

Chapter 4

INDUSTRY ENVIRONMENT ANALYSIS

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4.1: Introduction

Investing is the business of relative changes. When the economic outlook is assessed along with the direction of changes in the overall markets for the stocks, the analyst must realize that even though industry groups may find it difficult to 'buck the trend,' they do not necessarily respond to the same degree. Recessions or expansions in economic activity may translate in to falling or rising stock markets with different relative price changes among industry group. So in accordance with the recommended Economy – Industry - Company analysis (EIC analysis) sequence we now move on to the industry analysis.

The detailed work in the analysis of any corporate security logically begins with the industry. Most industries have important individual

characteristics that affect the values of their securities, and the analyst must review these carefully. The objective of this analysis is to assess the prospects of various industrial groupings. In fact, industry features are so important for a security analyst because the inherent nature of the industry itself shall sometimes decide the magnitude and patterns of cash flows in many of its member firms at different stages of the economy. Sometimes investment in stocks of worst firm in a growth industry may deliver better return than that the best firm in a declining industry delivers to its investors, hence an industry analyst demands insights in to the key factors that the influence the performance of particular sector and its relative strength or weakness compared to the other industrial groupings (Dougall and Corrigan 1978).

4.2: Importance of Industry analysis

Industry analysis is important for the same reason that the macro economic analysis is. Just as it is difficult for an industry to perform well when the macro economy is ailing, it is unusual for a firm in a troubled industry to perform well. Similarly just as we have seen that economic performance can vary widely across countries, performance of industry also can vary across industries.

The portion of economic theory which deals with the organization of industries (Chamberlin,1956, Joan Robinson,1933) suggests that firms which manufacture homogeneous products should maximize their profits by adopting fairly similar policies with respect to labor capital ratio, profit margins advertisement programmes etc. Each industry tends to have unique risk and return characteristics which result from the uniform technological process and similar set of operating policies that have been developed for

the production of its particular product. Economic competition between the firms in any given industry usually forces them all to adopt the most efficient production method, and this is the reason why all firms in a given industry tend to have similar return characteristics. Furthermore, the industry average rates of return differ significantly from industry to industry (Nerlove 1968). Fabozzi and Francis (1979) give empirical evidence that different investments result in different levels of risk which are the result of, among other things, significantly different levels of average risk from industry to industry. Such difference in risk level exists between the industries may be because of the different labor capital ratios, difference in their access to materials, differing degrees of foreign competition etc. Such differences between industries in terms their risk – return profile are what make the industry analysis worthwhile to perform.

4.3: Industry Factors

There are many factors pertaining to industries which investment analysts are likely to focus in their effort to appraise the investment profile of stocks belonging to a particular industry. Discussion of each of these features follows:

4.3.1: Sensitivity to the business cycles:

Industries are not equally sensitive to the business cycle changes. Some industries like FMCG, Pharmaceuticals etc. are virtually independent of the business cycle as the demand for the products of these sectors is regular in nature and hardly affected by the state of the macro economy and business conditions. But sectors like Real estate, Automobiles etc. are highly sensitive to the business cycle. Mainly three factors shall determine the sensitivity of an industry's earnings to the business cycle.

Sensitivity of sales is the prime factor determining the earnings efficiency of an industry at different stages in business cycles. The industries vary in their sensitivity to the business cycle. The sales of firms in industries that sell necessities such as food, drugs, and pharmaceutical products will show little sensitivity to business conditions. Consumer care, tobacco products and entertainment are industries with low sensitivity and for which income is not a crucial determinant of demand. In contrast, the firms in industries such as Machine tools, steel, auto and transportation are highly sensitive to the state of the economy (Bodie et al., 2000)

Second factor determining business cycle sensitivity is operating leverage which refers to the division between fixed and variable cost. Firms with greater amount of variable as opposed to fixed costs will be less sensitive to the business conditions. On the other hand firms with high fixed costs are said to have high operating leverage, as small savings in business conditions can have large impacts on profitability.

Third factor influencing business cycle sensitivity is financial leverages which is the use of borrowed capital in financing the fund requirements of firms. Interest on debt is to be paid regardless of the sales level. They are fixed cost that also increases the sensitivity of profit to business conditions.

4.3.2: Industry Life Cycles

Every industry is passing through different stages in its life cycle. Many industrial economics believe that the development of almost every industry may be analysed in terms of its life cycle. The life of an industry can be separated in to the pioneering stage, the expansion stage, the stagnation stage and decay stage. So the first step in industry analysis is to

determine what stage of growth through which the industry is passing at present. This approach will also be useful in analyzing the past and forecasting the future of an industry (Goodman 1970)

- ***Pioneering stage***

The early stages of an industry are often characterized by a new technology or product. In this beginning phase the product or industry starts with sales of zero and operates at a loss as initial sales obtained. Thereafter its demand not only grows but grows at an increasing rate. A great opportunity exists for profits and a large number of firms attempt to capture their share of the market, there arises a higher business mortality rate; many of the weaker firms attempting to survive in this new industry are eliminated, and a lesser number of firms survive this phase. A security analyst will have a difficult task at this stage selecting those firms that will on top for some time to come. Even if the analyst can recognize an emerging industry in the pioneering stage, he will probably not invest at this point in the industry's development because of the great risks involved and because of the tremendous difficulty in selecting the survivors.

