CHAPTER 2

LITERATURE REVIEW AND ANALYSIS
Planning is the first and the most crucial function of management that tell where to begin and how things would be well-organized in a system. Human beings are the most privileged animals of the creation because they need not start every new thing from the beginning. The past experience is always helpful to them. They learn from the past and make the plan for the future. In this context, a review was made of the existing relevant literature available on the topic. The review literature was categorized in five different categories. These were:

2.1 Studies related to information systems usage in the bank.
2.2 Studies related to information systems usage in other similar organizations.
2.3 Studies related to the performance of the bank.
2.4 Studies related to impact of technology on working of the bank.
2.5 Other related studies which can help in our research work.

2.1 Information Systems usage in the Bank
The paper titled “Role of Information Systems in Banks: An empirical study in the Indian Context” by A.M. Rawani and M.P. Gupta (2002), made an attempt to explore empirically the difference in the role of IS in the banking industry, i.e., between public sector, private sector, and foreign sector banks operating in India. This paper uses a strategic grid to determine the role played by IS in banks. The study carried was focused on role of Information Systems in banks from the perspective of technical persons in development and maintenance of IS, i.e. strategic or supportive. The study indicated that IS played a supportive role in public sector banks and a strategic role in private
and foreign sector banks. The study also indicated that the future impact of IS does not vary significantly with the banking groups.

Kaushik Mukerjee (2006) in his paper “CRM in Banking-Focus on ICICI Bank’s initiatives” had focused on CRM in Banking and its applications in ICICI Bank. The CRM in ICICI is being used for targeting customers, sales, consistent interface with customers, etc. ICICI Bank has managed to focus better on customers by undertaking a serious approach that has enabled it to manage its operations effectively. It included better targeting of customers; higher share of wallet; more effective channel strategies; database marketing, etc. The bank is able to evaluate customer usage pattern through CRM data warehouse. New products are developed through extensive customer profiling. Through CRM, ICICI is able to manage its data centrally.

Shyam Ramadhyani (2006) in his paper titled “Audit of Banks operating in a computerized Information Systems Environment” focused on Audit related issues of IS in bank. It was emphasized that the use of computers changes the processing, storage, retrieval and communication of financial information and may affect the accounting and internal control systems employed by a bank. The potential for human errors in the development, maintenance and execution of computer Information Systems may be greater than in manual systems, due to level of details inherent in these activities. Through audit reviews, a thorough look and understanding of IS in bank can be seen. The audit of IS would provide us general understanding of IS in bank, managing authentication of users, access control, data security, data integrity, audit
logs, testing, accounting entries, data migration, network and RDBMS security, business continuity and disaster recovery plans, hacking, identification of transaction for substantive checking, use of reports generated by system and documentation.

The paper titled “Application of IT in Banking” by K.S. Rajashekara (2004), talked about impact analysis of IT on banking. The problem of doing proper impact analysis is due to difficulty of measuring output accurately when the quality of service is changing as a result of such factors as convenience, speed, and lower risk. Through IT, banks anticipate reduction in operating costs through such efficiencies as the streamlining back office processing and elimination of error-prone manual input of data. Owing to IT, bank can offer new products and services. Banks are able to develop and implement sophisticated risk, information management system and techniques with more powerful data storage and analysis technologies. IT has positively affected the stakeholders of bank like management, employees, and customers.

Vasant Godse (2005) in paper titled “Technology: An Impact Analysis” talked about role of Information Technology in banking. Banks faced the enormous task of re-orienting their technology infrastructure towards such interactive decision support and information gathering tools, much different from transaction processing and final accounting. The impact of technology could be on relationship with information technology providers, organizational aspects, banker-customer relationship, control and supervisory aspects, new concepts and processes, which help in further gaining competitive advantage.
A paper titled “Information Orientation: People, Technology and the bottom line” by Donald A. Marchand, William J. Kettinger, John D. Rollins (2000), stressed upon the effective usage of information for business performance. It was stressed that IT improved business performance only if combined with competent information management and the right behaviors and values. The research was applied on banks. Banks were evaluated on three broad scales i.e. IT Practices (including IT practices for Operational support, IT for Business-process support, IT for Innovation support, IT for Managerial support); Information Management Practices (Sensing information, Collecting information, Organizing information, Processing information, Maintaining information); Information behaviours and values (Information Integrity, formality, control, sharing, transparency, proactiveness). Companies that incorporated a people-centric, rather than merely techno-centric, view of information use and that are good at all three information capabilities would improve their business performance.

A paper titled “Understanding the impact of IT-based coordination on the performance of Information-intensive firms: A Gestalt approach in Banking Industry” by Yannis A. Pollalis (2003), moved towards the development of such an explanatory and predictive model of IT-based performance by distinguishing three types of organizational systems integration (or coordination) that impact the performance of information-intensive organizations: Technological Integration (i.e. the integration of various IT components such as data, applications telecommunication, and systems); Functional integration (i.e., the coordination of responsibilities and roles
2. Literature Study and Analysis

across a firm’s value-chain activities between corporate and IT planning activities); and Strategic integration (i.e. effective decision-making at all levels, increased productivity and better return on investment). The organizations with coordinated elements (i.e., strategy, structure, and technology) will be more successful than uncoordinated ones. Banks were chosen as the context for the empirical phase of the study because of their high information intensity and their focus on customer service and cost management. The research indicated the existence of successful and unsuccessful patterns of integration, that is, certain combinations of technological, functional, and strategic integration might lead to better or worse performance. Strategic and Technological integration were found to be most important elements of success, which indicated the importance of consistency between technological and strategic infrastructure.

