Chapter 2

METHODOLOGY

2.1 Review of Literature

In this section it is attempted to discuss about certain concepts and arrangements relating to payment and settlement systems based on the survey of literature. These cover: (i) Efficiency, (ii) Payments Strategy, (iii) Payment Trends, (iv) Risk / Security in Payments and (v) Promotion of e-Payment Systems

2.1.1 Improving Efficiency of Payment Systems : Central Bank’s Perspective

Lamberte (2005) studied the efficiency of the existing payment system in the Philippines and concluded: “Although the country’s existing payment system is still far from those that can be found in industrialized countries, however, it has been changing rapidly especially in the last few years as the Central Bank of Philippines and Bankers’ Association of the Philippines strive to make it more efficient and less exposed to systemic risks, taking advantage of new technologies and best practices elsewhere especially in the clearing and settlement of large value transfers.” According to him, non-cash electronic payment instruments are now making headway into the domestic financial system and compete with the traditional payment media, such as cash and cheque. Changes in the legal framework, particularly the passage of the New Central Bank Act, 1993, the General Banking Act of 2000 and the Electronic Commerce Act, 2000, provide a wholesome environment for further innovations in the payment system. He proposed that: (a) For small value transfers, the possibility of increasing usage of electronic credit transfers (e.g. debit card system) may be explored to reduce clearing costs and settlement risk; (b) Under adequate regulatory framework, e-cash can considerably reduce costs in making retail financial transactions; (c) The security measures for e-money compiled by the Bank for International Settlements (BIS) task force should be seriously considered at this early stage when e-money products are just starting to emerge in the local scene; (d) The newly installed RTGS system for MIPS2 (Multi-Transaction Interbank Payment System) indeed addresses some of the major problems with large value transfers that may give rise to systemic risks. He also felt that by accommodating transfers of large-value, time-critical funds from one customer to another, the system could be expanded.
According to him, the planned expansion of the present RTGS system to include the settlement of equities trading, money market placements, government securities trading and foreign exchange market on DVP or PVP basis has to be accelerated.

Sangsubhan (2009) reviewed the Payment System in Thailand with Special Reference to the Evolution of Information Communication Technology (ICT). The author observed that the payment system in Thailand has been constantly enhanced to catch up with the international standards. The recent development of digitization of ICT provides a stimulus for formulating a new payment plan, that has led to a radical transformation of the payment system – Improvements of the BAHTNET (Bank of Thailand Automated High Value Transfer Network), the clearing system and other e-payment systems are in progress in Thailand. The plan also gives high priority to developing a closer link between the country’s payment system and the payment systems in the Asian region. He concluded that: (a) Regarding the cheque payment system, there is a clear need to reduce both the fees for cheque and the time taken to clear cheques in order to achieve more reasonable pricing levels and to serve as an effective financial management tool for the business sector; (b) The regulatory issues relating to electronic signature need to be solved for ensuring the safety and efficiency of the Thai e-payment systems. According to him, the efficiency and reasonable cost of basic infrastructures, including those supporting e-commerce via ATMs, the internet and mobile phones play a key role in promoting efficiency and convenience in transfers while raising standards of payment services of business and bank customers. Greater competition among service providers should be enhanced with the aim of fostering the wider use of e-payment systems that are based on secure and efficient service with fair pricing and effective laws and enforcement; (c) New payment instruments such as mobile phone payments are not widely used in Thailand at present due to non-availability of 3G mobile phone system. The author suggested that this facility should be made available in Thailand; (d) The BAHTNET has served as an efficient tool of high value funds transfers but there is a need to enhance the oversight and efficiency of this payment system to ensure a secure environment, in line with global standards and to take steps for joining international funds transfer systems.

Khiaonarong (2001) in his paper titled: “The Oversight of Payment Systems” highlighted the importance of the central bank’s oversight work to ensure the safety and
stability of Thailand’s payment system. He proposed that the country’s methods of payment might be grouped as cash and non-cash. Cash consisting of notes and coins is the popular payment means, accounting for 73 per cent of the currency ratio held by the public to the total money supply. Non-cash payments include paper-based and paper-less payments. Payments may also be classified according to payment schemes. The payment pyramid in Thailand consisting of three levels, based on the type of service provider, is as follows: **Level 1:** Central bank payment schemes which include BAHTNET, ECS, provincial cheque clearing and media clearing; **Level 2:** Commercial bank payment schemes which include form-based payments, credit cards, smart cards, ATM, internet banking, and financial EDI; **Level 3:** Alternative payment schemes that include payment gateways, postal money orders, telecommunication companies, convenience store payment services and EBPP service providers. In terms of aggregate values, BAHTNET and Electronic Cheque Clearing System (ECS) were important payment segments which accounted for 5 and 2 per cent of gross domestic product respectively in 2000. The other payment systems have lower average daily values due to their focus on small value payments and limits for payment transfers. As reported in the said study, the modernization of payment systems in Thailand started in the early 1990s, which mainly included computerization of current cheque clearing arrangements and the development of new e-payment systems. Since then The Bank of Thailand has undertaken regular assessments based on the Core Principles with a view to review the country’s payment systems. The Bank of Thailand’s payment services have complied with most of the key areas of the core principles. Legally, the Civil and Commercial Code protects paper-based payments while the legal process to enact the Electronic Transactions Law for e-payments is under progress. Regulations on each payment system and operating guidelines for e-funds transfer are published for members’ compliance, and, regular consultations are carried out with members’ representatives. The Bank of Thailand continues to promote safe and efficient payment systems through cooperation with international authorities like the IMF, World Bank, Bank for International Settlements, the South Asian Central Banks and monetary authorities. Rapid technological changes tend to reshape the international financial landscape, raising many issues for public policy. Such changes have an impact on payment systems on regulatory, technological and on international fronts such as cross-border issues in the linking of payment systems across different countries, to reduce potential foreign exchange settlement risks.
According to the author, these are the challenges that will shape the developments in the future. “While payment systems undergo a period of transition, including the development of new products and services, central banks would need to continue pursuing the dual public policy objectives of achieving safety and efficiency in systemically important payment systems.”

