CHAPTER 2.
REVIEW OF LITERATURE
A review of literature has been done by the researcher with a view to study the existing studies done in the subject area, which includes research articles, research papers, in national and international journals and magazines, internet, newspaper articles, and also literature written by the software developers in the area of Hospital Information Systems and Hospital Management as a whole. The thesis related to the topic have also been studied as a base for the study. The thesis from Pune University, Shivaji University, Mumbai University, Solapur University have been studied which are carried out in the same area of study. A detailed insight into the software industry catering to the computerization needs of hospital is also carried out, where all the modules of the HIS, other features like recovery, backup, etc have been studied.

2.1 McIlvane and Mary Elizabeth\(^ {10} \) (1987) in their paper “A fresh look at Patient Information”, have studied the essential components of patient information required for treatment and diagnosis which can be of immense value for doctors and the patient himself in reducing medical error and giving better service to the patient.

2.2 Tribble, Dennis A Mowry, Mychelle M, Corpman, Ralph A.\(^ {11} \) (1987) in their paper “A prescription for better Pharmacy Computerization”. The authors in this article advocate the computerization of inventory in pharmacy shops to get up to date information of medicines available, expiry date, stock status etc. highlighting the advantages of technology.

2.3 Nykänen, S. Chowdhury and O. Wigert\(^ {12} \) (1991) in their paper ‘Evaluation of decision support systems in medicine Computer Methods and Programs”. The authors have dealt with the issue of decision making in therapy planning and monitoring of the disease and treatment processes. Evaluation deals with the

\(^{10}\) "A fresh look at Patient Information" By McIlvane and Mary Elizabeth. In Computers in Healthcare, Volume 8, issue 14, page 2. Dec 1987

\(^{11}\) "A prescription for better Pharmacy Computerization" by Tribble, Dennis A Mowry, Mychelle M, Corpman, Ralph A. in Computers in Healthcare, Volume 8, issue 14, pg 66. Dec 1987

measurement or judgment of system characteristics and with comparison of these with the frame of reference. Evaluation of medical decision support systems is important because these systems are planned to support human decision making in tasks where information from different sources is combined to support clinicians' decisions concerning diagnosis, therapy planning and monitoring of the disease and treatment processes. As the field of decision support systems is still relatively unexplored, standards or generally accepted methodologies are not yet available for evaluation. Evaluation of medical decision support systems should be approached from the perspectives of knowledge acquisition, system development life-cycle and user-system integrated environment.

2.4 “Evaluation of decision support systems in medicine Computer Methods and Programs” (1991) in Biomedicine. The article explains the mounting health care costs which have escalated the pressure on hospitals and other health care providers to control expenses. Conventional hospital information systems help meet the challenge by providing data necessary for policy formation and outcome measurement. Additional decision support systems deliver models that can be used to systematically evaluate the policies. When deployed successfully, each stand-alone system can effectively support a segment of the hospital decision making process. Integrating the stand-alone functions can enhance the quality and efficiency of the segmented support, create synergistic effects, and augment decision making performance and value. A high-level integration framework, known as the management support system (MSS), can be adapted to provide the desired synthesis. This paper demonstrates how management support systems can improve hospital decision making. It overviews the hospital decision making process, presents an MSS for supporting this process.
2.5 Cavanaugh, Frank (1994) in their paper "Information Architecture : The Repository Alternative" in Hospitals and Health Networks Chicago, have suggested database architecture for convenient storage of data for easy and quick retrieval. The purpose of data mining and data warehousing being the key technology to be kept in mind and also the value of information in decision making.

2.6 Bergman and Rhonda (1994) in their paper "Where there is a will..." elaborated that computer based patient record(CPR) could improve the quality of patient care, raise patient satisfaction and lower costs, however various obstacles such as time, expense and lack of standards for defining data and defining CPR’s are blocking their progress. If the hospitals or health networks are already have a lot of points of information automated, their expense will come more in planning and networking to bring the information together. Organizations without automation will need major capital investments to automate each of the departments within the delivery system before they can proceed for the CPR.

2.7 Kathy Kahn (1994) in her paper “Health records to go electronic” writes about medical error and the fate of the patients. As the central and state governments continue to move forward with “paperless” initiatives, so goes the health care system, which is endeavoring to create better outcomes and fewer medication mistakes by forgoing ink and paper. Taconic Health Information Network Community (THINC) based in Fishkill was founded in 2007 with a $5 million New York state Health Efficiency and Affordability Law (HEAL) grant and tasked with helping hospitals, health care centers and private practices make the switch from written to electronic medical records. It is not necessary to track the health of a person from the moment of birth until the date of death said Stuard, “EHR focuses on the current health of the patient. It gives us a good snapshot as to where the patient is. The goal is a little more concise. It also gives the patient control. Do patients really want

15 "Where there is a will...." By Bergman and Rhonda in Hospitals and Networks Vol 68 Iss 9 pg 36 May 5 1994.
every piece of their health care information available? There are privacy issues to consider.” The goal is to improve the quality, safety and efficiency of health care and, according to its June 2011 press release, “to create a sustainable financial model for health care that lowers costs and increases quality; and health information technology used as a tool to improve patient health care and community health.”

2.8 Mane Patil (Udaysinh R)\[^{17}\] (1994) in his PhD thesis “Study of Hospital Management in Selected Hospital in Miraj City”, has following findings in Perspective, it is a general study of hospital management procedures in hospitals in Miraj city. His findings are:

- Welfare measures offered to staff are far from being satisfactory.
- Worker’s participation in management is observed in both sectors of healthcare, government as well as private.
- New ideas are welcomed and accepted in majority of hospitals and staff feel motivated to work in such atmosphere.
- Personnel appointed at the respective departments are trained and have fairly good job knowledge and show signs of commitment towards healthcare.

2.9 Montague, Jim\[^{18}\] (1996) in his paper titled “Erase the Paper Chase (Paperless Hospitals)” in Hospitals and Health Networks: Chicago. This is a case study in MacNeal Health Network's primary care centers in Oak Park, Illinois. The author cites the advantage of the wireless computer system. They say that electronic patient records won't save the world, but they can save your organization some cash. In the first six months after one of MacNeal Health Network's primary care centers went live with a wireless, electronic records system, its overall filing and related supply costs were cut in half. And there's more. Nurses and clerical staff spend only half as much time pushing paper thanks to the new setup. The wireless computer system, which went

\[^{17}\] “Study of Hospital Management in Selected Hospitals in Miraj City” By Mane Patil (Udaysinh R) PhD thesis guided by Dr. M.M. Ali, Submitted to Shivaji University, Kolhapur, 1994.

\[^{18}\] “Erase the Paper Chase (Paperless Hospitals)” By Montague, Jim; In Hospitals and Health Networks: Chicago, Volume 70, Is 20, Page 56 Oct 20, 1996.
online last year, holds in excess of 30,000 patient charts. More than 200 doctors, nurses, therapists, and support staff can quickly access those records. Besides the savings it generates, MacNeal's electronic records system is a boon to patient relations. When a patient phones with a question or problem, the doctor can search the electronic chart as the patient waits on the line, or quickly call back after pulling up the pertinent records in a flash. "We no longer have to use the excuse that we can't find someone's chart," says Bruce Kline, M.D., "so the patients feel like they're more important to us." This makes patient care optimum.

2.10 Martha T Ramirez Valdivia and Thomas J. Crowe19 (1996) in their paper titled, "Achieving Hospital Operating Objectives in the Light of Patient Preferences" In this paper the authors stress on patient satisfaction and Customer Relationship becoming increasingly important for the successful operation of private and public hospitals. The quality of the service provided can be improved if internal and external customers opinions are taken into account during the definition of hospital operating objectives. This research presents a new methodology, called the simulation service quality system (SSQS), developed to improve operating performance measures in the light of customer preferences. The motivation for the development of the SSQS. Methodology arose from the need to achieve timeliness standards at United States Veterans Hospitals. The Harry S. Truman Memorial Veterans' Hospital in Columbia Missouri served as the validation and initial application site for the SSQS methodology. Details one such project: the objective of reducing customer waiting times to 30 minutes or less at an outpatient treatment clinic. Through the identification of relationships and interactions, discrete-event simulation techniques are applied to model and experiment with the system to ultimately arrive at recommended changes in hospital operating policies which achieve the objective.

