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Use of Five point Du Pont model and Regression tools to study Information Technology Sector of India

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Abstract

This paper specifically concentrates on 5-point Du Pont analysis of the Indian IT software industry. Step by step development of 5-point model from the initial 2-point model is discussed. Trend of the industry over the past eight years is analysed and the effect of recession is studied using the time series analysis. Cross sectional analysis has been performed to discuss the significant focus points of different companies and these have been benchmarked with industry standards. Also, regression analysis has been performed to comprehend the relative impact of the five ratios on return on equity. Finally, using regression analysis, Indian IT industry is compared with IT industry of the USA and the differentiating factors are examined.

Keywords: DuPont, Regression, IT, Recession, Financial Ratio

Introduction

Acceptance of a decision to an organisation's financial management depends on the answer to question "Will this decision increase the value of the owner's equity?" Fundamentally, every decision that affects productivity, product costs, tax limits, etc. directly impacts the overall profit generated for investors. Likewise, any decision which impacts the type or amount of debt and equity used affects the financial structure.

The financial statements, namely, Balance Sheet and Statement of Profit and Loss, of an organisation accommodate significant and extremely important information about its financial health. For any firm, there are numerous models to determine how well IT is operating. Among these the DuPont model has become one of the significant tools of financial analysis for assessment of the profitability. IT can thus be applied to industries as well, to comprehensively analyze the important factors and examine its overall growth pattern.

In this paper we have used the 5-point Du Pont model comprising following ratios – profit margin, capital turnover, finance structure ratio, financial cost ratio, and tax effect ratio to analyze the Indian IT industry as this sector is proved to be very crucial in the growth and development of India. The Indian software industry has been a story of exceptional success. IT has helped wipe out the image of India as a poverty stricken backward nation to the one with highly intelligent techno-savvy brains, carving out a niche for India in the software world.

A time series analysis has been carried out to identify how the various Du Pont ratios have supplemented the trend of change in the overall return on equity over the years. In the study apart from the internal factors such as financial structure, sales, etc., the effect of environment over the years has also been discussed. The period of recession has been critically examined and its impact on the Indian IT companies brought out.

Regression tools have also been employed to compute the weighted dependence of ROE on its constituent components and the physical analogies are drawn. The same has been compared with that of the USA to highlight the distinguishing attributes.

Literature Review

The DuPont Model is an important financial analysis tool in imparting an overview as well as focus points for an

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industry or organisation. IT helps to identify the significant areas of strength and weakness evident in the financial statements. Hence, IT can be used as a compass in the process by directing the organisation toward important areas.

The Du Pont model was created by F. Donaldson Brown who brought about the model while he was allocated to clear up the finances in General Motors. The elegance of return on asset (ROA) being impacted by an efficiency measure and a profitability measure led to the DuPont model becoming a widely-used tool of financial analysis (Liesz, 2002). In 1970s, attention in financial analysis shifted to return on equity (ROE) from return on asset (ROA), and the DuPont model was enhanced to incorporate the ratio of total assets to equity. Later, further modification and addition of two more factors let to development of five-step DuPont model.

Progress of the DuPont model parallels the advancements in the financial analysis itself. Over the years, three distinct versions of DuPont model have been developed and utilised to help explain the fundamental drivers of profitability and return.

Two-step Du Pont Model

The actual DuPont model of financial ratio analysis was created in1918 by an engineer named Brown at DuPont who was allocated with analysing the finances of a firm that DuPont was acquiring. Brown identified that a mathematical relationship prevailed between two frequently calculated ratios, namely net asset turnover (an efficiency measure) and net profit margin (a profitability measure), and return on asset(ROA). The product of the net asset turnover and the net profit margin is equal to ROA, as shown in Equation 1 below.

Eq. 1: (net income / sales) x (sales / total assets) = (net income / total assets) i.e. ROA

At this phase of time, the usual corporate aim was to maximize ROA and the understanding that ROA was affected by both efficiency and profitability led to the development of a system of control and planning for all operating decisions within a business organisation. Until 1970s, this was the commanding form of financial analysis (Blumenthal, 1998).

Three-step Du Pont Model

In 1970s the normally assumed aim of financial management became "boosting the invested value of the firm's owners" (Gitman, 1998) and the attention shifted from return on asset ROA to return on equity ROE. This led to the first significant moderation of the original Du Pont model. The method that company uses to finance its operations, i.e. its use of leverage or debt became a third subject of recognition for financial analysts in addition to profitability and efficiency. The new ratio is known as the leverage multiplier, which is computed by the equation (total assets/equity). The three-step DuPont model is illustrated in Equations 2 and 3 below.