Murphy (2004) having reviewed the development of payment systems in the United States concluded that: (a) Bank regulators should concern themselves with potential operational risks. They must be aware of the changes in payment systems and adapt their approaches accordingly; (b) Bank regulators should consider the trend towards non-bank ownership and operation of significant portions of the payment networks. The author has indicated that as the operation of these networks has a direct effect on the risk exposure of regulated banks, the risk management procedures of these firms may have significant implications for bank regulators; (c) Banks and bank regulators need to be concerned about the market structure of the network providers, especially ATMs, debit and credit cards. As significant consolidation among network providers has already occurred, any further concentration raises problems about pricing, service quality and product innovation in this segment of the market, where bank regulators have no direct responsibility.

Shirakawa (2009) having reviewed the payment and settlement system of Japan stated: “The major objective behind improvements in payment and settlement systems is to avert the negative impact of a financial crisis on the economy. Considering the history of recurring “boom-and-bust” cycles, there is a need to build a robust financial infrastructure that can withstand and also absorb shocks in a flexible manner, especially payment and settlement systems, which form the bedrock of the financial infrastructure”. While reflecting on Japan’s payment and settlement systems during the recent crisis, he concluded: “Overall a favorable assessment can be made that the payment and settlement systems in Japan withstood the turmoil in the financial market, operating efficiently as designed. At a minimum, unfavorable issues in payment and settlement systems did not trigger a chain of defaults among Japan’s financial institutions.” The author suggests that the Japanese payment systems have demonstrated a high level of robustness, mainly due to the patient efforts that the relevant players have made to improve the systems over the years. According to him, the following three measures are essential to mitigate systemic
risk in Japan’s payment and settlement systems: (i) Reducing the size of outstanding settlement positions of individual market participants; (ii) Taking appropriate measures depending on the state of interconnectedness embedded in the payment and settlement systems; and (iii) Enhancing alternative arrangements for critical settlement functions. Finally, he concludes that investments in payment and settlement systems bring very high returns for the economy in the long run. Reforms of these systems have constantly brought about subtle but significant benefits to the economy in particular and the financial system as a whole.

He and Sappideen (2008) studied the development of the payment system in the Chinese banking sector. They have identified the following key issues in the development of China’s payment system: (a) As a safe and efficient national payment system requires a transparent, comprehensive and a sound legal framework, the flaws in the present legal system as have been identified by the authors include: (i) Payment effectiveness of market participants under bankruptcy and settlement finality; (ii) Some product innovations such as internet payment, mobile payment and other electronic payments face risks without sound regulatory back-up; (iii) Institutional arrangements for the payment service market and supervision over market behavior requires further clarification and coordination; (b) Globalization has led to an increase in the cross-border financial activities requiring more multi-currency cross-border payments. At present, the traditional payment system has been adapted for this purpose. However, these changes, according to the authors, have been responsive but not comprehensive; and (c) There are coordination issues between large value payment system and securities settlement system. In this context, the authors have suggested the following measures for the improvement of the payment system in China: (i) Technological advancement, mainly computer network and electronic communication system development; promoting innovation in payment instruments; and restructuring and reform of the payment process. Many countries have effectively used Information Technology (IT) to achieve efficiency in the payment systems; (ii) There is a need to emphasize on the need for systematic design and development of a payment system, with the aim of controlling legal, operational and financial risks of participants, and providing a payment system to financial institutions with low cost settlement credits and better liquidity saving mechanisms, so as to increase their benefits in addition to providing infrastructure services, and (iii) Highly efficient,
A stable and organized market system should be developed for payment services and pricing. An appropriate balance needs to be achieved between innovation encouragement and fair competition to ensure healthy market development. Regarding the regulatory framework of the market organization, the authors proposed that a balance needs to be maintained in coordinating the behavior of the main stakeholders and on pricing and other market arrangements relating to the rules and practices governing them.

**Bhasin (2007)** studied the “Impact of Technology on Payment Systems” in India. He reflected that since commercial and financial transactions can take place smoothly only if there is a high degree of confidence in the integrity and security of the system, payment and settlement systems are an important part of the infrastructure that support the nation’s economic activities. According to the author, any failure in the smooth functioning of the payment and settlement system would have a significant impact on the overall economic activities. Large volume payment systems have evolved rapidly since the last two decades, continuously striking a balance between liquidity and keeping settlement risk under control. Many countries have replaced the delayed net settlement systems that are very liquid but vulnerable to settlement risk, with real time gross settlement systems, which control risk better but are somewhat less liquid. In order to increase the reliability of the payment system, the author proposed that it is necessary to increase the certainty of operations and the predictability of their quality. Reliability can be increased by promoting technological innovations and by developing norms and standards for documents, terminology, hours of operation, etc., and also by implementing contingency plans for breakdowns of equipments.

