CHAPTER -I

1.1 Introduction

Most of the software industries today use project management software’s for managing various aspects of projects some of them are resource management, customer relationship management, inventory management and resource allocation. Software’s used to manage these resources are of different designs like some are web based and some software are standalone which are deployed and are running on a single machine. Various aspects of project management are used and various features of the project management are used to manage the software projects. The major lacuna in software purchase and its utilization depends on selection of the correct project management software to manage various resources in a software industry.

Our industry is very much based on individual skills, and as such, results are often unpredictable. That's why it is said that 50% of all IT projects are failures. So, software project management is crucial in order to manage, control and disclose early signs of project failure, so that they can be corrected, and the project brought back on the right course again.

This research work aims at analyzing various features of project management software’s used in the IT industry today so that the upcoming IT industries can choose the correct project management software’s deepening on the features which they would like to implement in their organization. This analysis will not only help the IT industry but also other industries who require software’s which can handle manpower and other required resources to produce the desired work in the organization. This analysis and comprehensive study of project management software’s will improve the efficiency of the projects and will also provide a effective means of selecting right project management software for the desired work to be carried out in an efficient manner.

The goal for this research work “Analytical Study On Comprehensive Project Management Softwares (Some 5 Softwares)” is to select the most appropriate project management software which is available in the market today as most project management software available are very expensive and the industry does not want to invest huge amount of budget in getting a management software for project execution instead they would love to use open source tools which kind of meets their requirements but is difficult to deploy and manage also reliability and security is another concern in open source environment for PM so. The goal is to find modularized PM solution which can help the industry purchase only those modules
which are required currently to execute their tasks currently and then think of purchasing those modules which will be required for future project execution thus till will require less investment and also the work will be accomplished smoothly.

The IT industries today face major problem in selecting an appropriate project for performing various tasks. Task allocation has different features and different methods which are sometimes different than what is needed by the industry. While selecting the software for managing various resources its important that the selection group takes a mockup of the project which the company would like to purchase but as this is a crucial part lot of time and money is spent to do this analysis but at last its not clear which feature and which part of the full project is functioning according to the needs of the company so the project manager should have a check list which justifies the requirement of the company and the needs. Allocating a resource for this kind of task is a major job for the industry also. There are various sections and parts in the IT industry and also each part is having different functionalities and each functionality has different features. This research work will provide a platform of analytical study of various features of project management software for all the IT industries and also other industries who would like to select a project management software they can use this analysis and select an appropriate software for their organization. The industries will get a fair amount of idea on which software will suffice their requirement and which project management software will not suffice the requirement of their industry.

Various aspects, which play a major role in the software industry, are as follows

1. Requirement Analysis
2. Design
3. Functioning
4. Testing
5. Documentation
6. Deployment (Installation)
7. Maintenance
8. Scalability
As shown in figure 1. The various aspects of project management software, which help in organizing and managing the projects, are having various stages each stage is discussed in details. In this project uses Agile model for software development. Agility of PM software is most important part as companies who require this software are purchasing PM software so that further modifications can be easily handled and the product can be expanded easily to meet the future needs. As most of the companies are investing less initially in procuring PM software’s they want the best tool which can cater to the companies needs when the company grows and also expansion of the PM software should not be a tedious task and should be less time consuming so that the operations which are running currently are not tampered with and a smooth deployment of new modules which are required by the company are easily integrate as plug an play modules and this will improve productivity of the employees and cater to the future requirements which are needed in the industry and help speed up the process of development of the clients software. thus agility of PM software is a must of the IT industry as PM software’s are expensive and all modules are some time not required at once hence the purchaser should have the flexibility to procure modules which are very necessary for execution of the tasks in hand.

A. Requirement analysis:

The initial stage in project management is requirement analysis. The customer will provide his requirement to the company. Most of the companies are responsible to maintain the
requirement of the customer in some format, which can be accessible to various stakeholders of the company so that they can study the requirement laid down by the customer and how the company can fulfill the requirement of the customer. A requirement analysis team is assigned a job to investigate the requirement of the customer and to check the feasibility of the requirement if the requirement of the client is not feasible then it will be intimated to the client that the requirement needs some changes and it can be rectified at an initial stage rather then at later stage of the project. This will help reduce the effort taken by the development team to work on the requirement, which is only feasible and implementable. The time and effort taken by the development team will be in the requirement, which is implementable rather then in some thing, which is not feasible to the company.

The most important thing is to capture the requirement of the client hence the company requires a requirement-capturing tool, which will help in collecting requirement of the client at one place, and the stakeholders can login and check the requirement of the client anywhere they are. The client will also be able to login and check the requirement, which he has given to the company for implementing the project. This examination could bring enthusiasm to some product configuration organizations because each organization needs to oversee extends in a productive way. The organizations discover it essential to get tolerable making arrangements for good tasks. To start with, it could help to give a gauge and know how much assets are required. For instance, a customer inquires for a financial plan from your organization and a couple of other information. Your team needs to make a good measure on the off chance that it needs to be focused. In the event that this gauge is sufficiently bad, the organization may lose cash as a result of a low gauge, or the customer can dismiss the venture due to its costs. Thus, a great arrangement work is vital before all else in the event that you need to have aggressive ventures against different organizations. Later it is valuable to control the development of the venture and to realize that we are doing the fundamental work furthermore, getting the goal firstly characterized. Another essential reason is the control of our extend on the grounds that we can know when we can complete the venture with our assets and cash. One of the most important tasks in project management is requirement capturing and requirement gathering requirement analysis will help the project managers to keep track of clients on what needs to be done in the project and how to complete the given task based on the requirement given by the customer who intends to build the software product from the software company its important for the project
management companies to complete the given task based on the clients requirements which needs more focus and time for analysis of the requirements