Eq. 2: ROA x (total assets / equity) = ROE

Eq. 3: (net income / sales) x (sales / total assets) x (total assets / equity) = ROE

The three-step DuPont model (also called the "Du Pont identity") was a significant tool to demonstrate the interconnectedness of a company's balance sheet and its income statement, and to evolve straightforward policies for raising the company's ROE. The three-step DuPont model gives an outstanding method to get a fast snapshot view of the all-round performance of a company in three critical areas of ratio analysis (Isberg, 1998). However, even the modified DuPont model had its critics. The DuPont model does not sufficiently differentiate between "unfavourable" debt and "favourable" debt, on the basis of preferred stock in a company's financial structure (Boyd, 1989).

Five-step DuPont Model

Recently yet another modification was offered by Hawawini and Viallet (1999) to the DuPont model. This modification resulted in disintegration of ROE in five different ratios. In this moderation they acknowledge, that the statements of finance prepared by firms for their annual reports (that are significant to tax collectors and creditors) may not be at all times of prime importance to managers taking financial and operating decisions (Brigham and Houston). Hence, on this basis Hawawini and Viallet redefined the conventional balance sheet into a "managerial balance sheet" that is "a more suitable tool for analyzing the impact of operating decisions to the company's financial performance" (Hawawini & Viallet,

2000, p. 68).

This redefined managerial balance sheet takes into account the notion of "invested capital" instead of total assets, and the notion of "capital employed" instead of total liabilities and owner's equity present in the conventional balance sheet. The basic difference is in the consideration of the short-term "working capital" balances. As a part of invested capital, this managerial balance sheet takes into account a net value called "working capital requirement" (calculated as: [inventories + accounts receivable + prepaid expenses] – [accrued expenses + accounts payable]).

The 5-step DuPont model is illustrated below in Equation 4.

Eq. 4: (EBIT / sales) x (sales / invested capital) x (EBT / EBIT) x (invested capital / equity) x (EAT / EBT) = ROE

where invested capital = net fixed assets + working capital requirement + cash

The decisions that incorporate the management of firm's operating liabilities (accruals and accounts payable) and operating assets (mostly accounts receivable and inventories) and the disposal and procurement of fixed assets are referred as company's operating decisions. These are reflected in the first two ratios-

1. Operating profit margin: (Earnings before Interest Taxes or EBIT / sales)
2. Capital turnover: (sales / invested capital)

The decisions that regulate the mix of equity and debt utilised to fund the company's operating decisions are referred as firm's financing decisions. These are reflected in the third and fourth ratios of the five-step DuPont model. These are:

3. Financial cost ratio: (Earnings before Taxes or EBT / EBIT)
4. Financial structure ratio: (invested capital / equity)

The last factor of a company's ROE takes into consideration the effect of business taxation. The return on equity ROE is inversely proportional to the tax rate on company's earnings before taxes (EBT). This is reflected in the fifth ratio of the five-step DuPont model.

5. Tax effect ratio: (Earnings After Taxes or EAT / EBT)

Analysis of Information Technology Industry

Overview

The Indian IT industry was born in 1974 when a group of Mumbai based conglomerates supplied programmers to the overseas IT firms for the first time. This opened the doors for a potential global market opportunity for India as well as the world. Advances in technology and communication, coupled with very low operating costs encouraged many western software companies to outsource their products to India. In the 1990s, the government relaxed the restrictions and liberalised the economy leading to a further growth.

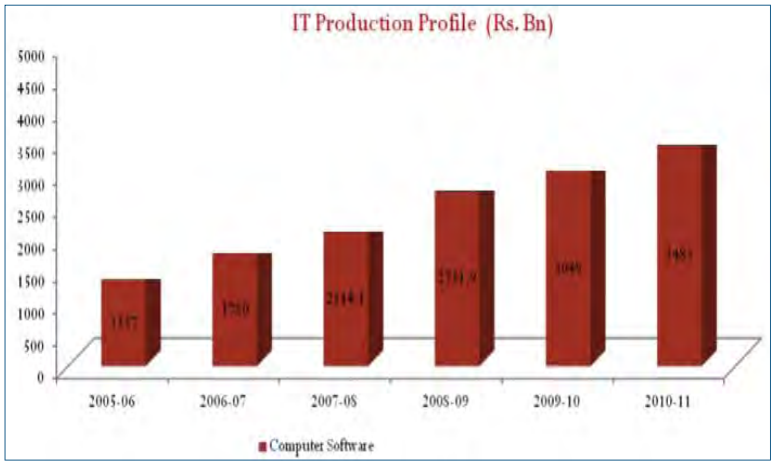
In 2007- 2008, the world witnessed one of the worst economic crises in its history. Large financial institutions crumbled, economies shrunk drastically and stock markets crashed across the globe. India was also hard hit by the economic slump with the software companies clocking a very low growth rate. The rising inflation and sense of insecurity caused demands to dip dramatically with about 40% of the Western companies cutting down their IT expenses.