**Balkrishnan (2009)** having analyzed the various Indian Payment Systems from 2003 to 2009 concluded: “In a country where 90 per cent of personal consumption expenditure is still cash-based, with the present volume of EP, the journey has only just begun. There is a tremendous potential in the Indian payments arena waiting to be tapped. It has been estimated that, if India were to move its entire physical payment to EP, it would improve the efficiency of the financial system and also result in saving of US$ 10 billion annually – a huge incentive for India.” According to the author, there are four critical factors viz. innovation, incentive, convenience and legal framework, which would decide the future payment systems, and their adoption. He felt that there is also a need of active
participation of the private sector in this process, which includes banks, technology companies, payment processors, academic institutions, etc. The central bank should facilitate innovation in payment systems through dialogues and leadership. Providing a reliable legal framework for EP and resolution of disputes, consolidation of retail payment systems and implementation of these recommendations effectively to make it more acceptable to users. These are the necessary steps to be taken to promote the use of EP systems in India. The author reported that MICR clearing locations controls about 83 per cent of the physical clearing volume and value; hence, it is desirable to focus on these locations to achieve the maximum benefit of adopting EP. He suggested that it will be beneficial if India could bring over the 1,55,000 post office branches and about 1,69,000 branches of cooperative institutions into the EP network. "Even a little progress in this direction would result in substantial savings and these savings could be used to improve further the efficiency and reach of payment system in India”.

2.1.2 Payments Strategy

Denecker, Sarvady and Yip (2009) have focused on the study of “Global Perspective on Payments.” According to the authors, “Payment Services generate worldwide revenues of more than $ 900 billion each year, which is roughly 25 to 30 per cent of the total bank revenues.” It provides a steady income flow and opportunities for banks to serve the consumer and business customers and also to reinforce their brand. However, payment systems tend to increase the burden on the overall bank operational costs; hence, the payment systems need careful handling. “As payments are increasingly a globalized business, banks need to articulate local strategies to address global competitive threats, applying lessons from around the world to enhance the longevity and profitability of each customer relationship.” Transaction services, according to the authors help in attracting deposits of customers and loan seekers and thus help banks expand their franchise into new regions, market segments and product groups. Banks need to consider regional differences in payment systems and develop their strategies accordingly. As reported by the authors, at the global level, the US, Europe and the Asia Pacific Regions are the three largest regional markets in terms of revenue. Together with Latin America, these regions cover more than 90 per cent of banks’ global payments revenue. However, payments revenue models differ across regions. They have reported that, in the US, fees account for more than half of the total payments revenues, whereas in Europe and Asia Pacific Regions, the most payment-related revenues originate from current accounts. Even the
contribution of retail versus commercial accounts also differs over regions significantly. The authors reported the following findings: (a) While rethinking on the strategy for payments accounts and services or introducing a new technology to a local market, a comparison with behaviors observed in other markets can be instructive; (b) Each market is unique; hence, the course to be adopted for e-payments will vary according to cultural, economic and regulatory factors; (c) “Bankers who take a global view of payments can chart the various possible trajectories a given market may follow as cards and electronic volumes grow and cash gradually declines.”

Bruno, Chubak and Nunn (2010) in their study Winning in the New Payments Landscape: A Global Outlook observed that global banking revenues, after risk costs, declined by more than 10 per cent from 2007 to 2009, while payments revenues fared somewhat better – falling by a single digit overall, with some geographical areas of stronger performance. In Europe, payments revenues, after risk costs, declined from €182 billion in 2008 to €141 billion in 2009, due to a fall in the net interest income (NII) by €31 billion. According to the authors, the interest rate environment played a more dominant role in Europe than in the US, where earnings on balances comprise a smaller share of the total revenue. However, increased losses on card balance played a greater role in the US and led to more erosion than the €4 billion increase in Europe. Across Asia there was a decline in the net investment income and increase in credit costs. In Latin America, there was severe impact on credit card market, but Mexico, Brazil and Chile sailed safely through the crisis as there was a deep penetration of card usage, resulting in more than 20 per cent transactional revenues. “Structural shifts in the economic cycle (historically low interest rates, constrained credit/lending), regulatory changes, evolving customer behavior and a redrawn competitive landscape have combined to alter some of the sources of payments, revenues and profits.” In order to move forward, the authors have suggested the following four feasible strategies for success in the new payment environment, applied individually or in combination: (a) Plot the portfolio – companies should decide which business they should be in and those from which they should exit; (b) Reinvent broken business models – changes in profitability and anticipated growth will mean that business models for some products will need to be reinvented, e.g. consumer credit cards in the USA and the UK; (c) Ruthlessly remove costs – banks need to reduce payment expenses on multiple tracks to boost profitability, e.g. going lean by improving payment processes, consolidating payments utilities and
moving to lower cost of labor; and (d) Develop integrated value propositions – a bank should provide the entire customer’s payments and collection needs and develop industry-specific solutions. The authors finally concluded that: “The global payments industry is emerging from a period of unprecedented change and turmoil. As the dust clears, there are great opportunities and, inevitably, threats. Smart banks and payments players will now make bold decisions on where and how they do business. They will reinvent broken business models, make step-changes, cost reductions, and, as always, execute with discipline. Those that succeed will shape, and profit from the new payments landscape.”