**B. Requirement capturing:**

It's important for the project manager to know all the requirements of the clients. Some of the companies are using requirement capturing tools which will collect requirements based on different tools available in the product which they are procuring. Requirement capturing is a technique in which the customer and the IT company person are in front of each other and they have the rights to question each other based on what the client wants from the company personal and how to get data from the required project. The customer will explain his project to the company person who is in charge of writing down the requirement. It's important that the company person uses pen and paper or some recording tool which will help him keep track of the requirement which the client is requesting him and he will be responsible to explain this further to other team members involved in the project. Some companies such as Borland are providing requirement capturing tools which will help IT companies capture requirements from customers using various tools they provide. Most of the project management tools today have functions such as brainstorming and feedback analysis which is important for gathering the requirement from the client. As most customers have great ideas which they would want the IT companies to develop into a product which can be used in their company for improving the efficiency of production and much more. To develop a software solution for customers requirement, it's important for a software development company to capture customers requirements and design a blueprint of the idea which the customer is requesting the IT company to design. The IT company team members will schedule a meeting with the customer for capturing the requirement of the client using software tools which can help to record the customers requirement and then provide reports for the IT company design team who will understand the customers requirement and finally design the blueprint of the product which is requested by the customer. Thus the client will be able to visualize his idea as a product and the customer can also suggest changes in the blueprint of the product under development.

Stakeholder involved in the project have high visibility into the requirement which is given by the client. It's important for all the stakeholders involved in the customers project to know what is exactly needed by the client from the project which he would like to get done from the IT company. Many stakeholders have various diversified thoughts on the requirements which...
have been collected from the client. It's important to meet with the client and do a brainstorming session where the client will explain his requirement to the IT company and will also answer questions which have been put-upon by the company person and the customer whose project is with the company person. In this brainstorming session the client and the IT company person will discuss about the functions and features which are required by the client from the product and how will the company person implement it; it's the responsibility of the company person to check the feasibility of the project and is modules which are to be implemented by the development team members; it also important to put checkpoints on requirement prioritization which modules are needed urgently by the client and which can be completed later on by the company personals. Keeping all these activities in track one needs tools for brainstorming and question answer session; these tools will help the IT company person to keep a record of what customer has requested in this product which he would like the IT company to build; this will also help in freezing the requirement of the customer for the first phase of the project thus resulting in project requirement traceability at further stages of the project.

C. Requirement gathering:

In this phase customer and the IT company person will have discussion related to the project functions, modules and feature accepted from each module of the project each module will be discussed in details so that the development team members of the software project do not face any difficulty in project design and development. Once the requirement has been gathered correctly and sufficiently it becomes easy for the other stakeholder involved in the company to take necessary actions on the modules which they have been assigned its important for all stake holder to work productively to complete the design and development of the module in time. Thus resulting in completing project related task in with and within allocated budget by the client and company for a specific module in the project under completion. Project requirement gathering plays an important role in managing the resources and development of the phases of the project within systems resources. All the resources which are available in the company for a given project need to be utilized efficiently and effectively to complete the project work within time and with allocated budget. Once the client has decided to design the product to improve the efficiency of the company he will approach the IT company team members and will discuss the product requirements the IT company team members will project management tool provide by the company for requirement gathering this tool will be used for gathering various product
related requirements such as brainstorming will be done with the client by asking him many questions the client will answer all these questions and the IT company person will record the clients answers for the questions and then design a requirement document this document will then be forward to the next level so that the primary design of the product will b designed for the client once approved by the client and the requirements of the clients are met by the product then the client will finalize to design and develop the product for his company. thus this is important part of requirement. At the point when a client demands that we assemble another framework, the client has some thought of what the framework ought to do. Regularly, the client needs to computerize a manual undertaking, for example, paying bills electronically rather than with manually written checks. Once in a while, the client needs to improve or augment a present manual or computerized framework. For instance, a phone charging framework that had charged clients for just nearby telephone utility and long-remov calls might be redesigned to charge for call sending, call holding up, and other new elements. More much of the time, a client needs items that do things that have never been done before: fitting electronic news to a client's advantages, changing the state of a plane wing in midflight, on the other hand observing a diabetic's glucose and naturally controlling insulin measurement. Regardless whether its usefulness is old or new, a proposed programming framework has a reason, generally communicated in terms of objectives or sought conduct. Requirement gathering is an important process in the project without exact requirement its difficult for any company to complete the project or to even start the project working on the project so requirement needs to be listed and justified in a given project management software to make the best use of the tools available in the company such as design and development tools. While the company starts working on any project its important to capture the initial requirement of the project once the initial requirements of the project are well understood by the stakeholders involved in the project it will be easy for all stakeholders to work on the initial project requirement. The development team members will work on the initial requirement which has been given by the requirement engineering team members who are responsible to capture, gather and collect initial requirements about the project from the client who is requesting for the project design.

The second activity will be requirement enhancement once the initial requirement is well understood by the client and also the initial requirement is given to the design and development team members of the project its job of requirement gathering team member to enhance the
activity of the requirement and to gather remaining requirement of the project this will help in completing the project work in time if the initial requirement is moved to the next level of design and development and the work is carried out by the next next phase in project management. Project activities of requirement capturing and requirement gathering will continue even after the initial requirements are completed by the company. Some companies provide POC (proof of concept) for the requirement which has been given by the client. Once the POC or the blueprint of the software project is ready it becomes easy for the company executive to explain how the product will function once it has been finally developed by the IT company and what features will be available and what data values will be visible on the screens given on the product interface analysis can be done of the POC provided by the development team members of the project. This POC can be demonstrated to the customer and the functional requirement which have been given by the customer to the company can be demonstrated with the help of POC which has been prepared by the development team members of the company. if the requirements which have been given by the customer are fulfilled in the designed POC then the development team members can working on the final development of the product which will lead to making the product more versatile and also will connect to database to store data.

