Internship Report

ATTUNE Technologies Pvt. Ltd

Post Graduate Diploma in Hospital & Health Management

Title : Background of the Organization

By

Dr. Shabnam Ahmed

Under the Guidance of

Dr. L.P Singh (Director of IIHMR)

Post-graduate Programme in Hospital & Health

Management, Health IT

2013-15

International Institute of Health Management Research
Plot No-3, Sector-18A Dwarka , New Delhi-110075
Ph:- 011-30418900, Email:- info.delhi@iihmr.org
Website:- www.delhi.iihmr.org

COMPLETION OF DISSERTATION FROM THE RESPECTIVE ORGANIZATION

This certificate is awarded to

Dr. Shabnam Ahmed

In recognition of successfully completion of her Internship and her project on

Implementation of the HIS in IPD module in XYZ Hospital

May 2015-05-04

Attune Technologies Pvt. Ltd.

She comes across as a sincere, dedicated and hard working individual with an inquisitive mind.

Training and reporting officer :

Signature :

TO WHOMEVER MAY CONCERN

This is to certify that Dr. Shabnam Ahmed, student of Post Graduate Diploma in Hospital & Health Management from IIHMR- Delhi, has undergone internship training in ATTUNE Technologies Pvt. Ltd. from 4th February 2015 to 4th May 2015.

The candidate had successfully carried out the project designated to her during the internship and had used proper scientific methods to carry out the same. The internship is in the fulfillment of the course requirement. We wish her all the best for her future endeavors.

Dr. A.K. Agarwal
(Dean Academics and student affairs)
IIHMR , New Delhi

Dr. L.P. Singh.
(Director of IIHMR,
New Delhi) .

Certificate of Approval

The following dissertation titled **"Implementation Of HIS in IPD Module"** at **"Attune Technologies"** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **Post Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

Name	Signature
S. V. Adhia	

CERTIFICATE FROM DISSERTATION ADVISORY COMMITTEE

This is to certify that Dr. Shabnam Ahmed, student of Post Graduate Diploma in Health & Hospital Management had worked under our supervision and guidance. She is submitting her dissertation titled Implementation of HIS in IPD module in a Hospital at Attune Technologies Pvt. Ltd. in partial fulfillment of the requirements for the award of Post Graduate Diploma in Health and Hospital Management.

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

Mentor,
Dr. L.P Singh
Director of IIHMR,
New delhi

Reporting Officer,
Mrs. Paramjeet Kaur,
Attune Technologies Pvt,
Chennai .

CERTIFICATE BY SCHOLAR

This is to certify that the project, "Implementation of HIS in IPD module" is submitted by Dr. Shabnam Ahmed , Enrollment no. PG/13/059 under the supervision of Dr. L.P Singh (Director of IIHMR , New delhi) for award of Post Graduate Diploma in Health and Hospital Management of the Institute carried out from the period 4-02-2015 to 4-05-2015 embodies my original work and has not form the basis of any award, degree, diploma associate ship, fellowship title in this or any other institute or institution of higher learning.

Signature :

FEEDBACK FORM

Name of the Student: Dr. Shabnam

Dissertation Organization: Athone Technologies Pvt. Ltd.

Area of Dissertation: Implementation of Hospital Information System in IPD Module.

Attendance: REGULAR

Objectives achieved: Acheived.

Deliverable's : Exposure to the complete implementation process & using the Implementation process in IPD module which increased the efficiency in IPD module

Strengths: Confident
Good Analytical & commonication skills.

Suggestions for Improvement: Increase more of critical thinking.

Signature of the Officer-in-Charge/ Organization Mentor (Dissertation)

Date: 06.05.2015

Place: Chandigarh

INTRODUCTION

We are a visionary healthcare information technology company that delivers next generation healthcare IT products to the market Attune have designed three innovative software solutions Attune Health Kernel, Lab Kernel and Clinic Kernel. These help in managing your business better.

COMPANY OVERVIEW

Attune Technologies Private Limited, a healthcare information technology company, offers Web-based software solutions for healthcare delivery organizations. The company offers Attune Health Kernel, a Web-based solution for hospitals that integrates its departments and branches that are geographically separated; Attune Lab Kernel, a Web-based solution for diagnostic and imaging labs that integrates its collections centers, branches, and partner networks; and Attune Clinic Kernel, a Web-based solution for clinics that integrates its departments and branches when they are geographically distributed. It integrates departments from pharmacies, diagnostic labs, imaging units, physiotherapy units, wards, inpatients and outpatients units, and branches and collection centers in various geographic locations. The company was incorporated in 2008 and is based in Chennai, India.

OUR VISION

To manage world's health information

WHY ATTUNE??

Attune products produces remarkable results to the company in terms of Financial, Technical and Managerial parameters. Fast and Efficient Customer Support.

OUR VALUES

To provide innovative solutions to business problems by appropriate usage of technology

TRANSPARENCY

We take utmost care in ensuring transparency in all our engagements with our clients and our vendors. We actively share relevant information with our clients and vendors enabling them to take informed decisions in all activities pertaining to our engagement.

TRUST

Trust among various stakeholders is the key driver for a successful business. We, at Attune, strongly believe in this philosophy and leave no stone unturned to establish relationships based on mutual Trust.

RESPECT

We strongly value the relationships with all our stakeholders and greatly respect their needs and decisions. Mutual Respect and Understanding is the cornerstone of all our relationships.

WIN-WIN

We strongly believe in establishing win-win relationships with all our stakeholders. Our engagements with customers and vendors shall be based on evolving long-term win-win relationships.

OUR CULTURE

ENTREPRENEURIAL

Culture and Innovation: We actively foster Entrepreneurship and Innovation across the organization. In this era of Knowledge Economy, we strongly believe that the most valuable asset of an organization is its human talent. By promoting Informed Risk taking, we provide the ability to tap the combined potential of individual team members to add more value to our customers. For us, encouraging Innovation involves fostering a culture of applying un-conventional ideas to solve everyday business problems of our Customers. By challenging ourselves and practicing a vibrant and informal work culture, we ensure constant flow of ideas and suggestions across the organization

TEAM WORK

One of the critical success factors of our business model is the ability of our project teams to deliver effective solutions to our Customers. This requires seamless co-ordination and transfer of knowledge among various specialized teams. Ability to work in cross-functional teams is a key pre-requisite for any member coming on board. Our Recruitment, Retention, Reward & Recognition Policies are aligned to foster and encourage team work across all levels of the organization.

POSITIVE CONTRIBUTION

The organization promotes a culture where everyone is free to challenge the ideas of any other person in the organization. Every employee is expected to positively challenge the issues and come out with alternatives and in the end, the valid propositions are accepted based on objective discussions. Once a decision has been arrived at, the team goes ahead implementing it without postponing any further.

DEPARTMENTS

1. Sales and Marketing

- ✓ Telesales
- ✓ Direct Sales

2. PMG department

3. Product Development Department

- ✓ HIS
- ✓ LIS
- ✓ SME
- ✓ Quality testing team

4. Release Department (Integration of all the software into one module)

5. Implementation Department

- ✓ HIS
- ✓ LIS

6. Support Department

- ✓ Human resource
- ✓ Finance
- ✓ Administration

PRODUCTS :

ATTUNE HEALTH KERNEL

Attune Health Kernel is a complete state of the art, secure & web-based solution for hospitals that integrates all its departments & branches even when they are are geographically distributed.

ATTUNE LAB KERNEL

Attune Lab Kernel is an advanced and contemporary software that combines all its collection centers, branches and partner network into a single platform to facilitate easy functioning.

ATTUNE CLINIC KERNEL

Attune Clinic Kernel is a path-breaking innovation for various clinics worldwide which integrates all the departments and branches irrespective of their geographical distance and distribution.

ATTUNE IS :

Focus on Business Benefits & Usage

The biggest challenge in any technology implementation is not the technology itself, but its relevant usage. Our relentless focus on business relevance and usability provides visible return on investment in shortest possible timeframe.

Truly Integrated

Our product not only integrates all your departments from pharmacy, diagnostic lab, imaging units, Physiotherapy, Wards, Inpatients and Outpatients, but also integrates

branches and collection centers in different geographic locations. The integration can be extended even to your partner organization.

True SAAS and Customizable

SAAS provides various benefits for customers but normally comes as standard product without customization. However, we understand that whether it is SAAS or not, our customers want customization. True to this spirit, our technology solution is SAAS software that is highly customizable for each customer making us unique.

Pay As You Go & Use

Customers get to use the software on a monthly rental model and for the modules that they want. Pay for what you use and on the go reducing the risk of exposure to huge upfront expense for software implementation.

