CHAPTER – 4
SURVEY OF LITERATURE

So far a lot of research work has been done on various aspects of financial performance of corporate sector. In this connection we have reviewed fifty studies which are briefly mentioned below:

Hurdle (1974) developed a theoretical model relating to leverage, market structure, risk and profitability and tested the model using cross-sectional data of manufacturing firms and found that while firms with high market power do have lower risk, they do not have higher debt than low market-power firms. The firms earned higher profit because of market structure and not through capital structure.

To judge the financial performance of public enterprises, James (1975) showed that though profitability is generally advocated as a fairly good index of efficiency, by and large it is borne out by the conventional efficiency analysis of private enterprises. It is not the single yardstick for public enterprises; others are: employment, development, stability etc.

A study has been undertaken by Neumann, Bobel and Haid (1979) who opined that investors were risk averters and that risk bearing was accordingly compensated by a higher degree of return. Degree of concentration and product differentiation were positively related to profitability. As regards size and profitability, an inverse relationship was found by them.

A view was given by Dholakia, Bakul H. (1980) regarding the relationship between profits and efficiency of public enterprises, where he contended that the ways of testing managerial efficiency are: earning profits through better utilisation of planned capacity and resources, by greater efficiency in productivity and by securing greater co-operation of labourers. Further he viewed that in many public enterprises, the producer and the consumer are one and the same person partly or fully. The profit of public
enterprises is thus not governed by the market mechanism and may not be the result of cost reduction or managerial efficiency.

An econometric analysis regarding price-cost margin in Indian manufacturing industries was presented by Jain Asha (1981) who observed that cost factors emerged as significant determinants of profitability while the structural variables like concentration ratio, capacity utilisation, growth and capital intensity showed mixed pattern. Result varied among industries.

Banerjee, B. (1982) opined in a research article that corporate profitability is influenced by its liquidity in three different manners. Up to a certain level increase in liquidity leads to an increase in profitability, beyond that profitability remains constant with the increase in liquidity up to a certain point and thereafter increase in liquidity leads to decline in profitability.

Banerjee, B. (1982) in his book on cash management showed that the liquidity position of a firm is largely affected by the composition of working capital in as much as any considerable shifts from the relatively more current assets to the relatively less current assets or vice-versa will materially affect a firm's ability to pay its current debts promptly. He, therefore, advised to study the distribution of current assets to determine the liquidity position exactly.

The principle of leverage states that a firm can increase the return on equity by increasing the proportion of debt in the total capital structure in favourable business environment. It is possible as cost of debt is generally lower than the cost of equity and a tax advantage is attached with debt financing. But many companies fail to take the advantage of the principle of leverage. This aspect is still a matter of interest to many researchers. The research study conducted by Desai, B.H. (1985) is worth mentioning in this regard. He considered the case of twenty-five selected firms working in Indian chemical industry and observed that a higher debt-equity ratio or larger dose of creditorship fund is not always associated with higher earnings. A large number of companies having a larger portion of owners' fund in their capital structure have performed well in terms of profitability.
A multiple discriminant model has been developed by Srivastava and Yadav (1986) to check the efficacy of working capital management taking into account four ratios at a time in a single equation. Their study considered forty textile companies out of which twenty were sick and twenty were healthy. They were able to classify 95 percent of the sample companies correctly with the help of their model.

Ghosh, T.P. (1994) opined that the traditional capital structure theorem is not a general rule. He argued in a research study based on an engineering firm that the Indian corporate sector enjoys equity as a cheaper source of finance. Equity works out to be cheaper in India for many established companies since dividend payout is optional. As a result, even dividend payout at an increasing rate does not have adverse cost effect. Debt cost appears to be higher even when taken on after tax basis. Thus leverage fails to reduce cost rather it causes an adverse effect on overall cost of capital.

Efficient working capital management is largely determined by the appropriate liquidity structure of assets and liabilities. Current ratio and acid test ratio are the most widely used ratios for testing liquidity, the guiding norms of which are 2:1 and 1:1 respectively. Patra, Santimoy (1996) showed in an article that the aggregate values of current ratio and acid test ratio are not sufficient indicators for testing liquidity because these fail to take into consideration the time dimension involved in individual components of current assets and current liabilities. A firm having the accepted current ratio of 2:1 and acid test ratio of 1:1 may face liquidity crisis and even ultimately face technical insolvency if the maturity schedule of current assets does not match with that of current liabilities. So a composite maturity schedule of current assets and current liabilities should be prepared and analysed and it will enable the management to maintain an appropriate liquidity structure.