- ***Expansion Stage***

The expansion stage is characterized by the appearance of the firms surviving from the pioneering stage. Sales of these companies grow rapidly and consistent annual profits usually begin to emerge during this stage. Their competition in the expansion stage brings about improved products at a lower price. These firms continue to expand but at a moderate rate of growth than that experienced in the pioneering stage. These now stronger, steadier, more efficient firms become more attractive for investment purposes. However these firms reinvest much of their earnings paying small

rate of dividend and also borrow heavily in order to finance its additional capital investments needed to sustain this period of rapid growth. Solvency is difficult to maintain as a firm expands rapidly

- ***Stagnation Stage***

Following years of rapid growth during which the firms in an industry tend to acquire stable market shares, come years of slower growth which comprise the third stage. Mature growth companies may be large corporations, they may begin to pay consistent cash dividends and they repay any excessive debt they acquired during their period of rapid expansion. At this point the product has reached its full potential for use by consumers and profit margins become narrower. Firms at this stage sometimes are categorized as cash flows, having reasonably stable cash flow but offering little opportunity for profitable expansion. The cash cow is best 'milked from' rather than reinvested in the company.

- ***Decay Stage***

In this stage, the industry might grow at less than the rate of the overall economy, or even it might even shrink. This could be due to obsolescence of the product, competition from new products, or competitions from new low cost suppliers. Customers have changed their habits, style and preference. So the industry becomes obsolete and gradually ceases to exist. The changes in the technology and declining in the demand are the major causes for the decay of an industry. The investors should disinvest when signals of decline are evident.

The life cycle theory is better for explaining the behavior of industries than it is for explaining the behavior of individual firms because

many firms fall in to bankruptcy during stages one and two. Even in those cases it is applicable, the life cycle approach can be difficult to interpret because there are no set time dimensions on a product's life. The experience of most industries suggest that they go through the four phases of the industry life cycle, though there are considerable variations in terms of the relative duration of various stages and the rates of growth during these stages. Because of these variations, it may not be easy to define what the current stage is, how long it will last, and what would be its precise growth rate.

4.3.3: Industry structure and characteristics:

Evaluation of industry structure and characteristics is an inevitable task of a security analyst in order to reach a considered investment decision. In an industry analysis, any number of key characteristics should be considered at some point by the analyst. Since each industry is unique, a systematic study of its features and characteristics must be an integral part of the investment decision process. At this stage Industry analyst normally focuses on the following:

- Structure of industry and nature of competition: Here his attention on the number of competing firms, industry leaders, entry barriers, pricing policies of firms, product differentiation, competition from foreign firms, product features of substitutes available etc...
- Nature and prospects of demand: In order to understand the nature and prospects of demand for products in an industry one should identify the major customers and their requirements, key determinants of demand, degree of cyclicity in demand, expected rate of growth in the future etc...

- Cost structure, efficiency and profitability of industry: This could be measured by proportion of key cost elements, labor productivity, liquidity conditions, profit margins, return on investments and earning power etc...
- Technology and research: Importance shall be given to degree of technological stability, technological changes, Research and Development expenses as a industry sales, the proportion of sales growth attributable to new products etc...

4.3.4: Profit potential of Industries

Industrial companies are engaged in the production and sale of commodities and services under competitive conditions. There are many factors which impel competition in an industry and decide its strength or weakness. So every security analyst seeking a particular sector for his or his client's investments shall take effort to understand the industry context in which the firms operates thereby he can reach a rational judgment as to its profit potentials.

4.4: Porter's five forces – A model for Industry analysis

Michael Porter (1985) provided a framework for analyzing the competitive conditions prevailing in an industry and its relation with the industry's profitability. In his model Porter has identified five competitive forces those altogether can drive competition or determine the profit potential or strength of an industry. The forces identified by Porter in his study include-

1. Threat of new entrants
2. Rivalry among the existing firms
3. Pressure from the substitute products

4. Bargaining power of buyers
5. Bargaining power of sellers

1. Threat of New Entrants:

New entrants to an industry put pressure on price and profits. Even if a firm has not entered an industry, the potential for it to do so places pressure on prices, because high prices and profit margins will encourage entry by new competitors. Therefore barriers to entry can be a key determinant of industry profitability.

Barriers to entry arise from several sources. Sometimes government creates barriers by restricting competition through the granting of monopolies and through regulation. Ideas and knowledge that provide competitive advantages are treated as private property when patented, preventing the others from using the knowledge and thus creating a barrier to entry. When an industry requires highly specialized technology or plants and equipment, potential entrants are reluctant to commit to acquiring specialized assets that cannot be sold or converted in to other uses if the venture fails. Most cost efficient level of production ie Minimum Efficient Scale (MES) which indicates the point at which unit costs for production are at minimum is another important barrier to entry for firms. To operate at less than MES there must be a consideration that permits the firm to sell at a premium price – such as product differentiation or local monopoly.

2. Rivalry among the existing players

When there are several competitors in an industry, there will generally be more price competition and lower profit margins as competitors seek to expand their share of the market. Slow industry growth contributes to this competition because expansion must come at the expense

of rival's market share. Industries producing relatively homogeneous goods are also subject to considerable price pressure, because firms cannot compete on the basis of product differentiation. When the customers of the industry can freely switch from one product to another there is a greater struggle to capture customers which increases rivalry.

3. Pressure from substitute products

Pressure from substitute products means the industry faces competition from firms in related industries. To the economist, a threat of substitutes exists when a product's demand is affected by the price change of a substitute product. The availability of substitutes limits the prices that can be charged to customers.

4. Bargaining power of buyers

The bargaining power of buyers is the influence that the customers have on a producing industry. If a buyer purchases a large fraction of an industry's output, it will have a considerable bargaining power and can demand price concessions. Sometimes the buyers possess a credible backward integration net thereby can threaten to buy the producing firm or its rival. But when the products are not standardized the switching cost to buyer will be very high which constraints the buyer to switch from one product to another frequently.

