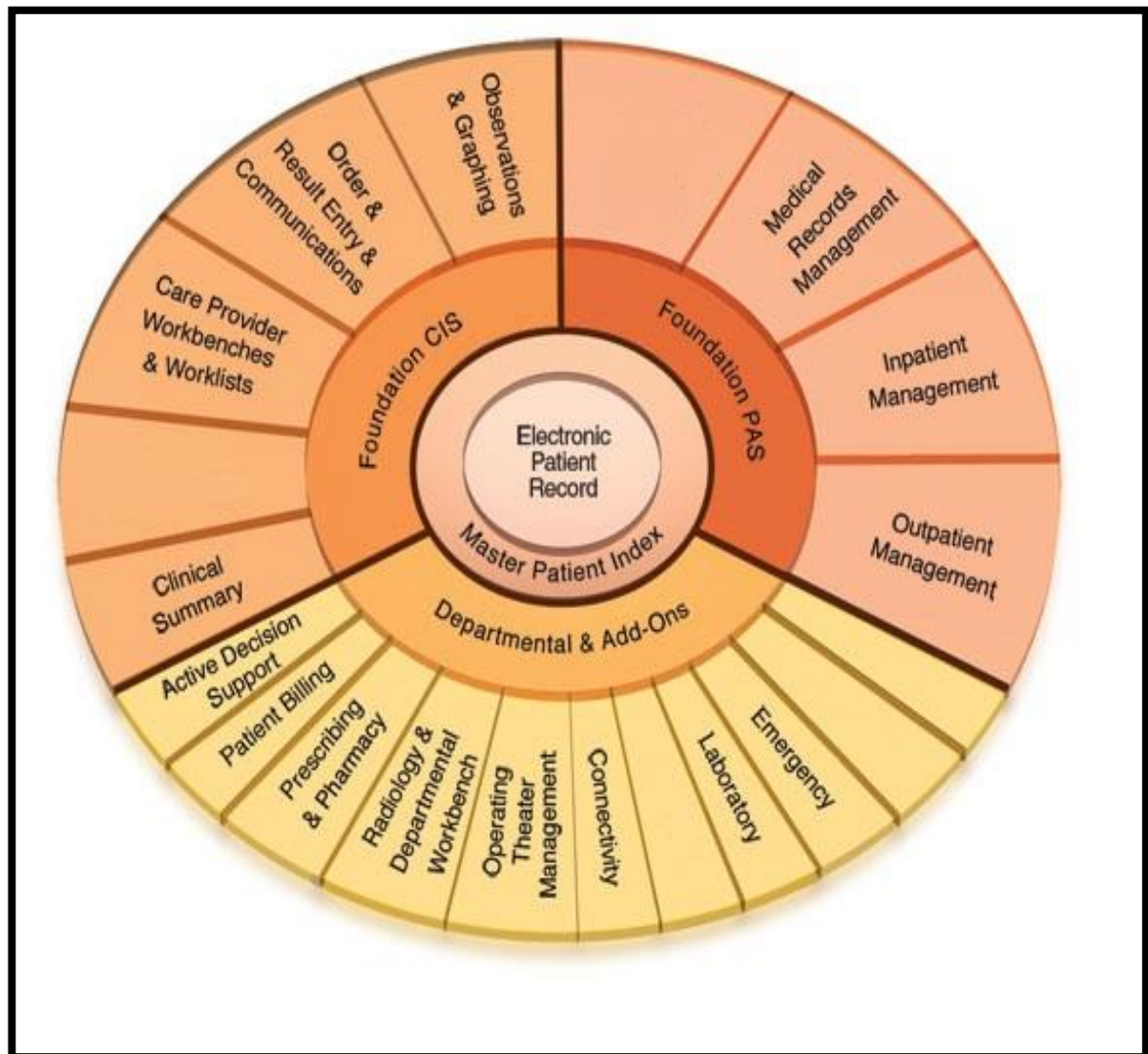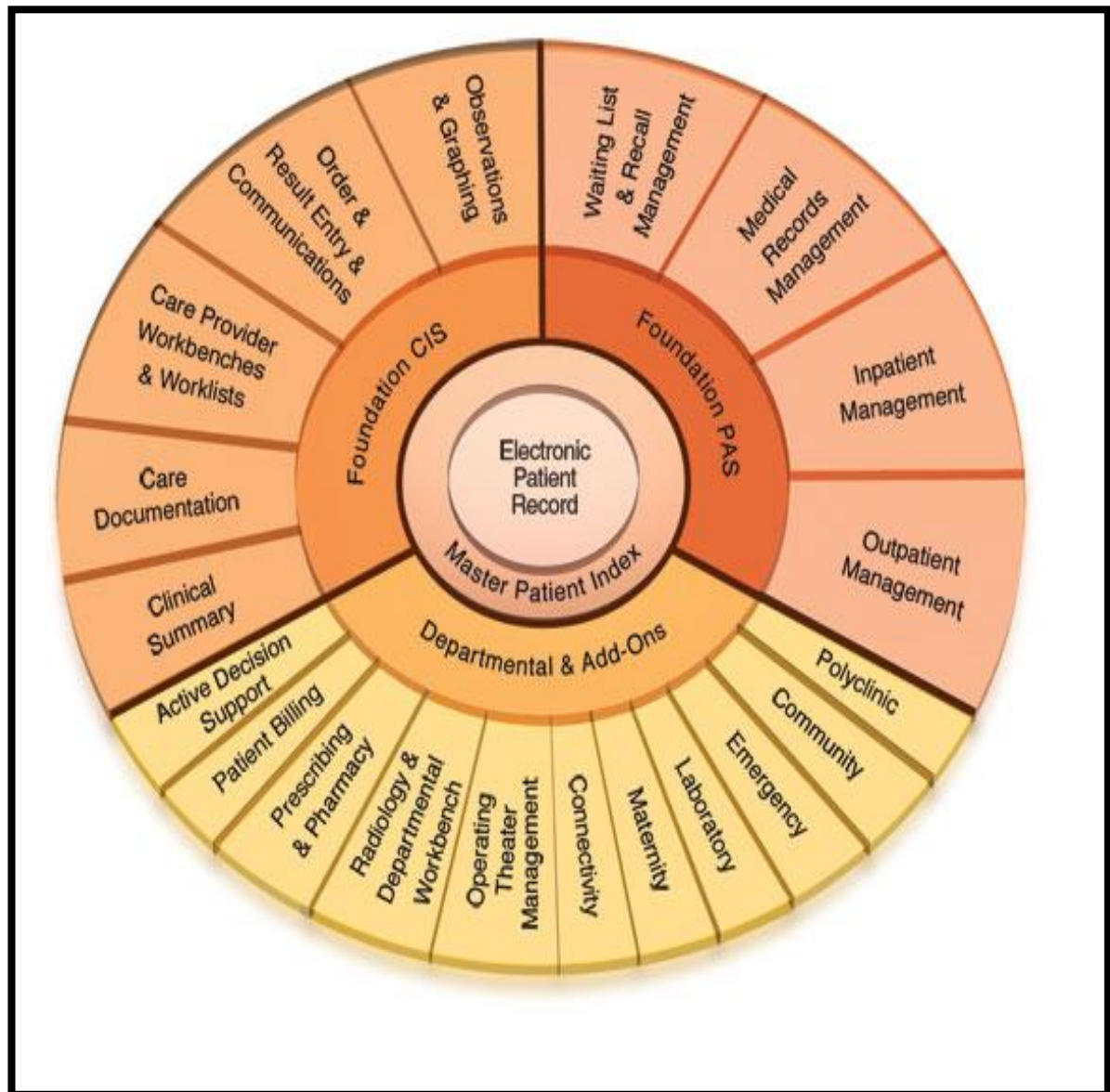

TrakCare version 2007

TrakCare version 2012

3.2 Module wise Differences:

TrakCare version 2007

TrakCare version 2012

3.3 Difference between DBs:

3.3.1 Caché version 2007.1 features

❖ Call In / Call Out Enhancements:
  ➢ Applications can now call into Caché as a DLL (Dynamic Link Lib.)/shared library.
  ➢ Call in is now multithreaded on some platforms. This enables multithreaded applications to call into Caché, with multiple threads effectively executing simultaneously

❖ Error Handling Syntax:
  ➢ This version's error handling syntax is similar to that in Java, C++ and VB.

