Chapter 2
Review of Literature

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2.1 Introduction

Investment behaviour of insurance industry has been widely debated in the area of finance. Investment behaviour of insurance companies has become an issue of concern to the investment managers, policy makers and institutional investors. Therefore several studies have been undertaken to evaluate investment pattern of insurance companies, their investment performance and investment regulations, etc. The review of literature covers different aspects of the insurance industry mainly divided into four areas:

2.2 Studies related to Present Status, Challenges and Future Prospects of Insurance Industry

Kantha and Gowda (2016) studied the outlook of insurance executives on importance of Foreign Direct Investment (FDI) in life insurance sector of India. The study was depended on primary as well as secondary data. Primary data were collected from 40 executives of LIC and 20 executives of private life insurance companies through questionnaire. The authors found that executives of private life insurance companies are in support of FDI whereas a very few executives of LIC are in favour of FDI. Executives of private life insurance companies comprehended that FDI will expedite product development and technological advancement.

Wanat, Papiez, and Smiech (2016) investigated the interrelationship between insurance market activities and economic development. Ten transition European Union member countries were examined during 1993-2013 by using bootstrap panel causality approach developed by Konya (2006) that incorporates country-specific heterogeneity with cross-sectional dependence. Gross Domestic Product (GDP) per capita was considered as proxy measure for economic growth and insurance market development was measured by life insurance density, non-life insurance density and total insurance density. The findings confirmed that there are diverse contributions of insurance market in economies of particular countries.

Alhassana and Biekpe (2015) utilized data envelopment analysis and malmquist index to estimate efficiency, productivity and returns to scale economies of
non-life insurance market in South Africa during the period from 2007 to 2012. Truncated bootstrapped regression and logistic regression techniques were applied to identify factors that influence the efficiency and the likelihood of steering under constant return to scale. The authors found that non-life insurance companies are working with 50 per cent inefficiencies and 20 per cent of insurers manifest most productive scale. Moreover, productivity improvements are inferable to technological changes. The results of regression analysis indicated that product line broadening, reinsurance and leverage have a prominent relationship with efficiency while there is a non-linear effect of size on efficiency.

Babu (2015) made bankruptcy risk projection of twenty one non-life insurance companies of India for the period of 6 years from 2008-09 to 2013-14. Backward regression technique was applied to describe the linear relationship of the net profit after tax as dependent variable with incurred claim ratio, solvency ratio, gross direct premium, net earned premium, claims incurred, commission expenses, underwriting profit, operating expenses, operating profit, FDI proportion in equity and current ratio as independent variables. Discriminant analysis was used to determine the factors influencing financial risk of non-life insurance companies. The researcher identified that all public sector non life insurers and five private sector non-life insurers are in risky category.

Bahekar and Sudame (2015) evaluated the relationship of financial goal for selecting ULIPs with various factors such as age, type of family, marital status, nature of livelihood and educational qualification. The study was based on primary data collected through valid questionnaire from 550 ULIPs customers from 11 district of Vidarbha Region in Maharashtra. The results highlighted that there is magnificent relationship of primary financial goal for choosing ULIPs with marital status, age, family, type educational qualification and nature of employment.

Kaur and Sharma (2015) concentrated on the impact of FDI on the efficiency of private life insurers. Ten private life insurers were analyzed with the use of multiple regression analysis for the period of 7 years from 2008 to 2014. The variables employed in the study were FDI, annual premium, profit & loss, operating expenses and business expansion. The authors highlighted that FDI will develop market for the private insurance players in urban, semi urban and rural areas.
Mathur, Paul, Prasad, and Das (2015) examined the association of health insurance subscription with socio-economic factors, individuals’ product perception and individuals’ personality traits. A questionnaire was emailed to 263 sampled respondents in Lucknow region. T test, F test and logistic regression method were applied to analyze the components which impact respondents’ opinion to buy health insurance. The author observed that age, medical outlay, family dependents, health condition and individual’s product perception are considerably associated with health insurance subscription. Moreover, personality traits are positive related to respondent’s health insurance status.

Mistry and Singh (2015) investigated the factors which influence maturity benefits of ULIPs from 2008 to 2012 by using regression analysis. The study covered ten insurance companies and their three classifications of ULIPs i.e. unit linked endowment plan, unit linked wealth plan and unit linked child plan. The results revealed that premium allocation charge, mortality charge, policy administration charge and fund management charge are the determinants of maturity benefit of ULIPs.

Priya and Srinivasan (2015) examined the awareness level of the respondents towards the health insurance policies and variables which impact their health insurance purchase decision. Sample survey was conducted to collect primary data from 325 respondents. In order to analyze data collected, the study used chi square test, t test, one way ANOVA and Garrett rank technique. The researchers found that 45.5 per cent of respondents aware of health insurance through advertisement, followed by 27.4 per cent by Agents and 19.1 per cent through friends & relatives.

Rakesh and Shilpa (2015) investigated the need for raising FDI in Indian insurance sector. The researchers highlighted that FDI initiatives are taken to encourage joint ventures in insurance sector so as to uplift position of insurance companies in domestic market. Despite the present policy and regulatory conditions are not ideal for foreign companies, there are major initiatives towards facilitating FDI inflows without affecting other sectors of the economy. Increased FDI is perceived to influence Indian insurance sector in long term than short term.

Shikhare (2015) highlighted that splendid growth of FDI in the global economy is an eye catching developments over the last two decades. The prevalent
policies in Indian insurance sector are endeavoring to stimulate joint ventures in order to revamp domestic insurer conditions. However, foreign capital may open Indian economy to the vulnerabilities of the world market. Hence, hike in FDI may not be legitimate for the Indian insurance sector in the present global economic context.

Talwar and Ali (2015) examined the rationale behind attracting more FDI in India especially the proposed 49% FDI in the insurance sector. The researcher emphasized that FDI is unquestionably the dire need of India which is economically challenged. The foreign firms will bring better insurance products and superior technological competence that may help the industry in effective claims settlements, underwriting and other major areas. Furthermore, FDI is required for meeting crucial infrastructural needs.

Gupta and Aggarwal (2014) tried to explore relationship between the level of insurance penetration and GDP in India. The researchers opined that lack of financial awareness leads to the lower savings in the financial instruments resulting to the very low level of insurance penetration, especially after 2010. Meanwhile, the insurance industry needs to tap the unrealized potential of the public, private and foreign investors in order to ensure growth in the economy together with increase in penetration.

Jogish (2014) compared the growth of ULIPs and traditional insurance products between LIC and private insurance players. Market performance of selected ULIPs of insurers was also ascertained by determining the excess return generated per unit of total risk. The author came to conclusion that returns produced by LIC are similar to its counterpart and suggested insurance companies to design their ULIPs in such a way that buyers are aware of various fees and commissions forming a huge proportion of the first year premiums paid.

Lin, Lai, and Powers (2014) developed an option pricing model to identify a nonlinear association between regulatory intervention and insurers’ risk taking. The researchers then conducted simultaneous threshold regression. The result showed a threshold impact of regulatory intervention (risk-based capital regulation) on insurer risk taking. Badly capitalized insurance companies seem to know about their vicinity to regulatory interferences even then they do not retaliate fully to the impending
regulatory interventions. This alludes either regulatory interferences are not costly enough or they are too late, or both.

Nandi (2014) measured relative performance of the selected life insurers of India. This study was based upon top 13 life insurers including 1 public sector life insurer and 12 private sector life insurers covering a period from 2002-03 to 2011-12. Output oriented DEA has been applied to assess the technical efficiency between 0 to 1 ranges. This study utilized two inputs (commission paid and operating expenses) and two outputs (premium and net benefit). The results showed that life insurers are carrying life insurance business at an average technical efficiency of 82.6%, pure technical efficiency of 87.5% and scale efficiency of 94.7%. On the other hand sector wise performance analysis revealed that performance of public sector life insurer is better than private sector life insurers.

Phutkaradze (2014) tried to identify relationship between development of insurance sector and economic growth by applying fixed effect panel data model. Annual data for 10 former transition countries were examined during the period from 2000 to 2012. The results reported that total insurance penetration is not significantly related to the GDP growth. The results are inconsistent with insurance-growth assumption. The findings supported those previous studies which explained a negative and non-significant influence of insurance sectors on the economic growth in the European Union (EU) members. Thus, the obtained results did not confirm that advancement of the insurance would facilitate faster economic development in the transition countries.

Shah and Dadachanji (2014) identified the various opportunities and threats which Indian insurance companies are confronting. The authors proposed a clear agenda for insurers and suggested that insurance companies should set a digital goal post, adjust to a digital attitude, speed up their current digital efforts and exhort the right possibilities within their organizations set up.

Banerjee (2013) examined the importance of personal selling in enhancing policyholders’ satisfaction in home insurance market of India. The primary data were collected with the help of structured questionnaire. Questionnaires were mailed to 100 respondents selected with the help of quota cum convenience non-probability sampling approach. The author mentioned that people have just heard about the home
insurance and they preferred to approach authorized agent of the company to know about the home insurance.

**Chen, Cheng, Pan, and Wu (2013)** applied bootstrap panel granger casualty test to investigate casual relationship between globalisation and insurance activity based on a sample of 8 eastern Asian countries (Thailand, India, Japan, Malaysia, Indonesia, Philippines, South Korea and Singapore) during 1979-2008. Empirically, the results found that there is causality from insurance market activity to globalisation only in Korea. However, strong causality was observed from globalization to insurance market activity in Malaysia, Thailand and Philippines. The researchers therefore came to the conclusion that there is a variation in causality between globalization and insurance market activity across countries with different situation.

**FICCI (2013)** highlighted that non-life insurance sector in India burdened with growing underwriting losses as claim ratio is very high. However, strong retail lines, increasing customer awareness and premium growth are among some of positive development in Indian non-life insurance market. Therefore, general insurance players should reassess all aspect of their business such as pricing, product, risk management and customer relation.

**Ghosh (2013)** aimed to identify association between life insurance industry and economic development in India. VAR-VECM (Vector Auto regression and Vector Error-Correction Models) and granger causality test have been used to found the long run and short run association between life insurance development and economic development. The result was consistent with the fact that there is long term association between life insurance industry and economic development in India, but this association is unidirectional. The results of granger causality test highlighted that life insurance industry contributes to the overall economic growth in India.