5. Bargaining power of suppliers

A producing industry requires materials, labor and other supplies. This requirement leads to buyer supplier relationships between the industry and the firms that provide it the supplies used to create products. If the suppliers of a key input has monopolistic control over the product or they

supply critical portions of buyers input, then the supplier can demand higher prices for the goods supplied and squeeze profits out of the industry. Here the key factor determining the bargaining power of suppliers is the availability of substitute products. If the substitutes are available, the supplier has little clout and cannot extract higher prices.

Michael Porter identified three generic strategies – cost leadership, product differentiation and focus that can be implemented at the business unit level to create competitive advantage. The proper generic strategy will position the firm to leverage its strengths and defend against the adverse effects of the five forces.

4.5: Data and Methodology

For the purpose of the study, five industries namely Energy, FMCG, Information Technology, Pharmaceuticals and Automobiles were considered based on the availability of the data. The logic behind the inclusion of these sectors is to bring in to the effect of industries sensitivity to business cycles. CMIE database has been accessed for getting the financial data pertaining to the sectors selected under study. Monthly closing values of the indices representing these sectors were used for ascertaining the sector wise stock returns. Among these five indices, all four indices except, automobile are NSE indices. Since NSE is not publishing any Automobile sector index, the index representing Automobile stock movement has taken from Bombay Stock Exchange. Banking sector index is not included because the performance of banking sector and stock market in most of the cases are complimentary to each other. Similarly Realty and Infrastructure indices could also not to be included as these indices has been compiled and published by stock exchanges in India since 2005 only, the

inclusion of which definitely lacks data consistency in comparison on time period basis. As many of the sector indices values are available from the financial year 2001-02 only, this part of analysis covered only nine years from that financial year to 2009-10.

Description of methodology used for the analysis is given in the just preceding paragraph of each part of analysis.

4.6: Analysis of Industry data

On the basis of the literature discussed earlier, first of all an effort has been made to analyze the performance of all selected industrial sectors during the study period. Here only quantitative (financial) variables pertaining to industries have considered for the purpose of the analysis. At first the financial performance analysis of the five industrial groups has made, thereafter the performance of stocks pertaining to those sectors is evaluated. Later an empirical model is constructed for ascertaining the causality between sector performance and stock returns.

4.6.1: Financial performance of Industrial sectors

For evaluating the financial performance of industries Accounting ratios are computed and meaningfully interpreted. Seven financial ratios/variables explaining different dimensions of financial positions are computed for this purpose. The accounting ratios computed for the purpose include income growth, export sales to total sales, debt to equity, current ratio, fixed assets to total assets, return on investment and employee cost to total expenses. The income growth represents the growth prospects of the industry, share of export sales in total sales revenue indicates its dependency on foreign market for revenues and also its potential to market expansion;

debt to equity is a measure of financial leverage as well as financial risk by employment of borrowed funds; current ratio measures liquidity conditions, indirectly the state of piling inventories; return on investment measures the efficient use of capital employment in the industry; fixed assets to total assets measures capital intensity indirectly the degree of operating leverage and employee cost to total expenses measures its level labour orientation.

When we look into the financial results with respect to five industrial sectors reported in Table 4.1 it can be easily understood that there has been sector wise difference in the performance of industries in India in terms of various financial measures. The rate of growth in income of all selected sectors is showed volatility during the study period. But there exists difference among them in terms of the lag in their sensitivity to swings in the economy. For example the economic recession in the global economy has made most hit on the Automobile sector in 2009, the sectors like Information Technology and Energy were received its banes in the subsequent year only. Similarly Pharmaceuticals and FMCG were able to withstand the crisis without incurring much dilution in their earnings growth.

With regard to the profitability, the performance of FMCG is far ahead of other sectors. Its return on investment measure has been improving year by year. Initially sectors like Information Technology and Automobiles gained increase in their profit at a rate much higher than the rate of growth in its investments during the first four to five years, but later they could not keep up that trend. The economic efficiency of the business of other two sectors—Pharmaceuticals and Energy, according to ROI measure are found less volatile or almost consistent throughout the period (although there has been slight decrease in the value of this measure for Pharmaceuticals during later years).

Table 4.1
Financial results of Five Industrial sectors in India for the period 2002-2010