Excellent Service & Support

Service makes the biggest difference between efficient adoption of technology product and its failure. Being a truly web-based product with complete configuration and management capabilities, it can be completely managed from a single point making it extremely simple to manage & support

OUR MANAGEMENT

Arvind Kumar

Founding Member & CEO

Dr. Anand Gnanaraj

Advisor – Medical Innovation

Ramakrishnan

Founding Member & COO

Mohanaraj.P

Founding Member & Business Development

Parthasarathy

Head Sales & Marketing

Devapriya

Clinical Specialist

Vijayaraghavan TV

Solution Architect

A.Ragothaman

Delivery Manager

ABOUT DIRECTORS

Mr. Ravindran Govindan

Chairman

Mr. Mohan Kumar

Board Member and Executive Director

Mr. Arvind Kumar

Board Member and CEO

Mr. Ramakrishnan

COO

MODULES & FEATURES OF OUR HIS

Patient Registration

- Family, Employees, Corporate or Insurance Patient Registration.
- UHID (also National IDs), Comprehensive Details, Smart Card System.
- VIP, Proxy, Foreign National Registration.

Billing & Revenue Cycle Management

- OP, IP, Day Care, Surgical Billing.
- Package Definition & Billing.
- Cash Payment Controls, Cash Tally, Multi-mode, Multi-currency.
- Discounts, Refunds, Cancellations, Write-offs, Dues.
- Service Charges, Tax Policy.
- Cash & Cheque Deposit(to Bank) Tracking.
- Cash Expense Management.
- Doctor & Department Service Fee Calculation.

Client Management & Credit Control

- Flexible pricing definition, Multi-rate card, Discount Policy.
- Invoice Cycle, Turn-Over Discounts, Credits & Debit Logic.
- Service Eligibility, Co-Insurance, Co-Payments, Multiple formats.
- Credit Control Policy, Discountable, Taxable & Reimbursable Slab.
- Automated, Bulk Invoicing & Publishing (Email, SMS Supported).
- Account Receivables & Payables Tracking System

Doctor Schedule & Appointments

- Clinic-wise, Specialty-wise, Centre-wise, Doctor-wise Schedules.
- New, Recurring, Follow-up Appointments.
- Transfer, Vacation, Re-assign Appointments

Modality (Diagnostic) Schedule & Appointments

- CT, MRI, USG, Echocardiology, TMT Schedules.
- Corporate Health Check Appointments.

Accident & Emergency Care

- Emergency Registration.
- RTA/MLC Log (Medico-Legal).
- Triage & Patient Criticality Dashboard, Status Tracking.
- Diagnostic, Pharmacy Orders, Billing.

Procedure Management

- Dialysis Workflow & Clinical Records.
- Physiotherapy Workflow & Clinical Records

Day Care Management System

- Insurance, Non-Insurance Day Care Treatment Plans.
- Programs-Scheduled Visits, Services, Products, Flexible Rate Cards, Discount Policy.
- Advances, Deposits, Offset, Adjustments, Credit, Due Management.

In-patient Management System

- Admission, Client / Employer Tagging, Service Eligibility Check.
- Room, ward, Bed Management – Transfer, Retention, Booking, Cancellation.
- Nursing Management – Vitals, Progress notes, Immunization, Orders, Status Tracking.
- Insurance, Corporate Enrollment, Cashless program Tracking.
- Operation Theatre & Surgical Management.
- Service Eligibility, Out-of-Package Alerts & Tracking.
- Discharge Process-Billing, Settlement, Checklist.

Doctor Consultation & Electronic Medical Record

- Out-Patient EMR, General Practice, Ante-Natal Clinic, Emergency Notes.
- Medical Coding (ICD-10).
- Admission Notes, Procedure Notes, SOAP / Progress Notes.
- Hemodynamic Monitoring, Surgical Notes, Anesthesia Notes.
- Discharge Summary, Birth & Death Notes.
- Medical Record Tracking & Maintenance.

Blood Bank Management System

- Donor Screening & Database Management.
- Phlebotomy & Blood Component Separation.
- Storage, Inventory Management.
- Recipient Request & Blood Issue.

Lab Information System

- Orders, Phlebotomy, Accession, Home Collection.
- STAT, Timed Specimen Collection, Sample Bar-coding.
- Test Results, Delta, Formula, Validation, Decision Support.
- Sample Rejection, Outsourcing, Test Reruns, Reflex, Dilution.
- Validation, Co-authorization, Second Opinion, Auto-Authorization.
- Auto-result Publishing & Dispatch System, e-Signatures.
- Point-of-Care Monitoring (Bed-side, Field, Operation Theatre).

Radiology & Imaging Information System, PACS Support

- Modality Appointments, Radiology Orders.
- Patient Preparation Checklist, History.
- Reports, Images, Authorization Workflows, Auto-Publishing, e-Signatures.

Purchase, Inventory Management & Consumption Tracking

- Inventory Packaging, Supplier Quotation.
- Supplier Analysis & Purchase Decision Support System.
- Centralized or De-centralized Purchase, Approval Workflow.
- Distributed, Scheduled Supply Chain & Stock Receive Functions.
- Stock Damage, Store & Supplier Returns, Re-orders.
- Supplier Payments, Credit & Debit Adjustments.

Pharmacy Information System (Drugs, Opticals)

- Central and Distributed Points of Sale.
- Prescription-controlled Pharmacy Sales, Sale Returns.
- Pharmacy Billing – OP, IP, Surgical Replacements, Non-hospital Public.
- Drug Expiry, Schedule H, Critical Alerts.
- Opticals – Glass, Contact lens Retail System.
- Client & Insurance-based Pharmacy Billing.
- Hospitals & Pharmacy Billing Settlement Workflows.
- Tax, Discounts, Refunds, Cancellations, Dues, Write-offs.
- Cashless Billing, Flexible Consumer Plans & Discount Offers.

Referral System

- On-line In-bound & Out-bound Referral System.
- Referring Doctor, Centre tracking System.

Dissertation Report

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Website:- www.delhi.iihmr.org

ACKNOWLEGEMENT

I would like to extend my sincere thanks to everyone,without whom it would not have been possible for me to prepare this report.

I am highly indebted to **Ms.Paramjeet Kaur (Reporting Officer) Attune Technologies Pvt.Ltd** for her continuous guidance and support.

I would like to express my special gratitude and thanks to **Mr. Raghothaman, VP of ATTUNE Technologies Pvt. Ltd.** who gave me the opportunity to be a part of this firm and Project. My sincere thanks to **Mr. Aminderbir Singh, my senior in ATTUNE Technologies Pvt.Ltd and also a past Alumni of IIHMR-Delhi** for his continuous support and guidance to make this project possible.

My sincere gratitude to my IIHMR mentor ,**Dr. L.P Singh, Director of IIHMR,New Delhi** for his kind assistance and support throughout my dissertation.

I would also thank **Dr.A.K Agarwal ,Dean (Academic & Students Affairs) and Ms.Kirti Udayai , Assistant Dean (Academic and Students Affairs).** I pay my sincere offering to the almighty without whose grace I would not be able to add a new dimension to my life.

Finally, an honorable mention goes to my family, friends and colleagues for their constant support , cooperation and encouragement in completion of my project.

Dr. Shabnam Ahmed

Health Batch (2013-2015)

PGDHM (IIHMR, New Delhi).

Roll no - PG/13/059

ABSTRACT

This project is related to a hospital management system. It maintains records of all the operations that occur at any of the medical center. It maintains two level of users, administrator level and the user level. The administrator level encompasses the nurses and the doctors while the user level includes the receptionist and the front desk . The administrators are able to execute operations on more sensitive and confidential documents /modules that contains different information about the staff to ensure confidentiality. The modules include laboratory, billing, OPD , IPD , Inventory, Pharmacy. User level is able to manage other modules such as registration and report generation for stock of medicine and staff reports.

The system enables registration of new patients, staff, nurses and doctors at the reception . The current diagnosis details of a patient are recorded in the consultation which are retrieved as previous details upon the subsequent visit. The patient either proceeds to the treatment room or to the laboratory depending on the doctor's decision in the consultation. In the laboratory, results are recorded in the laboratory module which are retrieved in the treatment room through appropriate search methods and the patient treated accordingly. Wrong medications are detected at this point ,since the doctor enters his identification number.

User requirements and other system specifications were collected through observation and interview methods where respondents were able to specify what was needed particularly.The current system is not in any way computerized as per the results from the collected data.

The proposed system has the following capabilities : maintaining patients records, registering new patients, enables recording of test results and easy future

references.Users can search records more easily.

