The initial studies on the efficiency of U.S. life insurers, Grace and Timme (1992) Yuengert (1993) and Gardner and Grace (1993) mostly focused on scale economies. These studies tend to find evidence of significant scale economies in the industry, although larger firms generally are found to exhibit decreasing returns to scale.

Weiss (1991) analyzed factor productivity of 5 countries of Organization for Economic co-operation and Development (OECD) - France, Germany, Japan, Switzerland and US spanning 1975 to 1987. They found that US and Germany had high productivity while France, Japan and Switzerland were below average.

Fecher et al.(1993) used the Data Envelopment Analysis and Stochastic Frontier Approach model and examined the technical efficiency of life insurers and non life insurers of France during 1984 to 1989. The inputs used in their model were labor cost and other outlays. On the output side, the factors included only Gross premium. The conclusion of the study was that there was high correlation between parametric and non parametric results and wide dispersion in the rates of inefficiency across companies.

Delhausse et al.(1995) studied technical efficiency of non life insurer in Belgium and France by using Data Envelopment Analysis and Stochastic Frontier Approach method. They found that the technical efficiency of France was more than Belgium. But the overall technical efficiency was quite low in both countries. They also found that non profit companies were more efficient than profit companies.

Rai (1996) studied cost efficiency by Stochastic Frontier Approach method during 1988 to 1992 covering 11 OECD countries- Denmark, Finland, France,
Germany, Italy, Japan, Netherlands, Sweden, Switzerland, U.K. and US. He concluded that the cost efficiency of Finland and France was greater than U.K. where as small firms were more cost efficient than large firms.

Donni, Fecher (1997) covered both life and non life sector in 15 OECD countries - Belgium, Canada, Finland, France, Germany, Iceland, Italy, Japan, Netherlands, Newzealand, Portugal, Switzerland, Turkey, U.K. and US during 1983 to 1988 using Data Envelopment Analysis approach to find out technical efficiency. They found that US, U.K., France and Germany were the best and Portugal was the worst. They also found that the technical efficiency level was high and dispersed.

Cummins and Zi (1998) made comparative analysis of Frontier Cost Efficiency methodologies by the application of a wide range of econometric and mathematical programming techniques to a data set consisting of 445 life insurers over the period 1988 to 1992. The alternative methodologies gave significantly divergent estimates of efficiency for the in-sample insurers. The efficiency rankings were quite well-preserved among the econometric methodologies; but the rank correlations were found to be lower between the econometric and mathematical programming categories and between alternative mathematical programming methodologies. Thus, the choice of methodology had a significant effect on the results. Most of the insurers in the sample displayed either increasing or decreasing returns to scale.

Sloan A., Conover J. (1998) examined the functional status of Insurance Companies from 1995 to 1997 in Japan. The result showed that functional status of insurer does not affect the profitability but public coverage has significant impact on profitability of insurance companies.

Cummins, Tennyson and Weiss (1998) studied the relationship between mergers and acquisitions, efficiency, and scale economies in the US life insurance industry. They estimated cost and revenue efficiency over the period 1988 to1995 using Data Envelopment Analysis. The Malmquist methodology
was used to measure changes in efficiency over time. They found that acquired firms achieved greater efficiency gains than firms that have not been involved in mergers or acquisitions. Firms operating with non-decreasing returns to scale and financially vulnerable firms were found to be acquisition targets. Overall, mergers and acquisitions in the life insurance industry were found to have a beneficial effect on efficiency.

Cummis, Tennyson, and Weiss (1999) used the Data Envelopment Analysis to examine the relationship among mergers and acquisitions, efficiency, and economies of scale in the US life insurance industry over the period 1988 to 1995. They found that acquired firms achieve greater efficiency gains than firms that have not been involved in mergers or acquisitions.

Mahlberg (1999) included 36 life insurers of Australia and 118 life insurers of Germany for the period of 1992 to 1996 to find out technical efficiency. The study revealed that the technical efficiency of Australia was greater than Germany but at the same time inefficiency was found in both the countries.

Cummins (1999) examined pure technical and cost efficiency of US life insurers spanning 1988 to 1995 by using Data Envelopment Analysis approach. The study found that efficiency scores in insurance were relatively low compared to other financial service industry and brokerage system was most efficient.

Carr, Cummins, Regan (1999) analyzed cost efficiency as well as revenue efficiency of 66 life insurers of US by using Data Envelopment Analysis approach. The result showed that exclusive dealing insurers were less efficient than non-exclusive dealing or direct writers. The study also found that dealing insurers should focus on fewer product lines.