Mukhopadhyay, A.K. (1996) conducted a comparative study of major international and national steel companies to provide an idea about the management accounting setup in steel sector by using three important performance indicators viz. EBDIT to sales, EBIT to sales and ROI. Three
Indian steel companies, five Japanese steel companies, ten European steel companies and nine steel companies belonging to the United States have been used in his study. He argued that while in the steel sector management accounting should take care of the needs of cost control, cost reduction etc., it should also enable the steel plants to operate on profit centre basis to go in for optimum income generation and optimum results subject to constraints. The researcher tried, with the analysis of comparative financial ratios, to draw conclusion regarding how cohesively the management accounting systems should support rudimentary, conventional, routine management accounting setup in today's situations. Respective strengths and weaknesses relating to steel companies across the world have been highlighted in the study which can motivate necessary strategic decision.

Banerjee, Kalyan (1996) presented in his article various indices and statistics relating to steel production, ROI and RNW (Return on Net Worth) of steel companies, comparative costs of steel making across the world and labour cost per tonne of steel during the period 1984-85 to 1994-95. In micro level analysis, the researcher considered two major Indian steel companies viz. SAIL and TISCO, the former belonging to the public sector and the later belonging to the private sector for a period of two years i.e., 1994-95 and 1995-96. Such analysis was based on two important profitability indicators viz. ROI and RNW. The researcher found that performance of both SAIL and TISCO was quite promising but SAIL has shown relatively higher return in terms of both ROI and RNW.

Vijaya Kumar, A. (1996) opined that the use of ratio analysis to judge the liquidity position of the enterprise is not free from limitations. The limitations arise because of the fact that the methodology is basically univariate, that is each ratio is examined in isolation. To overcome this problem he used a discriminant approach in his research study relating to the assessment of corporate liquidity of selected sugar mills in Tamil Nadu which takes into account the effect of both the current ratio and acid test ratio in order to distinguish between good risk and poor risk from the view point of liquidity.
But the model he used is still based on the traditional current and acid test ratios.

He also observed that the acceptability of current ratio and even acid test ratio in the context of determining appropriate liquidity is highly dependent on the predictability of the firm's cash flows. The more predictable the cash flows, the lower the current ratio and acid test ratio are required. He concluded that the control of liquidity requires active working capital requirement.

A study was conducted by Jain, P.K. and Kumar, M. (1997) to know the pattern of current ratio in determining liquidity position of the firm and it was revealed from their study that in the majority of Indian manufacturing public limited companies, the mean current ratio varies between 1.00 and 1.50.

Das (1998) attempted in his research study to estimate the influence of various factors, endogenous to banks, on return on equity of the Indian public sector banks for which the return on equity has emerged as a significant performance indicator.

A study has been conducted by Desai, B.H. (2000) on the assessment of capital structure and business failure based on a company belonging to iron and steel industry in India. He observed that the management of the company has failed to take the advantage of leverage. He also proved that productive employment of funds is more crucial than the composition of funds.

Saxena, Indu (2000) conducted a research study on corporate culture and organizational performance taking into account 15 manufacturing organizations in Mumbai, 5 each belonging to the well-performing, turned around and sick groups. The study has been conducted to identify the similarities and differences in the culture of manufacturing organization with difference in performance that is well performing organization, turned around organization and sick organization. Culture has been assessed in terms of perceptions of organizational ‘values’, ‘beliefs’ and ‘practices’ existing in the three types of organizations. The performance of the organizations has been distinguished on the basis of financial parameters like return on total assets, profit margin, return on owners’ fund and debt equity ratio.
The findings of the study reveal that there are differences in perception and practices on aspects like organizational mission, goals and business strategies, the working environment and the reward system, the dynamics of leadership and social responsiveness in three types of organizations.

A research study has been conducted by Bose, Santanu Kumar (2000) to evaluate the financial performance of Indian ports. He used five standard financial ratios viz. (i) operating ratio (ii) return on capital employed (iii) net surplus margin (iv) capital employed turnover and (v) fixed assets turnover ratio to judge the performance of the ports. Performance of the ports was found to be not satisfactory.