Sector	Year	Income growth	Return on Investment	Employees cost to Total cost	% of export sales	Export earnings growth	Current ratio	Debt to Equity ratio	Capital intensity
Information Technology	2002	12.83	19.00	28.70	72.50	21.60	2.46	0.15	0.23
	2003	11.20	15.60	29.80	74.90	18.10	1.93	0.19	0.19
	2004	24.00	19.50	35.50	78.10	26.80	1.57	0.20	0.18
	2005	54.20	28.70	40.50	80.50	69.90	1.87	0.10	0.19
	2006	34.00	34.40	41.90	80.00	29.80	2.01	0.10	0.18
	2007	35.30	31.80	42.70	80.80	37.80	2.16	0.13	0.16
	2008	27.10	27.70	43.10	78.20	22.60	1.87	0.20	0.17
	2009	21.20	24.60	42.10	80.10	25.40	1.80	0.23	0.17
	2010	5.10	26.40	40.80	77.70	1.30	1.78	0.22	0.15
	2002	10.80	23.00	8.50	24.40	28.20	1.52	0.71	0.36
Pharmaceuticals	2003	11.40	22.70	8.10	28.00	31.70	1.47	0.69	0.32
	2004	17.00	24.60	8.60	29.70	24.00	1.42	0.73	0.31
	2005	5.40	21.00	9.00	30.40	9.00	1.34	1.07	0.29
	2006	17.80	21.30	8.60	31.20	18.40	1.33	1.07	0.27
	2007	24.70	24.20	8.40	35.50	37.10	1.45	0.82	0.26
	2008	16.70	21.30	8.50	35.70	17.90	1.33	0.75	0.26
	2009	12.10	14.70	9.10	38.20	21.10	1.36	0.66	0.24
	2010	10.50	18.60	9.70	39.00	9.40	1.46	0.53	0.25
	2002	2.50	39.20	5.10	12.70	1.60	1.15	0.27	0.34
	2003	-1.90	41.00	5.50	10.90	-13.60	1.13	0.20	0.29
FMCG	2004	2.80	41.00	5.40	10.90	2.30	1.06	0.50	0.29
	2005	3.40	31.80	5.60	11.40	7.50	1.16	0.45	0.30
	2006	10.20	36.80	5.10	10.50	3.80	1.07	0.20	0.29
	2007	14.30	40.20	5.40	10.50	12.60	1.05	0.22	0.23
	2008	16.00	44.60	4.90	13.00	31.60	1.02	0.35	0.27
	2009	16.40	45.00	4.90	10.90	-5.70	1.16	0.47	0.27
	2010	13.50	48.20	5.30	7.60	3.00	1.10	0.33	0.28
	2002	-7.00	15.90	1.40	4.40	-3.50	1.23	1.00	0.50
	2003	14.50	22.50	1.30	4.60	28.50	1.27	0.77	0.42
	2004	11.20	25.20	1.20	5.80	30.40	1.16	0.62	0.39
Energy	2005	22.10	21.70	1.10	3.40	77.50	1.31	0.57	0.35
	2006	26.40	16.90	0.90	10.20	52.30	1.24	0.69	0.41
	2007	24.00	22.30	1.10	13.80	65.20	1.11	0.65	0.41
	2008	14.50	22.50	1.10	15.30	28.00	1.19	0.71	0.33
	2009	21.30	13.20	1.30	15.50	11.20	1.01	0.90	0.34
	2010	-2.70	14.70	1.40	17.80	10.60	1.15	0.77	0.42
	2002	2.70	7.80	6.80	3.80	-14.50	1.02	1.20	0.40
	2003	13.10	14.00	6.40	4.60	43.60	1.01	1.06	0.35
	2004	24.10	25.60	6.40	5.60	72.10	0.96	0.53	0.26
	2005	24.80	26.50	5.30	7.60	45.80	1.00	0.57	0.21
Automobiles	2006	15.90	30.50	5.10	3.00	22.60	1.00	0.47	0.19
	2007	25.70	29.50	4.70	3.50	28.30	0.98	0.47	0.13
	2008	11.50	25.30	5.30	3.40	21.40	0.96	0.53	0.19
	2009	3.40	15.80	6.30	13.00	40.70	0.95	0.68	0.20
	2010	24.50	23.30	5.30	11.80	12.50	0.96	0.63	0.20

Source: CMIE data base

Among the group only Information Technology is found more labor intensive and more than 40 per cent of its total cost comprises of employees cost. Hence its capital intensity is at a very low degree (less than 20 per cent) in most of the years. Owing to lower capital intensity this industry may suffer far less from the depreciation shortfall. However the trend in the rate of increase in its employee cost compared to the rate of increase in its total cost is against the stand point of the rational investment that the best industry is one in which the labor cost represents a small portion of the cost of operations (Christy and Clendenin 1978, pp. 318). All other sectors in the group are heavily invested in expensive, long lived plant and equipment which would have enabled them to enjoy more operating leverage during good days of the economy. Heavy investments in long lived assets have high collateral values and in buying them the companies belong to these sectors can usually borrow a high percentage of the purchase price. Because borrowings are easy, they are over prone to rely on debt financing mode for its asset investment requirements.

Information Technology and Pharmaceutical sectors are more exposed to the foreign markets than the other sectors in the sample. Exports constitute the major chunk of the sales of the companies from IT sector in India. More than 80 per cent of their sales have been procured by this sector from its foreign market. Similarly around one third of the sales of the Indian Pharmaceutical industry have been constituted by exports. Lower growth of earnings from the foreign markets during the last few years has been noticeably affected the profitability of these two sectors in India. All other sectors considered for the study highly domestic market oriented and their global market penetration is marginal only.

On interpreting the current ratio it can say that the liquidity conditions prevailing in different sectors in India are neither uniform across sectors nor consistent across the time horizon. Information Technology industry is the only one sector which has maintained a reasonably good level of liquidity as its current ratio was almost equal to 2. The liquidity conditions of Pharmaceuticals are somewhat better than the remaining three sectors.

After gaining insight in to the divergence existing in the performance of different industrial sectors in an economy, the next step in security analysis process is to see whether such difference truly reflects in the market performance of their stocks or not.

4.6.2: Industrial stock returns – Descriptive statistics

Table 4.2 presents the summary statistics for the five industrial sector indices for the period 2002-2010. Minimum and maximum rate of return provided by each sector index during the period and their respective Mean, Standard Deviation (S.D) and Skewness are also reported. SD and Skewness are computed for explaining the volatility and normality of the distribution respectively. Lower rate volatility in the distribution of return indicates more consistency in market and lesser chance for investors to lose their money. Generally value for zero Skewness represents that the observed distribution is normally distributed. The Skewness coefficient, in excess of unity is taken to be fairly extreme (Chou 1969).