TABLE OF CONTENT

ABBREVIATIONS

HMIS - Hospital management information system

HIS- Hospital information system

IT- Information technology

IS- Information system

IPD - Inpatient Department

OPD - Outpatient Department

SPOC - Single point of contact

VAT - Value added tax

TIN- Tax identification number

UID- Unique identification

SDLC - Software development life cycle

TAT - Turn around time

INTRODUCTION TO THE HOSPITAL

XYZ Healthcare Group is one of the largest healthcare providers in Punjab with a network of four operational hospitals at Mohali , Nawanshahr , Khanna and Hoshiarpur and with two new branches coming up at Amritsar and Bathinda. XYZ Hospital , Mohali has a capacity of 200 beds and is providing treatment to more than 1,00000 patients every year.

The departments are managed by a team of highly qualified and experienced doctors and paramedical staff who have trained at premier institutes. Hospital is enjoying leadership position in the fields of Oncology, Cardiology and Cardiac Surgery, Nephrology, Urology, Critical care, Orthopaedics and Joint Replacement, Trauma and Neuro Surgery. Other departments include Plastic / Reconstructive & Cosmetic surgery (including hair transplant), New Natal ICU, Gynaecology & IVF.

The group is expanding at a fast pace and new facilities are being developed at strategic locations across North India.

XYZ Healthcare group is committed to a strong code of ethical conduct and subscribes to honest and transparent medical services. It aims to be the largest and most respected healthcare provider in the region.

PROBLEM STATEMENT

The problem is the maintenance of the patient records in the hospital is manual. So ,due to which many problems have been faced . These problems are as follows -

1. Lack of immediate retrieval of data
2. Lack of immediate information storage
3. Lack of prompt updating
4. Lack of old data availability
5. Issues in preparation of accurate and prompt day to day reports
6. Issues in data security.

REVIEW OF LITERATURE

Information system is generally designed to meet particular purposes. Every field is trying to adopt the IS for improvement in their current working status and to bring efficiency in their operations. One of the most important fields is healthcare. It is considered as a complex field while providing services to the people because it involves the organization and involvement of many professionals. This organization and involvement of professionals means proper sharing of information about patients between healthcare workers. It is a very complex task for the workers in the health sector to share bulky paper based patient information between different sites and physicians. The solution is to achieve the sharing of information through computer based IS in health sector (Eason, 2010).

In short, IS in healthcare can enhance the quality of work and promote improved patient care. The ideal IS for healthcare sector, however, does not yet exist. Furthermore, what is ideal within one healthcare setting may not be deemed so in another and what is considered to be ideal may change over time (Baus, 2004). Ammenwerth et al. (2004) stated that healthcare sector without IS based on Information Technology (IT) and related applications for gathering and sharing of clinical information are unimaginable. Moreover, the administrative, financial and clinical features of a hospital can also be well managed through a complete and unified Clinical Information System which is also termed as Hospital Information System (HIS). Berg (2001) has said that the main goal of HIS is to attain the best potential support of patient care and administration by electronic data processing. It is
one of the enormous features of HIS that management can access the required information at right time for effective and efficient decision making. Berg (2001) has further said that HIS can help in improvement of patient care by accessing data and it enables a hospital to move from retrospective to a concurrent review quality and appropriateness of care. After introducing HIS in hospitals, it is seen that improvement in hospital management and patient care is achieved. Moreover, it reduces the treatment cost for patients and it has enabled the doctors to spend less time for retrieving the accurate patient records (Sagroglu & Ozturan, 2006).

Over the last few years, cost of high quality services and patient satisfaction has enormously increased and the best solution to cope with these issues is HIS. HIS ensures the patient satisfaction, improve hospital processes and to provide high quality services with reduced cost. HIS implementation in hospitals is considered to be complex as compared to the other information systems in other different organizations. Sagroglu and Ozturan (2006) has stated that system infrastructure design, requirement specification, master data collection and definition, integration with other systems, localization, training, and final system test are the main activities of implementation phase of HIS.

Sagroglu and Ozturan (2006) has drawn from the work of Ash et al. (2004), Ball (2003), Berg (2001) that there are some difficulties which may come across during the implementation of HIS. A hospital may face many difficulties in the implementation process of HIS.

Sagroglu and Ozturan (2006) have pointed out the following areas to be concerned with the implementation of HIS:

 Lack of information about HIS implementation

 Ignorance of administrative needs of hospital

 Infrastructure and planning of implementation process

 Balance between different departments and end users

 Redundancy and inaccuracy of master data

There are also some recommendations which Sagroglu and Ozturan (2006) has discussed. These are:

 Requirements of stockholders should be properly understood and then proper planning should be started.

 Failure and success factors from others should be considered.

 Proper training of the user groups should be ensured for successfulimplementation of HIS.

 Training of doctors, nurses and department secretaries must link the IS to actual clinical settings.

 There might be some resistance from the doctors towards the system and it can be overcome by proper motivation to use the systems.

 End users should be involved in the implementation.

 While implementation of HIS, hardware infrastructure planning must be effective.

The structure and culture of an organization have deep effects on the implementation of any project within an organization. According to Wanyama and Zheng (2010), organizational culture can help in drawing the linkage between the technology adoption and organizational growth. The main and important requirement for HIS implementation is to gain better understanding of organizational culture and how it facilitates or bounds the implementation process of an HIS. To gain better understanding

of IS development, implementation and its uses; the important thing is to comprise a better understanding of how people actually work, social practices, and the culture of organization. Wanyama and Zheng (2010) have further explained that culture has a dominant effect on employee's attitudes towards job satisfaction and commitment to the organization and their talent or readiness to adapt and perform well.

According to Houser et al. (1984), any hospital wishing to implement an IS must effectively work through the change process to achieve positive outcomes. The implementation of a HIS needs numerous elementary tasks to be performed. These include site preparation, environmental factors, a project team, implementation and system testing. It further requires the staff willingness, relevant software and installation of sophisticated high technology. Implementation of HIS in any hospital can be lead to success by proper change process. Change process plays an important role in introducing new IS in any organization (Houser et al., 1984).

Kotter (1996) has described that for successful implementation of IS, first the organization create a sense of urgency, powerful coalition creating a vision, communicating the vision, empowering others, planning for short term wins, and institutionalizing new approaches as the most important factors leading to thriving implementation. Kotter (1996) mentions that the most common factors to control the success of implementation is the managerial skills to manage the transformation and communication during this transformation. Two factors are involved for HIS implementation through change process these are social and technical factors. Social factors are more critical than the technical factors, as people that have to be the part of major change.

Kotter (1996) has further described that the change process takes much time for its success. It is also clearly described by the Rogers et al. (2003, p. 104105) by quoting this *"Rome wasn't built in a day"*. According to Rogers et al. (2003) change takes time and if we move too fast, our best people will leave and we will end up with worse results. From all this discussion, the success of implementation of HIS can be assured if there will be some changes which have to be made in the Hospital before implementation, so that the implementation may be useful and successful. There are some important factors which may assure HIS implementation to be successful or become responsible for the failure of implementation process of HIS. Baus (2004)
has described these factors in light of the socio-technical approach.

According to Baus (2004), the factors that are responsible for success or failure of HIS implementation are usability, leadership, technology, organizational structural change, and training and training support.

- Usability

Before introducing HIS into a hospital settings, there must be redesigning the way the office works (Baus, 2004). For providers and staff to adequately learn how to use the new system, they must be provided with time, training, and financial investments.

- Leadership

Strong leadership in support of the implementation of HIS is crucial in successful implementation. According to Wager et at. (2000), the leaders are referred to healthcare professionals who are committed to use the HIS to improve quality of care. Baus (2004) has explained that the leader in support of the HIS understands the impact that this new healthcare IT has and may increasingly have on healthcare delivery, while also understanding how to manage this impact.

- Technology

Technology facilitates successful implementation of HIS. Hersh (2002) explains that healthcare sites must have the appropriate technology and infrastructure to start the implementation process. Baus (2004) has stated that the lack of IT in implementation of HIS is major hindrance. Terminology for technology must be made regular to guarantee the meaning of the terminology.

- Organizational Structure Change

Baus (2004) explains that in some cases the organizational nature of HIS implementation is more important than its technical components. HIS can modify the working relationships between the people working in the hospital and it has positive effect on the ways in which hospital staff work together provide health care, and carry out their daily work practices. According to Wager et al. (2000) the impact on the organizational structure must be understood before the successful implementation of HIS.