**Huang and Eling (2013)** analyzed the performance of non-life insurance companies in BRICs (Brazil, Russia, India and China). Multi-stage DEA was applied to differentiate between managerial efficiency and inefficiency. It also captured cross-country variations by incorporating uncontrollable variables. Furthermore, regression analysis was conducted to identify impact of firm characteristic on efficiency of non-life insurance companies in BRICs. The results supported that efficiency of non life
insurance companies is affected by firm size, profitability, solvency position and ownership structure.

Nagarajan, Ali, and Sathyanarayana (2013) conducted a descriptive study on status of ULIPs by selecting top five private life insurers of India. The selected firms were ICICI Prudential Life Insurance Co. Ltd., Reliance Life Insurance Co. Ltd., SBI Life Insurance Co. Ltd., PNB Met Life India Insurance Co. Ltd., and Bajaj Allianz Life Insurance Co. Ltd. The performance of ULIPs was tested by using rate of return, correlation and t-test. The researchers concluded that Reliance Life Insurance Co. Ltd. provides better returns for the investors while Bajaj Allianz Life Insurance Co. Ltd. has lowest rate of return.

Padhi (2013) applied the techniques of correlation and regression analysis to measure the performance of selected private insurers of India during 2001-2012. The variables used in the study were number of policies floated, amount of premium collected and annual growth. Analyzing these variables, the author came to the conclusion that overall performance of all private insurance companies is satisfactory and they need to continue this pace to penetrate for more market share.

Shree devi and Manimegalai (2013) compared the performance of public and private non-life insurance companies over a period of 9 years from 2002-03 to 2010-11. The study was carried out to examine any significant difference in number of new policies issued, gross direct premium income and net incurred claim among public and private non life insurers by using Mann-Whitney U test. The researchers asserted that public sector firms have done far better than private sector firms which can be due to aggressive pricing and retention of business. Moreover, New India Assurance Company Limited and ICICI Lombard General Insurance Company Limited found to be pioneers in non-life insurance market.

Venkatesh (2013) attempted to explain growth of Indian insurance sector by reviewing premium and insurance density. The author had used trend analysis to obtain trend percentage of variables and advocated that trend percentage has been continuously improved. However, India’s insurance density has been showing low percentage, but it expected to be improved year to year.

Verma and Bala (2013) examined the association between life insurance and economic development in India during 1991-2011. Life insurance premium and life
insurance investment are selected as proxy measures for life insurance and gross domestic product is used as proxy measure for the economic development. The authors applied Ordinary Least Square regression model. In order to check robustness of the model, Breusch-Godfrey Serial Correlation LM, Breusch-Pagan-Godfrey model for Heteroskedasticity, JarqueBera, Collinearity Diagnoses tests have also used. The results revealed that life insurance has positively significant impact on the economic development.

**Yadav and Rokade (2013)** studied the development of Indian life insurance sector and its contribution in economic development of India from 2002 to 2010. Student’s t test and Karl’s Pearson correlation were applied to find out significant difference/correlation between growth of life insurance sector and economic growth. The researchers identified a positive relationship between life insurance sector and economic growth of India. Life insurance industry provides employment, escalate capital formation and boost industrial growth.

**Zafar and Aggarwal (2013)** analyzed the performance of selected general insurance companies of India during the period of 5 years from 2003 to 2007. Bajaj Allianz General Insurance Co. Ltd., IFFCO-Tokio General Insurance Co. Ltd., The New India Assurance Co. Ltd., ICICI Lombard General Insurance Co. Ltd., and The Oriental Insurance Co. Ltd., were taken as sample general insurance companies. The variables used in the study were current ratio, proprietary ratio, solvency ratio, returns on investment, fixed asset to net worth ratio, net profit margin ratio, gross profit margin ratio and fixed asset. The authors pinpointed that The New India Assurance Co. Ltd. has secured top rank among all the competing companies.

**ChakraBarty and SenGupta (2012)** measured efficiency of 13 life insurers of India in terms of catch-up efficiency scores, frontier efficiency scores and malmquist total factor productivity growth index for 7 years period ranging from 2003-2004 to 2009-10. The study utilized net premium along with number of products launched as output variables and operating expenses along with commission expenses as input variables. The results indicated that LIC reflected a relative catch-up efficiency score of 1 while private life insurers reflected a mean catch up efficiency score more than 1. Moreover, comparison of relative frontier shift efficiency score reflected that public sector life insurer is marginally ahead of its private sector counterparts. LIC reflected a consistent relative total factor productivity
change index more than 1 indicating relative progress in total factor productivity and all private life insurers reflected a mean positive total factor productivity growth.

**Ganapathy (2012)** provided a broader outlook to insurance legislation & regulation in India by studying core principles of International Association of Insurance Supervisors (IAIS) and 20 insurance principles of The Organization for Economic Co-operation and Development (OECD). The author tried to examine the level of compliance in India with IAIS core principles by assigning status of observed, partly observed and unobserved. Partly observed means greater attention demanded. The author suggested IRDAI to keep watch at core principle in respect of risk assessment & management, insurance activity, liability, capital adequacy and solvency in greater detail to achieve their compliance in India.

**Gnatzy and Moser (2012)** used Delphi based scenarios to analyze future developments in the health insurance industry in rural India. This study presented two different types of scenario. These were PEST (political, economic, socio-cultural, and technological) dimensions and stakeholder (consumers, competitors, suppliers, government, and the society) dimensions which investigated influence of stakeholders activities on the industry's future. The researchers surveyed more than 35 local experts to present how scenarios for the health insurance industry in rural India might look like by 2020 and how a business model might accordingly be developed or adapted. The researcher observed that many experts were very much focusing on their specific area of expertise only when justifying their judgments. Arguments provided by other industry stakeholder groups were often neglected. However, focus on a specific aspect of health insurance system in rural India is not enough. There are extremely high interdependencies among government, Non-Governmental Organization (NGO), mobile payment solution providers and insurance companies. They are rather required to establish collaborations with medical and mobile payment service providers as well as NGOs to jointly convince the government to provide the necessary infrastructure to improve medical services in rural India significantly.

**Hussain and Chakraborty (2012)** investigated the interrelationship between financial development and economic growth in context of Assam (India) using annual data set from 1985 to 2009. In the study, gross state domestic product used to capture economic growth in Assam and financial development was represented by financial depth indicator constructed with the help of the principal component technique.
Johansen and Jesulius Cointegration analysis suggested a long term cointegrating relationship between the two variables. Furthermore, Granger causality tests revealed that financial development causes economic growth in case of Assam.

**Njegomir and Stojic (2012)** utilized panel data of fifteen countries from 2004 to 2009 to investigate determinants of non-life insurance marketplace attractiveness for foreign insurers in Eastern Europe. Country-specific effects models for panel data were applied by using foreign companies’ premiums as dependent variable and market competitiveness, barriers to entry, human capital, insurance demand, FDI, market profitability and return on investment as control variables. The results indicated that the main factors affecting market attractiveness are insurance demand, market concentration, barriers to entry and return on investment. In addition, entry barriers, insurance demand, and return on investment are positively related with market attractiveness while market concentration has a negative impact on market attractiveness.

**Noronh and Shinde (2012)** studied cost efficiency of life insurance sector in India using the technique of DEA during the period of 10 years from 2001 to 2010. For the purpose of study, benefit paid to customer as well as net premium have been taken as outputs while operating expense and commission expense have been selected as inputs. The result found that LIC has consistently reported a cost efficiency score of 1 for all years under study. However private life insurers have been showing an inconsistent cost efficiency score.

**Sharma and Chowhan (2012)** studied the impact of privatization on life insurance business in India with sample of 50 consumers in Jaipur city. In order to fulfil objectives of the study, 50 consumers were divided into 3 category i.e. high level financial consumers, medium level financial consumers and low class financial consumers. The authors pinpointed that life insurance industry has been developed tremendously after privatization of Indian insurance sector in terms of number of offices, number of agents, new business policies and premium collected. There has also been a significant change in marketing practices of insurance companies with new innovative policies and products.

**Bedi and Singh (2011)** assessed the performance of life insurance industry in India by using t-test and analysis of variance. Performance of life insurance industry
was analyzed between pre and post economic reform covering the period from 1980 to 2009. The results indicated that Indian life insurance industry shows tremendous enhancement in the performance due to the policy of LPG (Liberalization, Privatization and Globalization). Finally, this paper concluded that there is also a huge change in the investment pattern of LIC. LIC’s investment in stock market increased from 60 per cent to 93 per cent during 1980-2009 because of increasing lucidity of capital market and the effective regulation of SEBI.

**Chaudhary and Kiran (2011)** highlighted the developments in Indian life insurance sector during 2007-2011. Various indicators selected to represent status of life insurance sector were growth in number of offices, growth in number of individual agents, total number of products and riders, lapse/forfeiture ratio, growth of life insurance business, premium income and settlement of death claims. For the analysis of data, statistical tools employed in study were percentages, ratios, growth rates and coefficient of variation. The results divulged that there is significant improvement in the performance of industry in terms of number of offices, number of agents, new business policies, and premium income, etc.

**Devi (2011)** discussed the impact of liberalization on overall functioning of Indian insurance market from 2001-02 to 2009-10 by applying Herfindahl Hirschman Index, Entropy and DEA. Volume of business, insurance penetration & density, market concentration, product innovations, market strategy and use of technology were examined in context of overall performance. The result showed that there is overall development in insurance industry indicated by the fall in concentration ratios, increase in insurance penetration & density and improvement in firm level efficiency and productivity.