Peter Drucker (1999) admitted that by providing financial protection against the major eighteenth and nineteenth century risk of dying too soon, life insurance became the biggest financial industry of that century.
Berger et al. (2000) analyzed cost efficiency, revenue efficiency and profit efficiency of 684 insurers in US by using Thick Frontier Approach and Stochastic Frontier Approach method for the period 1988 to 1992. The result showed that conglomeration hypothesis holds for some types while strategic focus hypothesis dominates others.

Hogan, John D (2001) assumed that the banking industry would quickly expand into non-banking activities, as synergies could be expected from the large bank customer information base and frequent contacts with customers. However, this quick response has not taken place, partly because of perception of risk in the insurance business. The author also suggests that banking companies should add insurance products to their lines of business for sound reasons such as small increment costs involved, the presence of existing customer relationships, revenue diversification, absence of interest rate risk in insurance compared with loans and banks’ web-based marketing capability.

Carrow Kenneth A.(2001) investigated whether the announcement of a merger between Citicorp and Travelers abnormally impacted stock prices of financial and insurance companies. Analysis of abnormal returns surrounding the merger show that life insurance companies and large banks experienced significant stock price increases, while the returns of stocks of smaller banks, health insurers, and property insurers remain relatively unchanged.

Diacon (2001) included 431 general insurers of 6 European countries: France, Germany, Italy, Netherland, Switzerland and U.K. in 1999. He concluded that the technical efficiency of U.K. was greater than Germany and Netherlands but at the same time Germany was more efficient compared to Netherlands.

Kessner (2001) found technical efficiency of 78 life insurers of Germany and 87 life insurers of U.K. spanning 1994 to 1999 by using Data Envelopment Analysis method. He came to the conclusion that the technical efficiency of U.K. was more than Germany and at the same time technical efficiency increased in both markets.
Diacon, Starkey, O’Brien (2002) included 454 life insurers of 15 European countries such as Australia, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, Switzerland and U.K. The study examined pure technical efficiency, scale and mix efficiency by using Data Envelopment Analysis approach of life insurers from the year 1996 to 1999. The study reached a logical conclusion that the efficiency level had decreased and there was striking international differences.

Boonyasai, Grace, Skipper (2002) examined technical efficiency of Life insurers of 4 Asian countries: Korea, Philippines, Taiwan and Thailand. The study covered 33 life insurers of Korea, 33 life insurers of Philippines, 31 life insurers of Taiwan and 13 life insurers of Thailand. The conclusion of the study was that the productivity of Korea and Philippines was more than Taiwan and Thailand. The technical efficiency of all life insurers had increased.

Carrow Kenneth A. and Heron R. (2002) investigated how the passage of the Financial Services Modernization Act of 1999 (FMA) affected stock prices of banks, thrifts, finance companies and insurance companies. The study looks at stock excess returns across sectors and company size. FMA opens doors for potential mergers and consolidations across banking, financial and insurance sectors, translating into abnormal positive returns for businesses that are likely candidate for mergers and consolidation. The results of the study suggest that the largest returns to the FMA passage were realized by large investment banks and insurance companies. The stock prices of banks, both small and large, seemed to be unaffected by the new legislation while thrifts, finance companies and foreign banks lost value.

Madabhushi Sridhar (2002) traces the evolution of the principle of moral hazard in a life insurance contract and its gradual dilution with the changing style of human civilization and understanding the influence of criminal acts on the civil contract. The study reached a logical conclusion that the principle of moral hazard plays a reduced role in a life insurance contract with reference to
suicide and that the terms of the contract should prevail to fix the liability of
the insurer to fulfill the purpose and objective of a life insurance contract i.e. to
help the dependents to absorb the shock of sudden death of the insured, either
by natural or suicidal death, in sane or insane conditions.

Lin (2002) applied the Data Envelopment Analysis approach to measure
efficiency scores and to examine whether life insurers in Taiwan have fully
recognized the new market structure after deregulation. Results showed no
change in overall efficiency, no pure technical efficiency change, and no scale
efficiency change after deregulation.

compared bancassurance sales and insurer’s own team of Taiwan from 2000 to
2002. They used Data Envelopment Analysis approach to compute the
efficiencies of bancassurance and traditional channels separately. The
conclusion of the research was that the efficiency score of a life insurance
company’s own sales representatives is significantly higher than that of its
bancassurance representatives and the efficiency relationship between the
bancassurance channel and traditional selling channel is independent.