Table 4.2
Industrial stock returns – Descriptive statistics

	Minimum	Maximum	Return on annual basis	Std. Deviation	Skewness
Energy	-29.02	36.60	27.72	9.19	-.088
FMCG	-17.90	28.21	13.32	6.93	.303
Information Technology	-42.00	38.21	13.92	11.29	-.316
Pharmaceuticals	-24.38	16.48	20.02	7.14	-.534
*Automobiles	-26.92	31.80	23.16	9.28	-.002

Compiled from NSE Industry indices data

*BSE Auto Index data

The statistics shows that the return generating capacity of different sector stocks are not uniform during the study period. Moreover the variability of returns which is measured by both Standard Deviation and Range (difference between maximum and minimum of returns during a period) is also much different from industry to industry. When Energy sector scrip delivered a highest return of more than 27 per cent to its investors, two other sector indices -Automobiles and Pharmaceuticals were in second and third position by producing returns at the rate of 23 per cent and 20 per cent respectively. The performance of Information Technology and FMCG stocks in terms of return were far behind of other sector indices. But in risk terms the performance of FMCG sector indices outperforms other sector indices. Pharmaceutical stocks also showed more consistency compared to the stocks of remaining sectors. Stability in delivering returns to investors by Energy sector is almost similar to that of Automobiles during this period. Information Technology sector stocks proved to be the most

risky investments for investors as it has highest standard deviation of 11.29 per cent among the group. The variability in return from this sector in terms of Range is also considerably high (more than 80 per cent) compared to other sectors. Here it is also very interesting to note that the return profile of the most risky stock investment among the group – Information Technology sector stocks is somewhat poor which further creates an impression that the return from stock investments of all sectors shall not always be commensurate with its risk profile. Investment in IT sector stocks in India has not been better rewarded for the level of the risk that its investors actually assumed during the period of the study.

It can also be seen that frequency distribution of all the indices except Energy and Automobiles are not normal, but none of them showed any extreme skewness. Skewness coefficient for both Energy and Auto sector returns almost equal to zero which one way help to say that market for these two sectors is relatively normal. When IT and Pharmaceutical indices showed moderate degree of negative skewness indicating the greater probability of large decreases in prices rather than rises, FMCG sector showed low degree of positive asymmetry in its distribution of returns.

Thus the descriptive statistics itself shows that there has been inter sectoral differences in terms of return and risk performance of stocks in Indian stock market during the post financial liberalization period. Definitely there arises another question as to what factors make such divergence in the performance of stocks across the sectors. Before searching for the answers to this question it is very interested to familiar with the factors which the fundamentalists normally assume that could specifically influence the price behavior of stocks from a particular sector.

4.6.3: Stock returns and Industry variables - The empirical model

The model to be tested consists of 7 independent variables for the nine year period from April 2002 to March 2010. These independent variables potentially related to industry stock returns are described in some detail below. The expected directions of effects of these industry variables are also given in a multivariate regression context. These variables are selected on the basis of the review of available literature relating the performance of the industries and stock returns and all of them are the descriptive of the industry characteristics. The multivariate regression model takes the form:

$$Y_i = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + u_i$$

Where income growth is taken as variable x_1 , export sales to total sales as x_2 , debt to equity as x_3 , current ratio as x_4 , fixed assets to total assets as x_5 , return on investment as x_6 and the variable employee cost to total cost is taken as x_7 . The dependent variable Y_i is the average monthly stock return of an industrial sector 'i' and β values measure the sensitivity of industry stock returns to each independent variable. α and u_i represent constant and error (assumed to be zero) terms respectively.

Step wise regression procedure (MaxR) is used by the study in an attempt to build more useful model than those incorporating all seven independent variables. MaxR begins with an independent variable that results in the highest R^2 and successively add variables at each iteration in order to maximize R^2 . For this analysis a significant level of 0.01 is specified.

For checking whether there is any problem of collinearity in the data or in the model used VIF and Tolerance statistics has been computed. If the largest VIF is greater than 10 then there is cause for concern (Myers 1990) and the tolerance statistics below 0.2 indicates a potential problem of collinearity (Menard 1995) in the model.

Table 4.3
Stepwise Regression results

Model	β	Std. Error	t	P value	Tolerance	VIF	Adjusted R ²
Constant	4.895	1.622	3.017	.009*	-	-	
Capital Intensity	17.875	3.416	5.233	.000*	.833	1.201	0.796
Liquidity	-8.155	1.330	-6.131	.000*	.462	2.163	
Share of exports	.101	.021	4.858	.000*	.211	4.732	

*Significant at one per cent level.

Table 4.3 presents the results from the stepwise procedures. For our current regression model the VIF values are all well below 10 and the tolerance statistics all well above 0.2; therefore we can safely conclude that there is no collinearity within the data used for the analysis. The average VIF also is much less than 10 and this confirms that collinearity is not a problem for this model also.

The regression results indicate that the average monthly stock returns of the five industrial sectors in India are affected by the changes in industry variables. However among the seven factors selected for determining its impact on industrial stock returns in India, only three factors - capital

intensity, liquidity conditions and share of exports are proved to be the strongest factors among the group. The relationship of stock returns with these three factors is exactly in accordance with the theoretical expectations. When the relationship of the stock returns with the capital intensity and export performance (measured through share of export sales) found positive and significant at one per cent level, its causal relationship between the liquidity conditions of different sectors found negative and significant at the same level. The value of adjusted R^2 indicates that about 80 per cent of the variations in industrial stock returns during the study period were altogether contributed by these three industry factors.