**Kamalanathan (2011)** undertook a survey of 400 policyholders from Mumbai city to investigate behaviour of policyholders towards private life insurers. The sample of 400 policyholders consisted of 115 from South Mumbai, 115 from Eastern Suburb and 170 from Western Suburb. The questionnaire included both open ended and closes ended questions related to policies purchased, reason to purchase, benefit drawn and companies recommended. The author concluded that satisfaction level of respondents towards private life insurance companies is more than LIC and trustworthiness is the major reason for purchase of LIC products.
Shinde (2011) evaluated financial performance and cost efficiency of public and private sector life insurers in India by using ratios, ANOVA, DEA and linear trend. The authors found that prediction of new business and total premium for both private and public sector life insurers in India have been exhibited an upward movement. Furthermore, in term of cost efficiency LIC secured a cost efficiency score of 1 in all years from 2000-01 to 2009-10 while private insurers turned into inconsistency.

Han, Li, Moshirian, and Tian (2010) investigated the interrelationship between insurance market growth and economic development where insurance market growth is represented in form of insurance density. The researchers applied Generalised Method of Moment (GMM) approach on a data set of 77 nations for the period of 12 years from 1994 to 2005. The findings reported that insurance market growth is positively associated with economic development and more significant in case of non-life insurance than life insurance. Moreover, both life and non-life insurance business play a much more important role in developing economies than developed economies.

Kakar and Shukla (2010) used the data generated by National Council of Applied Economic Research (NCAER) and National Survey of Household Income and Expedition (NSHIE) to analyze the factors influencing life insurance ownership. For the purpose of analysis, the technique of logistic regression analysis was applied. The authors found that education level and occupation of chief earner of households are the important determinants of life insurance demand and asset ownership.

Mitra and Ghosh (2010a) identified the relationship between macroeconomic factors and demand of life insurance in India. The authors had taken life insurance penetration, life insurance density, total premium volume and life insurance in force as dependent variables. Income, inflation, interest rate, financial development, price of insurance, education and urbanisation had been taken as independent variables. In the study, Augmented Dickey Fuller Unit root test was used to measure the stationary property of variables from 1991 to 2008. The results unfolded that income, interest rate on alternative investment, inflation, financial development and education are the significant factors in explaining life insurance penetration and life insurance density.
Rajendra and Natarajan (2010) analyzed the impact of liberalization, privatization and globalisation on LIC using methods of least square and linear trend. The researchers also examined the current status, competition and challenges faced by LIC. The findings revealed that LIC has been observed an upward trend throughout the study period in terms of business in India, business outside India and total business. It was further highlighted that there is a positive influence of LPG on LIC and its performance.

Gopalakrishna (2009) presented the idea of insurance in philosophical way, a duty toward human being. The author emphasized that business of insurance should be conducted in ethical way along with serving their own motives. In support of this view, references were taken from Epics, Religious Books and other literatures. The author further discussed the role of private insurers in providing better services to common man in coming years.

Prasad, HariBabu, and Varma (2009) evaluated the operational and financial efficiencies of life insurance players by applying financial ratios and operating parameters. The result revealed that industry has observed a paradigm shift in terms of market linked products, e-marketing, improved risk coverage umbrella to various sections of the society with innovative products, competitive packages and rural & social orientation. It was further observed that except LIC, all insurance players show a negative Return on Asset (ROA) and Return on Equity (ROE).

Sinha and Ahmad (2009) conducted a case study of American International Group to examine effects of financial crisis on insurance industry and to suggest future course of actions and precautions need to be undertaken by the industry. The authors emphasized that insurance industry would be affected adversely due to decreased economic activities and the cost of insurance would go up because of huge decline in investment income. The authors therefore suggested that insurers will have to be careful in providing insurance and should charge premium proportionate to the risk involved.

Veena (2009) described insurance product as an insurance policy having various term and conditions which express the acceptance of risk for valuable consideration. The research article put a special emphasis on micro insurance products
and its regulation. The author suggested that insurance companies should spread awareness among public about insurance product.

**Arena (2008)** examined the causality between insurance market activities and economic development using the GMM for panel data of 55 countries during 1976-2004. The researcher found an evidence of strong positive association between insurance market activities and economic development. Both life and non life insurance market activities found to have positively significant impact on economic development. In case of life insurance, the impact was observed because of high income countries. On the other side, for non life insurance, the impact was driven by high income countries as well as developing companies.

**Cummins and Venard (2008)** characterised world insurance market on the parameters of annual premium, relative importance of life and non life products, insurance concentration and insurance density. The researchers highlighted that the various national insurance markets are under the pressure to converge with global standards and face worldwide development while exhibiting distinctive local diversity. It was further identified that expanding complexities of insurance products, development of mega-financial intermediaries, risk diversification through reinsurance and increasing importance of supranational agencies are among the important global trends. On the other side, political, cultural and legal differences as well as differences in financial markets, regulatory system, taxation, insurance investment strategies and insurance distribution systems have taken as important local differences.

**Kao and Hwang (2008)** decomposed efficiency into two stages where efficiency is assessed separately for the whole process and for each stage to identify cause of inefficiencies. The researcher applied modified DEA model on non-life insurance companies of Taiwan. It was claimed that the model developed by researchers in this paper is more robust in measuring the efficiencies and gives reasons for inefficiency more precisely. Furthermore, by utilizing structure of this model, idea of inefficiency decomposition can also be applied to systems composed of multiple stages.

**Rao (2008)** conducted an exploratory study on how service firms actually innovate. For this purpose, sample of zonal managers from ten private insurance
companies had taken into consideration. The results reflected that all the ten private life insurance companies have a formal new service development unit with strategic role where top executives in collaboration with Research & Development (R&D) department develop service in formal way. The author therefore concluded that there is an effective system of innovation in these service organizations.

**Vadlamannati (2008)** examined the contribution of insurance sector to economic development in India from 1880 to 2006. The results reported a positive relationship between insurance sector and economic development and exhibited a long run equilibrium relationship. However, the study did not indicate any strong relationship between insurance sector reform and economic development, but favoured the reform as an indicator of prosperity. It has also suggested complete deregulation of insurance sector and an acceleration in pace of reform.

**Sinha (2007)** estimated technical efficiency and total factor productivity of 13 life insurers using DEA and malmquist total factor productivity approach from 2002-03 to 2004-05. The net premium income has been considered as the output and agents employed along with equity capital have been taken as the inputs. The results unfolded that private insurance insurers have been lagging behind the LIC. LIC has been reported efficiency score of 1 in all years from 2003 to 2005 on constant return to scale, variable return to scale and scale efficiency. However, all the life insurers have been exhibited positive total factor productivity growth over the three years.

**Dror, Radermacher, and Koren (2006)** conducted a survey of 3024 family units in seven different locations where micro health insurance enterprises are in existence. The findings reported that education and family size are observed to be the most overwhelming elements affecting willingness to pay. It was further highlighted that persons protected by micro health insurance enterprises have higher readiness to pay than uninsured, despite the fact that respondents were not given any alternative to pick the composition of the benefit package attached to their offers.

**Sadak (2006)** examined the interrelationship between life insurance demand and macro economic factors. The authors applied Pearson correlation matrix for representing the relationship among GDP, household saving, person disposal income, inflation, interest rate, population growth and life fund. The results exhibited a positive correlation among GDP, household saving, disposal income, population
growth and life insurance fund. However, inflation and interest rates have negative relationship with life insurance fund.

**Sinha (2005)** described the current state of development in India’s insurance market in respect of life insurance, non life insurance, rural insurance and regulatory regime. The author highlighted that Indian insurance market has vast potential to become a largest insurance market in the region fostered by sound economic fundamentals, rising household wealth and further improvement in regulatory framework which pave the way for strong growth in insurance market. Indian insurance market has been seen new trends with the entry of international players, proliferation of innovative products, distribution channels and raising supervisory standard.

**Tone and Sahoo (2005)** applied DEA to assess cost efficiency and return to scale of LIC for the period of 19 years from 1983 to 2001. The outcomes revealed a significant variability in overall and scale efficiency of LIC during the study period. High initial fixed cost of modernizing operations was led to a decreasing pattern in cost efficiency since the year 1994-95. However, the year 2000-01 reversed the pattern demonstrating a significant improvement in cost efficiency due to reaping fruits of modernisation.

**Somesh (2001)** discussed issues related to regulation of insurance business especially in context of solvency, market routine and some observed practice follow by different countries in world with particular reference to India. The author suggested that the initial focus of regulator must be on financial soundness of players, tariff and contract standardisation, and creating a level playing field for new entrants vis a vis the monopoly giant LIC and General Insurance Corporation of India (GIC).

**Bhaumik (1999)** addressed the importance of investment management in insurance business with special reference to impact of investment regulations on asset quality of insurance companies. For the purpose of supporting his views, author had taken a support from U.S. insurance industry experience and identified cost management as a crucial determinant of profitability. It was therefore concluded that acceptable portfolio quality and extent of price regulations are basic consideration for insurance companies especially in case of price war among insurers.
Rao (1999) examined the structure and pattern of growth of life insurance industry in terms of growth of new business, business in force and institutionalisation of saving and business by different zone of LIC. The author further compared these indicators with macroeconomic variables by using regression analysis. The results revealed that overall structure transformation of economy and organisation change lead to significant growth in life business.

Outreville (1996) conducted a cross sectional study of 48 developing countries for the year 1986 to test the association between financial development and development of life insurance sector. Data were collected by sending questionnaire to the government and supervisory offices. The results of regression analysis unveiled that life insurance premium income is significantly related to personal disposal income, level of anticipated inflation and level of financial development. Monopolistic market is found to be negatively related to life insurance growth. Moreover, life insurance sector is not assuming greater importance when considering the share of total business transacted in developing nations.

2.3 Studies related to Investment Pattern of Insurance Companies

Chiang and Niehaus (2016) analyzed corporate bond portfolio of U.S. life insurers from 2002 to 2011. Based on two herding measures, the authors found that sell side herding is evident in smaller bonds, bonds with lower ratings, downgraded bonds and when insurers with low risk based capital ratios trade the bond. Buy side herding is greater when insurers designated as Systemically Important Financial Institution (SIFI) trade the bond. Furthermore, it was observed that herding behaviour of insurers is destabilizing to bond markets and sell side herding is pro-cyclical. However, there was no indication that price effects would subsequently reversed.