However, the industry was able to cope with the slowdown by introducing methods of cost saving, thereby recording a good growth and helping India in surviving the blow. In 2005, the software exports contributed 15-20% of the total exports from India. During 2004-2009, the major market for the IT products and services was primarily the USA, accounting for about 60% of the total exports. The industry recorded a turnover of $60 billion in 2009 with a 78% contribution from exports and a CAGR of over 30%.

Today, the software industry contributes to 8% of the GDP and has its base in the Silicon Valley of India, Bangalore. IT ranks fourth in India's total FDI share and accounts for approximately 37% of total private equity and venture investments in the country. The industry stepped up with a 13.1% CAGR in the financial years 2008-2013 despite the global economic constraints.

The bar graph shown in Fig. 1 depicts the growth of the software industry over the years.

Fig. 1: Growth of Software Industry Over the Years



Source: Department of IT, Ministy of Communication and IT

Industry Structure

India's IT industry can be divided into five main components, viz. software products, IT services, engineering and R&D services, ITES/BPO (IT-enabled services/Business Process Outsourcing) and hardware.

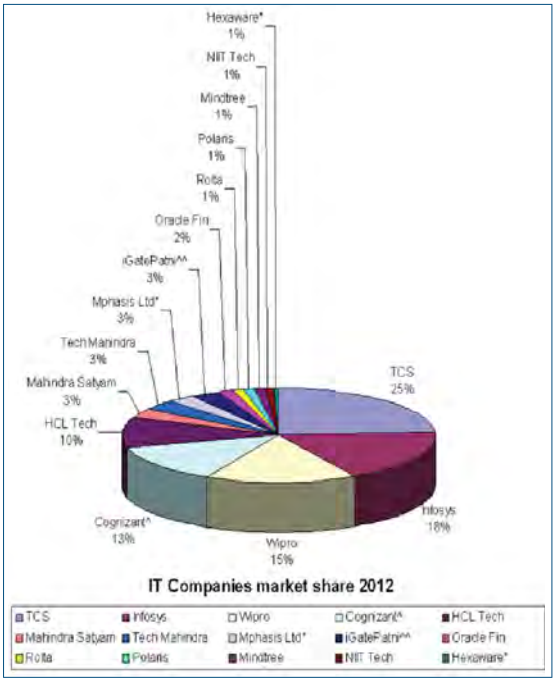
The IT sector is highly competitive sector, as more and more MNCs and startups try to invest in the technology hubs of India and replicate of the models of offshoring. Most of the industries are clustered at Bangalore, Pune, Delhi, and Chennai. However, the major chunk of the industry (81%) is captured by the five major players, namely TCS, Infosys, Wipro, Cognizant, and HCL technologies, thus making IT an oligopoly.

Table 1 shows the contribution of exports in the incomes of the companies. IT can thus be inferred that exports

Table 1: Contribution of Exports in the Income of Companies

Company	Export	Domestic
Tata Consultancy Services (TCS)	93	7
Wipro Technologies	76	24
Infosys Technologies	99	1
HP India	18	82
IBM	58	42
Cognizant Technology Solutions	100	
Ingram Micro		100
HCL Technologies	93	7
HCL Infosystems		100
Redington India		100
Cisco India	92	8
Oracle India		
Intel India	90	10
Accenture	93	7
SAP India	79	21
Dell India		100
Tech Mahindra	98	2
Microsoft India	90	10
MphasiS	100	
Patni Computer Systems	99	1

Fig. 2: IT Companies Market Share



continue to be major part of the revenue. During the financial year 2013, exports accounted for 68% of the industry's revenue.

Data

- We have used the following sources for data collection-
- capitaline.com for collecting balance sheet and income statement for Indian companies
- finance.yahoo.com for collecting balance sheet and income statement of US companies
- google.com for other data collection like market share, tax rate, interest rate, etc.

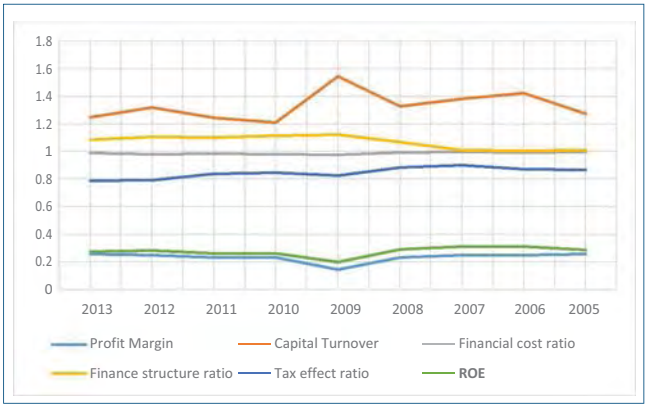
For each company the five ratios considered in DuPont model were calculated using the data taken from balance sheets and income statements.