4.7: Information Technology (IT) Industry

Information Technology (IT) industry is the industry, which through the use of computers and other supporting equipment helps in the spread of knowledge. The term Information Technology includes computers and communication technology along with associated software. Hanna N and Dugonjic (1995) therefore, are of the view that in IT industry, “on the supply side are computer hardware and software, telecommunications equipment, and micro-electronics – based industries. On the demand side are applications of IT and all economic sectors.”

Information Technology for sometime was used as synonymous to computers. But with the rapid advancement in various information delivery systems such as Radio, TV, Telephone, Fax and of course Computers and Computer networks, information Technology refers to the entire gamut of media and devices used to transmit and process information for use by various target groups in the society. IT has, therefore, been rightly termed as Information and Communication revolution.

With advancement in information technology information is being regarded as the fourth factor of production, along with the land, labour and capital. Information has therefore, become an important and distinct input in production. Thus along with three sector model of primary, secondary and tertiary industries, a fourth sector information related industries has emerged. Information is used as raw material of knowledge and the information industry has thus pervaded a wide range of industries, viz., manufacturing, education, entertainment, defense, trade, communications, etc.

At present the entire world is looking as a knowledge economy where raw material that matters is intellectual rather than physical. Low (2000) states: “The knowledge economy implies shift in the geographical centre from raw material and capital equipment to information and knowledge, especially in education and research centres and man – made brain industries.” The pervasive influence of Information Technology is so strong that there is no sphere of human life in which it is not able to make a niche for itself.

Table 4.4 summarizes expected growth of Information Technology spending worldwide over the next 2 to 3 years.

Table 4.4
Worldwide IT spending forecasts

(\$ billion)	2007	2008	2009	2010	2011	2012	2008-12 CAGR (%)
IT services	528	557	578	605	636	672	4.8
ITeS - BPO	103	115	131	146	164	181	11.9
Services Total	631	672	709	751	801	853	6.1
Software	277	295	308	326	349	376	6.3
Hardware	570	594	597	620	652	683	3.6
Total	1478	1561	1614	1697	1801	1912	5.2

Source: International Data Corporation

Divergence in the growth of spending of IT in its various segments is expected in the future. The total spending on IT is expected to grow at Compound Annual Growth Rate (CAGR) of 5.2 per cent globally. IT enabled Services (ITeS) spends are likely to grow at a faster pace of 11.9 per cent CAGR as compared with other segments within the IT industry. The lowest rate of growth is expected on the Hardware segment with only 3.2 per cent CAGR.

4.8: Information Technology (IT) Industry in India

Information Technology is of recent origin, but is spreading fast in India. It was in the 70's that the computer as a productivity tool started proliferating in the Indian industries scene. But it was only by mid 80's that the forecasters, analysts and Indian government policy planners began to understand the potential of the Indian talent in computer software. The realization led to the formulation of the computer software policy in 1986. Then the economists began to analyze the potential of the Indian IT industry. It would be they said, one of the fastest growing sectors of the economy and would provide high quality employment for young people. It would earn significant revenue from exports and would be a highly desirable industry, as it required skilled manpower, few raw materials and was not any way damaging to the environment.

With the huge success of the IT companies in India, the Indian IT industry in turn has become successful in making a mark in the global arena. This industry has been instrumental in driving the economy of the nation on to a rapid growth curve. As per the study of NASSCOM-Deloitte (2008),

the contribution of IT/ITES industry to the GDP of the country has soared up to a share of 5 per cent in 2007 (7 per cent in 2008 according to BMI) from a mere 1.2 per cent in 1998. Besides, this industry has also recorded revenue of US\$ 64 billion with a growth rate of 33 per cent in the fiscal year ended in 2008.

4.8.1: Indian IT industry: its component segments

The Indian IT industry can be segregated in to four main components: software products and engineering services, IT services, IT – enabled services and hardware. The services of the industry are spanned over various segments covering software development, software services, software products, consulting services, BPO services, e-commerce and web services, engineering services off shoring and animation and gaming. Banking, Financial Services and Insurance (also known as BFSI) is an industry name commonly used by IT/ITES/BPO companies to refer to the services they offer to companies in these domains.

From Table 4.5 it came to know that the Indian IT industry has grown at a remarkable pace since 2001-02. The overall revenue of the industry is estimated to have grown from USD 10.2 billion in 2001-02 translating to a CAGR of about 26.9 per cent. Despite the severe global recession, the industry grew at modest rate of 12.9 per cent in 2008-09. Table 2 reviews the performance of Indian IT-ITeS Industry in terms of its revenue growth (domestic and exports) during the period 2001-02 to 2008-09.