Murphy (2004), having reviewed the development of payment systems in the United States, concluded that: (a) Banks will have to adjust their offerings and internal back-office processing to reflect the changes taking place, which will lead to greater use of e-banking by consumers; (b) Since electronic transactions are cheaper to process, banks that do not charge for transaction services on a per-item basis will see reduction in costs; (c) Since cross-subsidization and implicit pricing lead to distortions, overuse of some services and lack of transparency, there is no justification for retaining the restriction on paying interest on demand deposits. The Federal Reserve should pay interest on bank balances, and, banks should not be restricted from paying interest on any demand deposit account; (d) There are provisions for cash management services extended to large corporations, but banks of all sizes will be able to continue to serve their customers with a mix of capabilities, including ATMs, on- and off-line debit cards, credit cards, acting as receivers of ACH payments on behalf of their customers and other services.

Chakravarti and Kobor (2003) found that different types of organizations have different motivations and strategies for offering payment services. After surveying bank and non-bank institutions, the authors made the following observations: (i) Investment in payments technology is characterized as a customer-retention tool, even when the payment functionality is a part of a bundled service offering. (ii) Cost savings remain hard to realize in near term if providers must simultaneously offer old and new systems. (iii) Those innovations that target the needs of a particular market niche are successful. (iv) Generally, successful innovations leverage connectivity among participants using the existing networks of payment. (v) Some new payment technologies provide economies of scale, which increase the importance of outsourcing. (vi) Payment innovations may open market segments that were previously unprofitable or unreachable. As more
competitors enter the market, after the first wave of acceptance of innovation, they try to extend the technology or augment it. According to the author, this generates a process of continuous change.

Rice and Stanton (2003) found that payments-driven revenue accounts for about 16 per cent of the operating revenues for the top bank holding companies (BHCs). If only service charges on deposit accounts were included, then it results into underestimation of the value of payment activities; and, if broad categories of activities that are only partly payment-related were considered, then it results in the overstatement of payment-driven revenue. Hence, during the survey, the authors found that a prior estimate of the volume of payments-driven revenue was overstated, because of aggregation of these activities with other closely related activities. Payment revenues vary significantly according to the business strategy of the organization. Large regional banks had the highest proportion (21%) of payment revenue, which reflect their focus on providing traditional banking services. Banks processing at the global level handle the cross-border transactions, safeguarding, settlement and reporting of clients’ securities and cash on a world-wide basis; hence the percentage ranges from 17 to 21 in operating revenue depending on how payment revenues are defined. Conglomerates, which engage diverse financial services, had payments revenues at 15 per cent of the operating revenue. “The results were counterintuitive but persuasive for credit card banks.” According to the authors, these institutions earn relatively less revenue from payment functions because a major portion of their revenues can arise from securitization of credit card receivables and credit card functions, i.e. by way of interest on credit cards.

Rice (2003) examined several aspects related to the value that payment activities add to the banking industry. Firstly, the author examined how the production of payment services affects the franchise value of the banks. Next, he explored whether analysts are incorrectly measuring the performance of the banking sector and fail to realize the full importance of payment-driven revenues to banks. During the initial empirical analysis, Rice found limited evidence to suggest that higher payments-driven revenue were associated with higher franchise value. He also found that estimates of productive efficiency change dramatically for a small number of banks involved in payment services. The estimated profit efficiency, according to the findings of the author, increased on an average at 20 per cent when payments revenues are included as outputs. However, these
estimates vary according to business strategy. The estimates of efficiency for global processors increased by about 50 per cent when payment-driven revenues were included in the production function. Rice found evidence to suggest that traditional efficiency estimates that exclude non-traditional bank activities inaccurately measure the relative performance of some type of BHCs. Thus, he suggested that the estimation of efficiency must take into account the different mixes of traditional and non-traditional activities in which banks are engaged.

**Federal Reserve Bank of Chicago (2003)** studies investigated the importance of payments and the impact of emerging payment technologies on the banking industry. These studies indicate that the lines between banks and non-banks are blurring especially in the area of payments. However, according to the authors, the environment has become symbiotic and not competitive. Banks acquire technology from non-bank innovators rather than developing it in-house. Innovators approach banks for access to the settlement system and also for marketing new products by using banks’ customer base. Technology leads to generating economies of scale and to processing of payments which are stimulating the consolidation of processors of payments. The said study reported that although income from payments activities forms a significant portion of all banks’ revenues, their relative importance has remained stable since the last six years on account of several issues, which hinder banks’ efforts in this area. The most important among them is consolidated reporting. When annual reports and regulatory data are reviewed, it is found that it is difficult to develop the aggregate estimates of the true value of payment activities. Reliable information about the total income and risks attributable to payment activities are available. It becomes difficult to measure the rate of return on investment, to price the products accurately and to allocate appropriate capital support.