Patra, Santimoy (2000) conducted a research study considering the case of a private sector steel giant viz. TISCO Ltd. to examine the capital structure policy of the company and to judge the effect of debt financing on cost of capital and return on equity measured in terms of earnings per share. It was found in the study that capital structure policy of the company was conservative. It is also revealed from the study that weighted average cost of capital has decreased and increased with a corresponding decrease and increase in the debt equity ratio which is contrary to what the theory predicts. Also EPS of the company did not follow any accepted norm in this study.

The evaluation of profitability performance of public sector banks and non financial non – govt. public limited companies has attracted the attention of some researchers like Desai, Bhairav H. and Farmer, Mayuri J. (2001) and Sahu, R.K. (2000) who have considered various profitability ratios in a single index assigning weights to the selected ratios on some appropriate basis.

Higher value of current ratio and acid test ratio indicates higher degree of liquidity and vice-versa. But problem arises in measuring the liquidity for a situation when current ratio is high but acid test ratio is low and conversely acid test ratio is high but current ratio is low. In such a case liquidity can be measured more precisely by applying Motaal's comprehensive test. Sur, Debasish (2001) made an attempt to measure the degree of liquidity of four companies in Indian power sector on comparative basis by using Motaal's test.
He used a process of ranking in order to arrive at a more comprehensive measure of liquidity in which three ratios, namely, working capital to current assets ratio, inventory to current assets ratio and liquid resources to current assets ratio have been combined in a score point.

Yadav, Jain and Rastogi (2001) found in their research study based on three public sector oil companies that a sound financial performance assumes great importance for public sector undertakings because of their own existence, growth and stability on the one hand and the overall economic development of the country on the other. They mentioned that public sector undertakings have the social objectives along with other multiple objectives, but to serve the society does not mean running into losses. Absence of profit and prudent financial management practices may bring down the growth rate and reduce their capacity to serve the society. So a sound financial position should exist for growth, stability and fulfillment of social obligations.

Needles, E. Belverd, Frigo, L. Mark and Powers, Marian (2002) conducted a research study on strategy and financial ratio performance considering the case of three leading Indian companies with a view to match them with three U.S. companies (studied earlier) for the purpose of determining whether the same pattern of relationship regarding strategy and financial performance are observed in an emerging economy. They began with an examination of four performance drivers: cash flow yield, profit margin, assets turnover and total debt to total assets ratios and found that the Indian companies exhibited financial performance that equalled or exceeded that of American companies in case of two of the three selected pairs considered. With regard to the value creation strategy in case of these foreign and Indian companies as measured by the Balanced Score Card, financial performance did indeed reflect the same behavioural characteristics for all companies that they considered.

Sengupta, Suprita (2002) investigated a vast volume of empirical works in the literature on company financing and capital structure of firms in the industrial economy and summarized and classified the results in a set of
observations, each one representing a broadly acceptable stylized fact supported by a large number of research study. These observations were:

*Observation 1*: Regardless of whether de-facto market based capital structure behaviour is observed, retention is the dominant source of finance in the main industrial countries.

*Observation 2*: Firms in bank-based financial system have higher leverage than the firms in market based ones.

*Observation 3*: Firms located in developing economies rely less heavily on internal finance than those found in developed economies.

*Observation 4*: Equity and debt are equally important as the major source of firm’s finance in developing countries, although one is more important in some countries and the other is more important elsewhere.

*Observation 5*: Firms in developing economies may use more or less debt than those in developed countries.

She also presented an industry-wise analysis carried out by Price Water House Coopers regarding trend in debt-equity ratio for past ten years for Indian companies. The analysis reflected a declining trend in debt equity ratios across all the industries studied, the decline being pronounced till 1996. The coverage included companies with market capitalization greater than Rupees five billion as of Oct.30, 1999. Respondents from all concerned categories consistently rated ‘expansion of equity markets’ as the most important reasons for the decline in debt-equity ratio.

A firm level study of the sugar industry of Tamil Nadu was conducted by *Vijaya Kumar* (2002) to find out the determinants of profitability and he found that there were various determinants of profitability viz., growth rate of sales, vertical integration and leverages. Apart from these three variables, he selected current ratio, operating expenses to sales ratio and inventory turnover ratio. The researcher noted in his conclusion that efficiency in inventory management and other current assets were important to improve profitability.