Bijlsma and Vermeulen (2015) examined if insurers displayed a flight to quality or a flight to home during the European sovereign debt turmoil. Flight to quality said to be exist when insurers reduce investments in risky assets and increase investments in safe assets in reaction to market turmoil. The researchers separately observed trading behaviour and portfolio revaluations of sixty insurance companies during 2006Q1-2013Q4. The results found that insurers disclosed a flight to quality during sovereign debt turmoil. The flight to quality was not presented before sovereign debt crisis and receded after ECB chairman Draghi's speech in 2012.
Chiang and Niehaus (2015) analyzed the decisions of U.S. life insurers to invest in corporate bonds over the period of 10 years from 2002 to 2011. In particular, the researchers measured the degree to which investment activities of life insurance companies are correlated. The researchers also investigated whether insurers herding behaviour is destabilizing to bond markets by observing abnormal returns prior, during, and subsequent to insurer herding. The findings revealed that herding is more noticeable among smaller insurers with poor performance and low risk-based capital ratios. It further observed that there is no possibility of potential destabilizing effects but sell side herding is pro-cycle.

Conforti (2015) examined how investment philosophy varies amongst property and casualty insurance companies. The author selected three insurers: Liberty Mutual, Markel and Berkshire Hathaway. The results revealed Liberty Mutual as a typical low risk investor because it invested majority of funds in high-grade bonds while Markel and Berkshire Hathaway invested majority of funds in equities.

Duijm and Bisschop (2015) investigated investment strategies of Dutch insurance companies and pension funds during market shocks in terms of their equity and sovereign bond portfolios. By using panel regression analysis, 17 insurance companies and 29 pension funds were analyzed from 2006Q1 to 2015Q1. The results uncovered that there is evidence of pro-cyclical behaviour by insurance companies, while pension funds do not observe countercyclical investment behaviour. Insurance companies massively sold equities during the crisis while pension funds kept buying equities as markets tumbled. However, both insurance companies and pension funds sold their sovereign bonds prior to rating downgrade.

Genc and Basar (2015) utilized two step difference GMM estimators with Windmeijer correction to measure the impact of the economic and financial crisis on investment portfolio of insurance companies in European countries. Data used in this study were acquired from the official website of Insurance Europe from 2007 to 2012. The authors analyzed several variables that might have impact on investment portfolio in two separate cases. In first case it was assumed that crisis has no impacts and in the second case crisis assumed to has impact on investment portfolio of insurance companies. The results revealed that changes in total insurers’ investment portfolio were explained by the number of variables i.e. number of insurance companies, total direct life premium income, life benefits paid, non-life claims paid, motor gross
written premiums, motor claims paid, European property gross written premiums, gross domestic products, population and the dummy variable which was formed to include the impact of the crisis.

Fischer and Schlutter (2015) investigated how the standard formula’s of stock risk calibration influences the equity position and investment strategy of a shareholder-value-maximising insurer with limited liability. It was found that a modest change of the stock risk criterion may shift asset allocation from conservative to highly risky securities. Some insurers invest in safe securities whereas others lean toward an exceptionally risky investment strategy relying upon the pinpoint collaboration between assets and liabilities.

Oloke, Durodola, and Emeghe (2015) examined the factors influencing views of insurance companies about investment in real asset. For compiling data, well structured questionnaires were given to fifty-two insurance companies in Lagos State of Nigeria. It was observed that security of capital and portfolio diversification are the main motive behind real estate investment while liquidity issues, very high transaction costs, poor infrastructure and inappropriate valuation of data are among others major factors resisting real estate investments. It was further found that investments in real estate securities are far below the prescribed limits in Nigeria. The paper therefore recommended that insurance companies should take real estate as attractive investment avenue.

Reddy (2015) analyzed investment pattern of life insurance companies from 2001 to 2009. The author found that investments of life insurers have been increased with respect to central government securities and investments subject to exposure norms. Moreover, investments are mainly inclined towards statutory investments avenues which are very essential to ensure policyholder protection.

Tong and Wang (2015) identified the association between insurance investment and macro-economic variables in China. The researchers applied unit root test, cointegration test and granger test of causality to analyze relationship among insurance investment, gross domestic product and money supply. The results of cointegration test unveiled that there is cointegration relationship among gross domestic product, insurance investment and money supply. The results of granger causality test showed that insurance investment and money supply granger causes the
gross domestic product growth while insurance investment granger causes money supply.

Demaria and Rigot (2014) investigated whether International Financial Reporting Standards (IFRS) standards are stimulants or restraints of long term asset allocation strategies of insurance companies in France. The researchers conducted semi-structured interview of insurance companies’ investment managers, regulators and professional. The article concluded that practitioner raised some issues related to the capacity of IFRS standards to fairly represent their activities. Firstly, they emphasized artificial assets-liability management mismatch related to international accounting standard 39 and international financial reporting standard 4. Secondly, they specify impact of short term volatility introduced by fair value measurement on investment strategies.

Gatzert and Kosub (2014) studied insurer’s perspective on investment in infrastructure projects based on classification of different types of infrastructure investments. Furthermore, main characteristics of infrastructure investments and effect of Solvency II regulations on these investments were examined by the authors. The article highlighted that an insurer’s asset management decisions and the attractiveness of infrastructure investments strongly depend on the type of investment, its treatment under Solvency II regulations and risks involved.

Guan and Liang (2014) employed the stochastic dynamic programming approach to draw closed-forms of optimal reinsurance and investment strategies. It was also attempted to drive optimal utility function under the constant relative risk aversion utility maximization. The researchers further conducted sensitivity analysis to show the economic behavior of the optimal strategies and optimal utility. The paper suggested that zero-coupon bonds and treasury inflation protected securities should be included in the market.

Korivi and Khamkar (2014) hypothesized 48 compliant portfolio combinations supplemented by insight from the investment practitioners in the life insurance sector in India. The hypothetical range of portfolio presented a gradual broad-basing of asset classes from two to four. The major finding revealed that there seems to be a consensus for investing 55% to 65% in government securities, 15% to 25% in mortgage/infrastructure loans with AAA credit rating, 10% to 15% in
corporate bonds with AAA credit rating and 5% to 10% in equities. Finally, the paper concluded that insurance companies prefer government securities which offer safety along with liquidity and recommended that there should be awareness or possibility of use for derivatives and other instruments.

Pugazhenthi and Sunitha (2014) analyzed the investment regulation and the actual amount of investments made by Indian insurers till 31st March 2013. Investment pattern of life and non-life insurance companies has been governed by the exposure and prudential norms prescribed by the investment regulations. Fund-wise and insurer wise analysis of investments unveiled predominance of public sector in government securities and in other forms of securities approved by the investment regulations.

Asanga, Asimit, Badescu, and Haberman (2013) evolved portfolio optimization approach to identify the minimum capital required for a non-life insurance firm which simultaneously satisfied solvency and portfolio performance requirements. Moreover, using a double rolling window estimation technique, the authors assessed the soundness and out-of-sample performance of optimal solutions for both the solvency specification and portfolio performance. The findings uncovered that correlation between asset returns assumes an imperative role in determining optimal capital required and the portfolio structure.

Auma (2013) established the relationship between portfolio holding and financial conditions of insurance companies in Kenya using multiple regression analysis. All insurance companies operating in Kenya as on 31st December 2012 were included in the sample. The results found that investments in stock and bank deposits are inversely related with the overall profitability of the insurance companies. Moreover, investments in real estate and government securities have direct relationship with the overall profitability of the insurance companies. Therefore, the author recommended enactment in policies that would facilitated the investment operations of the industry and contributed toward enhancing the overall profitability of the industry.

Babu (2013) highlighted that LIC and private insurance sector have invested large amount of investible fund in approved investments and only a little sum has invested in other securities because the traditional policies are always emphasized on
security of capital rather than return. The author further stated that new insurers begin to play an imperative role by increasing rate of accretion to total invested funds and insurance companies may provide policyholders hedge against inflation.

**Balogun (2013)** examined the impact of interest rate deregulation on the insurance industry’s investment choice from 1987 to 2007 with particular reference to government securities investments in comparison with others. The author observed that government securities do not look attractive to this institutional investors, since interest rate on them are lower than other financial instruments of almost the same period. It was further observed that this lower return on government securities would lead to infringement of law by insurers.

**Ghimire (2013)** explored the current investment practices of both life and non-life insurance companies and compared these with different norms issued by Insurance Board of Nepal. The researcher found that insurance companies have invested more than the stipulated limit in secured sector giving priority to safety over profitability. It was further revealed that among the 234 cases, 37 cases are of non-compliances whereas 197 cases are of compliances. Out of 37 defiance cases, 28 cases are seems too fragile to deal with them. Life insurers fail to abide by the statutory norms in 5 cases and non-life insurers in 23 cases. However, overall scenario of the insurance companies ‘investments portfolio is satisfactory excepting in few cases.

**Gowd, Kiran, and Rao (2013)** analyzed the investment strategy of LIC of India and its impact on profitability by employing the techniques of regression analysis, correlation analysis and ANOVA during the period from 1998 to 2011. The result unveiled that investment strategy of LIC has positive impact on its profitability, but its average investment yield is fluctuating. The researchers recommended that LIC has to revise its investment strategy to optimize its average yield of investment without violating regulatory norms.

**Jarraya and Bouri (2013)** developed a model that harmonizes simulation approach with a Multi-Objective Particle Swarm Optimization algorithm to ensure an ideal asset portfolio that augments shareholders expected utility and technical efficiency of non-life insurance companies in Europe. The experimental application made a comparison between the attained results with multi-objective optimization
technique and mono-objective technique to hunt an ideal asset allocation for European non-life insurance companies. The outcomes inferred that multi-objective optimization enable the researchers to find optimal asset portfolio that maximizes expected utility and technical efficiency of non-life insurance companies.

Panda (2013) shed light on the investment pattern of LIC and its risk taking ability while investing in different segments. The paper had used autocorrelation through linear trend analysis and Box Ljung statistics. The results demonstrated a significant increase in investment of government securities, state government securities plus housing/infrastructure, corporate sector and project loan. However, investment in housing and infrastructure alone does not reveal any significant increase. In addition to this, the paper concluded that investment pattern of LIC depend upon the growth and development of country as greater economic activities lead to widening financial market.