2.11 Hagland and Mark\textsuperscript{20} (1996) in their paper titled “Making Patient records more meaningful to patients”. The authors have mentioned about a certain hospital using EMR (Electronic Medical Record). The information systems initiative whose implementation began recently at Manhattan, New York’s Stuyvesant Polyclinic and is continuing across its sister clinics and parent hospital Cabrini Medical Center says much about the timeline of healthcare information systems in the US. Ed Bukstel, CEO of Bukstel & Halfpenny, the company whose Dr. Chart system is at the core of the automated patient record being implemented at Stuyvesant and Cabrini, says that from just 2 or 3 years ago to today, medical records and clinical information have gone from a dirt road to the information superhighway.

Stuyvesant medical director Edward B. Novak mentions that at the start, at least 80% of the physicians were computer-illiterate, and one of the major challenges was to break down their apprehension about having to do a lot of typing and complicated computing. Still, after setting up intensive classes to train them in the new system, Novak found that usually after just one class, they were hooked on the idea and ready to start. Here user training is an integral part of the current study too.

2.12 David C Katz, Ramesh Mazhari\textsuperscript{21} (1999) in their paper “Preventable inpatient time: Adequacy of electronic patient Information Systems” have highlighted how in delivering better healthcare to patients the waiting period which is the most harrowing experience can be reduced by using electronic patient information systems which not only make the work of the staff easier and more accurate but also reduces the waiting period of the patient who is already in not too a comfortable position health wise.

2.13 Guisseppi A. Forgionne And Rajiv Kohli\textsuperscript{22} (1999) in their paper “HMSS: a management support system for concurrent hospital decision making”. Which is an integral objective of the current study have mentioned that HIS as a


\textsuperscript{22} "HMSS: a management support system for concurrent hospital decision making”. By Guisseppi A. Forgionne And Rajiv Kohli uploaded online on google.com. pgs 393-401. 23 Feb 1999.
decision support system impacting decision making favorably has been proved. The author elaborates how several studies have shown that selected management support systems (MSS) favorably impact decision making. Others have theorized that additional benefits could be achieved by consolidating the separate system functions to form an integrated management support system. There have been few, if any, reported empirical tests of this theory. This article offers empirical evidence on integrated MSS effectiveness. It points to the general literature on MSS effects, notes an empirical gap in this literature, and reports the results of experiments that assess the influences of a specific integrated MSS on the process and outcomes of strategic hospital decision making. This helps the present study as it would be a guideline for the Indian scenario. The study though not in Indian scenario explains how computerization aids in decision making.

2.14 Robin Dowie (2000) in his paper titled “A decision analytic approach to commissioning ambulance cardiac services”. Describes how the decision analytic approach has been used to facilitate evidence based commissioning of cardiac services, commencing with ambulance services, in the district covered by the South Lancashire Health Authority and its neighboring authorities. Modeling services within a decision analytic framework ensures that all the evidence needed by commissioners in health authorities or, in future, primary care groups or trusts (Secretary of State, 1997) can be systematically identified. First, the essential features of the health commissioning process need to be clarified. Following the assessment of the health needs of the population, an appropriate service plan must be determined to meet those needs, detailing volume and quality required and accessibility for the population, evidence on clinical effectiveness including outcomes of care (where known), and any relevant audit data or information from research and development (R&D). Local provider clinical views will be taken into account, together with the results of discussions with other relevant parties: other health authorities and primary care groups, social services departments, the voluntary

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sector, and the general public. Account needs to be taken also of any national directives. Financial questions must be addressed, such as the cost-effectiveness of the proposal. This paper highlights issues where decision making becomes imperative and helps us to understand different areas where decision making needs to be done.

2.15 Marilynne A. Hebert (2000) in her paper titled “Impact of patient care information systems on healthcare professionals and patient care in two community hospitals”. The paper describes two case studies that illustrate differences in impact despite successful implementation of their Patient Care Information Systems (PCIS).

Five hospitals participating in the study were in various stages of implementing the same, single vendor PCIS. They ranged from 1 (very experienced) to 5 (minimal experience).

Although both Hospitals 1 and 4 achieved a level of implementation success in the traditional sense (on time and on budget), identifying the potential for new information and using it differed between the sites. The framework for analyzing impact had two dimensions impact on structure-process-outcome of care and levels of impact with respect to using the PCIS for substitution (manual processes are replaced by automated ones); proceduralization (the technology is used to accomplish several processes without intervention and new capabilities (totally new ways of doing work are possible). Hospital 1 demonstrated great success in implementing many of the PCIS modules. This was due to supportive hospital leaders, a knowledgeable and consistent IS team and effective training. Hospital 4 was less fortunate in using an integrated approach, with minimally funded IS support and much of the onus for implementation placed on individual departments. Two findings were of interest in this comparison. The first was the extent that organizations focused on training to use the technology, but had not developed the capacity to teach

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people how to use new information. The second finding was related to the changes in the roles and responsibilities that occurred when IS was introduced. While Hospital 1 was able to demonstrate traditionally recognized benefits, unexpectedly Hospital 4 was able to use the system in new ways to make connections between structure, process and outcome. This study is spread over three countries US, UK and Germany it helps us to understand the aspects of the present study as the same is applicable to Pune hospitals.

2.16 Bijan Azad and Nelson King\textsuperscript{25} (2000) in their paper “Enacting computer workaround practices within a medication dispensing system” have explained computer workaround practices in hospitals. Details about workaround practices are very well explained by the authors. Computer workarounds are a post-implementation phenomenon widespread in organizations. They are commonly defined as non-compliant user behaviors vis-à-vis the intended system design, which may go so far as to bypass the formal systems entirely (Koopman & Hoffman, 2003). The literature on the design, development and implementation of information systems (IS) often takes a black-box approach to this phenomenon, resulting in a lack of theoretical visibility. Indeed, IS researchers have generally focused their theoretical energies on the intended use of IS, devoting much less attention to computer workarounds. Therefore, the theoretical understanding in the IS literature of the inner workings and dynamics of computer workarounds remains rudimentary.

The main workaround practices are:

\begin{itemize}
  \item Habitual workaround practice.
  \item Verbal signature workaround practice.
  \item Fail-safe workaround practice.
\end{itemize}

2.17 Kunder\textsuperscript{26} (2000) in his paper titled “Strategic Planning in Hospitals”. G D Sunder has in a step by step given points to be considered in hospital building. Strategic planning is the process of defining the primary objectives of the organization and determining a course of action or devising a strategy to

\textsuperscript{25} "Enacting computer workaround practices within a medication dispensing system" By Bijan Azad, Nelson King. In European Journal Of Information Systems Basingstoke; Volume 17, Ls 3, pg 264 June 2008.

\textsuperscript{26} "Strategic Planning in Hospitals". By GD Kunder in Express Healthcare Management. 2000.
achieve those objectives. Building on Organization’s Strengths. Organizations succeed only when they discover their distinct competencies and build on them. Elements of Strategic Planning Strategic planning must rely on increasing emphasis on environmental assessment and forecasting.