A.K. Jain (2004) revealed that waves of liberalization have done wonders to the
insurance occupation. The average mindset, particularly of younger generation
in India is very amenable to these changes in insurance as an avenue where
exhilarating opportunities were opened up in changed environment.

Akihisa Oda (2004) studied natural catastrophe insurance systems of Japan and
compared them from three aspects: government commitment, insurance
scheme, and mitigation incentives. Through the study, the strengths and
weaknesses of the Japanese earthquake insurance system are implied and future
improvements are suggested. The comprehensiveness of the Japanese insurance
system seems to be one of the strengths. On the other hand, further
improvements are expected for the system in the participation rate, basis risk
and mitigation incentives.
Chen, Wong (2004) examined determinants of financial health of insurance companies of China from 2001 to 2003. The result showed that size, investment and liquidity are important determinants of financial health of insurance companies.

Madhukar Palli (2004) assessed Life Insurance Potential in India. The report focused on risk security, the core product of life insurance. It provides estimates of the Life Insurance Gap to maintain dependents’ living standards after the death of the primary wage earner. The primary drivers of demand for risk security are 'Age', 'Income', 'Affordability', 'Wealth' and finally the desire to protect income from Inflation. Though aggregate demand is driven by these factors, various researches have shown that there is little correlation between a specific family's need for security and its actual purchase of insurance. Many families, especially young ones, have either no risk security or inadequate security.

Tapen Sinha (2005) analyzed the evolution of insurance in India. He concluded that India is fast becoming a global economic power. India is among the important emerging insurance markets in the world. The fundamental regulatory changes in the insurance sector in 1999 will be critical for future growth. Despite the restriction of 26% on foreign ownership, large foreign insurers have entered the Indian market. State-owned insurance companies still have dominant market positions. But, this would probably change over the next decade.

Barros, Barroso, Borges (2005) covered 27 life and non-life insurers of Portugal country during 1995 to 2001. In this study they found technical efficiency, pure technical efficiency and scale efficiency by using DEA method. The study concluded that the technical efficiency improved over time but deteriorated in terms of technological change. At the same time pure technical efficiency and scale efficiency had increased.
AK Sukla (2006) reviewed the measures of liberalization initiated in the insurance sector. Six years into competitive market, the Indian insurance industry exhibited a healthy growth trend of new business and market share. The life insurance industry saw the new players stabilize their operations keenly matched by LIC of India and the premium numbers brought out the fact that the size of the insurance market grew over the six years of liberalization. He also viewed that with liberalization, India was penning the script of insurance convergence and not Insurance divergence. It clearly indicated the comfort zone of operation of the players.

Hwang, Shiu-Nan; Kao, Tong-Liang (2006) studied managerial efficiency in Life Insurance Companies with an application of two-stage Data Envelopment Analysis. The results revealed that marketability can be explained by percentage of outer servers, number of branches, premium investment percentage and corporate image, while profitability can be explained by market share. This paper uses the two-stage data envelopment analysis (DEA), which was first used by Seiford and Zhu (1999), to measure managerial performance in 10 life insurance companies in Taiwan. Performance was measured by Marketability in the first stage and Profitability in the second stage. In addition, this paper uses the Tobit regression model to examine factors that significantly influence managerial efficiency.

Hussels, Ward (2006) analyzed the cost efficiency as well as technical efficiency of 31 life insurers of Germany and 47 life insurers of U.K. during 1991 to 2002. They concluded that the cost and technical efficiency of U.K. was greater than Germany. There was limited evidence of improvement in post deregulation efficiency as well as limited influence of deregulation on efficiency.

Cummins et al. (2006) were the first to explicitly investigate the relationship between risk management, financial intermediation, and economic efficiency. In their application to the US property-liability industry, they analyzed whether
both activities contribute to efficiency through reducing costs of providing insurance. In order to show the contribution of risk management and financial intermediation to efficiency, they estimated shadow prices of these two activities. They found positive shadow prices of both activities and concluded that they significantly contribute to increasing efficiency.

Badunenko, Grechanyuk, Talavera (2006) studied technical and scale efficiency of 163 life and non life insurers of Ukraine country from 2003 to 2005 by using Data Envelopment Analysis method. They found that increased capitalization requirements have positively influenced Ukrainian markets and helped to improve both technical and scale efficiency.