Once the POC is finalized by the client its now the job of the company person to complete the work on the POC and design the final product for the customer. Its important to prepare requirement document without which no requirement is taken as final requirement only on the basis of discussion its important to map the requirement to the document of requirement which is actually the proof that the client needs the following requirement to be implemented in his project to complete the project[2]. As the customer freezes the requirement it becomes mandatory for the company person to work on the requirements given by the customer and design his product according to the given requirement. Its important to note that the requirements given by the client help the in getting an overview of the design of the system. Requirements also demonstrates the functional aspect of the project functionality of the project can be well understood by the requirement engineering document which is given by the requirement engineer to the development team or the project manager. In the requirement document its clear what the customer is exactly requesting from the product to achieve and how the flow of information will be in the system thus requirements document plays vital role in designing the system POC and also for the final completion of the customers product which will cater to clients requirements in
future needs client needs to sometime also justify his requirement so that it is well understood by the company for development of the product.

![Diagram of Requirement Gathering Process](image)

**Figure 2. Requirement analysis and requirement gathering process**

**D. Design of the system:**

In this phase of research the design of the overall system will be implemented the design is readily crafted to meet the needs of various devices with different aspect ratios so that the end user of the system will find no difficulty in viewing the contents on their respective devices with different aspect ratio. This analysis and design will help the end user in selecting the appropriate product without any difficulty thus giving all the stake holders of the system all the features required in implementing their work without any complications and easy to produce results and improve efficiency in analyzing complex datasets and software’s under development can be easily tested using the testing module available in the right product selected by the company using our research output. The design of the product is simple and can be easily used in various types of organizations like core software development companies and also other industries. This research will help the industries in selecting appropriate product for their companies the design should be simple and easy to understand so that minimum work hours can be spent in understanding the flow of the system. In this research project simple tools will be used to prepare charts of comparisons, which will help the end user to identify various aspects of the software’s and to analyze their requirements prior to installation and configuration at the end users premises. Some time its found that the design is not suitable for the end users hence its important to know which is the simplest and most efficient design of the software which the end user can
use this comparison is not provided online yet so in this research the online comparison chart will be available where the design will be simple so that the comparison can be understood easily. In this phase of the research project I am basically focusing on the simplest design possible for the stakeholders who would like to use the comparison chart can easily understand its implementation an they can modify the chart based on their requirement an analysis.

As product design is an important activity in the project design document is also important in every project design document will help the project manager to understand the functional flow of the system also the modules in the project will be clear and can be implemented according to the design document layout. Design document is shared with the customer to get his feedback on the implementation of the design for his system he can also suggest design changes in modules which he thinks need to be upgraded and need to be more intuitive so that the end users are attracted to the product which the customer is offering.

Project manager or the design engineer will be responsible to create and distribute the design document to various stakeholders involved in the project to get their views and opinion about what they think about the design of the system and if they have any suggestion to enhance the design of the system. There is a conceptual design document which is prepared by the design team and is given for review to the customer the customer will go through the conceptual design
document and will suggest required changes in the document which will lead to a final version of the design document after lot of brainstorming on the conceptual design document preparation its finally time to freeze the design of the product each module has been discussed with the customer and also feedback has been taken on the modules which are available in the conceptual design document of the project and all the feedbacks given by the customer are incorporated in the design document. Design document also plays an important role in project as the design team in the company is responsible to complete the activities in the design document the design document has to be

E. Functioning:

As the functioning of the system is concerned it’s fully functional and can be used to compare software’s as an when required by the stake holder of the systems. The design and functionality has been taken care of utmost to keep it simple and reliable to use so that the stakeholders can use it to compare with out any extra knowledge required for using the system apart from a short manual, which will help in understanding the system. It has few buttons to analyze an compare various products with different features which are present in the system. Thus it makes it a simple system to use without any complications in functionality of use and deployment at the end users premises for comparison of software’s[3]. Functional testing has been done on this system to keep track of minimum effort required to complete the given tasks without any difficulty. PM software must be rigid to cater user inputs easily without effecting the system deployment at the end users place. The modules of the system are functional and inter- process communication is easily possible with in the system as an when required at the time of comparison of different software’s by the stakeholders who are using the system. Functioning being one of the most important aspect of this software its important to keep the functionality of the system as simple as possible so that the end users can understand the functionality easily without extra effort matrices are produced to determine minimum keystrokes and also minimum remembering of information is needed autocomplete and auto correct functionalities are present to keep information already available sync as an when required with out any extra effort. Just auto fill will complete and pull the information from the database an complete the required box information so that the end user need not type the information again and again thus saving time and effort of the end user. The open source tools help in analyzing critical information of the project management software, which will be deployed at the end users premises.
F. Testing:

Various testing methods have been used to keep the system bug free so that the stakeholders can make best use of the system for preparing reports of comparison of various project management software’s testing performed on the system are as follows:

a) **Black box testing**
   
   This testing is important to check if the system fails at any point. Functionality of the system is checked rigorously at this stage of testing.

b) **White box testing**
   
   In this testing phase the implementation details are tested so that if the system has any implementation bugs they can be rectified.

c) **Integration testing**
   
   Integration testing provides information about all the modules developed by the developers are working in synchronization if not then the developer should modify the modules which are not functioning in synchronization with other dependent modules.

d) **Regression testing**
   
   In this testing the system is tested for the maximum load, which it can withstand from the end users point of view for example how many stakeholders can use the system simultaneously.

e) **Unit testing**
   
   The unit testing is helpful in testing all the module of the software under development it helps in identifying the system functioning and module synchronization with other modules this is done by the developer of the system and not the tester hence the developer should know the module code, design and functioning so that any errors related to unit testing can be rectified[4].
G. Documentation:

The research project has been well documented with the required help as and when required by the stakeholders they can use these documents to understand the functioning of the system, which will help in fulfilling the system understanding and functioning without wasting time in getting some expert in comparison.