2.18 Bill Briggs\(^{27}\) (2002) in his paper “Biometrics: Can we have a show of hands” in Heath Data Management. New York. In this paper the use of biometrics with the help of laser beams as a technology is explained with the help of example to authenticate people in the vicinity with an example. It’s 5:30 a.m. and Dr. Jones glances at a monitor as he drives into the gated parking lot. He parks, locks his car, then walks into the hospital. He stops at the first nurse's station along the way and says "Good Morning" to a computer monitor. The monitor replies, "Good Morning, Dr. Jones," and instantly lights up with a list of patients in the facility their latest medications and test results. Did you spot the security and authentication measures in place? The only obvious devices were the gate and the car’s locks. Everything else happened in the background. A laser beam scanned the doctor’s face as he drove into the parking lot. A similar device scanned his body and the way he walks as he entered the hospital and voice recognition software knew his voice. All the devices combined to identify, authenticate and grant information system access to the physician. Security concerns are taken care of in a scenario like this.

2.19 Shaikh Saleem\(^{28}\) (2003) in his thesis, “Tools used in hospital software development”, has studied the various software and case tools used in the development of hospital software like Database Design (MS ACCESS), Form Design (VB 6.0), Coding (VB 6.0), Testing (VB 6.0), Reporting Tool (Data report), C, C++, VB.Net, Java, Case Tools (Rational Rose).

\(^{27}\) “Biometrics: Can we have a show of hands” By Bill Briggs. in Heath Data Management New York Volume 10 is 12, page 48, Dec 2002

2.20 Panchpande Sandeep Raghunathan\textsuperscript{29} (2004) in his thesis, "An analytical study of HR management in healthcare industries in Pune and Bombay cities", has highlighted the benefits such as Housing Rent Allowance, Dearness Allowance, medical benefits, HRA, TA are not so satisfactory in secondary and tertiary hospitals but seem to be fairly satisfactory in the primary hospitals which comprise of the multi specialty hospitals with a bigger budget and accordingly the turnover in the smaller hospitals is higher. This study was done in hospitals to study the Human Resources Management in hospitals in Pune and Bombay with regard to HR practices, motivational policies, retention policies etc.

2.21 Es-Sayyed, Abdalla T.\textsuperscript{30} (2005) in his paper "A systematic review of international electronic health records (EHR) activities" mentions about the compelling rationale to use interoperable electronic health records (EHRs) for many governments worldwide is to improve the quality and safety of health care services and to reduce cost. These countries, including Canada, are striving to develop workable models. Their study summarizes and contrasts where Canadian EHR efforts stand in comparison to five OECD countries: Australia, New Zealand, the European Union, the United Kingdom and the United States. Findings from their primary project indicated that external barriers from diverse health care groups in Canada hindered the Canada Health Infoway's efforts to implement integrated health information technology (HIT) in Canada. Therefore, they conducted a second study to identify significant HIT integration opportunities and to bring together diverse health care groups to work on a successful project. Their study examined two different HIT models: the interoperable EHR and PACS / RIS systems it showed that EHR has a high implementation and adoption rate in countries that use clear strategies for implementation, set the HIT standards and provide economic incentives.

\textsuperscript{29} "An analytical study of HR management in healthcare industries in Pune and Bombay cities": By Panchpande Sandeep Raghunathan. Phd thesis submitted to University of Pune 2004.

\textsuperscript{30} "A systematic review of international electronic health records (EHR) activities" by EsSayyed, Abdalla T., M.H.I., Dalhousie University (Canada), 132 pages; AAT MR00930, 2009.
2.22 Aditya A. N.\(^{31}\) (2006) Senior Research Analyst, at Technical Insights in his paper "Hospital Information Systems". Aditya has focused on Information technology making a significant impact on the healthcare sector. According to him the past decade has witnessed the foray of numerous information systems and their resultant products into the hospital scenario. The number of investments in computers and types of hospital systems has increased. This is because paper medical records are cumbersome, bulky to use and difficult to manage. On the other hand digital records are much easier to handle and improve the workflow efficiency by integrating various tasks. According to reports by IDC the North American healthcare industry would be spending more than 5 billion on software products each year. Gartner predicts that the US spending on healthcare IT is estimated to be close to 40 billion in 2005 and is growing at alarming rate.

2.23 T. D. Babu and Dr. G. Jayabal\(^{32}\) (2006) in the article 'Health care in India: Opportunities and Challenges' is an outcome of a market survey. The author has observed here that the health care industry in India, which would reach a whooping figure of Rs. 2000 billion by 2012, is result of Liberalization & Privatization and globalization. Earlier reports by McKinsey showed health care industry's contribution to India's GDP is 5.2%. This could further shift upward up to 6.2% with government & industry support. Education & literacy have played a major role in developing the economy. As a result, the middle class level has bulged with greater incomes and focus towards quality healthcare is on the rise. Despite the increase in affluence among the middle class on healthcare spending, which is around Rs.10,000/ per year, there is more to be done. The international figure on health spent is much higher. According to WHO norms, there should be 333 beds, whereas our Indian figures are 1.5 beds and 43 doctors per thousand population (McKinsey's Report 2002). Government health expenditure too is focused towards secondary and tertiary care hospitals with 84% allocation as against 16% to primary health care. It is only since the previous two decades that we have


\(^{32}\) "Health care in India: Opportunities and Challenges" T. D. Babu and Dr. G. Jayabal in the article Ministry of Health and Family Welfare, Central Bureau of Health Intelligence - India.2006
seen the entry of corporate bodies into the health sector. Private hospitals have mushroomed throughout the urban & metro areas with 80% in medical personnel employed in this sector. The author has also highlighted the challenges ahead of India in this sector where concerns were shown towards deficient beds per thousand much below the WHO standards, unequal dispersal of specialty hospitals fragmented across the country, long gestation periods for private hospitals (due to high capital infrastructure). The Indian health care industry lacks standardization, accreditation and sharing of information on management expertise says the author. Medical insurance along with social-economic progress has now gained ground with Indians spending more on treatment of diseases than on vitamins and anti-infective treatment. The author has also suggested strategies like standardization to meet global standards, accreditation to attract medical tourism, which has high potential. Brand building and importance of hygiene has to be evolved through education. Global brands could also be invited to India especially special efforts to SAARC country-members can be extended. Economic & efficient waste disposal is also an important suggestion. Focus should be shifted to concept of well-being rather than from curative measure.

2.24 Anthony Tedesco\(^{33}\) (2007) in Merge Healthcare PR Newswire has give a description of Hospital Billing Software. The author has described how a billing software actually works and can be effective in generating accurate patient bills, and handles accounts related issues.

2.25 William Okelo Ogara and Michael Ogembo Kachieng\(^{34}\) (2007) in their paper “Technology, and its increasing relevance in the future of healthcare”. The paper highlights how the Health Industry is probably the most technologically intensive in the world. The author says a visit to any modern health facility will reveal a work culture immersed in high-tech tools, complex clinical processes, medically skilled human capital and patients. Medical practice requires a willingness to engage the patient, showing sensitivity that


\(^{34}\) "Technology, and its increasing relevance in the future of healthcare By: William Okelo Ogara and Michael Ogembo Kachieng'a uploaded on google.com 01 Dec 2009.
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probably has as much effect on a patient’s health as does the arsenal of technology used to treat their disease.

Technological innovations are regarded by many as the primary guarantor of quality healthcare, and the only pathway to finding new solutions to both old and new clinical problems. Such innovations include development of medical devices, which have been identified by many analysts as a major healthcare expense factor. This study is aiding in sensitizing to the patients needs as is the primary objective of hospital management.

