



HOSPITAL ERP IMPLEMENTATION GUIDE

[A Digital Transformation Perspective]

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Revision History

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1. Executive Summary

Hospital ERP / HIS Implementation is not just an IT Project as it requires engagement and involvement of key drivers and contributors from various work groups such as nurses, doctors, billing and insurance staff, finance team, radiologists, lab techs, HR staff, Pharmacists, inventory controllers, coders, and management. This article explores the best practice approach to implement the Hospital ERP from digital transformation perspective.

From people engagement to business processes review (BPR) and Processes Blueprints to change management, implementing the Healthcare ERP is unique in many ways, especially when it is not a green-field implementation. As a high value project, it requires due attention from the top management or the project steering committee (PSC) to steer the project and reap the maximum benefits of the Healthcare ERP – that is why it is called a “Business Transformation Program (BTF)”.

Traditional project approaches such as a waterfall or agile approach might not be successful if they are not modified as per the industry requirements. This paper explores key success criteria (KSC) for a hospital ERP implementation from a tertiary care facility.

2. Understanding Hospital ERP

Hospital ERP or Hospital Information System (HIS) is a total information system that contains various integrated modules and interfaces to carry out tasks related to the following operations:

- Patient registration /appointments
- Patient billing, Visit creation
- Nursing Assessment
- Computerized Clinician Order Entry (CPOE)
- Lab Information System (LIS)
- Radiology Information System (RIS)
- Pharmacy Point of Sales (POS)

and other related modules for Outpatient (OP), Inpatient (IP), Emergency Department (ED) and other ancillary services.

These systems are usually connected with several add on system such a:

- Queueing Management System
- Medical Records System
- Real time Location System (RTLS) based system patient protection
- Code announce system
- Nurse call system Picture Archiving and Communication System (PACS)

- Patient Infotainment System (PIS)

In addition to the above-mentioned system there are many specialty-based systems such as specialized system for Gastroenterology, Dialysis or nephrology system, Oncology and Radiotherapy systems, Dental and Cardiac PACS etc.

During the last few years, there has been a huge growth in the use robotics and Artificial intelligence (AI) in hospitals to improve the clinical outcomes and performance. Robotic pharmacies, meet and greet robots, virtual clinics, facility management cleaning robots, and robotic surgical units have become important components in the treatment process.

A Hospital ERP is an integrated software that combines all above-mentioned systems to automate the hospital operation with the following objectives:

- a zero-paper approach and providing next-gen patient experience to patients,
- Build smart business intelligence (BI) for management,
- Adoption of standard clinical guidelines and workflows,
- Conformance to all healthcare standards.

A Hospital ERP is an integrated software that combines all clinical and back-office modules providing automated workflows, smart business intelligence, and connected platform for Patients, Payers, and Providers. [3 Ps of the healthcare industry]

3. Building Request for Proposal (RFP)

The most important and tedious task is to write the ERP document. An efficient RFP should not be vendor-driven, has to include all functional (clinical and non-clinical), ancillary, and back office requirements. A good RFP is a key to success. Following are key components of an efficient ERP:

3.1. RFP Vital Information

A detailed information about the RFP submission date, vendor qualification criteria, and submission mechanism. This section should also include the details pertaining to the number of beds, no of clinics, number of sites, no of physicians and nurses, and number of annual patients per years with an extrapolation for 3 to 5 years. This information will allow the vendor to understand your sizing requirements and allow them to propose an appropriate solution suitable for your needs.

3.2. General Requirements

This section will include the details pertaining to the required number of modules, required conformance standards, integration details, and size of paper-based medical records. A broad detail about integration and compliance requirement should also be included in this section.

3.3. Vendor Profile

This section contains the vendor information regarding their previous implementation projects, name of their clients, demographic customer base, number of full time equivalent (FTE) and part-time implementation staff, their project management approach, and reference letters from the previous clients.

3.4. Compliance Requirements

It is pertinent to get an official confirmation of the compliance standards. A good Hospital ERP should be compliant with JCIⁱ, HIPAAⁱⁱ, ESIⁱⁱⁱ, ICD10^{iv}, DRG^v, PBM^{vi}, and HIMSS^{vii} Level 6 standards.

3.5. Technical Architecture

This section usually includes details related to operating structure and scalability, network architecture, IS and data security, Interoperability, and hardware requirements. In response to this point, the vendor will provide the required size and capabilities for network, servers, storage, and security components.

3.6. Functional Requirements

This section will typically include details about the required modules and their functions and features. A detailed list of required features should include the following modules.