The E-document is available to each stakeholder he can use this document and finally make comparisons between the software which he would like to purchase. As most of the system is self-explanatory it’s important to use the system without any flaw. The documentation process has versioning where various versions of the documents can be compared and the changes in the design and functioning can be studied easily by going through the latest version of the software. The documentation process can be automatized using open source tools available in the market, which will also keep track for version controls of documents[5], which have been created by different developers. Samples of functioning of the system are also documented in the system. There are many open source tools which are used for documentation of the project but which one is the best suited for the organization is based on the features required in the documentation tool.
The research will enlighten and portray the features in a documentation tools available in the market today.

Figure 5. Documentation at each phase of project

H. Deployment (Installation):

The system is easy to configure and deploy on any form factor thus reduces time and efforts in deploying and configuration. The stakeholders can input the data directly into the system and the system will generate a report based on the comparison of various features in different software’s, which the company would like to use as project management software in their company[6]. This research aims in reducing the complexity of deployment of the product for comparison purpose thus it also reduces the downtime of the system so the efficiency will be improved and more accurate results can be generated easily. The deployment of the system is centralized and it can be accessed from any place at any given time without any configuration at the clients end as most of the project management software are web based or service based they can be accessed easily from any web browser. In some cases the software projects are client server based hence they need client software to be installed on the clients machine.
I. Maintenance:

The research project has minimum maintenance time as the modules are limited and the action performed is comparison of project management software features, which is done by the input given by the stakeholders of the company to the software. As the software is agile changes can be accepted at any phase of the project design and development. The maintenance activity is categorized into four different verticals

I) Adaptive maintenance
II) Perfective maintenance
III) Corrective maintenance
IV) Preventive maintenance
J. Scalability:

The research project is highly scalable to the end user’s requirements and it can adapt to the changes easily by adding modules. The agile software development methodology helps the project to scale based on the stakeholders and end user’s requirements. This research project has a long-term goal hence it’s designed using the principles of agile software development methodology which caters to the end user’s requirements as and when it changes based on the new technologies in the market. As the form factor for all the devices have been kept in mind it’s important to keep the system and the modules scalable.
Figure 8. Scalability of software system based on users

by logging into the hospital management solution and get his medication history for the disease which has been cured by the doctor of the hospital so that in case any emergency situation arises with the patient, then he can take his medication. Gone are those days when records were maintained in registers by the hospitals and it was very difficult for the doctors and the patient to keep track of the patient’s health related history. Also, it was very difficult to find an appointment with the doctor as the patient needs to visit the Clinique of the doctor ones to get an appointment. Thus, it’s really important for the hospitals to get all their services online so that the patient can consume those services when required time to time and that the patient can book his appointment with the hospital and the doctor online from his home without going to the hospital and then booking an appointment. Online hospital management systems are available now in the market which actually provide most of the services which are offered by the hospital so such online system can be deployed and the information can be available to the patient from their homes and with less efforts the patient can get all service and book services online. Some of
the services which are most required by the patient are ambulance, room to be booked in hospital, doctors and specialist and many more services.

The scope of this project is not limited only to the hospitals and the services provided by them this software will connect hospitals, pharmacy and the transportation services together so that the patient can avail all these services on a common platform. Patients information will be maintained online and will be updated time to time so that the latest treatments and the medications will be available for next treatment to be taken by the patient from some other hospital incase required. Thus, this project provides connection between different services which help serve the patient to get cured without running out in the sun for booking appointments and finding pharmacy and the transportation service.

The current system which is available in Kingdom is not suitable and is rigid for the patient so it’s very difficult to find what services are offered by the hospitals for example if a patient is unable to walk and he needs special assistance then the person accompanying the patient should leave the patient and got to the reception to find out where he can get special assistance things and then ask someone to bring the chair to take the patient inside the hospitals thus it becomes cumbersome for the patient and the person accompanying him to run around the hospital to find different services and then ask for help from them. Thus, this solution will give one stop service list which can be availed by the patient and with just a single click away the patient can book the service. Incase if the patient is unable to walk then he can book the wheel chair in advance so that when he reaches the hospital the wheel chair will be available for him to pick him up and get him inside the hospital also if there is an emergency case then the stretcher will be available for the patient so that when he reaches the hospital he can get primary diagnostics immediately. Thus, these services which are really important are not available online in the kingdom and need to be connected for different hospitals so that the best service at minimum pain can be availed by the patient so that the patient is happy to get treated without running inside and outside the hospitals and the person accompanying him will also not run here and there to find which services are available in the hospital and then book them to avail them.

This project is aims at providing better and reliable services to the patient and thus enhancing the options which are available to the patient to book and appointment with the doctor and the hospital of his choice this project will be a collaborative project which will connect the doctors, pharmacy and the transportation service together. Thus, providing the end user
availability of all services related to healthcare at one central location this is required and these services are not available in the kingdom today these needs to be enhanced and also need to grow overtime. As we know that there are different types of hospitals available in the kingdom and they are providing different services these services are required by the patient to get cured most of the patient’s requests are left unanswered without any rely and the patient it not given attention in some hospitals even though the hospital offers the services which are required by the patient. Thus, the context of my project is to provide a platform which helps the patient to choose from the hospitals which are available in the kingdom today and the services which they are offering so that the customer will have an option to select the best possible option from the hospitals inside the kingdom. Connecting hospitals, pharmacy on one platform will help server the patient better and without running from one service desk to the other to avail the service.