2.26 Shayegani, Shapoor\(^35\) (2007) in her paper “Knowledge modeling to develop a clinical practice guideline ontology: Towards computerization and merging of Clinical Practice Guidelines” says that Clinical Practice Guidelines (CPGs) are documents based on best evidence and experts consensus to standardize care, reduce practice variations, and improve quality of care. Computerizing guidelines can facilitate patient-specific decision support at the point and time of care. In this thesis they investigated the clinical and operational pragmatics of CPGs attempting to develop a framework to computerize and execute them for clinical decision support purposes. The research involved knowledge modeling, whereby they applied a knowledge management approach to a body of real-life CPGs--covering a wide spectrum of clinical conditions and specialties--to abstract the underlying concepts, concept relationships, structure and operational constraints within CPGs and develop a unique and comprehensive CPG ontology. They evaluated their CPG ontology by instantiating 5 previously unseen real-life CPGs. This ontology allows (a) computerizing CPGs which offers guideline-mediated decision support, and (b) merging/integrating multiple CPGs along common actions/tasks to support guideline-mediated patient care plan.

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\(^{35}\) "Knowledge modeling to develop a clinical practice guideline ontology: Towards computerization and merging of Clinical Practice Guidelines" by Shayegani, Shapoor, M.H.I., Dalhousie University (Canada), 178 pages; AAT MR31687. 2007.
2.27 Swatee Kher\(^{36}\) (2008) in her project titled “Total computerization project starts at JJ Hospital”, highlights that state hospitals to go the IT way over next three years, store medical records of patients electronically. This article states that in early February, the JJ hospital—which is the largest in Mumbai—was selected for a pilot project of an eight-year plan, which will involve the complete computerization of all patients’ records at the hospital. And, if all goes well, at the end of the one-year long project, the hospital could well be the base for the national computerization programme that the Central government. The work has taken off after the State cabinet recently granted its approval for the ambitious plan of complete computerization of all medical records of the 33 state-run medical institutions. The contract for the plan was awarded to Cochin-based Amrita Technologies and Hewlett and Packard (HP), wherein the software support is extended by Amrita Technologies and the hardware comes from HP. The project will not just entail storing of records but will also mean having the data available for research. “The idea is to optimize patient care and record all case papers. But it throws up several other interesting aspects like clinical research and access to all sorts of data,” said Kher. Since the survey is about computerization of hospitals the case study of JJ hospital provides valuable insights about various aspects of computerization in a hospital in Mumbai which is very close to Pune.

2.28 Mohanty Rajesh, Rana Sarosh D, Kolay Saosh K.\(^{37}\) (2008) Project titled “Hospital Information system in Medicare- An Experience at Tata Main Hospital, Jamshedpur”. Tata Main Hospital (commonly known as TMH) at Jamshedpur caters its services to the employees (around 60,000) of Tata Steel, their families, and dependent relations. It also extends its facilities to patients coming from in and around Jamshedpur and Associated & Contractor company’s. TMH is a eight hundred and thirty five bedded hospital equipped with modern facilities and catering all specialties. Computerization at TMH has started in a limited way.

\(^{36}\)“Total computerization project starts at JJ Hospital by Swatee Kher in Mumbai Newsline, March 10, 2007.

\(^{37}\)“Hospital Information system” in Medicare- An Experience at Tata Main Hospital, Jamshedpur. By Mohanty Rajesh, Rana Sarosh D, Kolay, Saosh K.on google.com 2008.
The TATA Company has an in house hospital and the effects of computerization are shared by the authors. They also add that the Pathology, Radiology, Medical Research, In-patient Admissions and Billing, Medical Stores & Pharmacy are operational. The implementation of the above modules have evolved user-friendly computerized systems which are loved and cared by all. This paper tries to cover giving an insight to the Hospital Information system implemented at the Tata Main Hospital, which is being fully utilized to provide quality service. The computerized system has enabled the medics to serve their customers with a smile and to meet the corporate objective set by the founder. "We do not claim to be unselfish, more generous or more philanthropic than other people. But we think we started on sound and straight forward business principles, considering the interests of the shareholders our own, and the health and welfare of the employees the sure foundation of our prosperity", - JN Tata.


Here the researchers analysed the acute problems faced while implementing an HIS and identified key areas of focus viz lack of interest in employees, lack of technological knowledge, no proper advice, software identification, lack of funds to buy a standard software, resistance of users.

2.30 Ilan Modai, Michael Ritsner, Henry Silver, Rena Kurs (2008) in their project titled “A Computerized Patient Information System in a Psychiatric Hospital”. The authors are affiliated with the Institute of Psychiatric Studies of Sha’ar Menashe Mental Health Center, Mobil Post Hefer 38814, Israel. Dr. Modai, Dr. Ritsner, and Dr. Silver are also with the Bruce Rappaport. The authors describe a computerized patient information system at a psychiatric hospital in ISRAEL. The system is a fully implemented work instrument that


promotes clinical safety and cost containment. It allows interactive online consultations, clinical cross-checking, the production of computerized reports and schedules, fast response to laboratory results.

2.31 At HIMSS\(^{40}\) (2008) an article titled "Your Palm is the key to unlocking patient Records" in PR Newswire. The article has clearly elaborated about issues of data security and privacy stressing that the biometric use of palms is a sure shot way of ensuring unauthorized access of data and security. Some technologies have also been suggested for the same. It says, "Identity management in hospitals and other medical facilities can be a hectic and time consuming process. Traditional fingerprint security is limited because of high false rejection rates due to authentication errors where authorized users are not recognized correctly," said Joel Hagberg, vice president, marketing and business development, Fujitsu Computer Products of America, Inc. "False rejection rates with fingerprint sensors tend to result from dry or cracked hands, which is a common issue for healthcare professionals due to strict medical hygiene protocols. With PalmSecure, healthcare organizations have a clear advantage over fingerprint devices by providing ease of use while ensuring an extra layer of security." The success of the PalmSecure authentication device has been validated with a recent deployment by the Carolinas Healthcare Systems in Charlotte, NC. These installations are a part of a solution to effectively register and identify a patient. Hagberg states, "With the PalmSecure PC Log-In Kit, Fujitsu will deliver highly accurate and efficient biometric authentication to enhance secure identity management, as well as peace-of-mind for healthcare patients whose medical records will be better protected."

2.32 William M. Tierney, D. J. Marc Omvde, R Hace, Blaine Y. Takesue, Dennis L. Vargo., Clement J. McDonald\(^{41}\) (2008) in their paper "Computerizing Guidelines to improve Care and Patient Outcomes: The Example of Heart Failure". Exclusively citing the case of cardiac patients and heart failure the

\(^{40}\) "Your Palm is the key to unlocking patient Records" at HIMSS 2008.In PR Newswire Feb 21 2008.

\(^{41}\) "Computerizing Guidelines to improve Care and Patient Outcomes: The Example of Heart Failure", By William M. Tierney MD, J. Marc Omvde, R Hace, PhD, Blaine Y.; Takesue, MD., Lisa E, Harris, MD; Michael D. Murray; Pharmd., MPH, Dennis L. Vargo.,MIJ., Clement J. McDonald, MD.:. In TIERNEY ET AL 2008.
authors have given guidelines to ensure better care to cardiac patients where they recommend digitizing patient past history and other medical facilities to decrease the number of fatalities among the patients.

2.33 Howard J Anderson\textsuperscript{42} (2008) in his paper titled “Let's Make a Deal, Software contract for Hospitals”. Here the author studies about the software professionals involved in computerization of hospitals and issues of concern when going into a software contract with them. According to him unlike haggling over the price of a car, negotiating a software contract involves far more than just bickering about the list price, consultants who broker such deals say. Both sides have to approach the deal as the start of a long-term relationship. The cost and details of the professional services agreement are just as important as the licensing fee. When diving into contract negotiations, executives should devote a great deal of time and effort to sorting out the details of implementation assistance. The ideal contract includes a detailed implementation plan spelling out who will do what tasks when. Software buyers must be aware of vendors who insert inadequate "scope of use" clauses in their contracts, which enable them to appear to be the low bidder. Health care organizations must have a clear vision of their long-term plans for using software to make sure their needs are met.