❖ Long String Support

❖ Security Enhancements:
  ➢ user authentication and roles to be managed outside of Caché using LDAP (Lightweight Directory Access Protocol- an application protocol for accessing and maintaining distributed directory information services over an Internet Protocol)
  ➢ extended SQL row-level security capabilities to Caché

❖ SQL Gateway via JDBC (Java Database Connectivity)

❖ Objective-C Binding:
  ➢ This version provides an object binding to the Objective-C language

❖ Zen:
  ➢ Zen is an extensible framework for rapid development of Web applications. Pages are defined via high-level XML-based definitions using a rich set of components. Zen includes a strong, easy-to-use security model; built-in support for multilingual applications; server- and client-side event handling; and very good extensibility

❖ Other Changes:

➢ *Increased file name length* — the maximum path length for databases and other files has been increased from 64 to 232 characters.

➢ *Visual Studio 2005* — this release makes use of Microsoft's Visual Studio 2005 for Windows client components.

➢ *Studio Improvements* —

▪ The toolbar has a View Webpage button that allows the developer to see a preview of the page.

▪ The toolbar now has Forward and Backward buttons.

▪ The Studio Assist feature now works with selected XML documents, notably Zen.

3.3.2 Caché version 2012.1 features

❖ Rapid Application Development:

➢ **iKnow** is a new technology addition to Caché that considerably enriches the ability of applications to analyze, handle, and use unstructured (textual) data. Without needing any predetermined expertise or knowledge about the data, iKnow automatically discovers the most important information locked in your unstructured data and opens it up for automated interpretation and exploitation.

❖ Performance And Scalability: Improvements To Stream Performance

❖ Reliability, Availability, Maintainability, Monitoring:

➢ Manage ZEN Report Render Servers: This version introduces a new background process (external to Caché) that will be triggered automatically if you are generating Zen Report PDFs.

➢ System Monitor: The Caché System Monitor functions as a Multivariate Process Control System for monitoring a Caché system and alerting when it is not running within the statistical boundaries of a "standard" system.

➢ Task Manager Improvements: This release adds a number of improvements to support email notifications, and consistency adjustments.

- ❖ Security:
  - ➢ CSP (Caché Server Pages) Gateway to Caché over SSL: applications may now request a secure connection between the CSP Gateway and the Caché instance it connects to. This adds an important security layer for connections where the CSP Gateway does not reside on the same machine as the Caché instance.
  - ➢ Web Services - Secure Conversation: Many Web services applications accommodate frequent communication between the service and client. When this communication needs to be secured end-to-end using WS-Security, the application encounters additional overhead because WS-Security uses public key encryption to secure each message separately.

- ❖ Others:
  - ➢ Zen and HTML5: InterSystems has added logic to allow all Zen pages served from its products to produce HTML5 output.

4.0 Discussion:

According to the Gartner's study we can say that TrakCare satisfies all the criteria of being an Enterprise EHR system.

An enterprise EHRS is an integrated, not interfaced, point-of-care system that provides functionality for an acute care facility — including the emergency department and the intensive care unit (ICU) — and its attached ambulatory/outpatient clinics. The acute care functionality must include the pharmacy.

An enterprise EHRS is composed of eight core capabilities:
- EHRS management
- Interoperability
- Data model
- Clinical decision support
- Clinical workflow

- Clinical documentation and data capture
- Clinical display/dashboard
- Order management, which includes direct entry of both medication and non-medication orders

5.0 Conclusion:

With above discussion we can say that TrakCare's version 2012 is technologically a way ahead than version 2007.

Also the version 2012 has more Module wise coverage than that of version 2007.

Along with above, version 2012 has better security features than that of version 2007.

6.0 References:

❖ http://www.gartner.com/technology/reprints.do?id=1-1CQHORB&ct=121107&st=sg

❖ http://docs.intersystems.com/documentation/cache/20121/pdfs/GCRN.pdf