Purusothaman (2013) traced out the factors affecting investment of LIC. For the purpose of research, primary data were collected through questionnaire and the dependants as well as independent variables were identified through factor analysis and cluster analysis. On the basis of seven variables i.e., service quality, speed of decisions, efficiency, corporate image, pre purchase service, post purchase service, and size of operations, the empirical results reported that 50% customers are loyal to LIC.

Asanga (2012) investigated the problem of managing the optimal investment capital under ruin probability constraints in such a way that it jointly optimized the asset allocation among a diversified portfolio. The paper emphasized that the characteristics of risky and risk less assets and their behaviour over the investment horizon have great impact on investment plans.

Keneley (2012) considered the post war development of investment management practices among life insurers in Australia. The paper identified three stages in the development of investment practices which transform life insurers from basic investors of policyholders’ fund to large multifaceted institutional investors. These stages traced out complex process of adaptation and organisational restructuring consist of acquisition of new skills, expanding existing knowledge bases,
consolidation, diversification and the applications of these skills into institutional frameworks.

**Luan (2012)** constructed a dynamic theoretical model to contemplate the effect of reinsurance on investment hedging derivatives and underwriting hedging derivatives separately. The author made predictions that the association between investment hedging derivatives and reinsurance relies upon the hedging cost function and the correlation between an insurer’s investment and underwriting activities. Moreover, investment hedging derivatives are positively related to the risky investments and underwriting hedging derivatives can be an alternative to reinsurance.

**Milosevic, Meceski, and Srbinoski (2012)** discussed that shallow and weak capital market particularly affects the investment opportunities of life insurance companies in the Republic of Macedonia. In the weak and shallow capital market insurance companies cannot attain the desired diversification of investment portfolio and they are legally bound to the total amount of assets covering technical provisions to be adequately placed. The researchers suggested municipal bonds as a particularly attractive investment opportunity. Municipal bonds would be an effective instrument for life insurance companies in terms of their investment policy and for managing the risks that occur during the maturity mismatch between assets and liabilities.

**Roy (2012)** identified the financial risk variables and measurement tools essential for investment management and asset liability management of general insurers. The major financial risks considered were interest rate risk, liquidity risk, market risk and credit risk. The author suggested that investment managers should undertake thorough study of investment function and asset liability management to excel in such a changing market situation and regulatory reforms.

**Samina (2012)** analyzed the structure of investment portfolio of different general insurance companies in Bangladesh and tried to identify cause and effect relationship between structure of investment portfolio and profitability. The findings showed that general insurance companies are mainly concentrated on stock market securities where they usually invest through private placement. Along with this, they are also invested in government securities as a part of statutory requirement and safety purpose.
Shiu, Wang, Adams, and Shin (2012) examined the relationship between use of derivatives for hedging purpose and firm-specific factors using panel data and cross-sectional estimations over the period from 2001 to 2003. For the life insurance sector, the researchers found that large firms and firms exposed to either foreign exchange risk or interest rate risk are more likely to involve in derivative hedging activities. Exposures to interest rate risk and foreign exchange risk have a significant impact on the derivative usage in the non-life insurance sector. Moreover, derivative holdings are directly related to foreign exchange exposure and inversely related to the level of reinsurance.

Venkataraman (2012) described the dynamics of investment function of insurance companies as well as its importance in providing liquidity. The paper placed special emphasis on balancing of all aspect of investment management of insurance companies and suggested the investment managers to balance portfolios subjected to regulatory requirements and few broader optimum portfolio parameters. It was also highlighted investment function as an essence to honour claims and building wealth base.

Aryeetey (2011) evaluated the overall investment objectives of State Insurance Corporation of Ghana (SIC), its asset selection, the portfolio structure and its overall investment through optimal portfolio selection techniques i.e. Sharpe, Treynor and Jensen Alpha models. The results indicated that performance of SIC investment portfolio is below the market indices. Therefore, the author recommended that there is a need of careful insight on selection procedure and measurement and management of risk. Furthermore, asset allocation should be the blend of securities that promises the highest long-term expected investment return.

Haan and Kakes (2011) analyzed investment strategies of three types of institutional investors (pension funds, life insurers and non-life insurers) and linked their asset allocation decisions to firm-specific characteristics and macroeconomic variables over the period of 7 years from 1999 to 2005. The results demonstrated that institution investors tend to be contrarian traders i.e. they purchase past losers and offer past winners. Life insurers tend to be contrarian traders when they have large number of unit-linked policies while non-life insurers are contrarian when they have a very risky business approach.
**Kocovic, Antic, and Jovovic (2011)** assessed the impact of global finance crisis on the scale and structure of investment portfolio of insurance companies by considering the market of both economically developed countries and domestic financial market of Serbia. The authors highlighted that investment portfolio of insurance companies is not influenced immediately after crisis, because it initially affects low quality instruments and then high quality one. Therefore, the investment facet of insurance companies is gaining momentum at the end of crisis and in post crisis period.

**Silva, Tsai, and Gutierrez (2011)** identified the factors influencing equity investments of insurance companies and pension funds. The authors appointed logit model to estimate the probability for a given company to be in these investors’ portfolios and then analyzed determinants of the size of stock ownership of these investors in a given company. The results indicated that these investors prefer to invest in large, liquid and leveraged companies with good corporate governance practices.

**Theiler (2011)** investigated the dynamics of risk-minimising investment strategies which embed revolving portfolio optimisations into a system of dynamic portfolio insurance and link these two approaches of minimising the unsystematic and controlling the systematic risk. The author highlighted that portfolio optimisation does not protect portfolios against severe losses owing to systematic market movements. In the period of financial crisis all portfolios face drastic downturns regardless of constantly rebalanced or optimised portfolios. Therefore, portfolio insurance should be used to stabilize the performance of all investment strategies.

**Wolski and Zaleczna (2011)** examined real estate investments of insurance companies in Poland on the basis of their aggregated financial data during 2000-2008. The researchers explored the relationship between real estate investments and profitability indexes (return on assets, return on equity and return on sales) from the shareholders' point-of-view. The researchers further carried out same sort of analysis to measure the effect of real estate investments on the insurance companies’ return on technical activity and return on investment activity from insured persons’ point-of-view. The analysis reported some negative correlations i.e. investments in real estate may reduce the profitability of insurance companies.
Agwuegbo, Adewole, and Maduegbuna (2010) collected data on life and non life insurance assets from Central Bank of Nigeria to examine correlation between various insurance investment variables in view of few underlying but unobservable random quantities called factors. The study presented that results attained through factor analysis are promising and two principal components of the factor loadings have a cumulative proportion of variance accounted for 94.5% of the total variations of the investments pattern.

Azcue and Muler (2010) examined optimal dividend and investment strategies for an insurer whose uncontrolled reserve process emerges as a classical Cramer–Lundberg process. The paper highlighted that the ideal value function is the smallest viscosity solution of the associated second-order integro-differential Hamilton–Jacobi–Bellman equation. Finally, it was presented an instance where the ideal dividend policy is not obstacle and has a band structure.

Enoma and Isedu (2010) identified the factors influencing investment decision of insurance investment managers in Nigeria. The authors conducted factor analysis over the data to examine perception of staff and brokers of insurance firms. It was found that investment decision making and risk evaluation are multi criteria processes that cannot be explained only by rigid mathematical quantitative elements. Qualitative considerations such as political, social, religious and government intervention are among the main factors that influence manager’s investment decision making in insurance company.

Huanga and Lee (2010) concerned with an optimal portfolio problem of life insurance fund by using a multi-asset model. Asset-liability management is a most researchable topic in the area of life insurance. The authors investigated asset liability matching problem in a more wide way where stochastic random duration exists in the product’s profile of an insurance company. The authors provided a new approach for solving single-period and multi-period asset allocation problem of life insurance products and found that optimal portfolio policies differ noticeably for different portfolio structure.

Kapel, Miller, and Paton (2010) proposed a realistic liability-based approach for designing investment strategy that could be facilitated by providing a structure analogous to the treasury function in a bank. Such a structure expedites investment
decision making within the constraints of the organization’s risk appetite. Further, the role of investment decision making then shifts to concentrate on how to meet the liabilities. The authors switched focus to liability centric view from an asset-centric view of investment management and discussed the role of the actuary within the broader context of an insurer’s investment strategy and defining the nature of the liability.

Liebenberg, Colquitt, and Hollans (2010) elucidated the impact of firm characteristics on Residential Mortgage-Backed Security (RMBS) exposure. The authors found that size is positively related to RMBS investments while separate accounts assets, cash holding and investments in shares and short-term instruments are inversely related to RMBS investments. The authors further evaluated the impact of alteration in RMBS risk ratings on insurer surplus by the asset valuation reserve and found that any casual degradation of mortgage backed securities (residential plus commercial) could lead to a decline in surplus of about 10% for the largest U.S. life companies.

Lim and Wong (2010) applied benchmarking approach to tackle asset allocation problem of a pension fund or insurance company. In this approach, objective was considered as an increasing function of relative performance of the investment portfolio to a benchmark. The author highlighted that benchmarking approach can be applied to any optimal asset allocation problems without a contractual obligation and benchmark can be a function of liability settlement or any other target. Moreover, the benchmarking model progressively penalizes underperformance while in the meantime rewards outperformance.

Baranoff and Sager (2009) examined the effect of asset allocation strategies on the investment performance of life insurance companies in U.S. The researchers defined three quantitative indices of static/dynamic strategies to represent important aspects of the active/passive spectrum of investment strategies. Using cluster analysis, life insurers were partitioned into three clusters those excising dynamic (active), static (passive) and mix allocation strategies. It was found that the most active cluster emphasizes on stock and greatest relative performance. All the three clusters are differed due to variation in their risk characteristics, size and some internal factors
Bruneau and Mankai (2009) proposed two optimization models to solve capital requirement and portfolio selection problem of non-life insurance companies. The authors firstly developed a curve of efficient portfolios by using Monte Carlo simulation and then analyzed optimum sensitivity to some factors. It turned out that risk management by equity shift can be more effective than risk management with fixed capital. Furthermore, a close form of relationship between optimal economic capital and investment portfolios was derived.