The paper titled “Learnings from Customer Relationship Management (CRM) Implementation in a Bank” by M.P. Gupta and Sonal Shukla (2004) attempted to highlight the learnings from CRM implementation in the banking sector. CRM systems were particularly relevant to retail financial services companies, allowing much of the management of the customer relationship to be automated with the objective of maximizing the profitability of individual customer relationships while minimizing the cost of managing those relationships. The study was supported by a case study of CRM systems in a major Japanese Bank—Bank of Mitsubishi and also a field survey of scenario in Indian banking sector. The various issues examined included organizational information, the CRM strategy, strategic changes resulting from CRM
implementation, implementation priorities for the banks and the factors indicating the performance after CRM implementation. The study revealed that CRM was gradually picking up and was definitely considered as a viable proposition by banks in improving services to their customers. One of the major challenges experienced during implementing CRM was resistance to change. To get CRM to work, high commitment was required in those who were implementing it.

The paper titled “Impact of Information Technology on the Indian Banking Sector” by Harmeen K. Soch and H.S. Sandhu (2003) emphasized that impact of IT on banking was so radical that it would be a key determinant of success or failure in the industry, a key determinant of whether banks as a recognizable grouping continue to exist, and a key determinant of the differentiation between competitors in financial services. Mere possession of sophisticated IT would not guarantee success in future. The ability to apply IT effectively, i.e. to increase profits by reducing costs or adding value, will be the key. Banks that choose to use IT strategically would be long term beneficiaries of the Information revolution.

2.2 Information Systems Usage in other similar Organizations

The major objective of the study carried by Catherina Yi-Fang Ku (1995), with title “A Critical Success Factors Study of Management Information Systems Downsizing from Management Information Systems Managers' Perspectives” was to extract and test critical MIS success factors derived from previous research in order to empirically determine critical success factors (CSFs) for
MIS downsizing success. CSFs were considered from the perspective of MIS managers. Seven CSFs for MIS downsizing success were identified: communications between users and the MIS department, the managerial objectives of MIS/DP operations, the commitment and support of MIS downsizing, the MIS department’s service function, user participation, appropriate applications, and the user satisfaction. The study was focused on determining critical success factors that could help in decreasing the size of MIS in an organization. It did not talk about effectiveness of IS in an organization. More focus was on downsizing rather than on evaluation of IS based on KPI.

The major objective of the study carried by Helmut E. Zsifkovits (1996), titled “Success factors for management support systems implementation” was to delineate the reasons for the low level of Information Technology acceptance and discuss different aspects of Management Support Systems (MSS). This study emphasized on decision process with special reference to group decisions. Critical Success Factors (CSF), Key Indicator Management (KIM) and One-Page Management (OPM) were discussed as methods to establish yardsticks for measuring a company’s performance and provided a framework for data structures in MSS. The study was focused on finding reasons for low level of IT acceptance in Management Support Systems in an organization, rather than on evaluation of IS after implementation.

The paper with title “A critical review of end-user information system satisfaction research and new research framework”, carried on by Norman
Au, Eric W.T. Ngai and T.C. Edwin Cheng (2002), presented a critical review of research in End-User Information System Satisfaction (EUISS). To provide more insights into the psychological processing of the information system performance construct and its impact on EUISS, an integrated conceptual model was proposed based on the equity and needs theories. The implications of the proposed model for EUISS were discussed, and suggestions were made for testing the model. The study was focused on End-user satisfaction from information system. More stress of the study was on psychological processing of information systems and a model was proposed on equity and needs theory. Technical aspects of system usage were not considered.

The paper with title “The Delone and Mclean Model of Information Systems Success”, by Williams D. Delone and Ephraim R.Mclean (2002), presented Information Systems (IS) Success Model as a framework and model for measuring the complex-dependent variable in IS research. They discussed the utility of the model for measuring e-commerce system success. The study was focused on measuring e-commerce system success through a proposed model.

The paper on “Investment in Enterprise Resource Planning: Business impact and productivity measures”, by Lorin M. Hitt, D.J. Wu and Xiaoge Zhou (2002), discussed that Enterprise Resource Planning (ERP) software systems integrate key business and management processes within and beyond a firm’s boundary. There was little large-sample statistical evidence on whether
the benefits of ERP implementation exceed the costs and risks. It was found that firms which invested in ERP tend to show higher performance across a wide variety of financial metrics. Even though there is a slowdown in business performance and productivity shortly after the implementation, financial markets consistently rewarded the adopters with higher market valuation. The study carried on was focused on cost-benefit analysis of ERP implementation. It did not talk about overall integrated evaluation of IS.

The results of the study “The impact of technology investments on a firm’s Production Efficiency, Product Quality, and Productivity”, by Matt E. Thatcher and Jim R. Oliver (2002), examining the contribution of IT to productivity, were mixed. One reason for these mixed empirical findings may be that these studies have not effectively accounted for the impact of technology investments that increase production efficiency and improve product quality on firm productivity. In particular, it was assumed that such investments should lead to gains in both profits and productivity. It was demonstrated that investments in technologies that reduce the firm’s fixed overheads costs do not affect the firm’s product quality and pricing decisions but do increase profits and improve productivity. It was also demonstrated that investments in technologies that reduce the variable costs of designing, developing, and manufacturing a product encourage the firm to improve product quality and to charge a higher price. Although this adjustment helped the firm to capture higher profits, it would also increase total production costs and would, under a range of conditions, decrease firm’s productivity. Finally, it was shown that the direction of firm productivity following such investments depended upon the
relationship between the fixed costs of the firm and the size of the market. The study carried on was focused on impact of technology investments on product-based industry only.