The companies used in this study constitute a market share of more than 90 percent. The regression analysis have been performed using the regression tool in Excel.

Time Series Analysis (2005-2013)

In Fig. 3, the complete sector comprising large, medium and small software companies has been covered.

Fig. 3: Analysis of Large, Medium and Small Software Companies



In all the five ratios, there has been a significant change in the years 2008-2010, for instance the ROE, profit margin showing a sharp dip. The capital turnover ratio also reached a peak at the same time along with an increase in the finance structure ratio curve. The major reason for these changes can be explained by the economic slump that the world witnessed in the years 2008-2010.

ROE and Profit Margin

2010-2013 - Impact of the Western Economic Crisis And Falling Rupee

The ongoing global economic slowdown has impacted the Indian IT software sector in many ways. The Indian IT software industry has witnessed an overall gain since corporate in the Western countries are focusing on cutting costs and hence the outsourcing has been increased by them. This has caused more business opportunities to come in the hands of the Indian IT software sector. An advantage has been the fact that the depreciating rupee versus the dollar has caused the Indian outsourcing businesses to reap the effect in terms of appreciated rupee revenues. This has also made the competition among these companies fierce since their services cost less in dollar terms.

This can be observed from the graph given below, as the ROE and profit margin curves have been showing a steady rise from 2010-2013. Thus, both these components have a close positive correlation.

2008-2010 - Impact of the recession on the Indian IT sector

Lag phase: The severe economic depression that resulted from the subprime mortgage crisis of 2007, engulfed the entire world economy. The western world thus experienced a profound economic crunch, low growth and squeezed budgets during the years 2008-2010. India being one of the fastest growing tech markets and a major exporter of IT goods and services, was also hit hard by the global economic crisis of this period.

- About 43% of the Westerners, including USA, cut down their IT spends which lead to a drastic decline in the overall profit of the Indian software companies.
- The slowing US economy witnessed 70% of the firms negotiating at lower rates with suppliers and nearly 60% cutting back on contractors. With budgets squeezed, just

over 40% of companies planned to increase their use of offshore vendors, thereby adversely affecting the income of the Indian IT sector.

This can be reflected from the sudden dip in the curve of ROE and profit margin during the financial year 2009.

Growth phase: Despite the slowdown the industry displayed resilience in countering the negative effects. The IT services and outsourcing markets underwent a structural transformation, wherein more work was moved to lower cost offsite locations, which increased the cost savings of the industry. This led to a dramatic increase

Fig. 4: Profit Margin and ROE of IT Industry

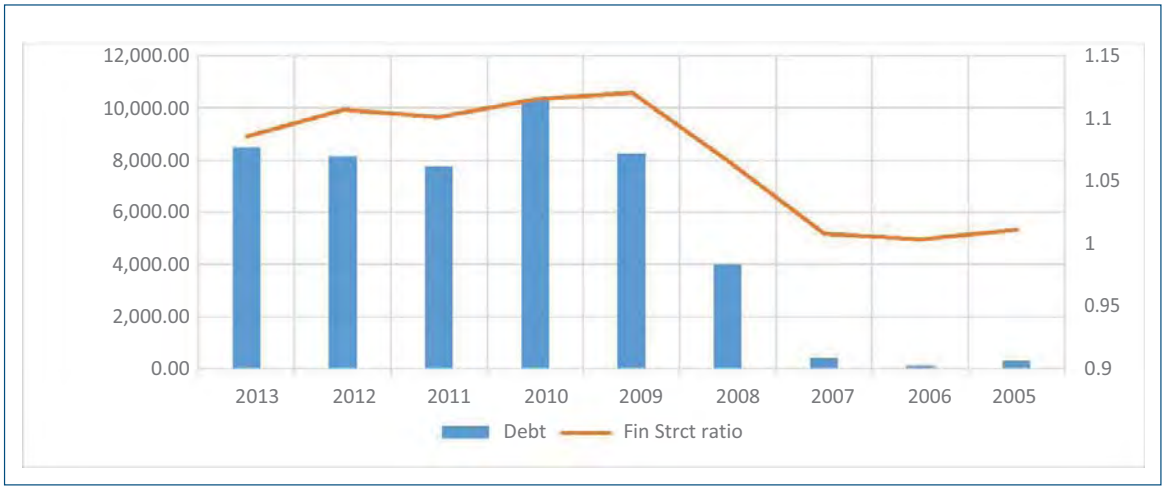
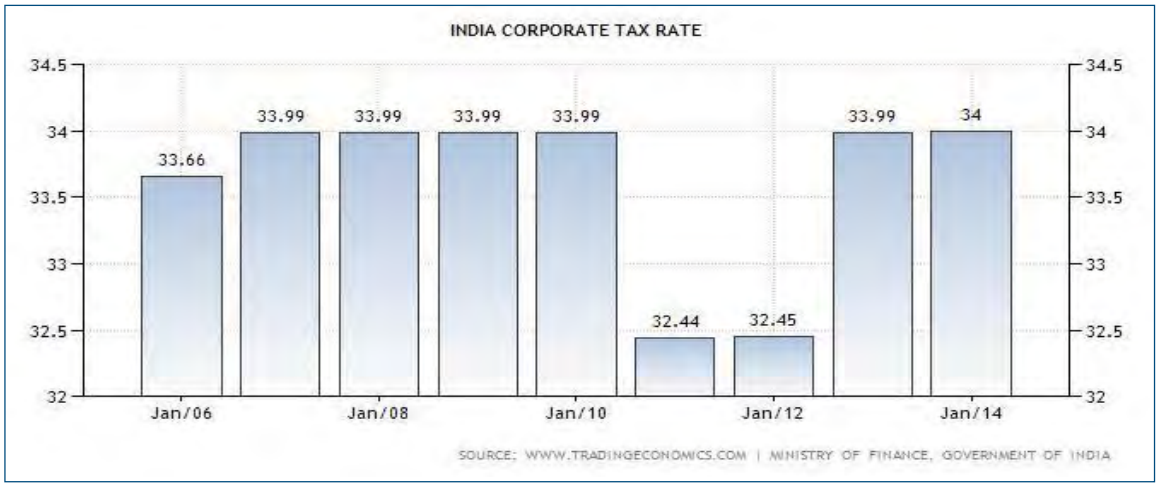