- Training and Technical Support

A hospital may not achieve the necessary goals only by implementing HIS. Such system cannot work properly until proper training is provided to the people who will use this. On-site technical support and trainings is must for user so that they can feel comfort while using the system successfully. Before implementing the HIS, make sure that the requirements of the physicians will be fulfilled by new system. When implementation of new IS is completed then for the success, proper training is required to reduce failure rate (Baus, 2004).

Baus (2004) has stated that Socio-technical approach enforce that the design of the HIS must be shaped in the region of unique requirements of the clinical setting. Berg (1999) has explained that the socio-technical approach offers attention to the social, or human, variables that have a noteworthy impact on the success of HIS. Users must be involved during the designing phase of HIS. According to Kyng (1994) the involvement of user is a Scandinavian approach for better understanding and fruitful results.

Socio-technical approach is an integrated approach which demonstrates that the technical and social considerations are to be intimately linked. This approach does not treat the present, traditional condition of clinical healthcare as unorganized and is required to repair. Instead it attempts to contribute and reinforce areas of already existed patient care system (Baus, 2004).

According to Berg (1999), socio-technical approach does not order to use electronic medical record as a substitute of the traditional paper medical record but it stresses the use of HIS as a tool having potential for important developments in the excellence and accessibility of the patient records and monitoring health status. Baus (2004) explained that any change in healthcare sector takes place in combination with the present skills, methods and positive approach.

HIS IN DEVELOPING COUNTRIES

There are a lot of studies made on the topic of HIS. On behalf of the results and development plans, we can say that there is a need for reinforcement of hospital management IS. It is proved as a difficult and tough task, especially in developing countries because of organizational complexity, partitioned and clumsy organizational structure, unrealistic ambitions and sustainability issues (Braa et al., 2007).

An IS may fail or it can be successfully implemented in any environment. In both developing and developed countries the research contains success and failure issues. In the famous papers entitled “Leading Change” and “Crash” by Kotter (1996), and Collins and Bicknell (1998) respectively, they have listed the main issues related to the results of implementation of ICT projects.

Kotter (1996) emphasized on the factors like sense of urgency, powerful coalition, creating a vision, communicating the vision, empowering others, planning for short-term wins, consolidating improvements and anchoring new approaches in culture. These steps can also lead to the successful implementation of HIS.

Collins and Bicknell (1998) have tried to explore the failure factors and found out that the main failure factors during implementation process are complacency, over-rating of the computer technology, over ambition, over reliance on ICT professionals and ICT consultants, excessive confidence in the power of the contract to penalize an underperforming ICT company and trust in costly custom built software. The technology is playing a vital role in healthcare sector of developed countries as well as developing countries. It has ability to improve both the clinical and management operations of hospitals.

Malik and Khan (2009), influenced by Kotter (1996), and Collins and Bicknell (1998), have suggested that for leading successful implementation of IS in any organization there must be some change process. Malik and Khan (2009) have explained that the developing countries are facing problems to get benefits of ICT in health sector. The success rate of HIS implementation is very low in developing countries. There are scarce examples on successful implementation of HIS in developing countries as compared to developed countries. In developing countries the studies from the developed countries cannot be utilized as guideline for the implementation process because in both, the working culture and circumstances are different.

In other developing countries like Bangladesh where the government is working on basic

health services for its people, there is limited knowledge about the status of HIS and some projects in relation to IS in health care. Bangladesh is using some innovative technologies to solve these problems and achieve better health outcomes in the country. Anon (2009) says that while HIS implementation, Bangladesh is facing problems like lack of ICT literature, limited financial resources to buy latest technology (computers), recruitment of ICT staff, poor record keeping and expensive ICT connectivity.

Similarly in Belize, Ethiopia, Ghana, Haiti, Indonesia, Kenya, Mexico, Mozambique, Peru, and Rwanda there are various problems regarding HIS. All these countries are facing critical HIS challenges. These challenges include data collection problems, lack of skilled staff, poor equipment, poor infrastructure, inadequate funding for ICT, policy standards and development national automated HIS. They are trying to cope these issues and working hard to improve the health care (Anon, 2009).

Regarding the failure and success rate of HIS in developing countries, Heeks (2002, p. 102) states, *"There is no evidence, nor is there any theoretical rationale, to support the idea that failure rates in developing countries should be any lower than those in industrialized countries. Conversely, there is evidence and there are plenty of practical reasons—such as lack of technical and human infrastructure—to support the idea that failure rates in developing countries might be higher, perhaps considerably higher"*. It means that the evidence of IS success and failure rate in developing countries is very limited. The available studies emphasize on factors rather than rate of success and failure.

E-healthcare is referred to the 21st century healthcare. It offers additional services such as hospital information system, electronic health record, and telemedicine. In order to understand the HIS implementation, challenges regarding e-health are also to be considered. According to Omary et al. (2009) many countries from both developed and developing settings, know the possible advantages of implementing e-healthcare but there are various challenges to be tackled prior to its adoption. These challenges differ in developed and developing countries. Omary et al. (2009) explained that developing countries have lack of funds, low rate of internet usage, low bandwidth, lack of healthcare rules and regulations, lack of acceptable privacy, and security concerns. Igira et al., (2007) stated that organizational structure is also a big challenge while designing HIS. On the other hand Igira et al., (2007) further described that developed countries such as Canada, Singapore, USA and UK had invested enormous amount of money for motivating e-healthcare acceptance while developing countries still depends on the traditional healthcare systems. Huge investment by developed countries is inspired by the problems related to the traditional healthcare setup such as repetition in patient's records, more time consumption while formulating new patient's records and rise in cost of providing patient care due to manually conducted procedures. From this discussion it can be said that main challenge which become hindrance in the way of implementation of HIS in developing countries as compared to developed countries is lack of funds and motivation.

PROJECT OBJECTIVE

- ✓ To understand the current process flow of the In-patient Department
- ✓ To understand the different steps of implementation of HIS and using them in implementing the IPD module. This is achieved by following the standard operating procedures and understanding the needs and the requirement of the department
- ✓ To improve the efficiency and quality of health care delivery in the Hospital.This can be done through further development and implementation of a standardized and sustainable Hospital Information System at all levels of health care, which will contribute to the establishment of an integrated health information system.
- ✓ To analyze the feedback of staff to understand the post-implementation benefits of the IPD module.

SCOPE OF THE PROJECT

- ✓ The HMIS application can be used in any Organization that has medical/health Centre within the institution for maintaining patients' tests and treatment details by customizing some of the features that suits that particular institution/organization.

OVERVIEW OF IPD MODULE

The In- patient module commences when the patient is being registered and allotted a bed in the ward. It deals with the complete treatment and services provided to the patient during his stay in the hospital.

This module works at the nursing station. During his stay in the hospital, every patient is provided various services in terms of consultants visits, investigations, procedures, medicines & consumable, room services, diet, etc. All these services are entered online to the patient record through nursing station. It also interacts with the Investigation module, Store, Pharmacy and sends the requisitions to these departments. This data serves as major input for the IPD billing.

Salient Features of IPD management are :

i. Bed Allocation and Transfer.
ii. Consultants visit entry.
iii. Recording Patient's Clinical Data
iv. Requisition of Investigations required.
v. Requisition to Store & Pharmacy for Medicines & Consumables.
vi. OT Billing & Management
vii. Discharge

MAJOR REQUIREMENTS

- **Patient registration**

The patient management includes capturing of complete and relevant patient information. It should automate the patient administration functions to have better and efficient patient care process. This includes inpatient, outpatient registration and easy retrieval of medical records of patients.

- **Doctors availability check**

Checking the doctors availability is the major requirement for the front office team. They may receive calls or inquiries from patients regarding the doctors availability and for scheduling the consultation.