The purpose of the paper named “Impact of Information Technology management practices on customer service”, by Jahangir Karimi, Toni M. Somers and Yash P. Gupta (2002) was to gauge whether IT management practices differ among firms where IT has a major role in transforming marketing, operations, or both, which gave the firms advantage by affecting customer service. Several research hypotheses were tested using data obtained from a survey of 213 IT-leaders in the financial services industry. The results clearly indicated that the IT leader firms had a higher level of IT management sophistication and a higher role for their IT leaders compared to IT-enabled customer focus, IT-enabled operations focus, and IT-laggard firms. The study concluded that IT management practices differed among IT leader firms, IT-enabled customer focus, IT-enabled operations focus and IT-laggard firms. This paper was silent on other aspects of IT like functional integration, technological integration, etc., besides customer service.

The paper on “Organizational Environment and Information Systems”, presented by Kamna Malik and D.P. Goyal (2003), suggested an ACE Model – a 3-ring model, which comprised of processes to (A)dapt, (C)ollaborate and (E)valuate, in order to establish and evaluate organizational effectiveness for improved IS effectiveness in the organizations. At the core was the need to cultivate a culture to adopt the latest tools and techniques for higher end use.
Next, the people must collaborate and work in teams for faster and beneficial plans and implementation. Finally, a well-defined process for constant monitoring and refinements of the plans was required. The rings in ACE model signified continuity of the three processes. This was a general model applied on automobile manufacturing industry.

The paper on “Information Technology Usage: an Indian experience”, presented by M.P.Gupta and Sanjay Kumar (2004), devised phases of IT usage in Indian organizations. The IT usage could be described in three phases, which coincided with three levels of IT applications, viz., automate, informate, and transformate. The automate phase referred to that period which saw the development of those applications of IT that served essentially to reduce operating time (work faster) and increased operating efficiency (make fewer mistakes). In this phase, there was a strong emphasis on reducing the manual aspects of clerical, routine, and tedious work. In the informate phase, IT was used to generate and deliver extensive management reports and decision support systems (DSS). The transformate phase traced the development of strategic IT for competitive advantage. The researchers stressed that KPIs linked to the goals and objectives of the organization need to be clearly identified and incorporated into the IS so as to monitor the health of the organization at all times. But only a few organizations had done so in India.

Technology Acceptance Model (TAM) was proposed by Fred Davis (1986) in his doctoral thesis. It examined the mediating role of perceived ease of use
and perceived usefulness in their relation between systems characteristics (external variables) and the probability of system use (an indicator of system success). Overall, TAM was empirically proven successful in predicting about 40% of a system’s use. TAM was a useful model, but had to be integrated into a broader one, which would include variables, related to both human and social change processes. Limitation was that, it was applied on student community and not on business environment, and didn’t involve much of business applications. This model talked about end user’s perspective only, not about other stakeholders of the system. Performance of IS in organization should be studied from functional and strategic point of view also.

Robert G. Fichman and Scott A. Moses (1999) while discussing their paper on “An incremental process for software implementation”, had said that even when all elements for a smooth implementation were present like support of senior management, adequate staffing and funding, a good fit between the needs of the organization and the capabilities of the software, and a solid information technology (IT) infrastructure, the implementation project sometimes failed to achieve the desired results. The traditional approaches of one time implementation do not work with dynamically changing requirements of an organization. They suggested an approach of incremental process for software implementation. They suggested implementation strategy based on principle of Result-Driven Incrementalism (RDI). The critical success factors (CSF) for the implementation of RDI approach were Technology divisibility, Technology and methodology fit, Technology and organization fit. This study was focused on problems of implementation, not on evaluation issue.
Charles R. McClure and John Carlo Bertot (2001) while discussing in their Book on “Evaluating and using Networked Information Resources and Services”, had written about the evolving context of evaluation, new methodologies for network evaluation, cross-discipline education and training, publicizing the importance of evaluation, combining technical and social-evaluation research, and the need of additional research. The five sections in which he divided the discussion were focused on evaluation of Networked Information Services. The first section focused on frameworks for evaluation. The second section moved on to discuss the methodologies for network evaluation. The third section explored various ways to explain and measure usability. In fourth section policy issues were covered. In fifth section it was emphasized that the information-science-evaluation paradigm needed to change “to remain relevant and connected to the real world of systems building and systems use.” The study focused on evaluation of Networked Information Resources and Services and their relevance for real world systems. This study talked more on technological integration and was silent on other performance indicators of IS.

A paper with title “Managing information technology evaluation-techniques and processes”, by L.P. Willcocks (2002), discussed that Evaluation brings into play notions of costs, benefits, risk and value. It also implied an organizational process by which these factors are assessed, whether formally or informally. The research showed the following problem areas for evaluation of IT plan which includes: Inappropriate measures, Budgeting practice
conceals full costs, Understanding human and organizational costs, Understating knock-on costs, Overstating costs, Neglecting ‘intangible benefits’, Not fully investigating risk, Failure to devote evaluation time and effort to a major capital asset, Failure to take into account time-scale of likely benefits. The study further stressed on problem areas for evaluation of IT plan. It did not talk on implementation and after-use of IS and its effectiveness.

V. Nanda Mohan & V. Ajayakumar (2005) in their paper titled “Managerial Effectiveness through IT”, had developed a new model for the IT enabling process. The main stages of the model were design of Information architecture, development of transaction systems, internal integration & development of management information systems, design of inter-organizational databases and business scope redesign. The software development in second stage was in accordance with the design completed in the first stage and was in anticipation of the requirements of the third and fourth stages. This study proposed a specific order for the events related to IT-enabled activities.