2.34 Noby Abraham\textsuperscript{43} (2008) in his paper titled “Patient Information Systems”. The author in this paper has given tips to those who want to design their own HIS including User Interface design, Database design, and has given following advantages of Patient Information System. PIS will support registering patients. Users of this software can search for patients by name, admission date, discharge date etc. Users can view the previous visit histories of any patient. System can maintain the list of doctors in the hospital. PIS can maintain the list of beds/rooms available in the hospital. Patients are categorized into "In Patients" and "Out Patients".

\textsuperscript{42} "Let's Make a Deal, Software contract for Hospitals". By Howard J Anderson In Health Data Management New York, Volume 16, Issue 12, Pg 84, Feb 2008.
\textsuperscript{43} "Patient Information Systems". By Noby Abraham. Uploaded online 23 March 2008.
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2.35 American Hospital Association\textsuperscript{44} (2008) have endorsed "Healthcare RTLS and Radio Frequency (RFID) solutions to improve Patient Care, Increase Safety and Produce Cost Saving". Healthcare organizations today face increasing financial pressures government regulatory mandates, an ongoing need for improved use of staff time, a requirement of patient and staff safety, and a mission critical focus on patient care. Aero Scout's healthcare solutions include real-time Asset Management, Equipment Maintenance, Temperature Monitoring, Workflow and Resource Management and Patient & Staff Safety solutions. Even if the temperature recommended for the storage of medicine exceeds it will raise an alarm. If an unauthorized person enters a restricted area it will raise an alarm.


This study analyses the Hospital Information systems market in Europe with 2008 as the base year. It provides a complete analysis of the market dynamics such as market segmentation based on various factors, drivers, restraints, challenges and strategies of the market, market share analysis, competitive structure etc. The study mainly provides an estimated quantification of the market, by segments. This Frost & Sullivan research service titled Hospital Information Systems Market in Europe while many hospitals in Europe have some sort of information system in place, few have fully integrated and functional HIS solutions. The adoption rate of HIS solutions in 2008 in Europe was diverse, from approximately 73.0 per cent in Italy and Spain to 95.0 per cent in Scandinavia. "Government and regulatory authorities are compelled to increase investments into healthcare automation due to political pressure as well as public demand," says the analyst of this research. "A significant part of the government's budget allocation goes towards healthcare, with the healthcare expenditure versus the gross domestic product (GDP) of the countries growing, worldwide." However, the growth rate in the HIS market is

\textsuperscript{44} "Healthcare RTLS and RFID solutions to improve Patient Care Increase Safety and Produce Cost Saving". Endorsed By the American Hospital Association 2008.

\textsuperscript{45} "Hospital Information Systems Market in Europe" from http://www.researchandmarkets.com/reports/1054603/.
considerably lower because of the decreasing number of potential end users year after year.


In a speech at George Mason University on January 8, 2009, then President-Elect Barack Obama goes on record, "... we will make the immediate investments necessary to ensure that within five years, all of America's medical records are computerized..." ElectRIS by MDIA can currently provide HIPAA-compliant access to archived web-based medical imaging examinations on a national basis no matter where the study was obtained, thus facilitating portability and the availability of all of a patient's diagnostic imaging examinations at a single location, for further evaluation, second opinions, comparisons, and other medical needs.

2.38 Dr. Diana S. Bental\(^{47}\) (2009) in her paper titled “Patient Information Systems that tailor to the Individual”. Here in this paper Dr. Diana S. Bental has explained the needs of patients as far as their need to information is considered and also talks about the right to information. The use of ARTIFICIAL INTELLIGENCE is also stressed. Also online training sessions on stress management, and advice are given to the patients where patients use the system to examine their medical record, and to find out further information about the topics mentioned in their record. All the information presented is centered on the patient’s own medical record, which can be viewed as providing a menu of topics to explore.

2.39 Ramesh Raghavan\(^{48}\) (2009) in his write up “Healthcare has no Room for Error”. Tata Consultancy Services, uploaded on company site. In a recent interview with eHEALTH, Ramesh Raghavan, Global Head-Healthcare

\(^{46}\) "ElectRIS by MDIA Answers President Obamas call for Computerization of Americas Medical Records". In Business Wire New York Jan 24, 2009.

\(^{47}\) "Patient Information Systems that tailor to the Individual" By Dr. Diana S Bental uploaded online 20th June 2009.

\(^{48}\) "Healthcare has no Room for Error". By Ramesh Raghavan Tata Consultancy Services, uploaded on tcs.com site June 2009.
Practice, TCS, has revealed various facets of technology, industry and business, excerpts from the interview. He elaborated that, having examined the HMS solution installed in various hospitals in US, Canada and India, I can certainly say that I haven't noticed any significant difference except the way we manage information. What makes us different from those in the West is the way they capture and utilize data. I guess there is one big advantage that we have over western countries – that of absence of legacy. Here, we can directly leapfrog into the most futuristic technology, without getting stuck in existing systems. Also, innovation is now taking place much rapidly in India and at our customers in developing countries, which makes our technological advancements at par with global standards. Additionally, TCS continues to collaborate with its alliance partners in the development of solutions that move their customers up the value chain of information management. Ramesh Raghavan stresses on error free medical practices need aid of computers.

2.40 Business Wire New York\textsuperscript{49} (2009) have reported in their article “Report linker Adds World Hospital Information Systems A Market Report”. This report analyzes the worldwide markets for Hospital Information Systems in US in Millions. The specific product segments analyzed are Clinical Information Systems (CIS), and Non-Clinical Information Systems (NCIS). The report provides separate comprehensive analytics for the US, Japan, Europe, Asia-Pacific, and Rest of World. Annual forecasts are provided for each region for the period of 2006 through 2015. A six-year historic analysis is also provided for these markets. The report profiles 303 companies including many key and niche players worldwide such as Agfa-Gevaert bv, Akhil Systems Pvt. Ltd., Allscripts-Misys Healthcare Solutions Inc., AxSys Technology Ltd., Brunie-Software GmbH, Cerner Corporation, Computer Programs and Systems, Inc., Eclipsys Corporation, GE Healthcare, Healthland, IBA Health Ltd., iSOFT Group PLC, Integrated Medical Systems Pty Ltd., Keane's Healthcare Solutions, McKesson Corporation, Medical Information Technology, Inc., MEDISTAR Praxis computer GmbH, Philips Nederland bv Medical Systems, Quadra Med Corporation, Siemens Medical Solutions USA Inc., Softlink

Market data and analytics are derived from primary and secondary research.
Company profiles are mostly extracted from URL research and reported select online sources.

3.41 Mr. V. Raghunandan Reddy\(^{50}\) (2009) in his PhD thesis “Information seeking behavior of doctors and the hospital Administration in Hyderabad” A Case Study, has specifically identified information needed by doctors in hospitals. Information being a pivotal pillar of doctors in diagnostics. The Information seeking behavior of doctors and the hospital Administration is analyzed with regard to what type of information is most sought by the doctors and others Reddy has listed the type of information sought by the doctors as follows: Patient past history of surgeries, test reports, diagnosis, discharge instructions, medicinal allergies etc.

2.42 Shaikh Shama Parveen\(^{51}\) (2009) in her PhD thesis “Hospital Waste Management. A case study of Mumbai” studies the area of hospitals but only with regard to waste management measures taken up by the hospitals. To analyze the waste management, disposal, reuse and recycling of hospital of the hospital and efforts are seen to make it hospitable waste in Mumbai hospitals. Shaikh Parveen concludes. Wastes in hospitals are disposed off instead of incineration. All hospitals in the district are serious about the concept of ambience.