**Kimori (2007)**, having studied the Japanese payments’ landscape, has observed that mobile banking has become the order of the day. In the late 1990s, banks developed their own electronic banking systems over the internet for corporate and retail customers. According to his assessment, payments are executed outside the direct banking system and accessibility and ubiquity are the challenges. But as a result of pursuing accessibility, payments are shifting into areas remote from bank accounts. So, banks should consider restructuring their payment services by leveraging customers’ bank accounts. According to him, another issue faced by the banks was the reduction of the cash component, which
is used for street payments. Handling of both cash and promissory notes is costly, while
cheques issue by corporate bodies is costly both for them as well as for the banks. These
payments are gradually being encouraged to migrate to electronic systems, e.g. Zengin.
Kimori found that Japanese banks and corporates are strong and good at product and
process innovation in the highly competitive environment, but social innovation has
remained a neglected field. Management of technology must be considered holistically
and in the social milieu. Technology application used in Japanese mobile phones was
superb and the RFID card had high standard, but it failed to be adopted as a global
standard. According to the author, “The steering force and leadership of the financial
community, together with the support of related authorities, are required in order to create
a more efficient financial environment.”

CII (2009), based on their survey of “Payment Business in Indian Banks”, which
includes randomly selected 10 public sector, 10 private sector and 10 foreign banks,
concluded that: (a) In terms of tracking revenue from payments, one third of the banks
tracked revenue at a macro level, i.e. at the level of a broad line of business within the
bank, like assets or liabilities only. Another half of the banks tracked revenue not only at
macro level but has also tracked revenue from payment channels. None of the banks
however tracked revenue from payment products, i.e., these banks get MIS reports on
volume and value of NEFT/RTGS/cheque transactions, but do not track revenues arising
out of these products. As “cards” are viewed as a separate vertical in most banks, they
track revenue of cards at the product level. As revenue is rarely tracked at the level of
customer groups, it becomes difficult for the banks to understand how a particular group
of customers respond to individual payment products. Only a few new private sector
banks and foreign banks tracked revenue for customer groups. More than one third of the
banks that was surveyed did not track either ‘float revenue’ or ‘revenue earned per
transaction’ from their payment business. As banks have not tracked crucial revenues-
related information in payment business separately, it has resulted in majority (57%) of
the banks indicating that less than 10 per cent of their total revenues could be attributed to
payments; (b) The study reports that banks still approach the costs of their payments
business in a traditional manner by calculating fixed and variable costs. Most of the cost
components are simply allocated instead of allocating actual costs relevant to each
payment product been tracked and allocated accordingly. Only 35 and 30 per cent of the
surveyed banks respectively track unique costs attributable to specific payment products.
and channels. Tracking these costs helps in finding out how much individual payment products earn revenue *vis-à-vis* the cost the bank incurs in offering them. Most of the banks surveyed tend to follow ‘Allocation-based Costing’ when it comes to payments. Banks, thus, do not track costs that are specific to activities under each payment business, but consider these as direct or indirect costs relating to a particular line of business. ‘Activity-based Costing’ helps banks to know as to how costs are distributed across payment products and channels that helps in shaping strategic decisions; (c) Pricing of payment products is a very complex issue and multiple factors need to be taken into account such as settlement time, transaction size, settlement risk, customer relationship, etc. Although 85 per cent of the banks concentrate on customers while pricing their payment products, it does not extend to tracking of revenue from payments; (d) Technological advances have made it possible for banks to offer a set of multiple payment products to their customers. But, according to the survey, there are issues in terms of ‘inter-operability of the technologies’ used for different payment products. To avoid technological obsolescence, there is a need to have regular and continuous up-gradation of infrastructure by banks; (e) All the banks reported that the benefits of superior delivery channels, like internet and mobile banking, are available to urban consumers but not in rural areas due to the lack of infrastructure facilities. Most banks agreed that the current infrastructure of payments still has a long way to go for achieving financial inclusion; (f) As per the survey, majority of the banks agreed that disparate systems were leading to duplication of operations, as different departments are performing similar functions. The study suggested that banks need to set up a ‘Payment Hub’ which would allow consolidation of multiple payment systems into one ‘centrally managed mid-office payment system’ to improve efficiency, reduce costs and enable more transparency in processing and improving customer service; (g) The study also suggests that banks need to increase their efforts to help customers switch over from paper-based payments to e-payment mode, save costs and take steps to improve the payment framework to ensure financial inclusion. Mobile banking, according to the study, is the need of the hour to cover rural areas.
2.1.3 Payment Trends

**Denecker, Sarvady and Yip** (2009) in their study *Global Perspective on Payments* observed that: (a) Although the use of cash is shrinking across the world, it continues to be one of the frequently used instruments of payment in most countries, and, it is especially dominant in the developing markets like India, China, Brazil and Russia. In the USA cash accounts for an estimated 57 per cent of the total payments’ volume. Hence, banks in diverse markets can advance the ‘war on cash’ and reduce the costs of cash processing by promoting electronic, card or alternative payment channels, such as Globe’s G-Cash, a mobile payment initiative in the Philippines; (b) Cards are becoming more and more acceptable as a medium of payment, especially in the emerging markets as these are cash-intensive areas, although their usage tends to grow at double-digit rates in highly developed markets; (c) Cheques have long been the main alternative to cash in several countries, although their relative importance is declining at the global level; but in general it is difficult to replace it completely even in developed markets; (d) Electronic transfers are quite strong in most developed economies. E-payments are an operationally efficient solution and have become a “fixture” in many developed markets, both for consumers and corporate payments. However, as e-payments proceed through batch transfer systems, e.g. ACH, it poses both challenges and opportunities for banks. As more and more people in emerging markets are integrated into the banking system, e-payments are the best alternative to cash for bill payment.