1.2 Problem On Hand

As most of the industries today use project management software to manage their resource its most important for the industry to select the right project management software which will suffice to their requirements. The lacuna in selecting software to manage the resources is most common as lot of project management software are available in the market today and it’s important to select the appropriate one which best fits the industry requirements. Hither to its necessary to investigate and generate an analytical report on various project management software’s available in the market today.

In my research work I have selected some 5 software’s, which I have compared depending on various criteria’s and finally generated an analytical report on comparative study which represents the most suitable software, which can be used in the company to manage their resources. Various functionalities required by the company are common but they differ in the operations which they would like to perform hence I have selected some companies and collected some feedback from various stakeholders in the company depending on the operations which they perform and the also the functionality of the software they would like to have. I have compared some 5 software’s, which suffice to the requirements laid down by the company persons, and if the company uses this analysis report it will be helpful for them to select the appropriate project management software for managing their resources and also the stakeholders. Hither to its important to investigate project management software available in the market today
and choose appropriate project management software, which will perform all the operations and
the functions, which the company requires when, it undertakes a project. Thus resulting in a
well-organized and well managed project management solution for the industry at large.

This research work will help the stakeholder of the company to select appropriate project
management tool which can be used in the company to complete the tasks required in the
ongoing projects of the company this project management tool will be selected based on the
research work which is being carried out in the research project. Project management tools in
today’s era have more features then required so it becomes difficult to manage, deploy and
maintain such huge project management tool by the end user who is willing to use the project
management tool of some vendor company. Today almost all the companies either big or small
all require project management software which can help them in scheduling and managing
resources which are available in the company as number of projects increase in the company it
becomes difficult for the company to manage all the projects without using project management
tool [7]. As the PM industry is growing and the number of PM software available in the market
are also becoming more functional and require to manage multiple ongoing projects at same
time. Agility of the software’s and the functional requirements today where modularization can
be achieved based on the requirement of client and his ongoing project. Agility of software
project is important criteria as one doesn’t know about the client’s requirement and the budget
which he/she might have allocated to complete this project also resource allocation is important
for the project if appropriate resources are not allocated for the project then the project can be a
failure at large for the industry which is working on it. Ninety percent of software projects are
failures because of lack of management, resources allocation and budget provisioning at various
phases of the project. All of which can be taken care with the help of project management
software which helps all the stakeholder to perform and share files at different stages starting
from requirement, design, development, testing, deployment and annual maintenance of the
software which is designed by the company. Selecting an exact project management tool which
suites your requirement is a tedious task of various stakeholder involved in the selection process
of project management tool for the company all these stakeholders are from various disciplines
and department which come together for selecting the project management tool with their
requirements. Its important for the in-charge of selection committee to prioritize the
requirements from various department in his company and to cater to the highest requirements first based on the departments who require immediate action to be taken at the earliest.

Thus, the management need to modularize the requirements from various departments and cater to the needs of highest priority modules first this will increase the efficiency of ongoing project in the company. Once the management has decided upon which modules need prior attention they can now finalized their requirement for selecting the exact modules of project management software/tool which they can use to complete the ongoing project activity. As the management approaches the market to select the appropriate project management tool for the module which they have decided upon it now becomes difficulty for them to select good project management tool which can be scalable as the requirements and the modules increase in the software project. Thus, this research work will help them in selecting the exact project management tool based on analytical analysis on the features which are available in project management software’s available in market today. Based on the numbers of features required for each module which is selected by the managers of the company they can decide upon which services from the project management software are important and how they can be utilized in scheduling and completing projects which are running in their organization at large [8,9]. Project management software’s are available as web services today all the phases of project management are web services which can be consumed by the company or else the company can design their own user interfaces and invoke the services which are being offered by the project management companies. As service, oriented architecture is picking up in the industry today some project management companies are offering modularized web services which can be invoked by the companies who require project management tools to manage project activities and resources in the company. This system provides user a centralized play to book various services provided by the modern hospitals also
related services such as pharmacy and transportation for the patient so that the patient does not feel that he is not been given an option to choose the best services which are provided by the best hospitals in the kingdom. Following characteristics are provide by my project which are important for the patient.

a. Book Online appointment in selected hospital
b. Select specialist doctor in the hospital
c. Book for wheel chair if required for the patient
d. Book ambulance for the patient
e. Book room inside the hospital for the patient
f. Book transportation service for the patient incase patient is not from the same city
g. Select the nearby pharmacy listed
h. Order medicine from the pharmacy

Many more services are offered by the project to connect the patient and the health-related issues with the hospitals

![Service Oriented Architecture Model](image)