Table 4.5
Indian IT - ITeS industry Revenue Trends

(\$ billion)	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	CAGR (%)
Exports revenue (excluding hardware)	7.6	9.5	12.9	17.7	23.6	31.1	40.4	46.3	28.6
IT services	5.8	5.5	7.3	10.0	13.3	17.9	23.1	26.5	23.2
ITeS – BPO	1.5	2.5	3.1	4.6	6.3	8.4	10.9	12.7	39.2
Software products & Engineering services	0.3	1.5	2.5	3.1	4.0	4.9	6.4	7.1	48.5
Hardware	N.A	N.A	0.5	0.5	0.6	0.5	0.5	0.3*	-9.7
Domestic revenue (excluding hardware)	2.6	3.0	3.8	4.8	6.7	8.2	11.7	12.4	22.2
IT services	2.1	2.4	3.1	3.5	4.5	5.5	7.9	8.3	19.5
ITeS – BPO	0.1	0.2	0.3	0.6	0.9	1.1	1.6	1.9	44.5
Software products & Engineering services	0.4	0.4	0.4	0.7	1.3	1.6	2.2	2.2	23.7
Hardware	N.A	N.A	4.4	5.2	6.5	8.0	11.5	11.8*	21.8
Total (excluding hardware)	10.2	12.5	16.7	22.5	30.3	39.3	52.0	58.7	26.9
Export density (%)	74.5	76.0	77.25	78.67	77.89	79.13	77.69	78.90	-

Source: Department of Information Technology and CRISIL research reports

*Estimated

Exports continue to dominate the revenues earned by the Indian IT industry. The export intensity (ratio of export revenues to total revenues) of the industry has grown from 74.50 per cent in 2001-02 to 78.90 per cent in 2008-09. Total IT exports is estimated to have increased from USD 7.60 billion to USD 46.30 billion in 2008-09, a CAGR of 28.60 per cent. Analysis of segment wise export revenue trends shows that the software product is the fastest growing segment with CAGR 48.5 per cent. The share of exports from ITes -BPO segment has nearly doubled during the study period. But the rate of growth in revenues from Hardware segment is abnormally low in global market.

Though the IT-BPO sector is export driven, the domestic market is also significant. The revenue from the domestic Software and Services market is estimated to have grown USD 2.6 billion in 2001-02 to USD 12.4 billion in 2008-09 a CAGR of about 22.2 per cent. ITes-BPO segment in the domestic market has witnessed noticeable growth over the past few years. Modest growth in hardware demand could be seen in domestic market which is mainly driven by consumer Note book purchases. NASSCOM said that the domestic IT-BPO revenues excluding hardware are expected to grow at 16 per cent to reach USD 17.35 billion in the FY 2011.

4.8.2: Export destinations of Indian IT industry

US and UK continues to be the major markets for the IT software and services exports (Table 4.6). However the share of USA has declined from 68.30 per cent in 2004-05 to 60 per cent in 2007-08, whereas that of

Europe has increased from 23.1 per cent to 31 per cent over the same period. Markets across Continental Europe and the Asia Pacific are also witnessing significant year on year growth. This trend towards a broader geographic market exposure is positive for the industry, not only as de-risking measure but also as a means of accelerating growth by tapping new markets. The economic downturn in these markets might be a serious concern for the future growth of this industry.

Table 4.6
Major export destinations of Indian IT industry

Market	2004-05 (per cent)	2005-06 (per cent)	2006-07 (per cent)	2007-08 (per cent)
Americas	68.30	67.18	61.40	60.00
Europe	23.10	25.13	30.10	31.00
Rest of the world (incl. APAC)	8.60	7.69	8.50	9.00

Source: Department of Information Technology, Govt. of India

4.8.3: Number of IT companies in India

National Association of Software and Services Companies (NASSCOM) is the premier trade body and the chamber of commerce of the IT-BPO industries in India. So almost all relatively well performing IT companies in India has already become the members of this trade body. The distribution of number of member companies in NASSCOM over the last 10 years reported in Table 4.7 shall give better approximation for the breadth of

the Indian IT industry as well as intensity of the competition among the firms there.

Table 4.7
Number of IT companies having membership in NASSCOM

Year	No. of IT companies
2000-01	686
2003-04	840
Dec- 2006	1138
Dec- 2008	1246
Dec-2010	1250

Source: NASSCOM Annual report 2011.

Size of the member ship in NASSCOM has almost doubled during the period. Such a dazzling growth in the number of IT companies in India reflects the optimism of the entrepreneurs in the growth potential of IT – BPO sector in the country. But the increased number of firms in the sector could intensify the competition among firms in the industry which might be become a barrier for the individual growth of most of the firms.

4.8.4: SWOT analysis of Indian IT industry

Business Monitor International Ltd. a leading business research team has made a SWOT analysis of India IT industry.

Strengths	<ul style="list-style-type: none"> • Abundant availability of skilled and technically qualified manpower with English-language proficiency
	<ul style="list-style-type: none"> • A major global centre for outsourcing, including business process outsourcing (BPO)
	<ul style="list-style-type: none"> • Domestic IT project sizes increasing
Weaknesses	<ul style="list-style-type: none"> • Weak IT patent protection and high piracy rates
	<ul style="list-style-type: none"> • Ministry of Communications and Information Technology often slow to bring forward regulations and guidelines for IT sector
	<ul style="list-style-type: none"> • Low incomes and regional disparities
	<ul style="list-style-type: none"> • Multinationals dominate; still no global Indian IT software or hardware brands
	<ul style="list-style-type: none"> • Red tape and rigid labour laws
Opportunities	<ul style="list-style-type: none"> • Hardware sector growth set to accelerate after a number of government measures to encourage domestic manufacturing and new investment incentives under consideration
	<ul style="list-style-type: none"> • Government creating framework to meet ambitious targets for IT investment in regions such as Chennai
	<ul style="list-style-type: none"> • Recovery in demand for research and development services
Threats	<ul style="list-style-type: none"> • Global economic slowdown and rising costs will impact on consumer and business sentiment
	<ul style="list-style-type: none"> • The financial crisis will hit key financial sector outsourcing clients
	<ul style="list-style-type: none"> • Competition from China and other Asian countries for global BPO market share
	<ul style="list-style-type: none"> • Moves to stimulate the hardware sector are having mixed results

4.9: Industry structure and profit potential of Indian Information Technology Industry – Michael Porter model

The maturation of an industry involves regular changes in the firm's competitive environment. As a final part in Industry analysis, the study examines the relationship among the Indian Information Technology industry structure, competitive strategy and profitability. For this purpose the study has used a model developed by Michael Porter (1985) for analyzing the competitive conditions prevailing in an industry and its relation with the industry's profitability.