Wells, Epermanis, Cox, and McShane (2009) evaluated the risky asset investments of life insurance sector from a historical viewpoint. Specifically, researchers tried to find out whether organizational form and other factors influence asset substitution decision. For the purpose of analysis, Heckman’s (1979) two-stage regression approach was applied on the data of 95 Guaranteed Investment Contracts (GICs) issuers and 416 non GICs issuers. Finally, it was concluded that stock insurer issuing GIC are more inclined toward risky asset investments than their mutual peers.

Bragt and Kort (2008) discussed that devising a proper liability-hedging portfolio is beneficial for life insurance companies because it stimulates insurers to address all risks arising out of insurance liabilities and expedites the subsequent optimization of the investment portfolio. It was further emphasized that under liability driven investment, the return on assets can be optimized using well-known Markowitz optimization techniques or equity hedge strategies.

Akinwale and Abiola (2007) selected four major Nigerian insurance companies on the basis of asset base and premium income to review their investment decision making process. The researchers revealed that security of the investment, consistency of returns, social networks, competency of management, regulatory controls and stable environment are the core investment decision making concepts.

Gerstner, Griebel, and Holtz (2007) developed a discrete time model for the asset-liability management problem of life insurance products. Specifically, the researchers tried to analyze the impact of product features, management parameters and market conditions on the risk appetite of insurers. The findings highlighted that different product features and management parameters may have a significant impact on the default risk but static regulations like the prescription of the maximum portion of stocks or the minimal participation rates for policyholders are insufficient to
control the company’s default risk or to ensure an appropriate policyholder’s participation. Hence, regulation as well as internal risk management guidelines should lay more emphasis on prescribing stress tests and stochastic simulations as these methods are much better suited to the complex interaction of the assets and liabilities of a life insurance company.

**Kakuba (2007)** made an attempt to identify causes of insurance firms' failure in indemnifying their clients and to ascertain the impact of insurance premium and investment income on indemnity. Four insurance firms namely National Insurance Corporation Limited, United Assurance Company, Statewide Insurance Company Limited and American Insurance Group were purposively selected to represent the Uganda insurance sector. The findings revealed that there is a corresponding and nonproportionate rise of claims for each year and investment levels are below the average statutory requirement. Therefore, the researcher suggested that insurance companies should adhere to the ethical conduct and statutory regulations & procedures. Furthermore, insurance companies should focus on optimal premium ratings, sound investment policies and risk management processes.

**Pottier (2007)** examined the factors influencing private debt investments of life insurance companies using Tobit regression analysis. The results found that insurers more likely to invest in private debt market are large size insurers, insurers with higher financial strength, insurers facing rigorous regulation, mutual insurers, publicly traded insurers and insurers with high cash holdings.

**Wang (2007)** considered general insurers’ investment selection with a view to maximize the exponential utility of reserve in future. The claim process is expected to be a pure jump process and the insurer has the choice of investing in various risky securities whose price is explained by the Black–Scholes market approach. It was suggested that if there is unavailability of risk free securities then the optimal strategy is to place a certain fixed amount in each risky security. If there are risk-free securities, the discounted amount placed in each risky security is fixed.

**Wang, Xia, and Zhang (2007)** concerned with optimal investment strategy for an insurance company by using the martingale approach. Nowadays, more attention has been paid to the asset allocation problem for an insurer in capital market. This is observed due to the reason that insurers are allowed to invest in security
markets. The researchers highlighted that an efficient investment portfolio and constant absolute risk aversion utility maximization are achieved when risk process of an insurer follow Levy process and fund can be invested in a capital market described by the Black–Scholes model.

**Heyman and Rowland (2006)** suggested that investment strategy of insurance companies must have objectives of immunizing insurance funds with a fixed-income portfolio and earning "abnormal returns" on surplus that considered the risk-return tradeoffs presented by a broad variety of investment types as well as the accounting treatment of investment income. Keeping in mind both accounting and economic considerations, the authors highlighted that after-tax net investment income as defined by U.S. Generally Accepted Accounting Principles (GAAP) is the best benchmark of performance. Consequently, insurance companies should adopt such management and portfolio approaches that aim to produce a growing and stable net investment income.

**Kong and Singh (2005)** focused on investment decisions of life insurance companies with special reference to emerging markets. The authors mentioned that mature market insurers invest only a small portion of their assets in emerging markets because of regulatory constraints, rating pressures and currency risk while domestic insurers usually remain captive investors of local securities and lend stability to the domestic investment market.

**Korn (2005)** proposed a concept of worst case investment portfolio optimization if there is any chance of market crash. The paper considered a case of an insurance company who was confronting risk from its business operations and could invest funds into a stock index badly influenced by any possible market crash. A more practical approach for risky investment was also provided in this paper. The findings suggested that risky investment should be immediately reduced if there is presence of crash risk.

**Moore and Green (2005)** tried to evaluate portfolio behaviour of other financial institutions in India including term lending institutions, insurance companies, unit trusts and mutual funds using annual data from 1952 to 1994. The results divulged that as lending rates increase the other financial institutions hold more loans and increase credit in private sector. Whereas, when government securities
yield raises the other financial institutions hold more government securities and reduce the holding of loan exhibiting crowding out effect of public finance.

Ravishankar (2004) propounded a wish list for investment managers in insurance companies. This wish list incorporated asset allocation redesigning, investment options broadening and a vigil on asset-liability mismatch in its framework. Besides, the author suggested that there is need to introduce a number of quality initiatives in the investment process of insurance companies and traditional approach of passive investment style must be replaced with dynamic approach of measuring, monitoring, managing risk and return.

Achleitner, Biebel, and Wichels (2002) identified a serious double effect of World Trade Center attack on asset and liability sides of insurance companies’ balance sheets. The researchers found that very well capitalized insurance companies suddenly felt themselves exposed to simultaneous shocks to their risk-absorbing capital. These unusual simultaneous shocks challenged the previous investment approach of property/casualty insurers. In this context, the authors suggested that deeper knowledge and better understanding of the underwritten risk structure is necessary to derive an optimal investment policy.

Scott (2002) highlighted the ways in which insurers adjusted their investment practices during the interwar years. This period marked the start of the transition from ‘traditional’ to ‘modern’ investment practice. The paper presented that insurance offices are forced to seek higher-yielding assets due noticeable doubts about the suitability of traditional insurance investments in such a competitive economic and financial environment. These pressures lead to emergence of new insurance investment philosophies, which accord both legitimacy and importance to corporate securities including ordinary shares in insurance portfolios.

Black (1999) examined pension schemes and life insurance policies in terms of options embedded in them. An asset-liability or surplus risk management framework was used to drive a procedure for hedging risk from excise of option embodied in products of life insurance companies. The author argued that these options should be hedge with a properly determined portfolio of securities. Finally, it was highlighted that both set of institutions tend to have major proportion of long
term asset such as equities, property and long-term bonds in their portfolios for minimizing asset liability mismatch.

Collins, Geisler, and Shackelford (1997) examined the impact of tax rate, regulatory restriction, income and organizational structure on life insurers’ investment portfolio realizations by utilizing a unique experimental setting within life insurance sector. Statutory rate and unique tax levied on life insurers extricated the impact of tax from profitability. The results revealed that company-specific equity tax rate affects capital gain realizations of mutual insurers while regulatory restriction and income consideration affect capital gain realizations of both stocks and mutual insurers.

Colquitt and Hoyt (1997) analyzed the effect of independent variables (firm size, leverage structure, asset-liability mismatch, reinsurance arrangement, organizational structure, separate account activities, taxes rate) on the probability and degree of hedging by the insurance firm with probit model, ordinary least squares model and Heckman's two-step selection correction. The results indicated that firm size, leverage, ratio of separate account assets to total assets and degree of asset and liability mismatch are positively influenced the insurer's likelihood of hedging with futures and options. Furthermore, stock firms are more likely to hedge than mutual firms.

Badrinath, Kale, and Rayan (1996) examined the stock market portfolio of insurance companies and compared the characteristic of their equity holding with those of non insurance institutional equity portfolio. The findings divulged a positive relationship between level of institutional ownership and the firms’ characteristics i.e. size, liquidity, age, stock ranking and previous performance. The study has also turned out a negative relationship between level of institutional ownership and total risk of stock.

Li and Huang (1996) introduced a technique to maximize insurers return threshold for a predetermined threshold risk level, by proposing threshold risk and slackening some unrealistic conditions. In this way, the authors presented a portfolio model for insurance companies which they can use in deciding their asset portfolios. The model can also help in optimizing underwriting as well as investment portfolios of insurers and generate efficiency frontier by modifying their threshold risk level.
Cummins and Grace (1994) developed a model of profit maximization by incorporating the Tax Reform Act 1986 especially the provisions applicable to property-liability insurers. The empirical evidence of the study revealed that insurers continue to invest in tax favoured securities following the Tax Reform Act. This indicated that implicit tax rates are low enough to catch the attention of insurers towards long-term tax exempt market. However, insurers reduced the percentage of income extracted from tax exempt interest and dividends following the Tax Reform Act.

Gollier and Wibaut (1992) discussed the optimal portfolio selection problem of insurance companies by solving a risk-sharing problem between policyholders and shareholders. Both policyholders and shareholders are risk-averse. In this context, the authors suggested that insurance companies should efficiently transfer some part of the investment risk to policyholders by means of participating policies. This will allow insurance companies to take higher investment risk. The authors further identified the impact of regulatory interference on investment behaviour of insurance companies. Regulations usually restrain the transfer of investment risk to policyholder which obliged insurance companies to play safe in capital market.

Kleiman and Sahu (1991) analyzed the risk adjusted portfolio performance of equity portfolios of life insurers. Using conventional measures of risk-adjusted portfolio performance, the authors found that life insurers like their mutual fund peers failed to exhibit differential stock selection or market timing abilities. However, variable annuity contracts of life insurers may provide an edge over mutual funds counterparts.