Fig. 5: Financial Structure Ratio Over the Years



in the ROE and profit margin from 2009-2010, as can be seen from the curve in Fig. 4.

Financial Structure Ratio

The financial structure ratio also saw a sharp increase in the years 2007-2009. This can be explained by the fact that due to the economic depression, the companies increased their debt significantly from Rs 400 crores in 2007 to Rs 8273 crores in 2009. From 2010 onwards, there has been a decline in the trend of borrowings, thereby reducing the financial structure ratio.

Financial Cost Ratio

Tax Effect Ratio

This ratio shows almost a similar trend as ROE as the tax rates have been fairly constant over the years. However, during 2010-2013, IT has shown an increase due to the lowering of corporate tax rates by the Indian government, as indicated in Fig. 6.

Fig. 6: Tax Effect Ratio Over the Years

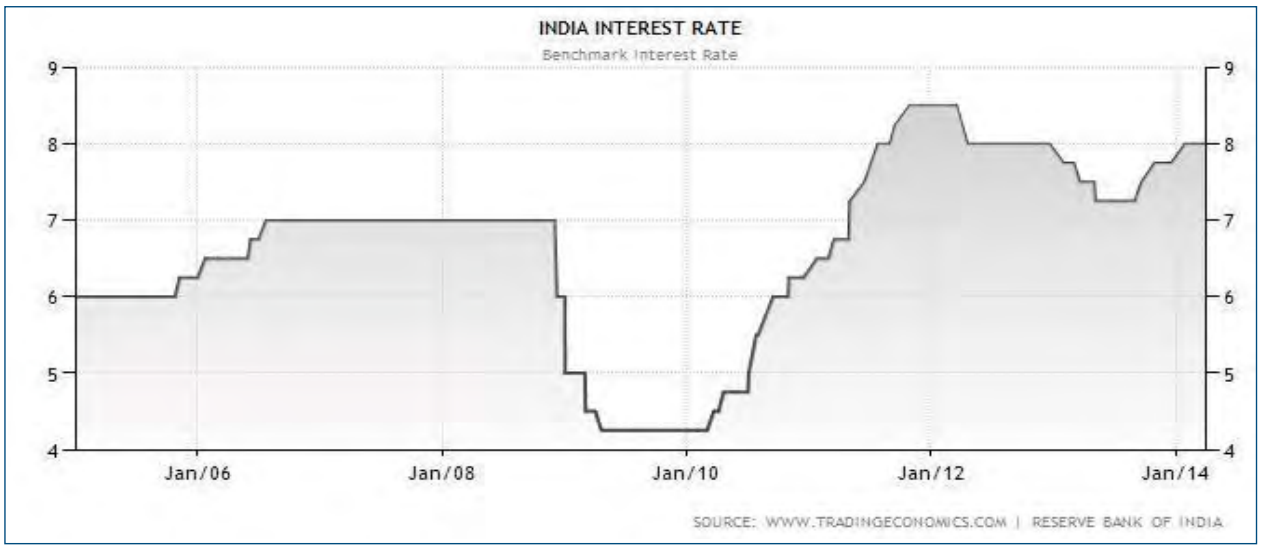
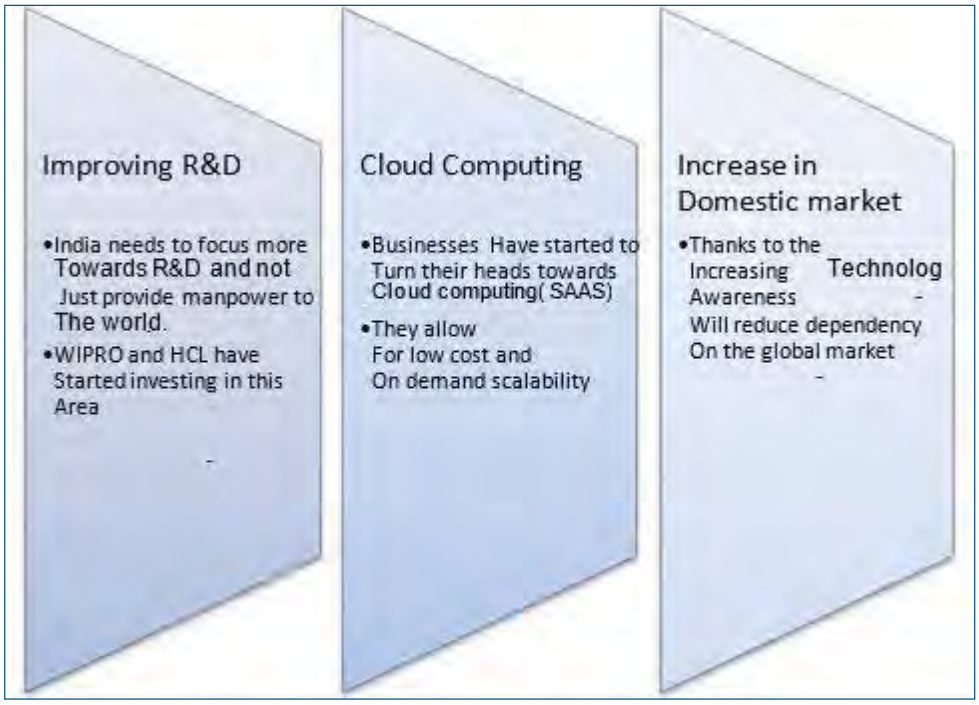


