USING WATERFALL MODEL

Hospital Management CRM

Project Title: Implementation of Waterfall Model for Hospital Management CRM

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Situation:

The hospital is currently running all its operations through manual processes or disconnected systems. Patient admission details, doctor-patient consultations, billing, and revenue-sharing with honorary consultants are all handled through separate records or manual registers.

This lack of integration creates several operational issues:

- Difficulty in retrieving patient history or treatment records quickly.
- Revenue-sharing arrangements with honorary consultants (who bring their own patients) are calculated manually, which can cause confusion and disputes.
- Communication between marketing teams, medical staff, and administration is slow and often dependent on in-person updates or phone calls.

This situation causes delays, human errors, and lack of transparency, which in turn affects both hospital performance and patient satisfaction. By implementing a centralized CRM system, the hospital can bring all these operations under one digital roof, ensuring smooth workflows, faster decision-making, and better service quality.

Problem:

Without a hospital-specific CRM, the following problems are occurring:

- **Patient Records Management: Data is scattered across files and systems, making it hard to track a patient's complete journey.**
- **Doctor–Patient Coordination: Honorary consultants lack a clear platform to see appointments, treatment updates, or billing details for their patients.**
- **Revenue-Sharing Confusion: The 50-50 earning split between the hospital and honorary consultants is prone to calculation errors due to manual handling.**
- **Workflow Gaps: Marketing teams, doctors, and admin staff often operate in silos, resulting in poor follow-up and missed opportunities to improve patient service.**

These gaps create financial and a compromised patient experience, which impacts the hospital's reputation and operational growth.

Opportunity:

By introducing a Hospital Management CRM:

- **All patient, doctor, and financial data can be centralized and accessible in real time.**
- **The 50-50 revenue-sharing model can be automated to ensure transparency for honorary consultants and the hospital.**
- **Inter-department communication can shift from manual handovers to an instant, shared digital platform.**
- **Doctors will get quick access to patient details, past medical history, and billing info, enabling better decision-making.**
- **Hospital management will receive real-time reports on admissions, revenue, doctor performance, and patient trends, helping them make informed strategic decisions.**

Overall, this creates an opportunity to modernize hospital operations, cut down administrative workload, and enhance patient trust.

Purpose Statement (Goals):

The goal of this project is to design, develop, and implement a Hospital Management CRM that will:

- Combine patient records, doctor coordination, and financial management into one seamless platform.
- Automate revenue-sharing for honorary consultants to remove manual errors and ensure transparency.
- Enable smoother communication across departments, reducing delays and confusion.
- Improve the overall quality of patient care by providing doctors with complete patient information at the right time.
- Support marketing teams with better data to manage doctor relationships and grow hospital outreach.

Project Objectives:

1. Develop an Integrated CRM – Merge patient management, doctor scheduling, and financial tracking into one easy-to-use system for all departments.

2. Automate Revenue Sharing – Implement built-in logic for the 50-50 split between the hospital and honorary consultants, viewable in real time.

3. Enhance Cross-Department Coordination – Provide a unified platform for marketing, admin, medical, and finance teams to work collaboratively.

4. Improve Patient Experience – Ensure faster response times, complete treatment histories, and personalized care through better information access.

5. Enable Data-Driven Decisions – Equip hospital management with dashboards and reports for quick strategic actions.

Success Criteria:

Fully Functional System – The CRM integrates patient, doctor, and finance operations without data gaps.

Accurate Revenue Tracking – Consultants can log in and see earnings, hospital share, and payment history without manual checks.

Reduction in Admin Workload – At least 50% less manual paperwork, allowing staff to focus on patient interaction.

Positive Stakeholder Feedback – Doctors, hospital staff, and management find the system easy to use and beneficial for daily work.

Improved Patient Care Indicators – Faster admissions, reduced billing delays, and better treatment follow-up.

Methods / Approach:

Model Chosen: *Waterfall Model*

The Waterfall Model is a linear and sequential approach to software development where the project progresses through clearly defined phases in a fixed order. In this model, each phase must be completed and signed off before moving to the next, with no overlapping unless major issues are found. This approach is ideal for our hospital CRM project because requirements are well-defined and the system functions are predictable (patient records, doctor coordination, revenue-sharing).