**Murphy** (2004) in “The Future of Banking in the US : Effect on US Banking of Payment System Changes” has observed: “It is now three decades since the dawn of the ‘checkless, cashless society’, was proclaimed, cash is still in use, although much of it is outside the United States and many checks are still being written. However, major changes in the US payment system as a whole are underway which will have effect on costs, profitability, mix of business and delivery systems that must be considered in an assessment of the future of banking in the United States.” He reported that ACH and the debit card transactions have had the fastest growth, whereas the growth of credit cards has been modest and cheque payments are steadily declining.

**Gerdes** (2008) after reviewing the recent payment trends in the United States have observed that the number of e-payments was more than twice the number of cheque payments or about 2/3 of all non-cash payments as per the data published by Federal
Reserve in 2006. As reported by the author, the value of e-payments increased substantially and in the year 2006 and they accounted for 45 per cent of the value of non-cash payments. He has also observed that the use of cheques has been declining since the mid-1990s, as consumers preferred using e-payment system. Even the interbank check-clearing system has been rapidly changing to become electronic, as original paper checks are increasingly being truncated and replaced with e-images during the cheque clearing process. The total number of non-cash payments in the US (payment by cheque, ACH, debit and credit cards and electronic benefits transfer or EBT) increased from 81 billion to 93 billion between 2003 and 2006, or 4.6 per cent a year. The nominal value of non-cash payments increased from US$ 68 trillion to US$ 76 trillion or 3.9 per cent a year, over the same period; but in real terms, non-cash payments have increased only by 0.8 per cent a year. However, the constant-dollar average value of payment declined by US$ 97 over the same period. Thus, the phenomenal growth in the number of non-cash payments was due to the large increase in the number of smaller value non-cash payments. Growth in non-cash payments was partly due also to the changing payments’ processing methods. It has been observed that the number of cheque payments is declining, because fewer cheques are being written and some of them are converted into e-payments which are largely processed through the ACH system. The number of payments made through major e-payment systems in the United States (the ACH system, debit and credit card systems and the EBT system) increased from 44.1 billion to 62.8 billion between 2004 and 2006, reflecting an annual growth rate of 12.5 per cent. However, the value of e-payments increased slowly, at 8.9 per cent a year during the same period. The number of payments made by debit, credit, or EBT cards grew by 12.8 billion from 2003 to 2006, reaching 48.1 billion which far exceeded over the number of cheques paid by 17.6 billion. The value of debit card payments in 2006 ($1.0 trillion) was less than half the value of credit card payments ($2.1 trillion). The growth of payments by cards was the result of payments of small-value payments instead of cash. For all types of account debits, the number and value of payments per capita was higher in urban areas, reflecting greater wealth and business activity. However, the average value of debit card payment was roughly the same both in urban and rural areas – $ 41 versus $ 40; however, the average value of cheque payments, ACH payments and ATM withdrawals was relatively smaller in rural areas.
The “Federal Reserve System, Non-cash Payment Trends in the United States : 2003-06” (2007) observed that the number of cheque payments in 2006 had been estimated at 30.6 billion for the value of $41.7 trillion. The number of cheque payments decreased by 6.4 per cent per year between 2003 and 2006 on account of the increase in the use of ACH to convert cheques by billers and merchants. The ‘average value per cheque’ paid increased from US$ 1,104 in 2003 to US$ 1,366 in 2006, which, according to the study, reflects the increasing use of alternative payment instruments for small value payments and changes in the financial behavior of consumers and businesses. During 2003-06 there have been significant changes in the method of cheque clearing mechanism, which has increased the efficiency of the cheque clearing system for interbank cheques. About 40 per cent of all interbank checks during this period were replaced by electronic payment information in the collection process. E-payments now constitute over two thirds of all non-cash payments by volume but less than half by value. The number of e-payments increased by 12.4 per cent per year during 2003-06; as a result, the percentage of e-payments in non-cash payments increased from 54.2 to 67.2 per cent during these three years. The value of e-payments increased by 8.9 per cent per annum: growing from 39.1 per cent of non-cash payments in 2003 to 45.0 per cent by 2006. In terms of number, payments made by debit and credit cards or EBT cards amounted to half (51.6 per cent) of all non-cash payments in 2006, but in terms of value it was only 4.1 per cent. The number of debit card payments now exceeds the number of credit card payments. Debit card payments increased by 17.5 per cent per year from 2003 to 2006. PIN debit payments increased faster at 20.6 per cent per year, as compared to signature debit payments at 15.8 per cent a year. It was observed that credit card payments increased at the rate of 4.6 per cent a year, i.e. 21.7 billion in 2006, which was 2.8 billion more than in 2003. In terms of value, credit card payments stood at $ 2.1 trillion in 2006. About 23.3 per cent of non-cash payments, using credit cards, was made in 2006; in value, it was 2.8 per cent. During 2003-06, the ACH payments increased by 18.6 per cent per year. In 2006 15.6 per cent of non-cash payments were of ACH, valued at 40.8 per cent of the total value. ACH payments totaled $ 31.0 trillion in 2006 accounting for 90.8 per cent of the value of all e-payments. ATM withdrawals were 5.8 billion, valued at $ 578 billion in 2006, which decreased by 0.4 per cent during the period. Thus, e-payment is making good progress in the US.
Balkrishnan (2009) having studied the payment statistics of India from 2003-04 to 2008-09 concluded: “Among EP (electronic payment) options, RTGS has been widely accepted as the payment mechanism by corporates and banks, and, on the retail payment side, a lot needs to be done to increase the use of EP. Also, with the arrival of RTGS and corporates/banks aggressively moving to that channel, most high value cheques have moved to RTGS and the bulk of the cheques now involve the retail aspect of the transaction.” “If one were to look at the contribution of each of these EP modes to the total EPs, clearly RTGS is the leader in terms of value contributing over 97.5 per cent in 2008-09. The total contribution by value of credit card stood at a merely 0.32 per cent and that of debit cards even lower, at 0.09 per cent. It means, collectively, despite there being close to 387 million cards, their contribution to total EP in India, in terms of value, was only a mere 0.41 per cent of the total EP. This corroborates that most the retail transactions happen by cash and India has a long way to go to eliminate cash as the primary payment mechanism for retail payments.” In terms of volume, i.e. the number of transactions, contribution of credit cards was the highest at 38.22 per cent and that of debit cards was 18.80 per cent. Thus, collectively these contributed to about 57 per cent of e-transaction volume, yet only 0.41 per cent in terms of transaction value. When RTGS is excluded from the scope of EP, the total contribution of EP to the total volume of payment in India remained very low, at 3.86 per cent in 2008-09. Thus, RTGS stands as the principle payment system in India for wholesale payments. NEFT and ECS are mainly used in urban areas of India. Corporates have started adopting the RTGS for high value transactions but the retail segment lags far behind in adopting EP and a lot more has to be done to wean away physical cheques to EP mode.