T. Sri Jyothi (2007) focused on the devastation caused by extreme climatic changes, with particular reference to those experienced in the USA and Australia, and the role of insurance industry and government in the occurrence of such events. The concepts like adaptation, mitigation are also explained. Further, it also deals with the recent tools available for the insurers to mitigate the loss and new policies developed by government to provide financial stability to these companies. It concludes with the new disaster and catastrophic risk insurance policies started by insurance companies in the US and Australia. It mainly focuses on the devastation caused by Hurricane-Katrina in 2005 and its aftermath.

Klumpes (2007) covered 1183 both life and general insurance companies of 7 European countries such as France, Germany, Italy, Netherlands, Spain, Switzerland and U.K. during 1997 to 2001. The study used Data Envelopment Analysis approach to find out cost efficiency, technical efficiency and revenue efficiency. The study concluded that acquiring firms achieved greater efficiency gains than target firms or firms not involved in mergers.

Yao, Han, and Feng (2007) used a panel data set of 22 insurance companies over the period 1999 to 2004 to evaluate their efficiency by applying Data Envelopment Analysis approach. In their study, labor and capital were input
factors while premium, benefits and claims costs were output factors to measure the efficiency of insurance companies.

Jeng et al. (2007) used the DEA model and examined the efficiency changes of US life insurers before and after demutualization in the 1980s and 1990s. The inputs used in their model were labor, business service, equity cost, assets and underwriting and investment expenses. On the output side, the factors included benefit payments and return on assets.

CS Rao (2007) reported that Insurance is a vital economic activity and there is an excellent scope for its growth in the emerging markets. The opening up of the insurance sector has raised high hopes among people both in India and abroad. The recent detarrification in the non-life domain has provided a great deal of operational freedom to the players.

Gamarra (2007) estimated cost and profit efficiency of three groups of German life insurance companies: multichannel insurers, direct insurers, and independent agent insurers. Nonparametric Data Envelopment Analysis was used to estimate efficiencies for a sample of German life insurers for the years 1997 to 2005. Testing a set of hypothesis, she found economic evidence for the coexistence of the different distribution systems. Further, she found evidence for scale economies in the German life insurance industry.

Sabera (2007) studied the opening of the insurance sector. He concluded that the entry of private players helped in spreading and keeping the operation in the Indian insurance sector which in turn results in restructuring and revitalizing of public sector.

Barros, Obijiaku (2007) covered 10 life and non-life insurers of Nigeria during 2001 to 2005. The study analyzed technical efficiency, pure technical efficiency and scale efficiency by using Data Envelopment Analysis approach. The study showed that the most of the companies of Nigeria were VRS efficient.
Mohit Anand (2007) analyzed the impact of JV insurers upon growth and innovation in the industry. Besides innovative ideas applied in product, Insurers face rising pressure to retain clients. Hence innovation in information systems, customer service and imaginative marketing approach are necessary. Many of the JV insurers bank upon product innovation and an increased acceptance of its global products to survive in this highly competitive insurance market which is even today dominated by public sector insurers. Hence for JV firms, innovation is a necessity but also the key to competitively survive and grow in long haul prospects of this market.

Naveed Ahmed, Zulfqar Ahmed, Ahmad Usman (2008) examined the impact of firm level characteristics (size, leverage, tangibility, risk, growth, liquidity and age) on performance of listed life insurance companies of Pakistan over seven years from 2001 to 2007. The results showed that Ordinary Least Square regression analysis indicate the size risk and leverage are important determinants of performance of life insurance companies of Pakistan while ROA has statistically insignificant relationship with growth, profitability, age and liquidity.

Fenn et al. (2008) covered 14 Europeans countries such as Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Sweden and Switzerland and found cost efficiency by using Stochastic Frontier Approach method. The study covered both life and non life insurance companies during 1995 to 2001. The result of the study was that in case of life insurers, Portugal and Austria were the best and Netherlands and U.K. was the worst. Among non life insurers U.K. was the best and Luxembourg was the worst. The study also found that there were no improvement in cost efficiency and returns to scale increased for most of the insurers. It also concluded that the larger firms with high market shares were less cost efficient.
Martin Eling, Michael Luhnen (2008) reviewed 87 studies and put them into a joint evaluation of efficiency measurement in the field of insurance. A broad efficiency comparison of 350 insurers from 34 countries was conducted. They found a steady technical and cost efficiency growth in international insurance markets from 2002 to 2006, with large differences across countries. Denmark and Japan had the highest average efficiency, whereas the Philippines was the least efficient.