The paper by A. Rafiq (2003) with title “Practical Approach to Information System Audit”, stressed on objectives of IS Audit including appropriate controls to be implemented in IT as designed and envisaged by the senior management. IS Audit was expected to provide reasonable assurance to the management that appropriate controls are designed and implemented in Information Systems supported by Information Technology. IT Audit involved
finalizing scope of audit, identifying related standards, perform specific tasks and execute audit as per audit phases. IS auditor covered following areas in IS audit of banks: Implementation audit; Environment and physical access controls review; Logical access controls review; IS operations review; SDLC control review; Business continuity planning review; Application controls and Data security review; IT security review; IT policies review; Certification of vendor software and IT Training.

The paper titled “Using Technology for Strategic Advantage” by R.Jagannathan (2003), cautioned Indian companies from investing in Information Technology in a hasty manner. It discussed about the common pitfalls companies faced in implementing technology solutions. It emphasized that the use of technology for strategic advantage was possible if top management commitment was there. The investment in IT should emerge from a business need. IT solutions should be applied after change management, by managing expectations of employees. The intangible benefits and intangible costs should also be taken care of, besides ROI and Payback periods. Decisions to invest in IT should be taken jointly by business unit heads and the IT department. Companies should target those vendors who have the domain knowledge and experience in executing them.

The paper "Implementing ERP Systems: Case Study on Critical Success Factors" by Kavita Gorwani (2005), emphasized that ERP was a major initiative, a culture change, which needed the commitment of the entire organization from top management to line staff. Though it took time to
demonstrate benefits, but a well-planned and structured approach to implementation definitely lead to the fulfillment of goals. This paper took the case of Nike, a footwear and apparel company. The critical success factors for ERP implementation were Business plan & vision; Change management program & culture; Top management support; Effective communication; Software development, Testing & troubleshooting; Business process redesign & minimum customization; ERP teamwork & composition; Appropriate business & IT legacy system; Monitoring & evaluation of performance; Effective project management & Responsible project leader.

The paper titled “A conceptual model of the challenges in successful Information Technology implementation to the businesses: A human centered approach”, by Himanshu Aggarwal, D.P. Goyal, P.K. Bansal (2005), emphasized the human aspect of Information Technology. A very important factor in the successful IT alignment to the business was people’s involvement, participation, changing attitude and the overall culture of the organization. The inherent problems with the human aspect of implementation of technology had been discussed with special reference to the Tacit knowledge, i.e., an experience based practical and experimental knowledge deeply rooted in human beings. The tacit knowledge despite its importance has been undermined and is largely un-exploited. Finally, a conceptual model entailing the various challenges in the technological implementation of Information Technology with humanitarian approach has been presented in order to achieve continuous improvement, innovation and sustainable competitive advantage.
P. Vijayraghavan & G. Kannabiran (2003) in their paper titled “Framework for Strategic Information Systems Planning in the Indian Context”, talked about Strategic Information System Planning in India. Even though Indian Organizations realized the growing strategic importance of IT and the need for IS strategic planning, a comprehensive IS strategic planning exercise and its alignment with strategic business planning was lacking. Traditionally IS functions were viewed as support functions. Organizations, during successive planning periods, would move into another fit from their current fit. An organization that was presently in the offensive or defensive fit will try to move into the competitive fit. Organizations in the offensive fit had to convert the low scope for leveraging IT to high scope through proactive technology development, organizational changes and increased resource commitment. Organization in defensive fit needed to scan the business environment and convert business opportunities into meaningful strategies. There was need to improve the internal factors which may range from additional resource allocation, strengthening of IS organization to consider new business models and identifying new business opportunities.

The paper titled "Success Parameters for Technologies companies in the IT Arena--An Indian perspective" by M. Chandrasekaran (2002) talked about problems of Indian Technology companies. The home-grown Technology companies required help on certain fronts like: a network of foreign collaborators who supported with funds and market technology; an Indian network of mentors who could assist the company grow and manage its
growth in a proper manner; appropriate growth and expansion funding from Indian banking institutions; support from Indian technologists/ academics; govt. support in Intellectual Property licensing/ patenting at International level, funding, etc.

M.P. Jaiswal (2002) in his paper titled “Enhancing Business Value Through ERP Enabled E-Business Transformation”, tried to do business impact analysis of ERP Adoption in India. He had taken up the case of Mahindra & Mahindra (M & M). It was found that ERP implementation has resulted into following instant benefits. The manufacturing, logistic management, product data and financial processes of the company were now linked and it had access to the information it needed to keep the lead in a demanding marketplace. The company had a long-term delivery solution - a high performance business critical system and information was continuously available for decision-making. There was instantaneous availability of inventories and company was able to respond to customers quickly. Overall there was positive impact on enterprise productivity after ERP adoption.

The paper titled “Achieving and Sustaining Business-IT Alignment” by Jerry Liftman and Tom Brier (1999) talked about enabler and inhibitors that helped and hindered IT-alignment with business. The major enablers were: Senior executive support for IT, IT involved in Strategy development, IT understands the business, Business/IT partnership, Well-prioritized IT projects and IT demonstrates leadership. The major inhibitors were IT/Business lacked close relationships, IT does not prioritize well, IT failed to meet its commitments, IT
does not understand business, Senior executives do not support IT, and IT management lacked leadership. The components of alignment were Business Strategy (Business scope, Distinctive Competencies, Business Governance); Organization Infrastructure and Processes (Administrative Structure, Processes, Skills); IT Strategy (Technology Scope, Systematic Competencies, IT Governance); IT Infrastructure and Processes (Architecture, Processes, Skills). A six-step approach was designed to make strategic alignment work in any organization and maximize alignment enablers and minimize inhibitors. This approach was: Set the goals and establish a team; Understand the Business-IT Linkage; Analyze and prioritize gaps; Specify the actions i.e. Project management; Choose and Evaluate success criteria; Sustain Alignment.