- **Patient case history record**

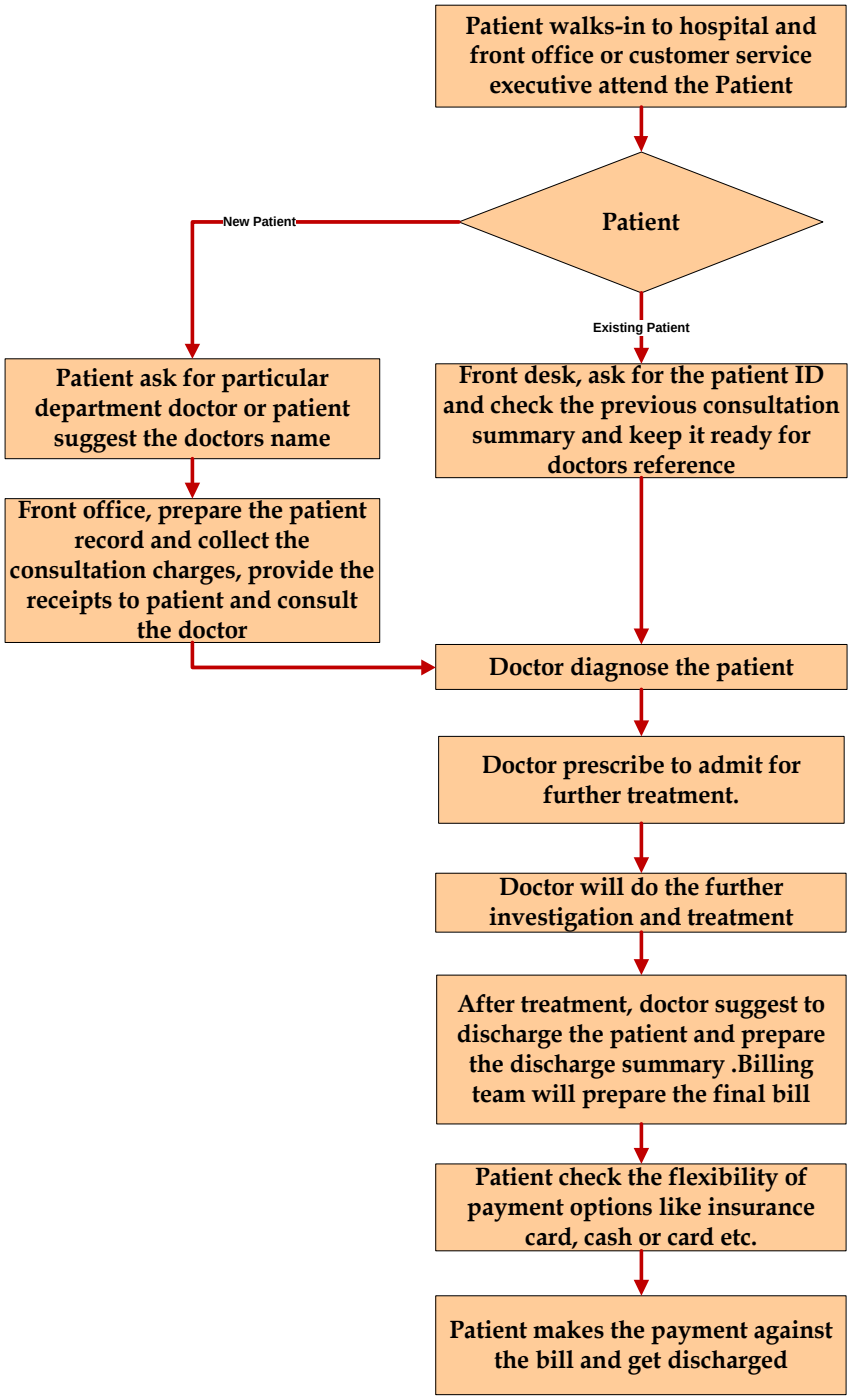
Should get the visibility about the patient records including the patient's contact details, admission records, and consultation history and discharge details. This should even take care of package deals for a patient at a fixed cost.

- **Bed/ Room availability and bed shifting**

Before admitting the patient, it is necessary to check availability of rooms or beds. Also categorization of beds and shifting of bed or rooms are also important.

IPD PROCESS FLOW (POST IMPLEMENTATION)

Inpatient Department Management :



METHODOLOGY OF IMPLEMENTATION IN IPD MODULE

There are various steps that we have to perform while Implementation process.

- ✓ **STEP 1 : SYSTEM STUDY** : First of all we have to understand the present structure of the hospital where we are going to implement our HIS system, like what is the Process flow of that hospital, whether they are doing work Manually or some other IT system is used by them, and if they are using an IT system then what is the reason that they want new system.

- ✓ **STEP 2: GAP ANALYSIS** : Then we need to do gap analysis in their existing system and we compare with our system and find the gaps.

- ✓ **STEP 3 : MASTER DATA COLLECTION** : Then we collect the master data of that particular organization, usually we have some formats on which we collect various details which that organization needs in the software, various details like , the Logo of the organization, address, Bill format, VAT Tax, TIN number, Doctors details, Rooms details, Treatment details, Laboratory details, Duty timing of staff details etc.

To collect this data one employee of the organization is assigned to us and that person is known as Single Point of Contact (SPOC). Usually this SPOC remains with us and helps throughout the implementation process.

After collecting the data clint sign this document and then we send this details to the back-end team which is Product Development Team.

- ✓ **STEP 4 : TO CREATE INSTANT USER** : The Back-end Team creates an Instant User by which the implementation team can login.The instant user is created under a software model.

- ✓ **STEP 5: INTERNAL CHECK / TESTING PHASE** : Then using this Instant user we do repeatedly internal checking of the software with the help of support team.

- ✓ **STEP 6 : TRAINING** : Then at the client place we start giving Training to the end users, with the help of SPOC.

- ✓ **STEP 7 : PARALLEL-RUN** : After training is given then software is run on a trial basis that means parallel with their existing system to check the user compatibility, this stage usually go for 2-4 days.

- ✓ **STEP 8 : GO LIVE** : Then after Parallel-run ,Go Live stage comes which means all the older system are stopped and only the new software /system runs.

- ✓ **STEP 9: MONITORING** : Then after Go Live the implementation expert remains at client place for 2-3 days and check whether the system is working smoothly or not or if any user is facing any kind of problem/issue then it is needed to be solved.

ACTIVITIES ARE LISTED IN A TIME FRAME :

A. System Study
B. Gap Analysis
C. Master Data Collection
D. Instant User / Software development phase
E. Internal Check/ Testing phase
F. Training
G. Parallel-run
H. Go Live
I. Monitoring

Activity	Task name	Immediate Predecessor.	Duration In weeks	Start	Finish
A	System Study	-	1	Week 1	Week 1
B	Gap Analysis	A	1	Week 2	Week 2
C	Master Data Collection	B	2	Week 3	Week 4
D	Instant User creation/Software development	C	1	Week 5	Week 5
E	Internal Check/Testing phase	D.	2	Week 6	Week 7
F	Training	E	2	Week 8	Week 9
G	Parallel-run	F	1	Week 10	Week 10
H	Go Live			Week 11	Week 11
I	Monitoring		1	Week 11	Week 11

GANTT CHART

Activity	WEEKS											
	1	2	3	4	5	6	7	8	9	10	11	12
A												
B												
C												
D												
E												
F												
G												
H												
I												

Expected time **Actual time**

DETAILS OF THE STEPS OF IMPLEMENTATION OF HIS IN IPD MODULE

- ✓ **STEP 1: SYSTEM STUDY** :The current system in the hospital is manual.

DRAWBACKS OF CURRENT MANUAL- SYSTEM

1. The current manual system has a lot of paper work - The manual system in the hospital is not cost effective as it requires a lot of stationary products and it is not environment friendly.

2. To maintain the records manually, it is a time-consuming job- The employee's in the hospital devote most of their working hours in maintaining the patient records manually instead of devoting most of their time in improving patient care and patient hassle free stay in the hospital. Thus, it decreases the efficiency of healthcare and effectiveness of the employees in their work flow.

3. With the increase in database, it is a massive job to maintain the database- The database management has become a critical job for the employees due to the manual system of database management. This causes errors in handling and management of data at the right time and at the right place.

4. Requires large quantities of file cabinets, which are huge and require quite a lot of space in the office, which can be used for storing records of previous details. As a hospital always needs space for patient care , but due to the manual system a large amount of space/room is wasted for record storage which can be otherwise used for either bed occupancy for the patient or other useful purpose in the hospital.

5. The retrieval of records of previously registered patients is a tedious job - Due to large database which are stored in the rooms it gets mixed with other files and other records, so this makes it difficult to retrieve the records of previously registered patients. It is also a time consuming process to retrieve old patient records.

6. Lack of security of the records- Due to large number of records in the hospital which are stored in a room without any security, so there are chances of theft of

these records and misuse of it. For example - The X-ray or lab results can be misused

for insurance claim process and also in medico-legal cases.

- ✓ **STEP 2 : GAP ANALYSIS :** Gap analysis is done with their existing system and then comparing it with our system and finding the differences.

As their existing system is totally Manual , so much of time is not devoted to find the gaps. As the gaps are already well understood during system study.

✓ STEP 3 : MASTER DATA COLLECTION :

For collecting the master data of a particular organization, usually we have some formats on which we collect various details which that organization needs in the software, various details , such as : the Logo of the organization, address, Bill format, VAT Tax, TIN number, Doctors details, Rooms details, Treatment details, Laboratory details, Duty timing of staff details etc. according to the client requirements.