Figure 10. Service Oriented Architecture Model

### 1.3 Research Objectives

Starting from requirement gathering, requirement capturing, design, development, testing and maintenance. All these services are available to the end user company which would like to use project management as a tool to manage resources and schedule activities of the project
which is under execution most of the software development companies today have multiple project under execution and most of the time one project manager is in charge of completing multiple project in the company. Task of the project manager is huge as he is responsible to deliver the project under execution on time without any lacuna in the project as the customer has invested enough to complete the project on time and with available features in the software project required by the client. To manage the project execution, the manager requires project management tool with all functionalities and cater to the needs of project under execution for example requirement management, design development, testing, reporting, deployment and maintenance if all these features are provided as web services by the project management company then it can be consumed or invoked by the companies who require project management tools for completing their tasks on time. This will also provide companies to consume only those web services which are really required at each stage of the project and leave those web services which do not provide the exact functionality which is required by the project reporting tool. Portfolio management as a service is also provided by the project management. Some of the project management companies provide on-premises deployment and management of project management tool and some provide it as SaaS software as a service which can be consumed by the customers for a specific period of time which it turns will help the customer to pay only for the usage period which will be less expensive then procuring a project management software with all features and functionalities and also deploying them on premises and maintaining them after deployment [10]. Some of the project management software provide service based help desk management solution which will help in managing requests from the client side and report generation about the issues which are associated with the project.
Major activities which project management tools have is to plan, organize and manage resource of ongoing project in the organization based on the complexity of the project management tool it can manage various activities such as scheduling of the project, time estimation of project completion, cost estimation and control of the project and also budget management of the project some project management software’s also provide collaboration and information exchange between project and their modules under execution. As it’s important for project managers to communicate with their subordinates such as developers, designers and testers they need a tool for communication and information exchange such as project messengers which will help team members working on same project to communicate with each other without leaving track and keeping focus on activity going on in the project also document exchange can be achieved using the communication tools provided by the software.
Judgment making is one of the most important and crucial part of the project management tool for any project under execution. Decision such as project completion on time and inter module communication between projects is an important decision which needs to be taken by the project manager who is in charge of the project. The software tool can give decision based on ranking and priority of tasks to be completed by the various stakeholders involved in the software project under execution also base on this software’s decision the project manager can decide what needs to be done to complete project on-time without any delay in delivering the project to the client.

1.4 Scope of research work
These rules can be applied to any industry who is looking to procure a project management software. This research project outcome can be used by any grade of industry who is looking for best or better project management tool for their company. These research outcomes will help improve efficiency in organization utilizing best project management tool.

1]. Using this research work, one can make better decision on which project management software will be most suitable for the company and what modules are available in the project management software currently which will benefit the organization at large to help it achieve good throughpout. Using this research work companies will find peace of mind in selecting appropriate project management software and tools which best meets their requirements and other project related issues [11].

2]. The modularized project management can be used by different people involved in the project if project management software is providing modularization its key point to procure only those modules which will help the company achieve the most desirable outcome from the project management software soon.

3]. Stakeholders will be able use project management modules as an when needed. Some of the modules which are reporting modules which can be used to generate project related reports will be helpful in catering to reports which are related to some part of project management which help in enhancing the outcomes of the project and also giving an inside to project related activities. Some of the hazards which can be avoided are as follows:
I. Environmental Hazards

II. Technical Hazards

III. Human Hazards

These are some of the limitations. Which can be taken care if right project management tool is procured by the company to speed up or enhance project related activity in the company. If proper backup procedures are applied to the servers which host this project management tool then redundancy can be maintained between various servers which are sometime located geographically apart in the same company. The server managers can create replica of the projects and the tools used to complete the project so as to provide redundancy between terminal which help perform job more frequently [12]. Technical issues can be handled easily incase the tool stops working of if there is a server failure hosting the project management tool which can be taken care by the redundancy servers which have been hosted by the server mangers in different geographical areas in the same company. The stakeholder involved in the project completion will not find any latency in the project execution as the switch over between servers will be taken care by virtual environment hosting these servers and the tool required in different geographical area so one will not encounter any problem and change in the programming or testing environment even if the servers are swapped due to downtime in the physical server related issues which some time is a common issue of most of the companies which are designing software projects.

1.5 Hypothesis

1. As most of the project management software’s available in the market today have lots of features but these features are not up to the requirement of the clients hence H0 = μ1 ≠ μ2 hence its required to analyze the features and functions of various project management software H0 = μ1 = μ2 so that it meets the company requirements. While purchasing a project management software for software development company the stakeholders need to first list all the features and functions which require to be performed by the project management software a formal requirement analysis document needs to be prepared which lists all features and functions needed in the project management software by the company. Once the features and functions are fixed by the product procuring company it’s easy to find exact PM software for the company. Some of the features and functions which are provided by the PM software are not appropriate to the requirement which is laydown by the client thus its important to cater to the requirement of the
client. In this research work we have compared some five software’s which have most of the features and functions which are required by the software development companies thus using our research output companies can purchase PM software based on the features and functions which they require in their company to execute projects in company. Analysis is carried out by analyzing functionality of PM software’s I have used these five project management software’s evaluation editions and listed all the features and functions present in this five software according to the analysis which has been carried out its found that some features and functions are present in some PM software’s and some are not also the budgetary requirements are different based on features and functions present in the PM software. If a company is purchasing one of these project management software for managing various activities in an ongoing or future project it’s important for the company to first list features and functions which they are accepting the PM software to perform once the features and functions are finalized then one can use the analysis which I have done on these five software’s if the features and functions are present in one of the compared software then the company can procure the PM software based on the budget available[13].

2. Project management software’s have been used by the industry since a long time but the appropriate selection mechanism and tool for selecting a project management software in an industry is still lacking. It’s important to analyze features and functions of PM software and a tool which will display information regarding feature and functions which are present in the PM software. As most of the project or product development companies rely on some project management software which can perform scheduling and resource management tasks easily is required it’s important to get a detailed view about the features and functions present in project management company. Software development companies have maximum project failures because many aspects of the project are not studied carefully by the development company and lack of management of the project related activities. It’s important to develop an analysis tool which provides report on various functions and features which are available in the PM software this tool will help IT companies in selecting appropriate project management software which best suites their requirements. Most of the companies provide modularized PM software’s which help IT companies to purchase modules which are necessary in completing the project currently under execution companies can further purchase modules and integrate them with the existing modules which have been previously purchased by the IT company to complete the project.
System integration is important between module as some time modules mutually exchange information as an when required by the modules to complete the project and manage various activities inside the project under completion. Some of the project management companies are also providing web services which can be invoked as an when required by the IT companies. These web services can be invoked for time period for which they are required.