The paper titled “Blending Business and IT Strategy: A conceptual Model” by R.Ramaswamy (2002), had provided conceptual framework by combining Nolan & Croson model and Deming’s PDCA (plan-do-check-act) model. N&C model proposed 6-stage transformation process about increasing employee’s productivity by utilizing capabilities of IT. It started from building of IT infrastructure; seeking dynamic balance in organization to create strategic advantage; develop a market–access strategy to create customer value by quality and cycle time; identifying attributes important to customers rather than attributes based on technical quality; ensuring a fit between the organization and its environment; organization should pursue a global scope by continuously expanding and contracting through strategic alliances. The proposed model combined the modified N&C model and its infrastructures
with other strategic initiatives. The model aimed at integrating the people and the technology aspects while designing an organization as a responsive man-machine system.

The paper titled “Why do people use Information technology? A critical review of the technology acceptance model” by Paul Legris, John Ingham, Pierre Collerette (2003), suggested Technology Acceptance Model 2 (TAM2). TAM had proven to be a useful theoretical model in helping to understand and explain use behaviour in IS implementation. It examined the mediating role of perceived ease of use and perceived usefulness in their relation between systems characteristics (external variables) and the probability of system use (an indicator of system success). A new and improved version of Davis’s model: TAM2 was used that included subjective norms, and was tested with longitudinal research designs. Analysis of empirical research using TAM shows that results were not totally consistent or clear. Research has shown that the influence of some factors on intention to use IS, varies at different stages in the IS implementation process. It was concluded that TAM is a useful model, but has to be integrated in to a broader one, which would include variables, related to both human and social change processes.

A paper titled “Building and Sustaining Competitive Advantage in the Knowledge era - Can Information Technology Help?” by DevKamal Dutta (1999), emphasized that adoption of a conscious IT strategy and its deployment does provide a firm with competitive advantage, the level of advantage derived from IT depends on the level of environmental turbulence
associated with the firm’s business. It could vary from industry to industry. By itself, IT cannot sustain this competitive advantage, for this to happen, role of the manager or IT-user within the firm as well as the organizational culture and its adaptability towards knowledge management (KM) through use of technology assume paramount importance.

A paper titled “Information Technology as a Competitive Advantage-Status & Trends of Enterprise Wide Computing in the Indian Manufacturing Industry” by Kapil Bhatia (1999), emphasized that companies faced the daunting task of reconfiguring their corporate IT networks piecemeal, and were in the dire need of a comprehensive solution. Large organizations worldwide were using ERP to integrate software, hardware, specialized requirements of the corporations, and the built-in up-gradation capabilities. The ERP provided them cost saving and efficiency. The need of the hour for Indian companies was to go beyond the traditional point-to-point integration method and integrate all enterprise businesses, functions, and processes. The challenge for Indian companies lies in management change. The irony was that a solid and flexible IT architecture is a fundamental requirement for managing change.

Robert O. Briggs, Gert-Jan de Vreede, Jay F. Nunamaker Jr. and Ralph H. Sprague Jr. (2002) while discussing their paper on “Information Systems Success” had said that an Information System (IS) has many stakeholders, each with a different definition of system success. From a developer’s perspective, a successful IS may be one that is completed on time and under
budget, with a complete set of features that are consistent with specifications and that function correctly. From innovator’s perspective, a successful system was one that attracts a large, loyal, and growing community of users. From a management perspective, a successful system may be one that reduces uncertainty of outcomes and thus lower risks, and leverages scarce resources. From end user’s perspective, a successful system may be one that improves the user’s job performance without inflicting undue annoyance. The success of an IS is by no means assured from any perspective.

James W. Cortada (1998) explained that IT architecture was made up of three main components, namely: Infrastructure (Hardware, Networks, Operating Systems, Tools etc.); Data architecture (Data, Packages, Applications etc.); Management Practice’s (Skills, Organization, Standards, Methodologies etc). Cortada has emphasized that due attention should be given to all of these components in terms of proper planning and control of IT.

D.P. Goyal (1994) had suggested a model to evaluate the effectiveness of MIS. He has given a comprehensive list of information system attributes for various levels of management as Timeliness, Accuracy, Relevance, Uptodateness, Adequacy, No-overloading, Format-clarify, No-duplicacy, Explicitness and Exception based reporting. While advocating on the effective MIS, Goyal has urged that the organizational information systems should be maintained on the continuing basis.
F.W. McFarlan and J.L. McKenney (1983) proposed strategic grid for IT evaluation. The strategic grid was useful for classifying systems then demonstrating, through discussion, where IT investment has been made and where it should be applied. The IT strategic grid included four quadrants stating applications sustaining existing business (factory), applications for improving, but not critical to existing business (support), applications critical for future success (strategic), application of future strategic importance (turnaround). It could help to demonstrate that where does and will IT give us added value.

M.E. Porter and V.E.Miller (1991) were also been useful in establishing the need for value chain analysis. This looks at where value is generated inside the organization, but also in its external relationships, for example with suppliers and customers. As every value activity has both a physical and an information-processing component, it is clear that the opportunities for value-added IT investment may well be considerable. Value chain analysis helps to focus on where these will be.

Peters Buxmann (1993) had suggested a method for relating IT investment to organizational/ business needs. The benefits to the organization in terms of Business expansion, Risk minimization, and Enhanced productivity appeared as one of the most frequent attributes of the IT investment that included expenditure on: Infrastructure, e.g. telecommunications, software/hardware environment; business operations, e.g. finance and accounts, purchasing,
processing orders; and market influencing, e.g. increasing repeat sales, improving distribution channels.