Martin (2008) studied the performance of micro insurance with Frontier Efficiency Analysis. This was the first paper to use frontier efficiency analysis for measuring performance of micro insurance programs. While research on performance in micro insurance has focused on traditional financial ratio analysis in the past, they believed that frontier efficiency might provide a new, powerful performance measurement technique and a valuable addition to the existing performance measures in the field. They illustrated efficiency values for 21 micro insurance programs from Asia, Africa, and Latin America for the years 2004 to 2008 based on data provided by the Micro insurance Network. They found that there was significant improvement with regard to productivity and efficiency for many programs. The results also illustrated the diversity of different micro insurance providers and emphasized the relevance of benchmarking in order to identify best practices across different micro insurance providers, countries and organizational forms.

Davutyan, Klumpes (2008) studied technical efficiency, pure technical efficiency and scale efficiency using Data Envelopment Analysis method. The study covered 472 insurers of 7 European countries: France, Germany, Italy, Netherlands, Spain, Switzerland and U.K. during 1996 to 2002. They included both life and non-life insurers in their study. The inputs used in their model were labor, business service and equity capital. On the output side, the factors included present value of losses incurred premiums and invested asset. The study analyzed that the efficiency score was very low in seven European countries. In life insurance France was the best and Netherlands was the worst.
where as in non life insurers Switzerland was the best and Spain was the worst. It also concluded that in life insurance, after mergers, business inputs replaced labor for both targets and acquisition and mergers do not significantly impact acquirer behavior.

Sharon Tennyson (2008) studied the state Regulation and Consumer Protection in the Insurance Industry. This paper analyzed the need for market conduct regulation in insurance markets, and argued for state versus federal provisions and regulation. It also examined the provision of consumer protection regulation by the states in light of proposals for an increased federal role in insurance regulation.

Chiang Ku Fan, Shu Wen Cheng. (2009) compared the efficiency of bancassurance, an indirect marketing channel formed through the creation of subsidiaries, with an insurer's own team, a direct marketing channel, in the Taiwan insurance sector. The three major findings were: the efficiency score of a direct marketing channel is significantly higher than that of a comparable indirect marketing channel. The efficiency relationship between the indirect marketing channel and the direct marketing channel is independent. A marketing efficiency evaluation, when divided into different marketing channels for evaluation, provides meaningful results for marketing decision-makers.

Chen et. al. (2009) examined the determinants of profitability of insurance companies of Japan from 2003 to 2008. The result showed that profitability of insurance companies decreased with an increase in equity ratio. He added that insurance companies have to diversify their investment and use effective hedging techniques which help them to create better financial revenues.

R. Rajendran, B. Natarajan (2009) studied the impact of Liberrization, Privatization and Globalization on Life Insurance Corporation of India. They concluded that in India the insurance habit among the general public during the independence decade was rare and in the following decades, it slowly
increased. There was a remarkable improvement in the Indian insurance industry soon after the acceptance and adaptation of Liberalization, Privatization, and Globalization in the year 1991. After 1991 the Indian life insurance industry had geared up and was forced to face a lot of healthy competition from many national as well as international private insurance players. The fall in the savings rate and increased competition in the primary market and particularly the aggressive mobilization by the Mutual Fund posed serious challenges before LIC.

Sandeep Ray Chaudhuri and Joy Chakraborty (2009) focused on the ins and outs of the strategies adopted by the private life insurers to overcome the product-selling challenges in the Indian life insurance market. The result showed that private life insurance companies focused more on selling Unit Linked Insurance plan.

Skyline Business School (2010) examined the customer preference for purchasing life insurance product during 2009. Out of the 500 people surveyed, 70.60% respondents said that tax saving was the most important motivator for taking up a Life Insurance Policy. 67.40% said that financial security was the most important motivator. When asked which company the respondent would recommend, most of them i.e. 43.20% said they would recommend LIC of India, reason being the high quality image. 87.80% respondents said they would consider LIC of India while buying their Life Insurance Policy.

The above literature reveals that most of the studies focused on cost and technical efficiency for insurance companies abroad. Very few studies have attempted to study about the impact of liberalization on the insurance sector and the performance of LIC in India. Even in this direction, the efforts are fragmented. No research has been undertaken to compare LIC of India vis a vis the new private life insurance companies in terms of cost efficiency. The present research seeks to fill this gap.