**Singh, P.K.** (2003) conducted a research study to appraise financial performance of IDBI Bank using capital adequacy ratio, non-performing assets,
priority sector advances, statutory liquidity ratio and cash reserve ratio as performance indicators and found that the Bank was sound in terms of liquidity, profitability, capital adequacy and well geared.

Patra, Santimoy (2003) carried out a research study in respect of iron and steel industry to examine the accounting and reporting practices for environment. TISCO was taken as a sample for this study. The researcher tried to show how much environmental activities and accounting information relating to environment were disclosed by the company under study in its published annual reports.

Gangadhar, V. and Yadagiri, M. (2003) conducted a research work to study the diversities in the leverage pattern of private corporate sector taking into account the large public limited companies (whose paid up capitals were rupees one crore and above) belonging to five industries viz. sugar, engineering, chemicals, cement and information technology. They found that aggregate debt equity ratios of all the companies moved between 57.3 percent to 72.8 percent during the period 95-96 to 99-2000 with an average of 65.3 percent. Industry-wise analysis of leverage pattern showed that cement industry adopted high capital gearing technique with enhanced use of leverage showing average debt equity ratio of 191.5 per cent followed by the sugar, chemicals, engineering and information technology industry with an average debt-equity ratio of 94.3 per cent, 70.1 per cent, 61.2 per cent and 16.4 per cent respectively.

Parmar, S.J. (2003) tried to evaluate performance with respect to inventory management considering the case of two public sector undertakings in fertiliser industry with the help of inventory turnover ratio, inventory holding ratio and inventory to total current assets ratio. He also applied regression equation model to assess the association between sales and inventories and the chi-square test in order to test the level of significance. He found that one company is performing better in inventory management in comparison to another. A notable finding of this study was that the company performing better showed a significant relationship between sales and inventories but no
significant relationship between these two variables was found in the other company.

**Reddy, G. Sudarsana** (2003) conducted a study to judge the financial performance of paper industry in Andhra Pradesh taking into consideration six paper mills covering a ten years study period from 1989-90 to 1998-99. He used some important liquidity ratios, leverage ratios and profitability ratios in his study. He mentioned that Andhra Pradesh is one of the leading producers of paper occupying third position in the country. But a majority of the paper mills in the state are running in the red. He found that the entire equity base in case of majority of the mills selected in his study was completely eroded by their mounting operating losses. There was a negative relation between debt and profit before interest and taxes. On an average, the ability to earn an adequate net profit in almost all the mills was poor. Use of excessive debt, high cost of production, increase in operating cost, heavy interest burden, outdated technology were found to be responsible for poor financial performance of the paper mills. The researcher suggested some measures like re-structuring of finances, modernization of technology for better operating performance, implementation of cost reduction and minimization programmes, creative efforts on marketing for the very survival of the mills.

In a study made by **Vijaya Kumar and Kadirlu** (2004) regarding profitability of Indian public sector power industry it was found that size, operating expenses to sales ratio and fixed assets turnover ratio have negative contribution in variation of profit in this industry while other variables like age, leverage, inventory turnover ratio, growth rate and vertical integration have positive contribution in variation of profit rate.

**Bhole, L.M. and Mahakud, Jitendra** (2004) analysed the trends in the corporate capital structure in India in respect of public limited and private limited companies and developed the panel data model for the empirical examination of the existing theories of corporate capital structure in case of private corporate sector in India. It has been found in the study that the leverage ratios reflecting the use of debts have significantly increased during
the period from 1966 to 2000. Again it appeared that the dependence of debt is more in case of public limited companies as compared to private limited companies. With regard to the determinants of corporate capital structure in India, the variables like cost of borrowing, cost of equity, size of the firm, collateral value of assets, liquidity and non debt tax shields were found relevant as revealed by the econometric analysis.

**Bardia, S.C.** (2004) conducted a study on the liquidity management which was based on time series data for eleven years of a steel sector giant viz. Steel Authority of India Ltd. The study tried to examine the liquidity position of the company with the help of six important parameters viz, current ratio, quick ratio, current assets to total assets ratio, cash position ratio, inventory turnover ratio and debtors turnover ratio. Overall liquidity position of the company has been evaluated more precisely in the study by applying Motaal’s comprehensive test. The relationship between liquidity and profitability has also been measured by using Spearman’s rank correlation and the study found a significant positive correlation between liquidity and profitability.