Butler Cox (1990) suggested that a major way forward on IT evaluation was to match techniques to objectives and types of projects. A starting point was to allow business strategy and purpose to define the category of IT investment. Butler Cox suggested five main purposes: surviving and functioning as a business; improving business performance by cost reduction/ increasing sales; achieving a competitive leap; enabling the benefits of other IT investments to be realized; being prepared to compete effectively in the future. The matching IT investments were categorized as: mandatory investments; investments to improve performance; competitive edge investments; infrastructure investments; research investments.

Robert A. Murdick, Joel E. Ross, and James R. Claggett (1998) suggested that Information System could be evaluated in terms of System Integrity including level of cohesiveness in various subsystems and versatility of the system; Operating performance including factors of Data security & reliability of the system, capability of the operations; Internal strength including achievements of the objectives by the system and robustness of the system; Procedural precision including quality of documentation and practicality of the listed procedures.

Gordon B. Davis and Margrethe H. Olson (2000) had said that evaluation of information systems should include assessments of system value as well as
technical, operational, and economic evaluations. Four methods chosen for assessing system value were observation of the system’s relevance to specific task improvements, determination of users’ willingness to pay for system capabilities or outputs, logs of voluntary system usage, and measures of user information satisfaction. Technical evaluation focused on the system performance criteria established in the feasibility study. Operational considerations related to whether the input data is properly provided and the output is usable and used. Economic evaluation provided a current assessment of cost-benefit.

Aman Jindal had said as per Hamilton’s survey (1980) the following approaches on MIS evaluation were frequently applied in organizations: Quality assurance review; Compliance audits; Budget performance review; MIS personnel productivity measurement; Computer performance evaluation; Service level monitoring; User attitude survey; Post-installation review and Cost-benefit analysis.

W.S. Jawadekar (2002) had said that for the success of Information System in any organization it should be integrated into managerial functions; should be oriented and designed in terms user’s requirements; should be kept under continuous surveillance; should be user-friendly; should concentrate on mission critical applications serving the needs of top management.

James O’ Brien (1997) stated that an information system should produce feedback about its input, processing, output, and storage activities. This
feedback must be monitored and evaluated to determine if the system is meeting established performance standards. Then appropriate system activities must be adjusted so that proper information products are produced for end users. An information services department should be periodically examined or audited. Such audits should review and evaluate whether proper and adequate information system controls, physical facility controls, and other managerial controls have been developed and implemented.

Jerome Kanter (1997) had said that following characteristics were necessary in an Information System for successfully managing with it: Management oriented/directed, Business driven/justified, Integrated, Common data flows, Heavy planning element, Subsystem concept, Flexibility and ease of use, Database, Distributed systems, and Use of information as a resource.

2.3 Performance of Bank

The paper with title “Expectations and Perceptions of Service Quality in Old and New Generation Banks- A study of select banks in the South Canara Region” by A.J. Joshi na and Moli. P. Koshi (2005) showed that service marketing was different from goods marketing because of inherent differences in service as compared to goods. The service was intangible, heterogeneous, production and consumption took place simultaneously and it was perishable. The results showed the challenges faced by the service business and had given rise to the need for new concepts and approaches for marketing and managing service businesses. New generation banks like ICICI, UTI Bank exceeded expectations of service quality in dimensions of reliability, empathy
and price. In case of other dimensions like tangibility, responsiveness and assurance, there was negative gap in perception and expectations but it was much smaller in new generation banks than old generation banks.

Sathya Swaroop Debasish (2001) in his paper titled “Service Quality in Commercial Banks: A comparative analysis of selected banks in Delhi” evaluated perception of service quality to customer on basis of three dimensions; the customer-employee interaction i.e. Functional Quality (FQ- refers to service delivery of the staff to customers); the service environment i.e. Environment Quality (EQ- refers to tangibles and intangible infrastructure that support better service delivery); the outcome-service product i.e. Technical Quality (TQ- refers to Product quality and tangible benefits offered to customers). The study revealed that foreign banks (Citi Bank, HSBC, Bank of America) operating in Delhi provided better service quality, as compared to private sector banks (ICICI, HDFC, Karur Vysya Bank) and public sector banks (SBI, Corporation Bank, PNB). Citibank, ICICI Bank and SBI were perceived to deliver better services in their respective banking sectors. The point of worry was that the public sector banks, which accounted for over three-fourth of banking business in the country had failed to adequately satisfy their customers.

R. Rani Geetha Priyadarshini & R. Venkatapathy (2001) in their study titled “Organizational Effectiveness in the Banking Industry” attempted to elicit factors affecting the effectiveness of various categories of banks pertaining to their financial performance and levels of ownership. The components of
Organizational effectiveness were Immediate supervision; Management Leadership; Compensation; Feedback and growth; Working conditions and job demands; Perception of quality; Communication; Productivity and decision-making; Personal morale and motivation; Organizational values. Four categories of banks were: Top performing Nationalized Banks; Top performing Private Banks; Low performing Nationalized Banks; Low performing Private Banks. Then results were measured on ownership types and level of performance for these banks.

In paper titled “Capturing the customer’s voice-A case study in banking” by S.K. Bhattacharyya & Zillur Rahman (2002), customer needs and wants in a bank were properly emphasized. Customer needs were categorized as Basic needs, Performance needs and Excitement needs. The various banking services like Tangibility, Reliability, Competence, Courtesy, Understanding customers, Communication, Access, Responsiveness, Credibility, and Security; were related with these needs. This paper helped to identify how customers perceived services of a bank.