2.43 The Chogoria Hospital team\(^{52}\) (2009), in Kenya have shared their experiences in their project findings “Hospital Management Information System, A case study analysis in Kenya.” The Hospital Management Information System can pay for itself in two months. This technical note deals with issues of Hospital Information Systems and supports cost vs benefit analysis, in favor of benefits, tangible as well as non tangible origins of the system. At Chogoria, the AFS

\(^{50}\) “Information seeking behavior of doctors and the hospital Administration in Hyderabad, A Case Study” By Mr. V. Raghunandan Reddy. PhD thesis submitted to Osmania University 2010.


team began with a comprehensive study of costs and revenues in each department of the hospital and its network of 31 satellite clinics using the HOSPITAL and CORE costing tools. The study showed that the hospital, which had diversified to try to improve its finances, was losing money on non-core businesses. Hospital managers did not have the information they needed, when they needed it, to make good decisions. The hospital team also state advantages the hospital can get.

Increases revenues collected by at least 20 percent in Chogoria. In Chogoria, the system paid for itself in two months.

- Makes timely, accurate financial information available instantaneously.
- Permits better decision making.
- Cuts workload, especially in areas such as payroll, patient registration, admission, invoicing, billing, cash collection and debt follow-up.
- Automatically computes bed occupancy, average length of stay and mortality, by department, so management can take steps to remedy problems early.

2.44 Dr. Haroon Khan, Dr. Alvin Marcelo, Dr. Fatima Mohbatali/Sohail Baloc and Jai Ganesh\(^{53}\) (2009) in their project, “Economic Evaluation Framework Of Computerization In Hospitals”. This project is dealing with the cost factors involved in computerization of hospitals, with reference to 3 countries viz Philippines, Afghanistan and Pakistan. The researchers studied two types of hospitals one which is computerized and one which is not computerized. The success factors included round the clock support by the Head Of Departments the manual system and HIS were run parallel with the developers sitting with the hospital team throughout peak and non peak hours, this helped the users and slowly they began to feel ownership of the system. Using the system also resulted in suggestions from the users which led to refinement and improvement of the system. Only after the staff became confident was the manual system stopped. User training was an ongoing process.

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\(^{53}\) Project Title: “Economic Evaluation Framework Of Computerization In Hospitals”. By Dr. Haroon Khan, Dr. Alvin Marcelo, Dr. Fatima Mohbatali/Sohail Baloc and Jai Ganesh. Uploaded Online on google.com 2009.
2.45 Jamia\textsuperscript{54} (2009) in his paper titled "Computerizing Practice Guidelines". In this paper, efforts to incorporate complex guidelines those for heart failure from the Agency for Health Care Policy and Research (AHCPR) into a network of physician's interactive microcomputer workstations are reported. The task proved difficult because the guidelines often lack explicit definitions. Increasing amounts of medical knowledge, clinical data, and patient expectations have created a fertile environment for developing and using clinical practice guidelines. Electronic Medical Records have provided an opportunity to invoke guidelines during the everyday practice of clinical medicine to improve health care quality and control costs. (e.g., for symptom severity and adverse events) that are necessary to navigate the AHCPR algorithm. They also focus more on errors of omission (not doing the right thing) than on errors of commission (doing the wrong thing) and do not account for co morbid conditions, concurrent drug therapy, or the timing of most interventions and follow-up. As they stand, the heart failure guidelines give good general guidance to individual practitioners, but cannot be used to assess quality of care without extensive translation into the local environment. Specific recommendations are made so that future guidelines will prove useful to a wide range of prospective users. This study is location specific but has relevant findings for the current research, where points related to clinical practice, and health care quality are mentioned which helps to understand hospital management which is an important aspect of the present study.

2.46 William Okelo Ogara and Michael Ogembo Kachieng'a\textsuperscript{55} (2009) in their paper "Health markets beyond 2020". The author discusses in this paper about pervasive computing. Pervasive computing involves increasingly omnipresent, interconnected computing devices used in the health environment. Pervasive healthcare services include making healthcare services more "pervasively" available across chronological, organizational and geographical boundaries. The convergence of advanced electronic systems, wireless technologies and the Internet is making this possible, adding more value to the health business

\textsuperscript{55} "Health markets beyond 2020" By: William Okelo Ogara and Michael Ogembo Kachieng'a uploaded on google.com 10 Nov 2009.
value-chain. Unlike personal computers, pervasive computing devices are tiny, sometimes invisible. They can be either mobile or embedded in almost any type of object imaginable, all communicating by means of interconnected networks. Pervasive computing could be used to facilitate task-based or activity-based computing within the healthcare environment. This study talks about global technology. The findings can be applied to the present study also in India also, here Dr. Michael talks of lessening the divide between developed and underdeveloped countries using this technology.

2.47 Martin Gorsky\(^56\) (2009) in his paper "Hospital governance and community involvement in Britain: evidence from before the National Health Service" Martin highlights that an important goal of NHS policy today is to increase public involvement in health care, most notably through the Patient and Public Involvement Forums associated with NHS trusts. In the hospital sector this has led to the controversial establishment of foundation trust 'membership communities', which aim to give local citizens a say in management. This is not the first attempt to introduce greater community participation in the running of British hospitals. Prior to the birth of the NHS in 1948 the hospital contributory scheme movement provided ordinary members of the public with the chance to sit on hospital management boards. This article examines the nature and extent of Britain's earlier experiment with local democracy in hospital governance. It argues that historical precedent is not only encouraging, either for the prospect of broadening popular participation, or for making services more responsive to local needs. It therefore points to those areas on which government should concentrate if the policy is to be implemented effectively.

2.48 Infosys company\(^57\) (2009) in their write up "Hospital Supply Chain & Revenue cycle collaboration". The company in their study of market point out that the hospitals have to look into these criteria:

\(^56\) "Hospital governance and community involvement in Britain: evidence from before the National Health Service" by Martin Gorsky in History And Policy. Uploaded online on google.com. 2009.

\(^57\) "Hospital Supply Chain & Revenue cycle collaboration." Write Up by Infosys company. Uploaded online on google.com 2009.
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1) Lack of visibility into cost and reimbursement data across the organization.
2) Performance myopia- functional performance that don’t align with organization - wide performance.
3) Poor collaboration among functional departments such as supply chain, clinical services and revenue cycle.

2.49 Jyotindra Zaveri\(^5\) (2009) in his article "Enterprise Resource Planning: Hospital Management System." Zaveri who is a Computer Engineer in Germany and an IT consultant since 1975 has chalked out the details of ERP implantation in ESCORTS hospital, New Delhi. Where there is a large amount of foreign patients and special data fields need to be catered to in order to process that kind of details. He also has highlighted the advantages of using ERP.

2.50 Robert Kalus, Haq Nawaaz\(^6\) (2009) in their paper “Customer Relationship Management- better health care for patient” Have concluded that paperless case papers give improved and efficient patient monitoring system.
1. Faster patient discharge time.
2. Good bed planning time, account integration and accuracy.
3. Great help in time of emergency.
4. Integration with inventory management of medicines etc.

2.51 Divan Dave\(^7\) (2009) “Electronic Medical Record is an ERP for a Medical Practice” This article throws light on issues like how EMR is an ERP for medical practice. An Electronic Medical Records (EMR) system is needed to add efficiency and significant cost savings to a medical practice. EMR may be the single, most important contribution physicians can make to improve the quality of patient care, while making a practice highly efficient. Advantages

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\(^7\) "Electronic Medical Record is an ERP for a Medical Practice" article by Divan Dave CEO, OMNID Tarrytown, NY, March 23, 2009.
being: Efficiency and cost savings in your Practice: Improving the quality of Patient Care and urging use of EMR systems.

2.52 Mathew Boyle\(^61\) (2009) in their paper “How to Play it: Digital Healthcare” in Business week. New York highlights use of computers and hospital information system software as an added advantage in healthcare facilities making the operations in hospital smooth and helping in serving the patients in an optimum way.