To collect this data one employee of the organization is assigned to us and that person is known as Single Point of Contact (SPOC). Usually this SPOC remains with us and helps throughout the implementation process.

After collecting the data clint sign this document and then we send this details to the back-end team which is Product Development Team.

✓ STEP 4 : CREATING INSTANT USER :

The Product Development team after getting the Master Data sheets started designing and developing the system according to the need of that particular organization.
And after developing the system, the back end team creates an Instant User for login purpose for the implementation experts for testing purpose.

The back-end team uses a Software Development Methodology (SDM) to develop a software. SDM that is used in the software development is called Software Development Life Cycle.

SDLC have a set of structured activities during development of a software . These are as follows :

- Specification
- Design
- Validation
- Evolution

This is based on the WATERFALL MODEL with rapid prototyping which is a sequential design process often used in software development process. The development is seen as a flowing downwards steadily. In the Model, one phase has to be finalized before the process can progress to the next phase.

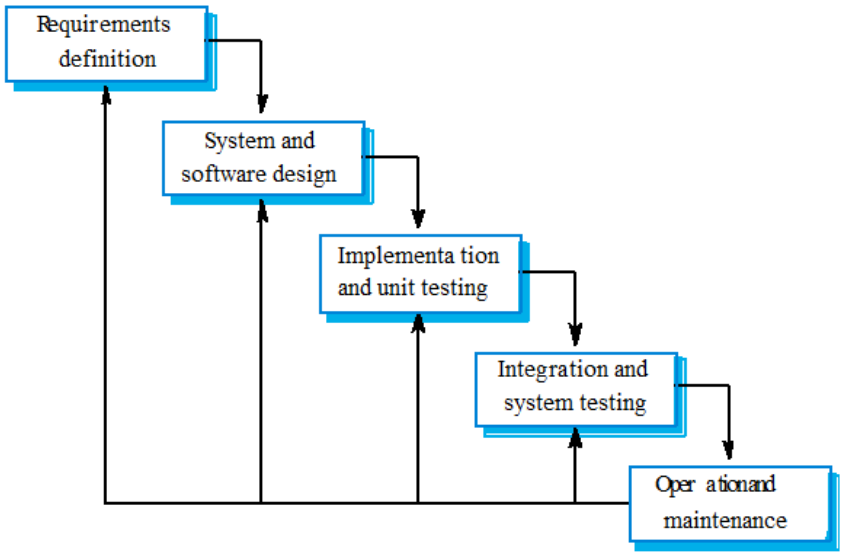


Figure 1: illustration of the water fall model

MERITS OF WATER FALL MODEL

1. Dividing the development of a system into phases makes the development process more manageable and it gives the opportunity for control of the application development process.

2. The methodology helps to ensure that the specifications are complete and they are communicated to systems development staff.

3. The following phase cannot start until the previous has finished. This helps to identify problems with requirement during design and also problems in coding are also identified.

DEMERITS OF WATERFALL MODEL

One problem with the waterfall model is that it does not provide feedback that is commitments must be made at early stage in the process and it is difficult to respond to changing customer requirements .

✓ **STEP 5 : INTERNAL CHECK / TESTING PHASE:**

By using this Instant user we do repeatedly internal check / Testing of the software with the help of Support Team.

One of the purposes of the testing is to validate and verify the system. Verification means checking the system to ensure that it is doing what the function is supposed to do and Validation means checking to ensure that system is doing what the user wants it to do.

No program or system design is perfect; communication between the user and the designer is not always complete or clear, and time is usually short. The result is errors and more errors. Theoretically, a newly designed system should have all the pieces in working order, but in reality, each piece works independently. The purpose of system testing is to consider all the likely variations to which it will be subjected and then push the system to its limits.

❖ SYSTEM TESTING

System testing involves testing the system to validate that it meets user specifications and objectives.

System test objectives are:

1. To analyze the test results.
2. Test the system against users requirements.

The components to be tested are :

- ✓ To test the system to validate it ,that is it should only accepts valid data.
- ✓ Check whether the system is giving the required output.

❖ TESTING STRATEGY USED ARE :

Testing the system using different types of system tests that were performed on the

system.This is aimed at uncovering errors and measuring the system capability.The following system tests are :

- **UNIT TESTING**

This is the test in the development process and ensures that each unique path of the project performs accurately to the documented specifications and contains clearly defined inputs and expected results.

Each module was tested to ascertain that it fully performs as expected.

- **INTEGRATION TESTING**

This involves testing integration of modules. This was done to ensure that modules interactions with each other were working and that integration of the modules making up the system flow smoothly.

- **ACCEPTANCE TESTING**

This involves testing the system with the intent of confirming readiness of the product and customer acceptance.

- **USABILITY TESTING**

This is making sure the objects are usable even after they have been completely tested. This test determines whether the users will be compatible with system or not.

✓ **STEP 6 : TRAINING THE END USERS :**

Training of end users will be accomplished in phased introduction to the new system, focused on building their skills and confidence to use the system effectively in their role.

The goal of training is more than just entering the right data in the right field on the right screen. The goal is to enable users to think logically about how to best use the system in order to maximize the benefits of the system for patients and for the hospital.

During this training period:
• HIS users should be prepared for further training, through understanding of the crucial importance of their participation in achieving the objectives of the HIS.

Effective HIS training should be organized based on the role of staff in the workflow (management, accounting, doctor, nurses...), not on the features and functions of the system.

Target of the initial training are hospitals' IT staff and end users.

IT staff training is focused on the IT personnel who will support and maintain the HIS system. It will cover the administration of users and system, code lists maintenance, detailed overview of the system functionality, organization/planning of work load and support to the users in case of problems in work and critical cases (first level support).

Workshop for end users are focused on classroom training, where trainees will get familiar with the general aspects of the HIS usage, as well as with the specificities related to work process and the manner of using the system by all members of the group. This training is oriented to the practical use of the system, since it is organized in classroom equipped with computers connected to the HIS server. Classroom training could be organized for groups of up to 20 attendees, although the optimal number of attendees is 15. It would be best if the training is organized for users of similar profile and coming from the same department.

PRACTICAL HIS TRAINING – TEST ENVIRONMENT

The training program in this phase is provided in the departments based on the one-to-one approach, in real working conditions.

This phase allows end users to immerse more deeply into the work of the system and provide feedback for optimization of its work:

• As users gain experience, they will have much to share on improvements, especially regarding usability and issues they encounter.

• As user's knowledge base grows, they can further be trained to incorporate systems advanced functionalities and to take a look at how workflows and processes can be improved.

✓ STEP 7 : PARALLEL-RUN:

After the training phase is completed then software runs on a trial basis, that means parallel with their existing system to check the user compatibility, and this stage usually last for 2-4 days.

✓ STEP 8 : GO LIVE / SUPPORT FOR HIS IN PRODUCTION

ENVIRONMENT

After Parallel-run phase ,Go Live stage comes which means all the older system are stopped and only new software/system runs.

This phase encompasses the transfer to the production use of HIS and on-request support provided to end-users, based on the requests for assistance or clarification.

Once the entire staff is trained and 'green light' is received from the hospital management, the hospital is ready for the transfer to work in the real environment, namely the production phase.

When the system enters into the production phase, the entire team, which includes members of the particular hospital, has to be focused on customers and be available to assist in their work and overcome any problem, to respond to any additional requests for the system configuration that would provide a more comfortable and efficient operation of the system.

The involvement of local IT experts is necessary during this phase, beside the persons who are specialized in HIS implementation and maintenance.

It is very important that all the necessary preconditions are met, so that the success of HIS implementation and transfer to work in the production environment, along with the participation in training and use of the system, will not depend on the "general climate" and the willingness of individuals to work in the system.

✓ STEP 9 : MONITORING PHASE :

After Go Live stage we remain at client place for 2-3 days and check whether the system is working smoothly or not or if any user is facing any kind of problem/issue then we need to solve the issue.

CHALLENGES FACED DURING TRAINING AND IMPLEMENTATION

1. Acceptance by the end users
2. Problem in providing training to staff in night shift
3. Lack of user involvement
4. Resistance to change
5. Poor skills set among users is a hindrance to project implementation.
6. Communication barrier is another aspect which must be managed well in order to pass the correct message to other employees in the organization.

It is indicated that successful implementation of HIS results in benefits to the organization; cost saving, better information handling, timely and accurate information for decision making and competitive edge.

LIMITATIONS:

- ✓ Available data cannot be shared due to clause of confidentiality.
- ✓ End-users always keep on changing the requirements.
- ✓ Communication with the client was a big issue.

SECURITY MEASURES

Security Performed in Hospital Management System :

User Name & Password security implemented so that no unauthorized person can handle any operation without username and Password.