1. Requirements Gathering and Analysis

- **Collect, document, and finalize the complete set of requirements for the Hospital Management CRM system.**
- **Conduct multiple meetings with hospital management, honorary consultant doctors, marketing team, administrative staff, and finance team.**
- **Understand current pain points in patient admissions, doctor scheduling, revenue-sharing, and billing.**

- Identify all functional requirements (patient data management, doctor-patient interaction module, revenue-sharing automation, communication tools) and non-functional requirements (security, speed, usability, scalability).

- Define data fields for patient records (personal details, admission date, treatment history, billing details), doctor profiles, and revenue-sharing tracking.

Deliverable: Requirements Specification Document (RSD) containing all finalized requirements with stakeholder sign-off.

2. System Design

- Convert the gathered requirements into a technical blueprint for the CRM.

- Prepare the system architecture showing how patient, doctor, and finance modules will interact with each other.

- Design the database structure to store patient records, appointment schedules, and financial transactions securely.

- Create user interface layouts for hospital staff, doctors, and administrators — ensuring ease of use for non-technical staff.
- Design workflows for patient registration, doctor assignment, billing, and revenue sharing.

Prepare diagrams:

- Use Case Diagrams to show interactions between users and the system.
- Data Flow Diagrams (DFD) to visualize data movement between modules.
- Sequence Diagrams for patient admission and revenue-sharing processes.

Deliverable: System Design Document (SDD) – with architecture diagrams, database schema, UI mockups, and process workflows.

3. Development

- Build the Hospital Management CRM in accordance with the approved design.

- Develop backend logic using Java for patient data management, doctor scheduling, and automated revenue calculation.

- Build frontend interfaces using ReactJS for smooth, responsive interaction.

Create core modules first:

1. Patient Registration Module: Admission form, record creation, and appointment scheduling.
2. Doctor-Patient Interaction Module: Enables consultants to track their patient cases.
3. Revenue-Sharing Module: Automatically splits earnings 50-50 between hospital and consultant.

Deliverable: Working CRM system with all planned features ready for testing.

4. Testing

- Ensure the CRM system works flawlessly before deployment.

- Perform Unit Testing for individual modules (e.g., patient registration, billing).

- Conduct Integration Testing to ensure all modules work together without conflicts.

- Run System Testing to validate the CRM as a whole against the RSD.

- Carry out User Acceptance Testing (UAT) with selected hospital staff and honorary consultants to verify usability and performance.

Test real-life scenarios:

- Adding a new patient and linking them to a consultant.
- Generating monthly revenue reports.
- Migrating 1000+ patient records without data loss.
- Document all bugs and ensure fixes are implemented before go-live.

Deliverable: Testing Report & Bug Fix Document with UAT approval.

5. Deployment

- Launch the CRM in the live hospital environment.
- Install the CRM system on hospital servers or cloud environment.
- Perform data migration from manual registers and old systems into the CRM database.

- Configure user access levels (e.g., doctors, admins, finance team).
- Provide hands-on training for all hospital departments to ensure smooth adoption.

Deliverable: Live, fully operational Hospital Management CRM accessible to all authorized users.

6. Maintenance and Support

- Ensure long-term reliability and performance of the CRM system
- Provide post-deployment support to handle any technical issues, user queries, or bug fixes.
- Conduct performance monitoring to ensure the system remains fast and stable.
- Implement minor enhancements based on feedback from hospital staff and doctors.
- Keep maintenance logs for transparency and future audits.

Deliverable: Support Documentation and Update Logs for all post-launch activities.

Resources:

1. People (Human Resources):

Project Manager (1) – Responsible for overseeing the project from start to finish. Tracks timelines, manages budgets, coordinates between hospital management and technical teams, and ensures deliverables are on schedule.

Java Developers (4) – Work on the backend development of the CRM. This includes creating the core hospital modules such as patient registration, doctor scheduling, billing, and revenue sharing logic. They also integrate the system with existing hospital databases.

ReactJS Developers (2) – Focus on building the frontend web interface for the CRM. Their role is to make the system visually appealing, easy to navigate, and responsive across devices so hospital staff can use it with minimal training.

UI/UX Designer (1) – Creates intuitive user interface designs, ensuring that even non-technical staff (such as receptionists or nurses) can operate the CRM efficiently. Works closely with developers to implement user-friendly layouts and workflows.