The irrelevance of traditional capital structure / leverage theorem has been observed by **Patra, Santimoy** (2004) in a research study and he found that Bharat Heavy Electricals Ltd., the sample company considered in this study could not enjoy the benefit of accepted leverage theorem. Rather it was able to maximize the EPS by the reverse operation of financial leverage.

**Dandapat, D.R.** (2004) viewed the corporate performance measurement with the help of four important performance measurement criteria viz. Return on Investment (ROI), Residual Income (RI), Economic Value Added (EVA) and Balanced Score Card (BSC) indicating chronological development in their uses. He argued that ROI technique is useful to evaluate the profitability of investment, RI and EVA produce goal congruence between evaluation of division (sub-unit) and the actions that maximize the economic wealth of the division and the organization as a whole. He also expressed the view that the financial measures alone may not be sufficient indicator for guiding and evaluating how organizations in the present information age create future value
through investment in customers, suppliers, employees, processes, technology and innovation. The Balance Score Card (developed by Kaplan and Norton in 1996) may be a guiding technique in this regard.

**Gupta, Arindam and Majumder, Amit** (2005) opined in their article that from the viewpoint of financial statement analysis, corporate performance may be measured in terms of liquidity, long-term solvency, profitability and activity. They have made an attempt to discuss a host of traditional and non-traditional measures of corporate performance. The traditional measures they emphasized are Return on Investment, Residual Income, Earnings Per Share, Dividend per share, Dividend Yield, Price-Earnings Ratio, Dividend Pay-out Ratio etc. which mainly expose the financial strength or weakness of a company. Economic Value Added, Balanced Score Card, Wealth Added Index, Stakeholders Approach and Value Reporting Model have been emphasized as non-traditional measures reflecting financial and non-financial aspect which are used in recent years in the changing pattern of corporate performance measurement. They concluded with a suggestion that a company should use more than one measure simultaneously as any one measure cannot be identified as fully satisfactory.

**Srinivas, Kolluri** (2005) conducted a study to judge the performance of Indian steel companies during 1999-2003. He has constructed in this study an overall index of performance based on eleven financial ratios including profitability ratios by using the Taxonomic Method. The empirical results showed that overall composite index would serve as a better performance indicator than the conventional stand alone operating profit margin. The performance of eleven companies considered in this study appeared to be converging during 1999-2003. It was also revealed that contrary to the conventional norm, the sign of market share showed positive and significant relation with overall performance.

**Patra, Santimoy** (2005) has undertaken a research study to examine the impact of liquidity on profitability considering the case of a private sector steel giant viz. Tata Iron & Steel Co. Ltd. Out of seven liquidity ratios selected for
the study, four ratios namely, current ratio, acid test ratio, current assets to total assets ratio and inventory turnover ratio showed negative correlation with profitability ratio. The remaining three ratios namely, working capital turnover ratio, receivable turnover ratio and cash turnover ratio showed positive association with the profitability ratio.


An attempt has been made by Khatik, S.K. and Singh, P.K. (2005) to evaluate the profitability and financial health of IDBI through the application of the technique of ratio analysis. Capital adequacy ratio, non-performing assets, priority sector advances, statutory liquidity ratio, cash reserve ratio and credit deposit ratio have been used in the study and results have been interpreted based on the norms selected by RBI. The study revealed that the bank emphasized on lowering the cost of deposits, improving fee-based income, operational efficiency and managing cost. The challenges facing the bank were massive but not insurmountable. The study findings indicated that IDBI bank has made commendable progress during the last few years.