3. The US have revolutionized the project management industry and have gained a greater level in project management. In the late 1950s when project management started it was then when multiple teams working in different parts of the project came together and started contributing. Collaboration between teams working in different geographical regions on same project is important collaboration tool is a must in project management software to keep work going on without leaving the platform to complete the project in time and not carried away by the new tools or switching between tools which is not a right job for a project. Exchange of files and chat engines should be available in project management software platform so that the developers are focused and need not switch between other software’s to perform different tasks. Document exchange mechanism and social collaboration between team members is important to keep project work going on without any disturbance of switching software’s to perform different tasks [14,15]. Team management and team building functionality should be available in PM software so that once the IT company receives a project for execution the PM tool should find right developer with right technical skills and social collaboration which is needed to complete the project in time without any obstacles affecting the product development in the company thus rewarding the IT company a success in project management and team collaboration for completing the project under execution. Analysis done shows that if the project management tool has collaboration and social exchange available then it’s more likely that the IT companies will purchase the PM tool. Never the less it’s important for the team to collaborate to complete the project task in time and within available budget hence it’s important to collaborate on various aspects of project which is under execution by the IT company. The collaboration tool integrated with the PM software will help team members to work on one platform and complete the project tasks fast. But if incase the collaboration is not available then the project development team need to switch between various software packages to complete the project which is time consuming and also disturbing for the stakeholders to complete the project in time and with allocated budget this sometimes delays the release of the project to the client as immediate responses are not
available in time when required and the project team members have to use many tools for collaboration and exchange of information required to proceed in the project execution phase as the decisions are delayed so is the delivery of the project is delayed and the client is not happy about the product and is also loosing market for his product. So it’s important for IT companies to have project collaboration module which will help all stakeholder involved in the project to use one platform for any query related to the project. Immediate responses will help team members to work more effectively and efficiently and without any disturbance in accomplishing the project in time for the client [16]. Some project management software companies also provide web based system where the client can also have access to the collaboration tool as some time clients feedback regarding the modules of this project is important and testing for this project can be done at real time. The client can get involved in discussions and meetings which are organized by the project team members and can give his valuable feedback on the collaboration software which will be recorded and can be viewed by the developed team for further action on the product which is being developed. Some tool help in immediate communication but some help in delayed communication most IT companies need both the tools so that the project under execution can be done smoothly without any issues. Information and files can be exchanged using the collaboration tools too this will help in reducing the load for adding modules to PM software. Which has been taken by the IT company to complete various tasks of project and also help in collaboration [17,18]. Constraints for my project are as we know that inside the kingdom there are many hospitals they are divided into government and private hospitals it is important for my project that the hospitals should provide me with the information which I am requesting so that I can design and develop a platform for connecting these hospitals and their services. It’s also important that the pharmacy should give correct information about the products or medicines which they are offering. The transportation section will contain information about deriver and his contact information of the driver. All this information should be correctly entered into the database so that when requested from the system the system will generate correct information to the patient. The software system will be a web based so its important to install web server such as WAMP, XAMP or IIS any one web server should be installed so that the application can run online also latest version of web browser should be present on the client side to use this software. The server which will host my web application should provide installation and configuration of various software’s such as Visual Studio, XML,
Java Script and many more software’s which are required for the development of the system. Project when installed may ask for various latest packages which are important to run the system. All the packages should be given permission from the administrator of the system to install and configure the system with required packages. MSSQL server and SQL server should be installed for database. The system is really easy to use and does not require much training it is self-explanatory and the system provides help as and when required also it displays relevant help information to fill in the details such as phone number formats, date format etc. all these formats related information help are available to the end user of the system. So that the end user does not make any mistake while filling in the information related to these fields and will not receive any error. Also, the system provides exact error information and points to the box where the information is not correctly entered so that the stakeholders can enter the information correctly.

Functional requirement for this project involves different modules which are required to integrate the services which will be provided by this platform services include the following

a. Registration Module for Patient, Hospital, Doctor, Pharmacy and the driver

This module is required by all the stakeholder who would like to use this system as this module collects information about the stakeholder and his level of usage which is granted to him from the system. All the stakeholder using this system should first register so that they can take benefit of this system and deliver the best possible service to the patient.

b. Login Module for all stakeholders

All the stakeholder is required to enter their details so that they can gain access to the system and check for what services are provided by the system.

c. List of hospitals will be provided to patients

All the information regarding the hospitals will be available here the administrator of the system will enter all the information about the hospital into the database so that when the patient logs into the system he will find list of hospitals and their services offered.

d. List specializations in the hospital will be provided to patients

All hospitals provide some kind of specialization such as operation theater and special care for most dangerous diseases such information will be available to the patient this information will be entered into the database by the administrator of the system.

e. List of doctors will be provided to the patients
All hospitals have some specialist doctors who are best in their area of specialization to cure certain kind of illness information about list of doctors available in the hospital selected by the patient will be available so that he patient can book appointment with the doctor.

f. List of Pharmacy will be provided to the patient and the hospitals

Most of the areas around the kingdom have less pharmacy and some time the pharmacy may not have the required medicine so its important to keep track of all the pharmacy and connect them together so that the patient can select from the list of pharmacy and order his medicine online so that the information about the medicine required by the patient is available to the pharmacy. This project provides greater level of security to all its stakeholders In my project the stakeholders are required to enter the password which they have given at the time of registration if they forget their passwords they can generate it again in that case email will be sent to reset the password and the stakeholder can retype his password and get new password so when the user logs into the system he is required to enter his password without out which the user can not gain access to the system. Also, I am planning to integrate SSL with this project so that requests can be handled securely. All the database is stored on database server which is different from the webserver so that incase the web application is attacked the database server will remain secure and the attacker will not get any information from this project. Thus, maintaining high level of security by separating webserver from the database server to protect critical patient’s information from the intruder of the system. work breakdown structure for this project includes various tasks and modules which will be designed and the outcomes that are expected from the modules also the number of stakeholder who will be utilizing this system and their tasks will be listed in the work breakdown structure of this project

g. Driver information for transportation will be provided to the patient and the hospital