2.53 Marilynne A. Herbert\(^62\) (2009) in her paper titled “Impact of Patients care information systems on healthcare Professionals and Patient care in two community Hospitals”. Marilynne Herbert has done certain observations of two hospitals where one is using HIS and the other is only semi automated. She has clearly observed how the patients and staff both of the hospitals have benefited to a great extent with automation and subsequently are able to perform better and deliver better patient care.

2.54 Hand held devices for doctors in the offing. Doctors can now write their prescriptions on a hand held device which will be connected to the computer and this data can be stored and be used for reference by the nurses and other staff taking care of the patient, reducing the legibility issue of the handwriting of some doctors thereby reducing medical error of the prescription. This news article explains hand held devices which are the future in Technology and creates an awareness of the latest technology available in the market. And also it talks about reducing medical error which is an important aspect of the present study. Times of India 24th August 2009.

2.55 Ravi Das\(^63\) (2010), in his paper “Luxury Vs. Need” discusses the importance of biometrics for the security of the patient data. The need in the healthcare system lies in the fact accurate and up to date patient records need to kept, as


well as having an effective and efficient system to identify those people and patients in need of medical care. The hospitals have the luxury to dispute the issues surrounding Privacy Rights, and if they choose not to, nobody is forcing them to use Biometrics. The organization which is implementing the Biometric system usually will keep a back up, manual system, just in these types of cases. Although they are not required to by law, it is done to “keep the customer happy”.

2.56 Jennifer Trueland64 (2010) in her paper “Doctors call for stricter rules to protect patient confidentiality”, enlightens us on tougher safeguards for electronic records to protect patient confidentiality – partly because doctors themselves might share user names passwords with each other. Speaking ahead of a parliamentary debate on e-health, doctors’ leaders warned that current measures to protect patient information might not be enough. Specifically, the doctors say that the Clinical Portal Technology project – which allows patient information to be viewed electronically by a wide variety of clinicians and, in some cases, by others as well requires tighter controls. The ease with which patient information could now be shared challenged the health service to come up with new ways of protecting information shared by patients. “With the growing use of electronic patient records, it is essential that we know who has looked at which records and when, so we can ensure only appropriate access.

- Administrative procedures involved in general hospital management.
- Problems faced by patient.
- Problems faced by staff.
- Administrative practices.

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64 “Doctors call for stricter rules to protect patient confidentiality” by Jennifer Trueland uploaded online google.com September 21, 2010.
Dr. Vasanti Iyer states in her findings that Hospitals are broadly divided into Primary, Secondary and Tertiary care centers and her findings state that,

- The ambience of the hospital coupled with the services have been given priority is found as a paradigm shift in delivery of healthcare.
- The concept of family doctor for the whole family who had to play a dual role as an administrator as well as doctor is a thing of the past now.
- There is a paradigm shift from traditional healthcare delivery to modern super specialty healthcare. Doctors are technically as well as professionally skilled and lead their own private hospitals in the most efficient manner through their flat type of organization.
- Labor turnover is experienced in every hospital and the frequency is half yearly.
- There have been reports of harsh behavior at the reception and sometimes no one at the reception to attend to the patients.
- To add to the agony of the patients, most of the patients have to wait for more than one hour at the reception to meet the doctor unless prior appointment has been taken.

Though many hospitals claim tall about computerization, many records and personal details of patients have not been covered thus leading to duplication of work at many stages.

2.58 Sunil Doke\textsuperscript{66} (2010) in a consultancy for Sahyadri Hospitals Nanded titled “Public Relations System for Hospitals” has done a study on a related topic to hospitals. He studied the public relations management of hospitals with regard to patients in Nanded as a consultancy service to the hospital. He talks about, Customer Relationship Management (CRM). The importance of customer in service delivery is to educate and reward customer. As the hospitals are already equipped with patient data in detail, they could be used appropriately on different occasions. Hospitals should make a note of next check up. There

\textsuperscript{66} "Public Relations System for Hospitals". By Sunil Doke. Consultancy for Sahyadri Hospitals Nanded 2010.
is a need for hospital administrator to run hospitals on scientific lines so that healthcare delivery could be more efficient than the existing ones.

2.59 Dr. Smt. Gyaman Guruprasad Murthy\(^{67}\) (2010) in her PhD thesis “Organizational culture in Hospital Public & Private sectors” has carried out a research regarding the culture in Hospital Public & Private sectors, she concludes that the ambience of the hospital coupled with the services have been given priority is found as a paradigm shift in delivery of healthcare. The patient’s delight is of utmost importance to all hospitals. It is found that majority of the hospitals have undergone a metamorphic change from the age-old types to the modern ones. There is change right from the gate of the hospital to the rooms of the patients. Hospitals try to provide all the modern amenities, which bring about patient delight and this is of course comes with a price tag attached to it.

2.60 Upadhaya Shivakant\(^{68}\) (2010) “Primary Health Centres and Healthcare Delivery: A case study of Two Adivasi Talukas- Jawhar and Mokhada of Thane District. The two talukas Adivasi Talukas- Jawhar and Mokhada of Thane District were taken with a view to study the Primary Health Centers and Healthcare Delivery available to these groups. Upadhaya Shivakant observed that though government initiative is there to a large extent the people here prefer to get medication from the local ayurvedic and herbal practitioners and there is a marked lack of awareness.

2.61 Lisa E, Harris, MD; Michael D. Murray\(^{69}\) (2010) in their article “About Medical Appointment Scheduling Software” have explained about the software. Since many technological advances in the recent past, the work that has to do with large blocks of information include the pursuit of every detail

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\(^{68}\) “Primary Health Centres and Healthcare Delivery: a case study of Two Adivasi Talukas- Jawhar and Mokhada of Thane District”. PhD thesis by Upadhaya Shivakant submitted to Bharati University 2006.

\(^{69}\) "About Medical Appointment Scheduling Software" By Lisa E, Harris, MD; Michael D. Murray. Uploaded online google.com. February 24th, 2010.
in every sector, it is not difficult anymore. With advances in technology, the invention makes it easy for all activities of the software.

This software can take care of all that you are too light and less cumbersome. Even people in the medical field like doctors or Office Assistants enjoy the ease of doctors Software. The most important thing for the practice of the book by a doctor appointment and related software for medical examination, which helps the good administration of the organization.

**Types of Medical Practice**

If the doctor a general practitioner or a part of a health organization, medical administration. A good and appropriate software should be able to integrate and collaborate with other Software. Some software products are designed for large organizations in many locations and some are designed for the practice of small size medical Scheduling Software. Software programming doctors who use the color-code to indicate exactly when the doctor at the hospital. This software is so flexible that it allows images of the patient, instead. Doctors and medical assistants enjoy the ease, knowing that their names and recognize them. These software Trackers have to make an appointment for the patient, the doctors, the availability at this time. The best part is that a free demo version is also planned, so that the doctor can perform and see if it could not be easily or exported. It is only after the hearing that the practitioner must complete the election.

2.62 Open The Medical Chest. India’s bid to exploit the potential of medical tourism should also drive it to improve its health services. Outsourcing of business from developed countries to developing countries, where the same business could be carried out cost-effectively is a significant practice in global business. This continues to be the driving force behind the dramatic growth in IT and IT enabled services (ITES) industry in India. In the healthcare sector, medical tourism is rapidly emerging as a hot sector, as individuals in the developed countries, especially the US, are relying on cost-effective medical services abroad. Dr. David Himmelstein, the lead author of a study on personal bankruptcies and associate professor of Medicine at Harvard, noted
"Unless you are Bill Gates, you are just one serious illness away from bankruptcy. Most of the medically bankrupt were average Americans who happened to get sick". India has a very good future for medical tourism because of excellent medical services at a substantially lower cost than what is available in the US and other developed countries. The above newspaper article enlightens us about how India can be a hub for medical tourism provided it adheres to the standards and also emphasizes on the health insurance factor. Both these aspects are a part of the current study. Pune Mirror, Monday March 1, 2010.