Fig. 7: Legend for Cross Sectional Analysis Results



Cross-sectional Analysis of the Indian IT sector

The various ratios of the companies are compared with the industry reference. On the basis of comparisons, analysis have been made to show what are the strong points of a particular company and other are the areas that is can work upon.

The legend used for all the five parts is specified as shown in Fig. 7.

Profit Margin Analysis

The profit margin of the following companies is significantly lower than the industry average-Capgemini, HP, IBM, Polaris, and Tech Mahindra. These companies need to focus on improving the profit incurred on the sales.

Table 2: Cross Sectional Analysis (Profit margin)

Profit Margin									
Company	2013	2012	2011	2010	2009	2008	2007	2006	2005
IT Industry	0.259307	0.247892	0.232013	0.234253	0.143599	0.233357	0.249146	0.250461	0.257826
Capgemini					0.136575	NA	NA	NA	NA
Cognizant	0.291472		0.249279	0.224975	0.407705	0.26689	0.305816	0.350605	
HCL Techno	0.35596	0.267692		0.240443	0.242604		0.282949		
HP					0.178704				
IBM						NA	NA	NA	NA
Igate	0.25814	0.341694	0.326214	0.254454	0.329632	0.301048	0.27233	0.356269	0.348609
Infosys	0.29857	0.316412	0.34687	0.332504	0.340254	0.317692	0.313392	0.306948	0.295732
Mphasis			0.256256	0.281782	0.254007				
Oracle	0.445501	0.475765	0.413706	0.323417	0.307569	0.234321		0.240684	0.265159
Polaris									
TCS	0.310598	0.328095	0.292934	0.274752	0.22679	0.263824	0.275451	0.272514	0.260557
Tech Mahindra				0.226069	0.249066				
Wipro				0.242204	0.169895				

Table 3: Cross Sectional Analysis (Capital Turnover)

Capital Turnover									
Company	2013	2012	2011	2010	2009	2008	2007	2006	2005
IT Industry	1.249876	1.31986	1.24297	1.21169	1.54443	1.32819	1.38061	1.42383	1.27304
Capgemini	2.0124168	2.19292	2.19106	1.56004	2.55739	NA	NA	NA	NA
Cognizant	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.45725	[illegible]	[illegible]
HCL Techno	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.47702	[illegible]	[illegible]	[illegible]
HP	3.4606543	2.73663	2.34298	[illegible]	[illegible]	1.57177	1.63787	1.46584	1.33096
IBM	2.7615457	2.97507	3.57975	3.31716	2.85556	NA	NA	NA	NA
Igate	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Infosys	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.34189
Mphasis	[illegible]	[illegible]	[illegible]	1.33413	1.61029	[illegible]	1.74229	[illegible]	[illegible]
Oracle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Polaris	1.5699907	1.57218	1.54942	1.488	1.73093	1.59299	1.5918	[illegible]	1.29422
TCS	1.523249	1.61138	1.50147	1.53248	1.68273	1.7218	1.86859	2.00146	2.36689
Tech Mahindra	[illegible]	[illegible]	[illegible]	[illegible]	2.33301	2.79757	2.99256	2.05475	1.92552
Wipro	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.47018	1.60785	1.48066

Oracle, TCS, and Infosys have outperformed the others owing to their vast export market. For example- Oracle, Infosys, and TCS generated 96 percent, 94 percent and 91 percent respectively of the revenue through exports.