2.1.4 Risk / Security in Payments

Kellogg (2003) surveyed a cross-section of bankers and identified four key concerns related to the emerging payments technologies. The concerns identified were: (i) changing delivery channels and safeguards, (ii) fraud, (iii) vendor oversight, and (iv) operational risk measurement and reporting. The concern about delivery channels focuses on how to move to e-payments either through the internet or ACH. Some of the safeguards on which consumers rely with regard to paper-based payments do not exist in the case of e-channels. Hence, commercial customers increasingly demand e-payments, which imply that larger value payments would be moving over these higher risk channels. Regarding fraud, the sample reported that the actual losses have been stabilized, but
losses in commercial accounts have increased. There was also an increase in fraud attempts. The respondents indicated a growing dependence on outsourcing. Large banks have to monitor their processing vendors continuously, especially for compliance with new regulations like the information privacy requirements of the ‘Gramm-Leach-Bliley Act’. According to the responses, operational risk measures and controls have a business-unit focus. The business line divides reporting collective operational risk for payments activities. Hence, comprehensive risk measurement has been important for taking pricing decisions and also for the management to understand the true cost of the activity. Smaller institutions indicated that tools available for core processing systems to monitor the collective operational risk of payment systems are difficult to use and/or are lacking. Even larger banks find it difficult to aggregate the risk of payment activities across business lines. Hence, banks tend to rely on Risk Committees and self-assessments by the business lines to reduce this risk. Many units covered by the sample are in the process of improving their comprehensive risk reporting. Lack of comprehensive risk reporting will hamper development of synergies for new payment products across business lines.

Lemieux (2003) observed that, as payments technology evolves, network vulnerabilities become an important concern. Several events have demonstrated the contagious nature of network vulnerabilities. As network linkages co-exist, these vulnerabilities can jump from banking to other sectors of the economy. The weakest link in the network can expose all other participants to risk, which can cause losses and affect non-banking sectors also. Even the consolidation of outsourcers and the increase in the use of foreign firms with weaker internal controls for performing out-sourced functions also create problems. However, existence of multiple retail payment options, absence of large losses in retail payment systems, availability of alternative IT vendors and the ability of technological solutions to limit risk, all help in reducing problems. To mitigate this risk, bank managers have four primary tools: (a) chartering requirements, (b) capital regulation, (c) supervision, and (d) disclosure. Issues hindering banks from adopting emergent payments are related to customer safeguards available for new delivery channels, fraud prevention and ability to provide effective supervision of payment vendors in concentrated markets. As technology increases, the relationship among banks and non-banks, “resiliency concerns for the economy, such as network vulnerabilities,
should not be ignored. More work is needed to better understand systemic risk implications”.