As transportation is one of the services which I will be integrating to my system this service will help pickup patients from their door step and take them to the hospital also special needs for the patients will be taken care off once the patient reaches the hospital he will take his medication after he is done with his medication from the hospital he will be taken back by the transportation service which he had ordered back to his home so need of finding and booking taxi and waiting in queue to find a transportation for the patient. The project development plan will contain all modules which will be designed for this project. Development plan will start
from collecting requirement for the project then analyzing the project requirement and then preparing a detailed development plan for software development life cycle of the project starting from design, development, coding, testing, deployment and maintenance of the project. All the stakeholder will be involved in the development plan of the project and the system will function according to the development plan of the project. As this is a web application it will have many changes at different stages of the project various versions of the project will be implemented based on the modules which will be designed and coded based on the functionality which is required by the particular project module. Also, the database involved in this project will be updated and changed on regular basis as number of users will increase overtime user wants to use this system these modules are required to be integrated so that the information can be exchanged between modules easily where ever required. All these services will help the patient, hospital and the doctors to connect with each other so that utmost care can be taken for the patient who is ill and required immediate medical assistance.

4. Project management started in the United States prior to 1950’s when most of the projects were treated as ad hoc projects the united states Navy started using the project management software’s to manage their resources during war time. Initially project management software was having limited features and functions but today it’s a clutter of features and functions which are there in project management software available in market today. Most of the project management tools available in market offer functionality which may cater to the IT industries project under execution. These functionalities may be helpful to some industries but may not cater to some project requirements of some other company hence it’s important for an IT company to list all features and functions which they require from project management software and find a suitable tool along with stakeholder to cater to the requests and necessities of the project under completion by the IT company [19]. As may software development products are also providing some level of collaboration it’s important to have project management tool to manage schedules and resources involved in the IT project under execution software development companies need to cater to the needs of all stakeholders requirements in the project as at different levels in the project different stakeholder may require different tools for example at requirement stage requirement analysis and requirement gathering tools are required and at testing stage in the project different tools for testing and reporting of bugs are required thus it’s important to study
exact requirement at each level of the project. Also keeping stakeholder aligned in one direction to complete the product under development in time and within allocated budget is a challenging job for any IT company. If all the resources are working and reporting their activities in time it will be easy to keep track of which activity needs more resources to complete the project in time [20]. Project manager can assign more resources to the tasks which are likely to delay the project development activity and thus speeding up the project completion in time and delivering the right product which is required by the client. In this project, I assume that hospitals around the kingdom will agree to provide information about the services which they are offering also they will have brochure which they can share with me which has information related to the hospital and the specializations which they have in their hospital. I also assume that the hospitals will provide doctors information and their area of specialization so that it can be added to the database. I will also be collecting information about the pharmacy so I assume that pharmacies will provide me with the relevant information about the products which they are offering related to the surgery and normal medications regarding fever and pain reliefs etc. I am connecting transportation with medical services so I assume that the taxi drivers will provide me contact information which will be loaded to the database. The user interface will be easy to use and intuitive also help will be provided when required by the stakeholders using the system. The system will have adaptive screens which will prompt for various emergency situations and incase the patient is very ill and requires immediate assistance then the system will send notification to the nearby hospital so that the emergency services will arrive to the patient’s doorstep to cure him and get him to the hospital to get proper medication. Information and form filling will be very precise so that the patient and the other stakeholders do not waste time in filling huge information is not necessary for the primary use of the system. Patient record will be maintained as secret by the system no one can access the system without knowing the password of the patient. The system will be designed using latest technology such as AJAX, ASPX, JAVA script so all these prerequisites should be installed on the server where the system will be running. As the system will be really easy to understand it does not require any training sessions for the stakeholders to use and there will be a panic button on the system which send message in case there is emergency for the patient such as heart-attack etc. In this case the patient without filling any information can press this button and emergency services will reach the patient immediately and give him first aid to protect him for the attack and other related issues
5. Today project management is treated as the most important discipline in the IT industry, which falls under the management discipline. All the management and the project manager use the project management software to get reports related to the project activity. Reports help different stakeholder at different levels in the project under execution some reports can be helpful as they talk about time and resource requirement for modules in the project which are likely to be delayed and can be allocated more resources to complete the project within time and with allocated budget. Some technical reports can be viewed by developers of the product thus helping them figure out critical issues which are present in the project which is being developed thus at each level in project management it’s important to generate reports which will help in information resolving any issues in the levels which have been complete or are to be complete thus speeding up error recovery and correction in each module which may effect in project execution at client side at the time of deployment. Project reports help project manager to manage issues related to project at different level of SDLC thus if the project management software has report generation facility at each stage of SDLC it will be helpful as one can rectify any issues related to the project phase wise and module wise [21]. Modularize reports will help in rectifying errors at module level which will be helpful and will stop error in the project. Modularized reports can be given to client for his feedback about satisfaction of the complete and its functionality performed if the client has any suggestions then the development team member can work on rectification and correction of the module as per client’s requirement. As the system is an online web application it is required that the computer system should be up and running 24x7 so that the end users of the system will never phase downtime of the system. The performance of the system purely depends on the server configuration and the maximum input connections which it can handle over the network also the network card should be gigabit. If the server connection and the internet connect are good then the system will be running very good and will not crash but if the server configuration is not good and the number of users using the system increase and the server cannot handle the load then the system will crash and software will go down