Capital Turnover Analysis

Capgemini, HP, IBM, Polaris, and TCS have performed better than the industry average in terms on capital turnover ratio. Better utilisation of the capital employed has allowed them to outperform other companies. Table 3 also shows the effect of recessionon Tech Mahindra and Wipro. The companies have not been able to recover from the dipping of sales and increase in capital invested during the time of initial recession. HCL, Cognizant, Infosys and Oracle enjoy a major market share i.e. have high amount of sales but need to work on reducing the capital employed.

Financial Cost Ratio

HP, Cognizant, Infosys, Oracle, and TCS have marginal or no interest payments owing to leverage free capital. Tech Mahindra and Wipro need to significantly work upon in reducing their debts as they are paying our 12% and 5% respectively of their operating income as interest, which is pretty high than the industry average i.e. 1.2%.

Table 4: Cross Sectional Analysis (Financial Cost Ratio)

Financial Cost Ratio									
Company	2013	2012	2011	2010	2009	2008	2007	2006	2005
IT Industry	0.9876409	0.979865	0.986631	0.981301	0.974888	0.991676	0.995691	0.994921	0.996656
Capgemini	[illegible]	[illegible]	1	0.999975	0.999702	NA	NA	NA	NA
Cognizant	1	1	1	1	1	1	1	1	1
HCL Techno	0.9834545	[illegible]	[illegible]	[illegible]	0.976971	[illegible]	[illegible]	[illegible]	[illegible]
HP	1	1	1	1	1	1	0.998754	0.998104	0.994125
IBM	0.9862465	0.985679	[illegible]	[illegible]	[illegible]	NA	NA	NA	NA
Igate	0.9950596	0.993971	0.988548	[illegible]	[illegible]	[illegible]	[illegible]	0.999415	0.999326
Infosys	0.9995717	0.999757	0.999829	0.999887	0.999734	0.999702	0.999805	0.999759	0.999635
Mphasis	[illegible]	0.984396	0.99756	0.998501	0.989636	0.996402	0.997288	[illegible]	[illegible]
Oracle	0.9999003	0.999879	0.999797	0.999692	1	1	1	1	1
Polaris	0.9882142	0.992487	0.99643	0.996879	0.995661	0.990724	0.993963	[illegible]	[illegible]
TCS	0.9980539	0.998775	0.997705	0.998505	0.998555	0.999317	0.999178	0.998542	0.9951
Tech Mahindra	[illegible]	[illegible]	[illegible]	[illegible]	0.997713	[illegible]	[illegible]	1	1
Wipro	[illegible]	[illegible]	[illegible]	0.982759	[illegible]	[illegible]	0.997738	0.998064	0.996838

Table 5: Cross Sectional Analysis (Financial Ratio)

Financial Structure Ratio									
Company	2013	2012	2011	2010	2009	2008	2007	2006	2005
IT Industry	1.0858516	1.107453591	1.101716915	1.115982432	1.121024406	1.066509784	1.008211319	1.003819233	1.011427047
Capgemini	1.1121057	1.149437141	1	1	1.003450331	NA	NA	NA	NA
Cognizant	1.0739717	1.09909624	1.000255724	1	1	1	1	1	1
HCL Techno	1.1200929	1.235012669	1.208721402	1.283109732	1.147274843	1.00787311	1.011938616	1.005194362	1.033807929
HP	1.0641841	1	1	1.000036656	1	1	1.000036986	1.005448168	1.008896213
IBM	1.0930521	1.115450357	1.115024654	1.4440995	1.996192538	NA	NA	NA	NA
Igate	1.0003549	1.000210267	1.000293407	1.000694114	1.000910345	1.00138138	1.001557236	1.002110196	1.00290413
Infosys	1.0006477	1.001327875	1.000705716	1.001020167	1	1	1	1	1
Mphasis	1.0083971	1.078185741	1.078466527	1.003295679	1.062480062	1.017922487	1.004053623	1.001579779	1.00255052
Oracle	1.0032895	1.00745111	1.00876487	1	1	1	1	1	1
Polaris	0.8199264	0.797181575	0.865158664	0.870153096	0.888922199	0.825473159	0.848055408	0.851960784	0.85467511
TCS	1.0212924	1.018588138	1.012625437	1.00228428	1.009052141	1.001658358	1.006296074	1.006328742	1.036355972
Tech Mahindra	1.4305011	1.501887779	1.517021277	1.744723899	1	1.077336373	1.055808656	1	1
Wipro	1.261487	1.229204394	1.247826005	1.312578424	1.400634444	1.32921357	1.025535385	1.007812537	1.012691009

Financial Structure Ratio

Most of the big market players like Infosys, TCS, Oracle, and HP have net capital invested to equity ratio less than the industry average. As discussed earlier, debt to equity ratio of Tech Mahindra and Wipro is comparatively has been comparatively large.