**CII (2009)** having undertaken a survey on “Payment Business in Indian Banks” came up with the following findings: Most of the banks surveyed expressed confidence in the security of their payment-related data, but the issues and challenges may be more complex than what they think. With the increase in incidents of fraud, tools and techniques to collect, protect, store and present electronic evidences are issues in which banks have to invest. “Frameworks related to the collection of the electronic evidence should be incorporated and ingrained across the organization.” An effective legal framework is necessary to protect privacy-related issues. This will help in proper submission of the electronic evidence in the court of law.

### 2.1.5 Promotion of e-Payment Systems

**Sangsubhan (2009)** having reviewed the Payment System in Thailand concluded that Thai SMEs have long benefited from the existing payment systems although many SMEs still lack the knowledge about how to access internet and its e-payment system options. In order to promote the use of e–payment system to help SMEs in reducing their costs of financial transactions, SMEs need to be trained in best practices and on how to access the internet and its e-payment systems.

**Bhasin (2007)** having studied the “Impact of Technology on Payment Systems” in India came up with the following suggestions: (a) In India, the payment system gradually progressed *from* manual processing and settlement *to* computerized MICR *to* electronic and image-based payment systems. However, there is a need for greater efforts to promote and popularize the usage of e-payments. Traditionally, the RBI has to take the initiative to move from paper-based payment system to e-payment mechanisms. The tradition-bound Indian banks were slow to visualize the vast business opportunities available through e-payment systems to provide various products to their customers by way of cash management services, as offered by the new generation private sector banks and foreign banks. The retail payment system needs to be improved by developing user-friendly websites with simple interface and local content. There is an urgent need to create a world class, efficient, reliable, affordable and global standard payment system; (b) Technology has played a significant role in developing the new-age payment systems.
which are now the mainstay of the payment system in India as it has made multiple new-age payment methods available to the larger sections of the society, with the help of internet and other communication technologies to suit their needs; (c) More and more customers are becoming aware of the new-age payment methods. However, the paper-based instruments would continue to remain in operation for some more time to come. Much more efforts are necessary to make the new-age payment methods popular. The RBI and other banks have to take the leadership role in implementing these payment options and make them popular for the benefit of all. They must address all the irksome issues and bottlenecks and take steps to resolve them so that the adoption rate could improve rapidly and radically. In the banking sector, adoption and use of technology will continue to have its positive impact till “the end of the legacy of paper-based payment system era” and the entire payment system will move to a risk-free electronic-on-line and real-time gross-settlement system comes into operation, whereby the finality of payment is in fact ensured and assured to both the sender and the receiver (the payer and the payee). (The) “New challenge of Indian economy to achieve inclusive growth and service delivery through financial inclusion and technological innovation in e-payment systems is possible by reaching the disconnected people who do not share the benefit of the e-global world”.

Balakrishnan (2009) having studied the Payment Systems in India from 2003 to 2009 came up with the following strategies to move to electronic payments : (i) encourage the use of electronic payments , and (ii) discourage the use of physical instruments.

2.2 Research Methodology

Initially, an extensive literature survey was carried out in order to gain insights into the various areas of concern and the issues involved in the design, structure and efficiency in the functioning of the payment systems in various countries including India. Secondary data was then collected mainly from the Reserve Bank of India (RBI) Annual Reports, Report on Payment Systems in India (RBI, 1998) and Payment System Development Reports of selected countries. As the specific focus of the study was the period covering 2005-06 to 2009-10, which has recorded a massive rise in the volume and value of transactions handled by the Payment and Settlement in our country, relevant data was captured from the RBI Annual Reports. Similar data was also collected from the RBI website for individual banks.
For the purpose of this study, the purposive stratified random sampling method was adopted for the selection of 20 banks. As nearly 80 per cent of the total banking business in the year 2005-06 was handled by public sector banks and the rest by the private sector banks and foreign banks (IBA, 2005-06), 18 public sector banks out of 27 and 2 out of 25 private sector banks were selected as samples for this study.

Public sector banks were grouped into three categories in descending order of their size of total business. The first category (termed as Large Banks) included five banks: namely, State Bank of India (SBI),* Punjab National Bank (PNB), Canara Bank (Canara), Bank of India (BOI) and Bank of Baroda (BOB). The next category of seven banks (termed as Mid-Size Banks) included the Union Bank of India (Union), Central Bank of India (Central), UCO Bank (UCO), Syndicate Bank (Syndicate), Indian Overseas Bank (IOB), Oriental Bank of Commerce (OBC), and Allahabad Bank (Allahabad). The third category (termed as Small Banks) included Indian Bank (Indian), Corporation Bank (Corporation), Andhra Bank (Andhra), Vijaya Bank (Vijaya), Bank of Maharashtra (BOM) and Dena Bank (Dena). From the private sector banks’ category, one new generation private sector bank and one old generation private sector bank were picked randomly; thus the two private sector banks selected for the study were : the Axis Bank (Axis), and the Lakshmi Vilas Bank Ltd (Laxmi) respectively. The relationships of technology *vis-à-vis* net profit were analyzed for all the 20 banks.

The annual reports of the selected 20 banks were studied in order to assess the initiatives of these individual banks in introducing new products and services using the payment system as the backbone to garner new business. In order to get an in depth and holistic picture of the state of art in payment products and services in Indian banks, primary data were collected from two of the 20 selected banks that were willing to share such information through structured questionnaire and personal interviews.

* The abbreviations, used in this text, of the selected banks are given in brackets.