- Only authorized person can log-on the system.
- Only authorized person can update the records.
- Only authorized person can handle the reservation.
- Only authorized person can print the report.

It has two kinds of users:

- ✓ Administrator
- ✓ User1

Administrator: He has complete authority (Read, Add, Modify) of operating the software. The User Name and Password provided to the Administrator in this project is:

User Id: Admin

Password: admin123

User1: When this user logs into the system, he can only view information and other reports. He can generate different reports.

User Id: User1

Password: user123

RECOMMENDATIONS

- **Regarding structure perspective**

a) Select competent leader for conducting change
b) Create a clear vision regarding new system
c) Motivate the employees to accept new system

- **Regarding people perspective**

a) Arrange awareness programs for employees
b) Arrange training workshops for employees

- **Regarding technology perspective**

a) Establish an IT department
b) Hire IT staff in the hospital

- **Regarding process perspective**

a) Motivate employees to participate in process designing
b) Ensure active involvement of employees in process designing
c) Employees requirements should be considered
d) Employee's satisfaction should be assured while designing process.

- **Regarding implementation approach**

a) Parallel implementation approach should be followed for successful implementation of HIS.

CONCLUSIONS

The project **Hospital Management System (HMS)** is for computerizing the working in a hospital. The software takes care of all the requirements of an average hospital and is capable to provide easy and effective storage and availability of information related to patients that come up to the hospital.

It generates test reports, provide prescription details including various tests, diet advice, and medications prescribed to patient by the doctor. It also provides billing facility on the basis of patient's status whether it is an indoor or outdoor patient.

The system also provides the facility of backup and easy retrieval of patient records as per the requirement.

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Annexure -I

Evaluation of Hospital Information System - Sample Questionnaire

Post-Implementation feedback

In this questionnaire, we would like to know about your use of and perception of the HIS in your hospital.

A. About your position

1) Do you regularly work with patients in this hospital?

Yes ☐ No ☐

2) Have you been working for more than three months in this hospital?

Yes ☐ No ☐

B. About the Performance of HIS in the hospital

Compared to previous routines, how has the HIS in your opinion changed the performance of the following tasks?

	More difficult	**Difficult**	**No change**	**Easier**	**Significantly easier**	**Dont' know**
To enter daily notes has become						
To review the patients records has become						
To collect patient information for discharge reports has become						

About your satisfaction with the HIS in your department

	Never/ Almost never	**Seldom**	**Most of the time**	**Always**
How often does the system provide the precise information you need?				
How often does the system provide sufficient information?				
How often are you satisfied with the accuracy of the system?				
How often is the information clear?				
How often is the system user-friendly?				
How often does the system provide up-to-date information?				

Assessment of the HIS in your department:

	Strongly disagree	**Disagree**	**Neutral**	**Agree**
How much do you agree with the following statement: HIS is worth the time and effort required to use it				
The Information System can reduce waiting time.				

	Poor	**Fair**	**Good**	**Excellent**
Were you satisfied with the training				
All considered, how would you rate your satisfaction with HIS in your department?				

All considered, to what extent has HIS changed these three aspects of your own department?

	More Difficult	**Difficult**	**No Change**	**Easier**
How do you compare the new system with the old system				
The performance of my own tasks has become				
The quality of our department's work has become				
The performance of our department's work has become				

Comments:

INTERPRETATION

After evaluation of all the responses, it is identified that all the employees are satisfied with the new HIS system. The staff is also highly satisfied with the training curriculum but the only recommendation which is suggested that a IT expert should be hired for the hospital IT department for the maintain-ance of the HIS System .

As the work load and time consumption has also been decreased now. It has become very easier to maintain the patient records. The employees now can use the new system with great ease and promptness.Quick search of old patient data and quick admission of new patient is done without any hassle. There is now easy availability of patient past data with great security system at all levels. Data retrieval has become easy now for any loss or deletion of any patient data . The work efficiency has been increased in all the departments which is leading to the growth of the organization and also to the effectiveness of the employees in the hospital premises.

The patients are also satisfied due to decrease in TAT (turn around time) during OPD and IPD registration and billing, decrease in long waiting time and hassle free appointment, OPD, billing and admission procedures.

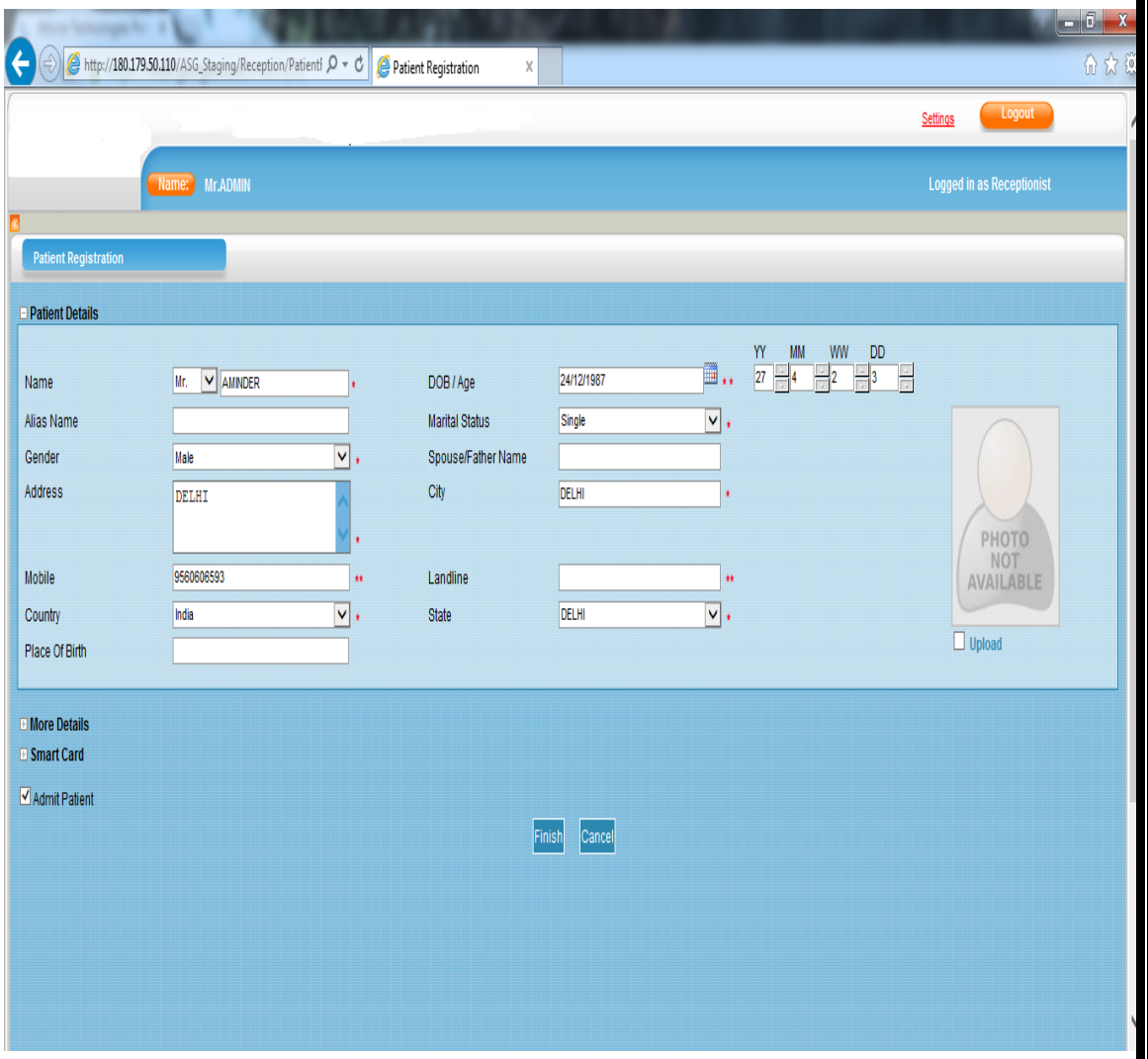
Thus leading to :