C.L. Chandan (2001) in his paper titled “Competitiveness of Public Sector Banks and Reform Process” had said that Public Sector Banks (PSBs) have responded well to various reform measures to meet the competition and challenges of changed environment. They had modernized and restructured themselves and had shown signs of improving profitability and financial health. The PSBs had taken leap in introduction of technology and computers in their operations, which helped them in improving the quality service to
customers. A major challenge before PSBs was to retain their market share. They should focus on customer centric business strategy, with emphasis on better service, with further technology up gradation, product development and innovations, and diversification in to new markets. Organizational restructuring and human re-engineering is imperative to be flexible, efficient and productive. Banks must become more competitive internally and improve their internal systems. The rural banking was a market segment where PSBs had a competitive advantage. For meeting the social and economic objectives, the govt. should not alter the public sector character of these banks.

V.P. Gulati and M.V. SivaKumaran (2003) in their paper titled “CRM in Banking and Financial Services CRM for Banks in India” emphasized on the value added by CRM in banking. With more and more advancement in technology taking place and an equally higher level of implementation of technology would be totally irrelevant and unproductive unless they were made after a well thought-out business strategy, supported by exhaustive business intelligence and customer information systems and solutions. Meaningful CRM was just a matter of time and not a matter of choice. The sharper focus provided by CRM would help the bank management in making key decisions and impact analysis on various groups of customers and their contribution to the bank. A carefully planned CRM strategy and initiative would bring in the following benefits to the customers namely: Improved customer service, Effective and timely delivery, Value added services, Personalization and closeness, Variety of products and packages, Availability, Reliability and affordability of products and services, More satisfaction, A sensitive market
with equally good choices. The initiative would also bring in the following benefits to the banks namely: Growing customer base, Increasing levels of customer loyalty, Stable and vibrant business potential, Higher volumes, Lower costs, Sensitized and productive workforce, Proper and functional customer segmentation, Focused and cost-efficient marketing, Business process reengineering on scientific lines, An attractive and profitable product mix, Proximity to customer, Improved bottom line.

Joshua Madan Samuel (2003) in his paper titled “CRM – With special emphasis on financial services and banking”, emphasized about growing need of managing customers better in banking. CRM applications applied in banking were customer knowledge, sales effectiveness, customer retention, customer segmentation, product presentation, customer fulfillments, customer acquisition, channel management, marketing intelligence, campaign management. The processes need to be redesigned in order to be able to utilize CRM for the customers and organizational benefits. The three S’s of banking i.e., Size, Speed, Service; are better managed by CRM. In the world of banking CRM technology was the answer to the question of increased growth with less cost.

The paper titled “Roadmap for successful CRM Implementation” by Arindam Banerjee (2002) stated that traditional approaches to customer relationship management had yielded weak results because they had been technology-led. Ideally, the prime movers of a CRM strategy should be line functionaries in marketing, finance or operations. Indian banks just moving into CRM can
learn from the mistakes made in the west. The marketing functionaries could better integrate their knowledge about customers with careful collection and analysis of appropriate historical transaction data to evolve better customer-specific product offerings.

### 2.4 Impact of Technology on working of Bank

A.P. Sebastian Titus and Albin D. Robert Lawrence (2004) in their paper titled “Customer Focus in Banking Services” had stressed on importance of customer relationship management. The aim of the banks should be to retain the existing customers and acquire the new customers. In order to add value to the services offered, the banking industry has to efficiently and effectively utilize the technology with an eye on the cost of product and the services offered. To win the customers, the modern banking should integrate technology and deploy marketing strategies that would enable banks to maximize profits through customer satisfaction. In market with fierce competition providing the customers with value addition is the only way to achieve complete sustained customer satisfaction.

S.S. Satchidananda & Dharshan Shanthamurthy (2005) in their paper titled “Implementing Information Security in Banks” provided a perspective on the Information security for banks and also guidance for its implementation. It set out the methodology for implementing Information security management system in banks. A structured Information security risk assessment would enable banks to accomplish their security needs and objectives. This paper suggested the OCTAVE (Operationally Critical Threat Asset Vulnerability
2. Literature Study and Analysis

Evaluation) risk assessment methodology for managing the risk of Information security in banks.

H. Peeru Mohamed and V.J. SivaKumar (2003) in their paper titled “Strategic Issues relating to e-CRM in Banks - The perspective of bankers and customers”, emphasized the views of bankers and customers as regards designing and implementing e-CRM. It also tried to identify and discuss issues relating to implementation of e-CRM in the banking industry. The findings provided guidelines for customer acquisition, retention and interaction. e-CRM includes capabilities like self-service knowledge bases, automated e-mail response, personalization of web contents, online product bundling and pricing, and so on. e-CRM gives Internet users the ability to interact with the business through their preferred communication channel, and allows the business to offset expensive customer service agents with technology. So, the value was largely one of improved customer satisfaction and reduced cost through improved efficiency. However, an e-CRM strategy deployed alone could also backfire and actually result in decreased customer satisfaction. If the customer’s interactions through electronic channels were not seamlessly integrated with those taking place through traditional channels, the customer is likely to become extremely frustrated.

A paper titled “Internet Banking in Indian Scenario” by T. Uma Maheswara Rao and L. Hymavathi (2005), had emphasized the importance of Internet usage for banking worldwide and its relevance in Indian scenario. In order to avail the benefits those were accrued through using Internet, the financial
institutions like banks were transforming themselves and conducting their business electronically. This transformation from normal banking to electronic banking enabled customers to transact online, while saving on various factors. Normal banking activities still persist in developing countries like India, where the Internet penetration levels were low.

A paper on retail banking titled “From Physical to Virtual Banking” by George Smith Alexander, Arti Sharma & Tamal Bandyopadhyay (2003), emphasized that Technology is minimum requirement for business in banking. It allowed banks to service a lot more customers with the same amount of infrastructure. Technology and alternative channels had lowered the cost of delivering services to the creamy layers among masses. The private and foreign banks have made technology the basic driver of banking growth and business. So, public sector banks needed to adopt the same for competitive advantage.