Testers / QA Team (3) – Responsible for testing every CRM module to ensure there are no errors. They perform unit tests, integration tests, system tests, and user acceptance testing (UAT) with hospital staff.

From Hospital Management & Staff:

Hospital Administrator & Management Team (2-3) **– Provide key operational requirements, approve design decisions, and participate in testing and validation of the CRM.**

Honorary Consultants & Doctors (3-4) **– Share feedback on patient record access, scheduling, and revenue tracking modules to ensure the CRM meets their needs.**

Department Representatives (1 from each major department) **– Offer input on workflow improvements and test department-specific features.**

2. Time (Timeline):

Estimated Total Project Duration: 12 Months

Requirement Gathering & Analysis – 2 months
Meetings with management, doctors, and staff to understand operational needs. Documenting workflows and preparing detailed requirement specifications.

System Design – 2 months
Designing CRM architecture, database structure, module workflows, and user interface wireframes.

Development – 5 months
Building core CRM modules first (patient registration, scheduling, revenue sharing) followed by secondary features (marketing tools, advanced reporting).

Testing – 2 months
Conducting detailed testing cycles including UAT with real hospital staff.

Deployment & Training – 1 month
Installing the CRM on hospital systems, migrating old records, and training staff across all departments.

3. Budget (Estimated: Rs. 10,00,000)

Development Costs **– Rs. 4,00,000**
Salaries and expenses for Java and ReactJS developers, UI/UX designer, and project manager during the build phase.

Testing Costs **– Rs. 1,00,000**
QA resources, test environments, and simulation of hospital workflows.

Training **&** *Deployment* **– Rs. 2,00,000**
On-site and remote training sessions for hospital staff, data migration from manual/legacy systems.

Hardware & Tools – Rs. 2,00,000
Servers, database licenses, development tools, and backup systems.

Emergency – Rs. 1,00,000
Reserved for unexpected costs such as additional development requests or hardware upgrades.

4. Other Resources:

Hardware: Dedicated on-premises server for CRM hosting. Backup storage systems for patient and financial data.

Software: Java IDE and development tools for backend coding. ReactJS frameworks and libraries for frontend. Database management systems for patient and billing records.

Network & Security: High-speed internet connection for real-time CRM updates. Secure role-based login system for hospital staff and doctors.

Risks:

1. Resistance to Change – Staff used to manual registers or paper files may hesitate to adopt CRM. This can slow usage and reduce benefits. Training with real examples of time savings can help them adapt quickly.

2. Data Migration Errors – Moving patient, billing, and appointment data into CRM could cause missing or incorrect records. Trial migrations and proper backups ensure accurate transfer.

3. Integration Issues – CRM may face problems connecting with hospital billing, lab, or pharmacy systems, leading to double work. Early planning and compatibility tests can prevent this.

4. Technical Downtime – Server or internet issues could make the CRM temporarily unavailable, affecting operations. Backup systems and offline modes can keep work running.

5. Security Risks – Patient and hospital data could be exposed if security is weak. Encryption, secure logins, and regular audits protect sensitive information.

6. Budget Overruns – Extra requirements or technical issues can push costs beyond the plan. Defining scope clearly and keeping a contingency budget reduces the risk.

Dependencies:

1. Active Involvement of Management and Staff: For requirement gathering, system testing, and UAT, active participation from hospital administrators, doctors, and departmental heads is critical. Without their input, the CRM may not fully address operational needs.

2. Timely sourcing of Hardware and Licenses: Servers, backup devices, networking equipment, and software licenses must be procured and installed before development and testing begin. Any delays in sourcing could push project timelines.

3. Availability of Skilled Personnel: Java developers, ReactJS developers, testers, and UI/UX designers must be available as per the project plan. Shortage of skilled manpower can slow down progress.

4. Data Readiness for Migration: Existing patient, billing, and appointment data must be collected, cleaned, and organized for smooth migration. Delays in preparing this data could stall the go-live schedule.

5. Management Approvals at Key Stages: Approvals for requirements, design, integration approach, and final testing sign-off must be provided on time to avoid bottlenecks.

6. Training Completion Before Go-Live: Hospital staff must complete CRM usage training sessions before the system goes live to ensure a smooth transition without operational disruptions.

Thank you!

For Your Time