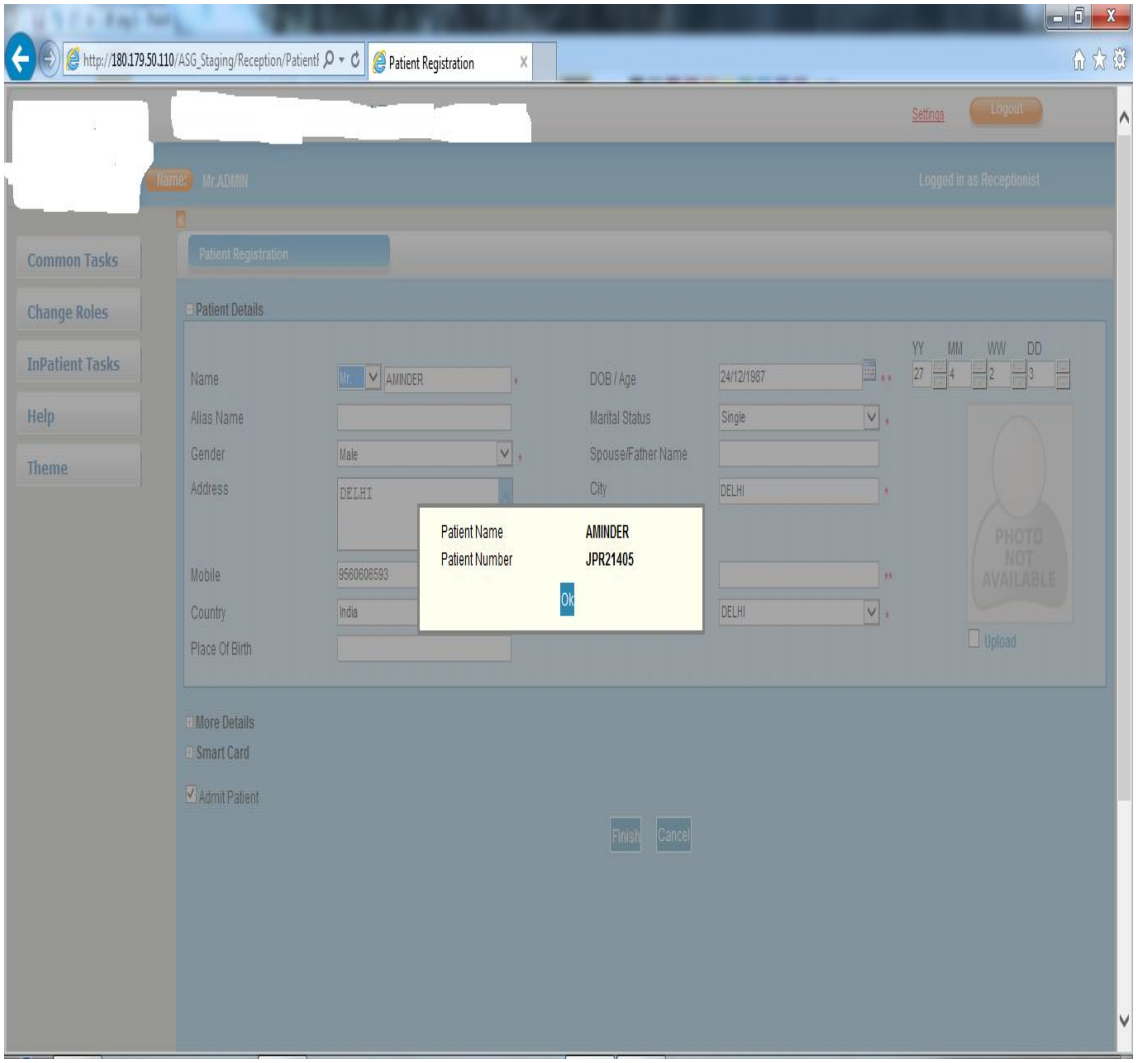
- Better quality of patient care
- Improvement of the efficiency of hospital management
- Improvement in information quality
- Reduction in operating costs.

Thus ,to improve the success of HMIS implementation in hospitals, it is recommended that improved planning and coordination is necessary , capacity building through end-user training, knowledge and skills transfer, transparency in procurement of information systems, involvement of managers at all levels & sufficient software & hardware evaluation. It is further recommended of employing qualified managers to spearhead HMIS implementation and empowering them through training since they are the drivers of the project. Hospitals intending to implement HMIS should establish and equip IT department which will spearhead automation, development of IT strategy and enterprise architecture.

Annexure- II : SNAP SHOTS OF IPD MODULE

PATIENT REGISTRATION :




http://180.179.50.110/ASG_Staging/Reception/Patient
Patient Registration
Settings
Logout
Name: Mr.ADMIN
Logged in as Receptionist
Common Tasks
Change Roles
InPatient Tasks
Help
Theme
Patient Registration
Patient Details
Name
Mr.
AMINDER
DOB / Age
24/12/1987
YY MM WW DD
27 4 2 3
Alias Name
Marital Status
Single
Gender
Male
Spouse/Father Name
Address
DELHI
City
DELHI
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Patient Number JPR21405
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Mobile
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Place Of Birth
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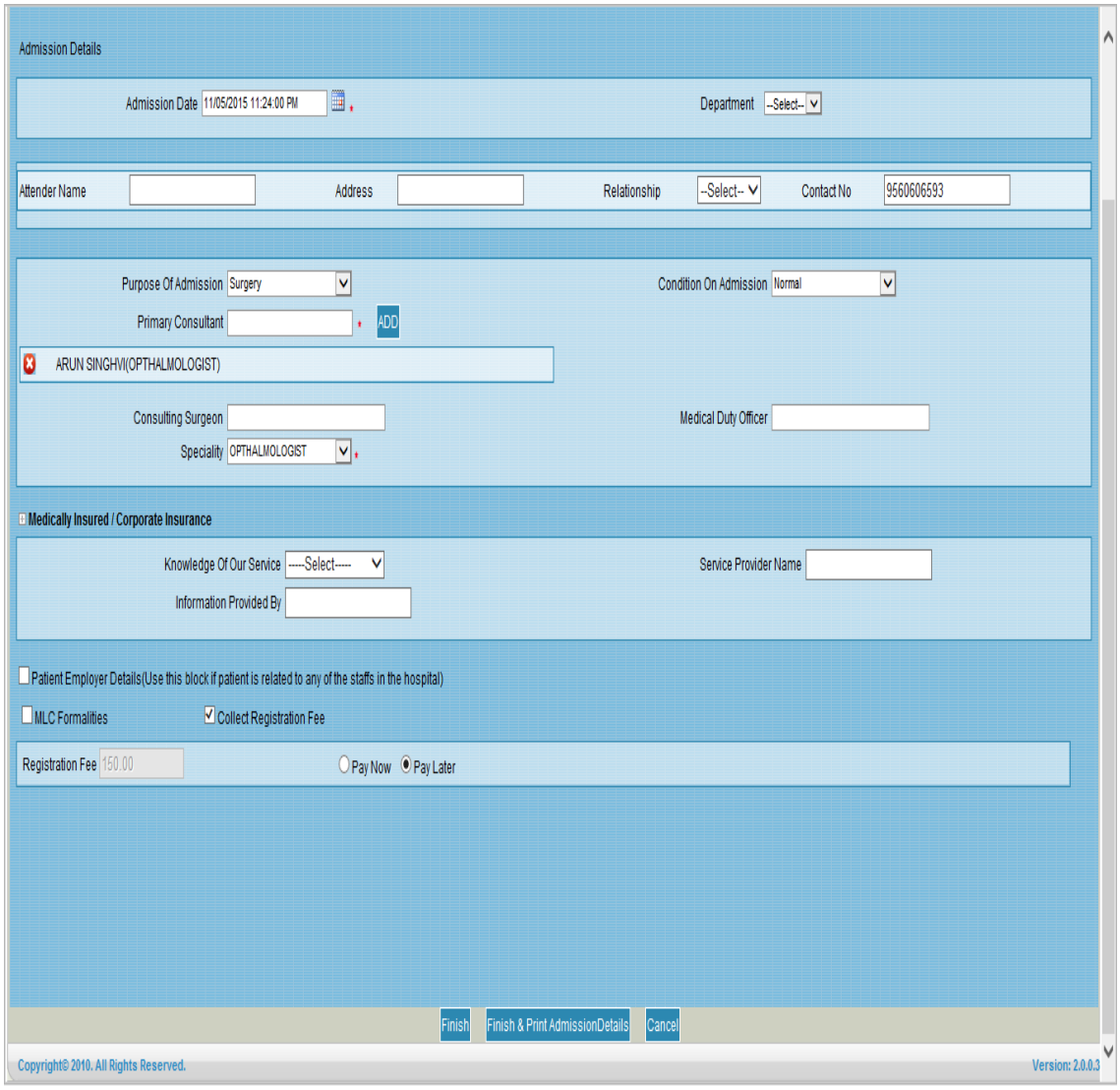
Upload
More Details
Smart Card
Admit Patient
Finish
Cancel

ADMISSION DETAILS OF THE ATTENDENT:



ROOM BOOKING DETAILS :