A brief explanation of the working of the model explaining the competitive forces mentioned by Porter in the Indian Information Technology context by affecting its profitability and growth potential has been made in the following discussions.

1. Entry and exit barriers

In India both Central and State Governments are more supportive rather than restrictive by creating conducive environment for the development of Information Technology sector in the country. Government of India has been taking a lot of pro active measures for encouraging the new investment to the industry (making the entry of new firms to the industry more easy) through creating Special Economic Zones and by providing fiscal and non fiscal incentives. Income tax holiday for profits from IT exports (Sec 10A of Income Tax Act 1961), procurement of capital goods and other inputs at zero rate of excise duty, manufacture of IT software products at zero rate of excise duty etc... are some of such measures. Since major portion of this sector constituted by services, the production of which requires least amount of capital investments facilitates

free entry and easy exist by the firms from the industry. India is the hub of cheap and skilled software professionals, which are available in abundance which helps the Information Technology companies to develop cost-effective business solutions for their clients. This attracts new entrants to the sector which makes it more competitive in structure. Moreover the products offered by different firms in this sector are virtually identical; the rooms for product differentiation are very limited. Such a competitive environment of the industry makes the profitability of the sector often nominal or low.

2. Competitions

The Indian IT services market is highly competitive. Competitors include global consulting firms, sub divisions of large multinational Technology firms, IT outsourcing firms, Indian IT service firms, software firms and in house IT departments of large corporations. The increased acceptance of the global delivery model has driven MNC service providers to expand their base within India and encourage in predatory pricing. In order to counter this menace Indian firm has to invest more in Research and Development (R&D) and selling and marketing which again reduces their profitability. Increasing competition from China and other Asian countries for global Business Process Outsourcing market share is also a big threat to this counterpart of Indian IT industry (Business Monitor). Stiff competition, rapid technological changes and high rate of piracy demand frequent product introductions and enhancements which in turn pressure the firms in the industry to invest heavily in the Research and Development and marketing of new products, services and technologies, while keeping a constant check on piracy. As most of the products and services are standardized in form the customers of the industry can freely switch from

one product to another and there is a greater struggle to capture customers among the market players which intensifies the severity of rivalry. All these actions most of the cases reach price wars among firms which negatively affects their operating margins.

3. Buyers and markets

Corporate buyers, who account for a substantial portion of the market, are highly price sensitive and enjoy bargaining power. It is fairly easy to switch from one brand of computers to another as most of the computers use Intel microprocessors and Microsoft window operating systems. Until 2008, IT services players mostly faced margin pressure on the grounds of wage inflation and retention/attrition costs. However later environment has brought forth a whole set of challenges, putting margins under pressure because of dwindling of dollar revenue growth led by decline in billing rate and stronger rupee. Exports account for nearly 64 per cent of the Indian IT industry (NASSCOM). Nearly 80 per cent of this revenue derived from US and UK. US alone constitute more than 60 per cent of India's IT exports. BFSI sector (Banking, Financial Services and Insurance) is the key vertical for the Indian IT services industry which accounts for two – fifth of the Indian IT exports (CRISIL). Owing to the overwhelming dependence on these two regions for their overseas business operations the downturn in these two economies especially, in times of the global meltdown has terribly affected the earnings of Indian IT industry. The brunt of slowdown in BFSI sector makes its profit margins under more pressure. The prevalent political climate in these countries and changes in government policies there with regard to the IT sector (For eg: debate over outsourcing in US) may impact player margins. More over the heavy

dependence on exports makes the industry vulnerable to the fluctuations of Indian rupee against the major currencies of the world such as US Dollar, British Pound, Euro etc.. The appreciation of Indian rupee against these prime currencies during the past few years has been put the margins of IT players at risk.

4. Suppliers

Since major inputs of the product supplied by Information Technology firms constitute Processors, Operating Systems and Personnel (IT programmer or Professional) the bargaining power of suppliers in the IT industry is very high. A major cost component in the IT industry is employee related costs. These costs are also subject to a great deal of inflationary uncertainty. Also, as competition within the industry intensifies, the need for skilled man power gains dominance, firms also increasingly poach on each other's employees by offering better Pay packages. This results in a rise in employee costs, which in turn affects their margins. The suppliers of the other inputs to IT industry also exert big influence on the profit margins of its players. This is because the US computer giants 'Intel' dominate the microprocessor production and 'Microsoft' controls the operating systems market in the Industry. So whatever be the product manufactured by the firms in this industry they have to heavily depend on these multinationals to get their supplies. If they want to switch their suppliers (like AMD for processors, LINUX for OS etc.) due to the inherent nature of their products it is more expensive for them.

Thus from the above discussions it is rational to say that the presence of these competitive forces in the Information Technology sector of India has been considerably affected the performance of its member firms and

most often they force to operate at a margin which is much less than that of firms from other Industrial sectors of the economy. Even though there has been no substitutes for almost all of the products or services offered by the industry, the prevalence of other forces at aggravate level constrains the ability of firms in the industry to raise prices. More over high degree of exposure to the external markets, the economic crisis in the developed world and currency fluctuations is expected to have negative impact on the revenue growth of Information Technology Industry of India in the near future.

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