Carter and Van Auken (1990) reported the outcomes of a survey of investment managers of 63 life insurance firms to analyze their perception towards importance of investment strategies in their firm’s portfolio. The results suggested that life insurance companies have been shifted to publicly traded assets from privately placed assets since 1980. However, comparison of investment strategies pre and post stock market crash of 1987 revealed that this event had no impact on investment strategies of life insurance companies. Additionally, the life insurers which were highly rated by A.M. best became more diversified and utilized fundamental analysis and option strategies.
Davis (1988) conducted an extensive survey of the behaviour of long term institutional investors in capital market to show the causes of institutional growth, the nature of institutional investors and implication of their activities. The paper made a comparison of institutional investor in U.K., U.S., Germany, Japan and Canada. The finding uncovered that institutional investors differ both within and across nations with respect to securities selection. The reasons behind these differences are capital market conditions, objectives of institutions and presence of regulations. It was finally concluded that institutional investor are beneficial to the capital markets as they may increase both the availability of funds and the efficiency of the allocation of funds between different sector of economy.

Almagro and Sonlin (n.d) evaluated the asset mix decisions of insurance companies by using insurance and investment related information. The authors referred that evaluation of the impact of alternative investment allocation on the projected financial condition of the company allow management to manage the combined risk of both the investment and insurance operations. This may also help insurance companies in setting an appropriate investment strategy.

Guidara and Lai (n.d) analyzed the influence of underwriting and investment practices on both capital adjustment speed and level. The authors concluded that aggressive equity investments increase capital requirement due to rise in insolvency risk, where reinsurance based underwriting strategy implies higher capital generally required by re-insurer. The authors suggested a higher regulatory circumspection in hard markets and through-the-cycle approach for supervising capital adequacy.

Khandelwal (n.d) described the practical application of credit derivatives in investment portfolio of Indian life insurance companies. The authors emphasized the role of both capital market regulator and insurance regulator in promoting trade in derivatives and developing a more efficient market in India. A controlled investment climate with plethora of investment instrument will lead to development of insurance industry.

2.4 Studies related to Investment Regulation of Insurance Companies

OECD (2015) examined the investment regulations particularly quantitative investment limits on portfolio allocations of insurance companies and pension funds. The OECD Insurance and Private Pension Committee and Working Party on Private
Pensions were collected data on investment regulations of insurers and pension funds. The report highlighted that quantitative investment limits with governance and risk management requirements are complemented by qualitative requirements for investment regulation. Therefore, the prudent person rule is an important qualitative standard to which both pension funds and insurance companies are commonly held accountable in order to ensure a more comprehensive approach for the management of investment risks which consider the best interest of beneficiaries and/or policyholders.

Joyce, Liu, and Tonks (2014) assessed the effect of quantitative easing policy on the portfolio behaviour of insurance companies and pension funds. In order to measure the incremental impact of quantitative easing, a reduced-form approach was adopted by incorporating various policy invariant parameters. The dependent variable in the regression was net acquisition of any asset class held by any type of investor. The regressors were included the quantitative easing policy variable and lagged value of the dependent variable. In addition, net issuance of gilts by the debt management office and foreign financial treated as exogenous variables. The authors suggested that quantitative easing allows institutional investors to switch their portfolios from gilts to corporate bonds. However, analysis of micro-data suggested some heterogeneity across different institutions in the response to quantitative easing and shift into corporate bonds was quite extensive. However, portfolio rebalancing by insurance companies and pension funds into riskier assets restricted to only corporate bonds and did not applied to equities.

Department of Financial Services (2013) reviewed the existing investment patterns being followed in banking, capital market, pension and insurance sector. The committee recommended a five-year phase-out plan to move to the prudent investor regime. During the first two years, the current ambit of directed investment should be shrunk. In the next three years, the limits of directed investment norms must be markedly loosened, including as a preparatory to paradigm shift to prudent investor regime. While doing so the regulator must allow for the emergence of some new classes products, such as commodity futures, real estate investment trusts, infrastructure investment trusts, etc. It is only after five years that the insurance and pension sectors should leapfrog to prudent investor regime completely.

Gupta (2013) asserted that investment of insurer is very sensitive issue and should be diligently monitor by insurer in order to obviate the possibility of an
industry failure. The article suggested that investment committee should change the status of the security in its investment risk management system when credit rating agencies downgrade certain assets. Simultaneously, it is also required to uphold solvency of the insurer so that it remains in a position to shell out its claims and survival benefits to policyholders.

**Pasiouras and Gaganis (2013)** carried out a cross country study on the influence of regulations on the financial soundness of insurance companies using data over 1700 insurance companies operating in 46 countries. The result found that decision to embrace a detailed regulatory framework on admissible assets versus prudent investor rule or a combination of both approaches and corporate governance and internal control guidelines have no impact on financial soundness. Furthermore, regulatory authorities and guidelines on technical provisions have significant impact on financial soundness that is robust to controls for firm specific and country specific determinants.

**Bijapur et al. (2012)** investigated the impact of regulatory guidelines on the amount of investment in risky securities by life insurance companies across EU countries by applying a panel data approach. The findings unveiled that these guidelines have a statistically significant negative impact on risk-adjusted returns of around 1-2 percentage points while holding constant other relevant factors. Regulatory restrictions impede investment managers’ ability to grasp the benefits of portfolio diversification, thereby mutilate portfolio selection below the efficient frontier.

**Bijapur, Croci, Michelin, and Zaidi (2007)** investigated the differences in investment returns across a sample of OECD countries which follow prudent investor rule or quantitative regulation using firm-level balance sheet data. The paper provided evidence of an economically and statistically significant impact of quantitative regulation on investment returns for life insurance companies of the magnitude of around 2-3 percentage points while adjusting for risk and controlling for other relevant factors. It was also observed a statistically significant difference in the impact of strong and weak quantitative regulation compared to the prudent investor rule. Strong quantitative regulation has a negative impact on unadjusted returns of approximately 4 percentage points while weak quantitative regulation has not impose any costs above the prudent investor rule.
Davis (2002) examined the rationale, nature and financial significance of two
different approaches to investment regulations for life insurers and pension funds,
namely prudent investor regime and quantitative investment restrictions. The
arguments had drawn on the financial-economics of investments, the differing
characteristics of institutions’ liabilities as well as evidence from major OECD
countries. The author concluded that prudent investor regime is superior to
quantitative restrictions notably for pension funds except in few conditions that may
hold momentarily in emerging market economies.

Vaidyanathan (2001) looked at the factors to be considered by life insurers,
general insurers and pension funds in their investment decision making by discussing
the experience in the United States, United Kingdom and India. The findings turned
out that the investment regulations of insurance companies should be emphasised on
solvency requirements, asset valuation regulation, maximum amount of investment in
certain classes of securities, minimum percentage of the fund to be invested in certain
asset classes, limits on the percentage of funds that can be invested in any
company/industry and treating some assets as inadmissible for valuation purposes.
Finally, it was concluded that liability profile, incidence of income tax and capital
gains tax are important factors influencing the asset allocation between fixed income
and growth oriented investments.

Vaidyanathan and Sriram (2000) expressed the views on the investment
regulatory framework of insurance and pension funds in India. The authors have also
referred to investment practices in other countries in order to identify possible
changes in investment criteria which will benefit all constituents of industry. The
authors have recommended an investment pattern for regulated asset in which
bifurcation is made between regulated asset and free assets. Free assets of life
insurance should be invested in approved and unapproved investment based on
insurers’ discretion.

Henebry and Diamond (1998) studied the investment portfolio of life
insurance firms by using a data of 55 life insurance insurers (stock, mutual and
fraternal). The findings reported that the investment percentage has not been altered
significantly over time for bonds and real estate while for stocks, mortgages and
“other” assets the changes have been significant. The researchers have also evaluated
whether regulatory restrictions impose a binding constraint on investments portfolio
and found that regulations focusing on permissible investment percentages have not imposed a binding constraint.

**Guercio (1996)** examined the influence of prudent man approach on investment behaviour of institutional investors by using reported portfolio holdings of 941 institutional investors. The author argued that these regulations restrict the institutional investors to act in the best interest of their clients. It was further reflected that bank managers prefer to invest in stocks while mutual fund managers do not prefer to invest in these securities.

**Davis (n.d)** examined the rationale of two different approaches of investment regulations for long term institutional investors i.e. life insurers and pension fund. The author emphasized that prudent man rules are desirable in certain cases for life insurers particularly in competitive life sectors in developed countries. Furthermore, prudent man rules are superior to quantitative restrictions for pension funds except in certain specific circumstances which may prevail notably in emerging market economies.

### 2.5 Studies related to Investment Performance of Insurance Companies

**Bergstrom (2015)** explored the impact of asset allocation strategies on investment return of European insurance companies. Return on investment was compared among insurers in order to investigate the variation among them i.e. high and low performance. The variability of the return through time was also examined to explain patterns of high (low) return on investment. The data set of 42 insurance companies was analyzed using regression techniques over a time span of 11 years from 2004 to 2014. The result was indecisive as it was not possible to figure out whether asset allocation strategy or active management have any significant impact on the investment performance of insurance companies.

**Yakob, Yusop, Radam, and Noriszura (2015)** used slack-based measure – data envelopment analysis to assess the investment efficiency. Tobit analysis was also used to identify the determinants of the investment management efficiency among life insurance firms and takaful operators. The results found that the variation in investment efficiency of insurance firms and takaful operators has been diminished during the examined period. Besides, failure to manage the resources at optimum
level brings on inefficiencies. The results from Tobit analysis confirmed that operating system and investment-linked product inculcate efficiency in investment practices while size does not influence the investment efficiency of insurance firms and takaful operators.

Yakob, Yusop, Radam, and Ismail (2014) used a two-stage data envelopment analysis method to obtain the efficiency scores of investment and risk management. Tobit regression analysis was also conducted to examine the determinants of investment and risk management efficiency. The results demonstrated that larger insurer, mutual company and takaful system exhibit better risk management efficiency. However, no significant correlation is found between consumer preference and risk management efficiency. Organizational form, operating system and firm size have no impact on the investment management efficiency, but consumer preference is positively related with efficiency of investment management.