2.63 Zanele Dlamini\(^{70}\) (2011) in his paper "Quest for quality customer care in public health facilities" stresses on patients rights. He emphasizes that the ministry of health is expected to adhere to the Swaziland Patients' Rights Charter which all health practitioners subscribe to and it also enables patients to know their rights.

The health service in the country is there to respond to patient needs while ensuring that quality service is being provided at high standards. Everyone has the right of access to health care services which include health information in both local language and in English, on available services. A positive attitude displayed by health care providers demonstrating courtesy, human dignity, patience, empathy and tolerance despite the stressful experiences. In January 2010 a consensus building meeting on the development of a customer care programme within health facilities was held in Mbabane. This meeting gave birth to the Customer Care Programme which is now being implemented in almost all the health facilities. Customer Care Officers were later identified whose main role is to assist patients maximize what they get from the services rendered at the health facility.

\(^{70}\) "Quest for quality customer care in public health facilities" by Zanele Dlamini uploaded on google.com 18 June, 2011 subject of Management, competitiveness and development. 2006
Jennifer Vogel\textsuperscript{71} (2011) in her paper "Electronic records mandate strains rural hospitals." has studied the problems a rural hospital faces in computerization. Under federal health care reform, hospitals and clinics have to start using electronic records to a "meaningful" degree by 2015 or face escalating penalties. For now there are incentives, but down the line, most underachievers will see Medicare reimbursements trimmed by 1 percent per year up to a possible 5 percent. Behind the scenes, hospitals are struggling to implement the systems. Rural communities worry the mandate, which can cost millions of dollars to meet, could further strain small-provider finances, forcing them under or leading them to join larger health systems like North and South Dakota-based Sanford Health and Duluth-based Essentia Health. Medical consolidation is already a trend in the state. Since 1987, according to the Minnesota Hospital Association, 28 rural hospitals have closed. And just during the past 18 months, eight hospitals have gone under the wing of larger systems. "Hospitals are very paper-based". Part of the problem is that hospitals start from so far behind when it comes to electronic records, says Joe Wivoda, a technology consultant for the National Rural Health Resource Center in Duluth. "Hospitals are behind every other industry in information technology," he says. According to Waved, certain departments do use digital systems, like labs, radiology and, of course, billing. But "the priority has never been to put information technology at the point of care where it can impact safety, efficiency and quality. "Hospitals are very paper-based," he adds. Wivoda credits federal health care reform with "giving everybody a kick to get them to move in the right direction." But he also says it can take years to get an electronic records system up and running. "A lot of hospitals are going to run into the fines," he says. "It's going to be probably half or more who won't be able to reach it in time."

PCMC propose health cards for poor patients. The PCMC will introduce health cards for poor patients for their convenience in YCMH hospital. The total cost of the project is 4.75 crore. It will save printing cost upto 4 lac a year of case papers. PCMC medical officer Nagkumar Kunchagi said, it will start

\textsuperscript{71} "Electronic records mandate strains rural hospitals" by Jennifer Vogel, Minnesota Public Radio google.com. June 20, 2011.
form May first in YCMH and then in the other 6 civic hospitals only, they will be connected through LAN. The poor and illiterate people easily misplace their case papers, and stand in long queues to get fresh papers and spend Rs. 8 per case paper this will spare them of this ordeal. Since this article talks about PMC hospitals it is adding value to the present study as the present survey is about computerization of hospitals in and around Pune. Sunday Times of India, Pune February 14, 2010.

2.66 Pune Hospitals lack international JCI accreditation, important for any city to be recognized as a medical tourism Hub. By Vishakha Sharma. JCI The Joint Commission International is an international accreditation, which offers accreditation for a subscription fee to the hospitals and health organizations. JCI is part of the Joint Commission Resources (JCR) in the USA. India is a preferred medical tourism destination today. Many hospitals have the JCI accreditation. It is very expensive to get the accreditation says Dr. Muglikar of Jahangir Hospital, but soon they are moving towards it. Ruby Hall as of now has the NABH accreditation which is the Indian version of JCI says Dr. Sujata Malik, medical Director of Ruby Hall National Accreditation Board of hospitals but soon they are moving towards JCI accreditation. Pune can attract foreign patients if the hospitals acquire it. Though the issue which is tackled is of medical tourism. Guidelines on acquiring accreditation from various regulatory bodies have been mentioned whereby; India can become the destination for medical tourism. Times of India, Pune Mirror, March 17, 2010.

2.67 “Now, new system to collect health data, By “Neha Madaan” This web enabled system aims at facilitating district level public health data capturing on a monthly basis, as against other data collection systems that provide health-related information after long intervals of time. An initiative of the ministry of health and family welfare, the Health Management Information System (HMIS) interface therefore, involves health officials at the district and state level uploading health-related data on a monthly basis on the HMIS portal online. Times of India June 27th March, 2011.
“Pvt. Hospitals will have to display treatment costs” Govt. Readies Plans to curb overcharging by Durgesh Nandan Jha. In a major move aimed at checking unnecessary medical tests and procedures, the health ministry on Sunday said it was working on a plan to make it mandatory for all private hospitals to declare and display the treatment costs of different diseases. This is aimed to curb the overbilling and bring it in transparency in the healthcare sector. As the present research study covers the fifth objective of hospitals that is information, data of this kind will needs to be displayed can be stored and updated on the computer and then printed from time to time in the hospitals. Times of India 8th October, 2012.

Analysis of the literature
The literature review done on the basis of Research articles, research papers, in national and international journals and magazines, internet, newspaper articles, and also literature written by the software developers in the area of Hospital Information Systems and Hospital Management as a whole. Related theses have also been studied as a base for the study. The areas in which work has been done is, Medical Informatics or Health Informatics, market for software, guidelines for hospitals for use of computer technology, cost verses benefit analysis, acute problems faced while implementing an HIS, HIS as a Decision Support System, HIS as Management Support Systems (MSS), Patient Care Information Systems (PCIS), effective software training, electronic patient records leading to paperless hospitals, guidelines for hospitals to get into a software contract, patient care preferences and satisfaction, physicians being computer-illiterate and their apprehension about having to do a lot of typing and complicated computing, Health Insurance Portability and Accountability Act (HIPAA) and government regulatory mandates for EMR, right to information, the use of artificial intelligence, online training of patients on diseases and prevention, advantages of using Enterprise Resource Planning (ERP), Hospital Information Systems (HIS) as Customer Relationship Management (CRM), pervasive computing and nanotechnology, hand held devices, Joint Commission International (JCI) accreditation, Unique Identification (UID) and health cards, patient and medical imaging, cloud computing in HIS. The following list gives a list of research that has been carried out in the area of hospitals but no research has focused on the current
topic of study, which makes the present study very innovative and offers fresh insights into an area which is clearly unexplored and needs to be probed into.

Many researchers have studied the current topic of research with respect to technology used in healthcare industries, hospital management. The current study is a comprehensive research on software industries developing software for hospitals. The various HIS software are studied to analyze various modules offered, recovery and backup techniques, security methods used as well as investigating various aspects of the end user of these software in hospitals which the researcher has intended to do especially in Pune region. The research papers, articles, projects are all covering various aspects of the study of computerization of hospitals, like decision making, hospital information systems etc. But the present study is a comprehensive study of all these aspects and more, and is unique study of its kind. As it also covers user training and a detailed study of Hospital Information Systems available in the market, with regard to modules available and standard features of the software in an analytical and comparative methods. All aspects of hospital management and decision support system and the impact on decision making are studied. A detailed insight to the user training in hospitals and the relation it has to the enhancement in effectiveness of the success of implementation of HIS also the most important entity which is the patient of the hospital has also been taken into consideration. A detailed insight into the software industry catering to the computerization needs of hospital is also carried out. This makes the current study a robust analysis of the Medical Informatics Industry.

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