The Information Technology (IT) industry in India is among the fastest growing segments of the Indian industry at present. An attempt has been made by Hamsalakshmi, R and Manicham, M (2005) to analyse the financial performance of software companies in India taking a sample size of thirty four covering a period of five years from 1997-98 to 2001-2002. The study examines the structure of liquidity position, leverage position and profitability position on the basis of their average result over the years. The study revealed that liquidity position and working capital were favourable during the period of study. The companies under study relied more upon internal financing than on debt financing i.e. the companies followed a conservative financing policy. Return on investment and return on equity proved that overall profitability position of selected software companies had been increasing at a moderate rate.
Sur, Debasish and Rakshit, Debdas (2005) tried to examine in a research study the relationship between asset management and profitability taking into account twenty five selected companies in Indian industry with the help of receivable turnover ratio, inventory turnover ratio, operating long term asset turnover ratio and operating return on asset ratio. In their sample there was only one company belonging to the steel industry in India. Their study revealed that receivable turnover ratio was positively associated with profitability for 14 companies, inventory turnover was positively associated with profitability for ten companies only and operating long term asset turnover was positively associated with profitability for nineteen companies out of twenty five selected companies. So all the selected companies did not conform to the traditional view that higher assets turnover is associated with higher profitability. Taking all the selected companies as a whole, a positive association between receivable turnover and profitability and between operating long term assets turnover ratio and profitability was found. However, a negative relationship between inventory turnover and profitability was noticed.

Rao, N Janardan and Adusumilli, Ravi Babu (2006) has reviewed in their article the steel production, domestic and export demand, input prices, total production cost and availability of raw material etc. They opined that massive infrastructure development with boom in auto and auto-ancillary industries have emerged as strong demand drivers for steel in India. They found that cost of steel making is high due to increase in input costs particularly energy, the crucial input for steel making, which constitutes 35% of the total production cost of steel. They have shown the financial performance of Indian steel industry for the two years 2004 – 2005 and 2005 – 2006 and found that the performance in the year 2005-2006 has been pale as compared to that of 2004-2005. It was attributed to the steadily declining steel prices in the domestic market alongwith increase in the cost of inputs. Thus though steel production and consumption have increased significantly, rising
input cost and declining steel prices have been hitting the performance of steel industry.

**Reserve Bank of India** (2006) conducted a study for evaluating performance of private corporate business sector during the first half of 2005 – 06 (April – Sept’ 05) covering the data relating to 2,128 non-government non-financial public limited companies. RBI used some absolute measures like sales, other income, gross profit, profit before tax, profit after tax etc. and some relative measures like profit allocation ratios (tax provision to profit before tax and interest to gross profit), interest linked ratios (interest coverage ratio, interest to sales) and profitability ratios (gross profit to sales, profit after tax to sales) in this study. The large number of companies considered in the study has been classified according to their size of paid up capital and sales. It was found in the study that the non-government non-financial public limited companies exhibited continued good performance in terms of high growth in sales and profit along with sharp decline in interest payment. Profitability in terms of gross and net profit margin recorded improvement across all the paid-up capital size classes.

**Bhunia, Amalendu** (2007) has made an assessment of working capital management and observed the liquidity position of two central public sector iron and steel enterprises viz. IISCO and SAIL covering a study period of twelve years from 1991-92 to 2002-2003. Assessment of working capital management has been made in this study by making a comparison between actual working capital and estimated value of working capital of these two companies. It was found that actual values of working capital was less than the estimated values of working capital which indicated that working capital was not sufficient in meeting current obligations for both the companies. Inadequacy was, however, more prominent in case of IISCO. Liquidity position of these two companies has been measured in terms of current ratio, acid test ratio, cash position ratio, age of inventory and age of debtors and creditors. It was observed that liquidity position was poor for both the companies. The unsatisfactory liquidity position was caused by inefficient
inventory management in case of SAIL and inefficient receivable management in case of IISCO.

**Research Gap:**

From the in-depth study of the above literature, the following research gaps have been identified:

1) Financial performance evaluation has a wide range of coverage. Almost all studies conducted so far were concentrated on one or more areas reflecting financial performance. These have not paid due attention on all areas at a time.

2) Most of the empirical studies were based on industry data which were aggregate in nature.

3) A limited number of research studies were made earlier which were concentrated on the individual companies belonging to the iron and steel industry in India, although this particular industry has been identified as priority sector in the context of infrastructure development of India during its post liberalization period and accordingly it deserves extensive research in the field.

4) Review of research work related directly or indirectly with the present study shows that many works on different aspects of financial performance of public sector and private sector have been done in isolation, but there is hardly any research work done regarding performance evaluation of public sector and private sector on a comparative basis. Moreover the same study in iron and steel industry has remained untouched by the researchers particularly in the post-liberalization period. This very fact has inspired the present researcher to select the field for the present study.

We have tried in our research study to cover the above deficiencies of earlier studies.