3.6.1. Online Appointments and Patient registration – Mobile Application

3.6.2. Patient Billing and Visit creation

3.6.3. Nursing Assessment

3.6.4. Computerized Physician Ordering System

3.6.5. OP and IP Pharmacies including stores and POS

3.6.6. Radiology Information System (RIS)

3.6.7. Lab Information System (LIS)

3.6.8. Medical Records

3.6.9. Admission, Discharge, and Transfers

3.6.10. Operating Rooms Management

3.6.11. Emergency Department

3.6.12. HR Management

3.6.13. Finance Management

3.6.14. Facility and Operations Management

3.6.15. Materials Management

3.6.16. Occurrence Variance Recording (OVR)

3.6.17. Central Sterilization System Department (CSSD)

3.6.18. Revenue Cycle Management and Insurance Approval and Claims Management

3.6.19. Clinical Documents and forms etc.

3.7. Dashboards and Reporting Requirements

Dashboards and management reporting are essential component of a system. This section of RFP should contain a list of all required clinical, financial, and administrative dashboards and reports. A list of existing dashboard and reporting tools should be provided to the vendor in order to ensure the compatibility and compliance with the reporting standards.

3.8. Mobility and Portal

This section will contain the required mobility and portal requirements such as data elements that should be shared with the patients etc.

3.9. System Controls, Workflows, and Users management

A detailed list of user preferences, applications, management controls, and required workflows for clinical and non-clinical workflows should be provided in this section. Certain applications such as **Cerner's ISH Med for SAP** consist of an array of all clinical workflows and guidelines. These standard guidelines are always helpful for the implementation of the best practices system.

4. Evaluation of Proposals.

Evaluation of the proposals is the most difficult process. As a best practice, a heterogeneous evaluation team should be formed to review and grade the applications through demo and walk-through sessions. This team includes members from all functional units for clinical and non-clinical areas.

5. Contracts Management

The Science of preparing the contract and executing the contract is pretty straightforward. An impactful contract should include the following:

- 5.1.1. Scope of Work (SOW) – an itemized detail of the deliverables
- 5.1.2. Deliverable acceptance criteria – a standard to accept the deliverable.
- 5.1.3. Payment milestones
- 5.1.4. Exit and penalty clauses
- 5.1.5. Implementation Approach
- 5.1.6. Clinical Documents and forms etc.
- 5.1.7. Project timelines (high level)
- 5.1.8. Change management (high level)
- 5.1.9. Administrative and financial closure details.

6. Project Management

This section includes the project charter and project management plan. [Refer to authors HIS project Management guideline.](#)

7. Workgroups and Teams

HIS or Hospital ERP project can not be implemented by IT department. It is a joint venture between IT, operations, finance and all other departments which are covered in the scope of work.

Author has an extensive experience in implementation Hospital ERPs in various geographies. According to him, four (04) key work groups should be formed to steer the project across the hospital. These workgroups are:

7.1.1. Outpatient Workgroup (OPWG)

7.1.2. Inpatient Workgroup (IPWG)

7.1.3. ER Workgroup (ERWG)

7.1.4. Backoffice Workgroup (BOWG)

Each workgroup will be led by a WG manager who spearhead the project within his / her workgroup. The workgroup managers will be reporting to the project director and steering committee.

Each workgroup will have a team of **Business Processes Orchestrators (BPOs)** who will be responsible to review the processes, build the blueprints in consultation with the functional consultants, review and approve the business requirements, and sign off the project deliverables for their respective functions.

The below illustration shows a typical project organization chart.

As an example, a **Nursing BPO** will play an important role in setting up the care pathways and building clinical workflows suitable for patient treatments in outpatient (OP), Inpatient (IP), Emergency Care (ER), Operation Theatre (OT), and critical care units (CCU) in a tertiary care hospital. By virtue of having close interaction with the doctors during a clinical episode, they not only understand and contribute towards setting up the nursing assessment module but also play a pivotal role in Provider (Doctors) modules. It has been observed that even after going live, nurses even guide doctors on how to use the system.

The **Quality BPO**, on the other hand, will not only help in building the workflows in line with international standards of patient safety and care, such as JCI^{viii} etc. but also ensure effective conformance/compliance to those standards.

Doctors BPO, the most important stakeholders, who face the heat of the problem if the system is not successfully implemented. They must maintain appropriate eye contact with patients while struggling with new screens to record chief complaint(s), subjective and objective assessments, lab and radiology orders, and pharmacy prescriptions. Huge importance should be given to training and change management for doctors to protect them from any embarrassment during patient encounter due to delayed learning curve, system deficiencies, or both.

The **RCM and Finance BPO** will define the appropriate billing codes for various services offered at the hospital which are then linked with a structured and segmented chart of account (COA) crafted by the expert finance team to ensure the revenue and cost actualization at various segments such as doctors, specialties, clinics, etc. thus presenting profit and loss to the decision makers to help them make informed decisions.