Andersson, Lindmark, Adams, and Upreti (2013) identified the factors influencing investment performance of Swedish property fire insurance industry during 1903-1939 by employing panel data techniques. The researchers found that mutual fire insurers yield systematically higher investment returns than stock fire insurers. Investment returns are positively related to liquidity but negatively related to leverage. The study concluded that fire insurance companies adopted a conservative investment strategy based on low leverage, high liquidity and the use of interest-related assets in order to achieve their strategic investment goals. It also contended that the realization of ‘healthy’ investment returns could be a major reason behind the market expansion of mutual fire insurers in Sweden during the first half of the twentieth century.

Bawa and Kaur (2013) calculated investment efficiency of general insurers of India over the period of 8 years from 2003 to 2010. The study selected 10 general insurance companies of India including 4 public sector general insurers and 6 private sector general insurers. Two models were tested with the use of data envelopment analysis. First model was considered investment as input, and return on investment to policyholders and returns on investments to shareholders as outputs. For the second model, capital and net premium were taken as inputs, and investment was used as output. The results depicted that technical efficiency of public sector is quite high as compared with private sector.
Ismail (2013) made an attempt to identify the factors affecting financial performance of general Islamic and conventional insurers in Malaysia using panel data from 2004 to 2007. The paper used investment yield as dependent and various economic and firm specific variables (profit/interest rate levels, equity returns, company size, retakaful/reinsurance dependence, liquidity, solvency margin and contribution/premium growth) were taken as independent variables. The results revealed that company size, retakaful/reinsurance dependence and solvency margin are statistically significant determinants of the investment performance of the general Islamic insurance companies in Malaysia. In case of conventional insurers, all factors have significant impact on investment performance except equity returns.

Joo (2013) examined the solvency position of Indian general insurers in context of Insurance Solvency International Limited predictors from 2004-05 to 2008-09. The study employed the technique of multiple regression analysis to identify various determinants of solvency position of general insurance companies. The factors taken for analysis were firm size, investment performance and liquidity ratio. The results divulged that claim ratio and firm size have greater impact on solvency position of general insurance companies.

Kamau (2013) evaluated the interrelationship between investment income and underwriting profit. Data were collected for twelve years ranging from 2000 to 2011 for non-life insurers licensed more than three years within period. The study presented a very low degree of correlation between underwriting profit and investment income. Unlike underwriting profit, investment income has high correlation with all other selected variables namely admitted assets, admitted liabilities, capital employed and non-life net premium.

Kumari (2013) evaluated the financial performance of life insurance industry in India through various financial ratios. These ratios were calculated based on Gart et al. (1994), National Association of Insurance Commissioners (NAIC) guidelines and IRDAI. Some of these ratios are total assets to earned premium ratio, investment income to earned premium ratio, investment income to total investments ratio, current ratio. Overall results of these ratios provide an indication of financial soundness.

Bawa and Kaur (2011) determined the technical efficiency, pure technical efficiency and scale efficiency of Indian non-life companies using data envelopment
analysis. Ten non-life insurers including 4 public sector non-life insurers and 6 private sector non-life insurers were taken into consideration for 8 years from 2002-2003 to 2009-10. For the purpose of analysis, claim incurred was taken as output, and investment income and net income were taken as inputs. The results uncovered that overall efficiency of non-life insurance companies have been improved over period. However, the sector wise performance analysis stated that the technical efficiency of the public sector insurers has been better than that of the private sector insurers.

Kumar (2010) exposed that public sector non-life insurers have higher underwriting loss than private sector non-life insurers. However, investment income of public sector non-life insurers has been compensated their underwriting loss, leading to higher profitability than private sector non-life insurers. It was further highlighted that the new competitive market condition acts as a catalyst in the non-life insurance industry and instil efficiency in business practices of public sector non-life insurers. Private insurers have been filled the gap rapidly by offering better services to their customers. They have covered approximately forty-one per cent of market in such a short span of time. Therefore, public insurers should thoroughly reassess their business practices to remain competitive in the market.

Eling, Gatzert, and Schmeiser (2009) firstly developed an alternative framework for evaluating solvency of an insurer as a proposal for standard model of Solvency II and then tested its relevancy by utilizing data from a German general insurance company. The model provided firm-specific minimum standards for risk and return of investment efficiency, given the liabilities structure and predefined safety level. The model presumed that in a situation of poor solvency position, investment portfolio of an insurer can be appropriately adjusted in short term. The authors assured that model will bring down the intricacy and costs for insurers as well as for regulators.

Wu et al. (2007) developed a new problem-oriented DEA model to simultaneously assess the investment and production performance of insurers. This model differed from traditional DEA models which were congruous for independent efficiency assessment. The result showed that Canadian life and health insurance companies operate very efficiently during 1996–1998. In addition, there is no existence of scale efficiency in the Canadian life and health insurance industry.
Chen, Yao, and Yu (2006) analyzed the performance of active equity mutual funds of insurance companies and their subsidiaries. The authors documented that insurance funds underperform mainly because of their low risk-taking ability and lack of incentive to chase superior performance. Moreover, insurance fund flows are less reactive to performance when they perform badly and the investors they attract seem to be less rational. The authors came to the conclusion that insurers’ efforts to cross-sell mutual funds may provoke agency problems that abrade fund performance.

Hsiao (2006) studied the correlation between Grey Rational Analysis and investment return because good number of studies applied Grey Rational Analysis to evaluate financial performance of firm. Investment return constitutes a major portion of profit of life insurers in Taiwan. The study further explored whether there is any significant difference in investment performance among original domestic, new entrant domestic and foreign branch groups of life insurers. The result Grey Rational Analysis showed that there are significant differences for among different group of original domestic and foreign branch life insurers. The investment performance is also exhibited variation from 2001 to 2004.

Hsiao and Su (2006) applied DEA and malmquist productivity index to measure relative investment efficiency of 24 life insurers in Taiwan from 1998 to 2002. The researchers also explored differences in investment performance among the original domestic life insurers, new entrant domestic life insurers, and foreign branches of life insurers. The result of MPI revealed that there is no difference among these three groups. The main findings provided that investment performance is the main determinants of business performance. Moreover, Nan Shan and Hontai were investment efficient for the overall technical efficiency and scale efficiency. In addition to Nan Shan and Hontai, Cathay, American and Manulife were found to be investment efficient for pure technical efficiency.

Yang (2006) constructed a two-stage data envelopment analysis approach to provide management with valuable insights when measuring the dual impacts of operating and business strategies on Canadian life and health insurance industry. This approach integrated the production performance and investment performance of insurance companies. The result showed that the Canadian life and health insurance industry is operated efficiently during the period examined (the year 1998). In addition, there is scale efficiency in the Canadian life and health insurance industry.
Binay (2005) assessed the risk-adjusted investment performance of institutional investors in the U.S. during 1981-2002. The results revealed that institutional investors are efficient in handling assets of their client and exhibit outstanding stock selection skills. Institutional investors are generated substantial value by yielding excess returns after managing major portfolio risk. Furthermore, it was indicated that style choice is an important factor in affecting overall portfolio performance.

Adams and Buckle (2003) examined the factors affecting underwriting and investment performance of 47 Bermuda insurance companies using panel data for 1993–1997. The study found that firm size, leverage, area of operations, underwriting risk and reinsurance are positively related with operational performance. Liquidity is inversely related to operational performance. However, company size and the scope of operations are not significant factors in explaining operational performance of insurance companies.

Pirinsky (2000) assessed the investment performance of financial institutions covering insurance companies, banks, mutual funds, independent investment advisors and corporate and state pension fund based on quarterly disclosures of their equity portfolio holding. The study found that financial institutions on an aggregate show significant abnormal performance before subtraction of expenses. However, performance varies across type of institutions—banks, independent advisors and mutual funds. The study concluded that variation of performance across the major institution type is consistent with agency theory and the “transparency” hypothesis of Ross (1989).

Plantinga and Huijgen (2000) developed a dual benchmark framework by harmonizing different benchmark portfolios for assessing the investment performance of institutional investors. The dual benchmark approach was emphasized on two main objectives of the investors namely the maximization of shareholders’ value and the preservation of the value of the policyholders. The researchers inferred that investment according to the liability-driven benchmark (conservative portfolio with cash matched assets) may improve the shareholders’ return substantially without imperilling the future return to the policyholders.
Adam (1996) measured the interrelationship between the investment yields of life insurance companies in New Zealand and their firm specific factors using a pooled weighted least squares regression model over the period 1988-1993. The results found that investment yields are positively related with firm size, underwriting risk, leverage position and stock companies. Life insurance firms having more financial than non financial assets have low investment earnings. The liability profile of life insurers has no significant impact on their investment earnings.

Derrig (1994) studied the effect of federal income taxes on property-liability ratemaking. The article provided a theoretical foundation for handling taxes by using Myers-Cohn pricing model and Myers theorem. The article included asset portfolio beta of the capital asset pricing model for tax and after tax returns. Finally, it was unveiled that after tax beta is not equal one minus tax rate times the investment return beta.

Boose (1993) tested the predictions of agency theory and its alternatives concerning the investment yields of life insurers. Agency theory mainly proposed that managers of investment portfolios would not necessarily maximize net return on investment for any level of risk. Investment income is represented approximately one third of the total income of life insurers and rate of return on invested assets can substantially affect an insurer's products and profitability. The finding reported that there is offsetting differences in the investment results of these insurers.

Hsiao (n.d) determined the capital investment efficiency and productivity changes of life insurers in Taiwan using DEA and MPI from 1998 to 2008. The author had also developed some hypotheses to test if there is a statistically significant difference among the DEA model and Total Factor Productivity of CAMELS (Capital Adequacy, Asset Quality, Management Quality, Earning, Liquidity and Sensitivity to Market Risk) model. The author recommended that insurers should review their investment practices to enhance overall financial performance.

2.6 Conclusion
The chapter gives a summary of various literature reviewed and gives analytical and synoptic view of similar work already carried out in the area selected for research. This chapter presented in detail various studies related to investment pattern, investment regulation and investment efficiency. It also presented studies related to
present status, challenges and future prospect of insurance industry. It brings to light
the key gaps in the existing literature which helped the researcher in setting the
objectives for the present study. Review of relevant literature has done with the
support of research reports and publications of several governmental and non-
governmental organizations, related research paper and articles both online and
offline, published and unpublished thesis of Indian and foreign universities.