A paper titled “Technology-Key to success” by Ashish Sen (1997), had discussed about the importance of IT in banking. He said that the competition unleashed by the reforms process have improved the services of banks thus making them more customer-oriented. Technology has played an important role in making this happen. Computerization in commercial banks has indeed traveled a long way. Starting with reconciliation of inter-branch transaction and providing whole-bank MIS reports, on a selective basis, computerization was confined to bank head offices alone for quite some time. In subsequent phases, computerization spanned many areas including branches, back office and front office operations. Use of modern, state of the art technology in
banking, is being increasingly seen as essential not only for good customer service, but also for good housekeeping. About four decades of public sector banking has widened the banks branch network and customer base to such gigantic proportions that time tested manual systems of yesteryears are now bucking under the pressure of sheer volume and variety of transactions. Most of the foreign banks and all the newly established private sector banks operating in India are fairly advanced in the use of technology. Services such as neatly printed statement of accounts, automatic and prompt updation of pass books, ATMs, etc. are some of the benefits that customers are enjoying. However, Indian banks unlike their western counterparts have failed to achieve inter-connectivity amongst branches.

2.5 Other related Studies

The study by Patrick Y.K. Chau and Paul J. Hu (2002) with title “Examining a model of Information Technology acceptance by individual professionals: An exploratory study”, investigated technology acceptance by individual professionals by examining physicians’ decisions to accept telemedicine technology. Synthesized from relevant prior research, a generic research framework was built to provide a necessary foundation upon which a research model for telemedicine technology acceptance by physicians could be developed. Results of the study suggested several areas where individual professionals might subtly differ in their technology acceptance decision-making, as compared with end users and business managers in ordinary business settings. Based on results obtained from this study, the initially proposed framework for technology acceptance by individual professionals
was revised to a “hierarchical, three layer” structure with the individual context at the inner core, the implementation context on the outermost layer, and the technological context residing in the middle. The study carried on was focused on technology acceptance by individual professionals, by taking case study of Telemedicine technology for physicians.

Mike Evans (2003) in his paper on CRM titled “What are the returns on Investment from CRM”, stressed that failure of CRM in an organization was not the failure of CRM Technology. The problem was to match technology to sales and marketing working practices and then manage change in those practices. CRM’s marketing automation should provide big benefits by matching marketing activities to sales activities. IT industry had seen CRM too much as an automation tool and not enough as an empowerment tool. CRM had worked best in situations where a sale is simply about taking orders from inward calls generated by marketing campaigns. CRM needed to be applied intelligently where sales was complex enough otherwise it won’t work.


2.6 Gap Analysis:
Today’s competitive business environment calls for effective organizations. Effectiveness of organizations depends on degree of effectiveness of IS in organization. To define and measure IS effectiveness which is universally
applicable across organizations, has failed to emerge despite the efforts of the theorists from a variety of fields. Although there is evidence to increase professional interest in IS effectiveness in recent years, the literature is still characterized by a paucity of empirical studies.

Various studies were conducted related to information systems usage in organizations. A.M.Rawani and M.P.Gupta (2002) found that IS played a supportive role in public sector banks and a strategic role in private and foreign sector banks as supported by Kaushik Mukerjee (2006), M.P.Gupta and Sonal Shukla (2004).


Various models for IS effectiveness were proposed by V. Nanda Mohan & V. Ajayakumar (2005), Kamna Malik and D.P. Goyal (2003), Lorin M. Hitt, D.J. Wu and Xiaoge Zhou (2002) and Matt E. Thatcher and Jim R. Oliver (2002),


The banking industry is highly dependent on the growth of technology and contemporary business processes. In spite of this industry being exposed to similar technology and information, there has been a significant difference in the performance of the banks, which brings out the need to study the extent of IS effectiveness in banks. IS effectiveness could be analyzed and evaluated by identifying and studying Key performance Indicators of IS in banks.
From a survey of literature, it is observed that while organizations in the developed countries are making use of Information Systems to their best advantage, the organizations in the developing countries including India are yet to make a complete use of Information Systems. The survey also revealed that research gaps exist in evaluating the effectiveness of Information in general; and with special reference to its applications in banking organization in particular. Further evaluation studies exist on multiple fronts but an integrated view is missing. The survey also revealed that none of the research work mentioned above, integrated the approach for evaluation of IS based on functional integration, technological integration, and strategic integration. The survey also revealed that none of the research is able to identify Key Performance Indicators for measuring effectiveness of IS.

In business environment, the business value of Information System must be measured to get the best out of it. There should be a model for comprehensive evaluation of Information System in general.

The model should be based on Key Performance Indicators that helps in continuous evaluation and monitoring. It should pinpoint the weaker areas of Information System at the earliest, so that the various stakeholders of IS can make decisions quickly and wisely.

Thus, keeping in view the existing research gaps, there was a need to find a way for evaluating the Key Performance Indicators of IS in Indian Banking Sector. These KPIs would also help us to propose a model for evaluation of
IS. Since IS is a socio-technical system, building a true objective model was not feasible. But a model could be proposed for evaluation of IS at industry level. Once the model got validated at a particular industry level, it could be reused in other industries by generalization. The present work is an attempt at the industry level in Chandigarh region inclusive of Chandigarh, Mohali and Panchkula Tricity.

This chapter refers to the studies related to information system usage in the banks and other organizations. In this context, literature review was done to identify the gaps that existed between relevant available matter and proposed study. The review literature was categorized in five different categories. These were: Studies related to information systems usage in the bank; Information systems usage in other similar organizations; Performance of the bank; Impact of technology on working of the bank; and other related studies. It was found that there was a need for evaluating the Key Performance Indicators of IS in Indian Banking Sector in integrated manner through a model.