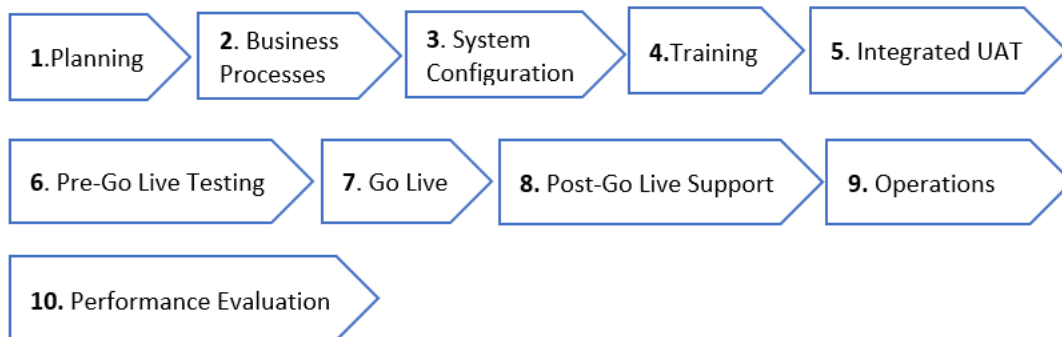
Pharmacy BPO, consisting of OP and IP pharmacists, ensures the upload of the correct drug list, and accurate hospital pricelist, configures the appropriate drug search criteria, defines the rules to dispense control drugs, and the workflows to dispense and charge for OP and IP patients.

The role of IT BPO has more responsibilities than authority. They are involved in data migration, application, and database server configuration, key users training, user acceptance testing (UAT), and in short overall project management. The IT department also manages the project team, oversees the performance, and controls the cost of the project.

8. Focus on Planning and Execution

Like any other ERP project, Healthcare ERP also requires excellent planning. An ill-planned project is a recipe for disaster. A well-thought and coordinated plan is more important than the approach you select to implement the project. In my two decades of project management experience in the Healthcare space, no specific methodology can be considered and effective or less effective. Methodology may vary from project to project based on the type of project, i.e. for green field project, any bookish methodology can be applied whereas, for brownfield projects, it is up to the on-ground team to select the appropriate one that best fits the on-ground realities and culture. The following approach is recommended to deliver the project without disrupting the running system.

Table 1: A sample project management Approach



9. Business Engagement means Business Acceptance

During my last two decades of project management journey, I have learned that getting sign off or acceptance before and after go live, when project execution takes place, becomes a real hurdle due to insufficient involvement of business representatives. The right kind of people

should be taken on board from the beginning of the project. This not only helps understand the business requirements but also ensures the acceptance of the module or the project.

- It is not important to select x or y methodology Many projects are based on the classical project management methodology 'Waterfall' where business involvement
- Documenting business requirements (Business Process Review or BPR)
- Execution of integration tests mainly by business representatives and supported by the vendor.
- Participating and partly taking responsibility for the final preparation
- Providing 1st level support for business departments during the hyper-care phase and afterward.

If the business team is not selected and involved from the beginning, the delivery of the project becomes worst and, in most cases, the scope and schedule are adjusted that delaying the project delivery and increasing the cost.

There are many project management tools and techniques available to overcome these situations but they have associated limitations too. Below are the possible limitations of these methodologies such as "Agile" or "Scrum".

- Organizational readiness is not given (e.g. organizational structure, competencies or responsibilities).
- Project team members have difficulties changing their mindset and adapting to the new way of working.
- Project character and scope do not allow a project management methodology other than 'Waterfall'.

To gain the maximum business benefits out of Healthcare ERP implementation, I would recommend the following:

- Combine project management methodology 'Waterfall' with 'Agile' or any other, based on your experience and skills. There should not be any hard and fast rules.
- Higher involvement of business and/or 3rd party representatives during project implementation, such as involvement of PACS and LIS vendors for possible HL7 interfaces, etc.
- Planning and conducting 'presentation or handover' sessions between ERP vendors and various business units, for effective results.

10. Conclusion

The ever-persisting dilemma in healthcare is the shortage of staff. Clinical and Backoffice departments believe that they cannot spare their top brass for what they consider as **“just an IT project”**. This is a huge misconception and may lead to a disaster. IT can lead and manage the project by the key drivers are the functional power users or champions from all clinical and administrative departments.

In this article author has shared his experience and lessons learned from a recent implementation of Hospital ERP at one of the leading tertiary care hospitals group during the COVID-19 pandemic period.

Experience shows that when a healthcare ERP project is used as a tool to transform the business, the business case can be significantly improved with no extra cost by just engaging people from different departments from the beginning of the project. These power users or champions or BPOs for this text are required to identify and lead the business change initiatives such as reviewing workflows, verifying global master data, and users’ rights and privileges.

Change management is also a key driver for the success of the project. BPO should be empowered to drive the change.

As a best practice, a clear methodology was adopted to identify, plan, manage, and track business outcomes, combined with clear responsibilities and communication. This approach changes the Healthcare ERP project from delivering new system capabilities into a real business transformation program which is accepted by senior management and aimed for better business benefits after go-live.

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ⁱ JCIA – Joint Commission International USA

ⁱⁱ Health Insurance Portability and Accountability Act

ⁱⁱⁱ Emergency Severity Index for ED

^{iv} International Codes for Diseases, a standard coding system developed by WHO.

^v Drug related Group

^{vi} Pharmacy Benefits Manager

^{vii} Health Information System Society