Tax Effect Ratio

The tax effect ratio is impacted by the tax policies of the government, which are constant for all companies. However, allowance of no tax on debt impacts the tax effect ratio as companies based on debt have to pay lesser tax. Tax management methods to decrease the tax burden are adopted, to one degree or another, by most of the companies.

Return on Equity

TCS having the highest market share also has very high return on equity. Other players like HCL, HP, Infosys, and Cognizant have return on equity more than industry benchmark and also significant market share. It can also be seen that post-recession, return on equity of Tech Mahindra and Wipro have tipped over the industrial benchmark which were higher during pre-recession period. The two companies have not been able to recover from the losses of lag phase of recession period.

Table 6: Cross Sectional Analysis (ROE)

Return on equity									
Company	2013	2012	2011	2010	2009	2008	2007	2006	2005
IT Industry	0.27364065	0.28093037	0.26265405	0.26341728	0.19981886	0.28954336	0.31051987	0.31028923	0.28668858
Capgemini	0.23815449	0.21987986	0.21237726	0.2145625	0.33328106	NA	NA	NA	NA
Cognizant	0.25350835	0.21131879	0.24312533	0.18937584	0.4061425	0.29973682	0.41803827	0.4008477	0.30625445
HCL Techno	0.36186893	0.25522281	0.29451411	0.21406189	0.28590636	0.24282777	0.32169739	0.24769083	0.31518018
HP	0.41951346	0.32693489	0.19583543	0.11470987	0.22129529	0.14855904	0.12010651	0.14026902	0.17986024
IBM	0.28455268	0.26255054	0.33432431	0.24898267	0.29895049	NA	NA	NA	NA
Igate	0.14782717	0.22275287	0.18840537	0.1543511	0.1514831	0.0933551	0.08520860	0.1717116	0.19601726
Infosys	0.24218379	0.2528079	0.28463891	0.26296886	0.2633418	0.3267449	0.33135656	0.33891776	0.35102218
Mphasis	0.14515639	0.16521508	0.22946639	0.34274005	0.41331404	0.2252103	0.22606211	0.13861703	0.14501879
Oracle	0.14114267	0.13415536	0.14798487	0.11817117	0.19824073	0.14667932	0.14757282	0.17670412	0.17504091
Polaris	0.15159862	0.1812044	0.2037341	0.16747	0.19071152	0.0875422	0.11996833	0.07504435	0.1009337
TCS	0.39267372	0.44157152	0.38662797	0.37167693	0.34925667	0.40970626	0.46622343	0.4843484	0.55145812
Tech Mahindra	0.15599158	0.11377091	0.20588001	0.25911327	0.52450824	0.26514165	0.37425568	0.36817984	0.1472305
Wipro	0.23159907	0.19238481	0.2771883	0.27684516	0.23762076	0.26383422	0.30493326	0.31469445	0.30553671

Table 7: Regression Data -IT Sector

Regression Data - IT Sector (2013)

Company	ROE	Profit Margin	Capital Turnover	Financial cost rati	Finance structure	Tax effect ratio
Ancient Techno Holding	0.063116557	0.137326268	0.936030011	0.986216285	1.081515696	0.450357174
Capgemini	0.135154488	0.125091868	2.012416806	0.964577889	1.112105651	0.72269357
Cognizant	0.253508348	0.291471681	0.966536607	1	1.073971726	0.837895634
Geometric Ltd	0.138896735	0.120781047	1.492110891	0.993954222	1	0.775399885
HCL Techno	0.361858928	0.355959658	1.132128798	0.983454514	1.120092911	0.815166544
Hexaware	0.375829939	0.389796095	1.162870549	0.998733406	1.019277081	0.814501378
HP	0.419513461	0.113912373	3.460654329	1	1.064184139	1
IBM	0.184558979	0.081379241	2.761545712	0.986246454	1.09	0.761803514
Igate	0.147827167	0.256139909	0.57936216	0.995059938	1.000354941	0.846826392
Infosys	0.242193798	0.298569815	1.105073498	0.999571673	1.008647724	0.728038852
KPIT	0.116144084	0.196386453	0.814569431	0.942385965	1.32685735	0.787389127
Mastek	0.078950809	0.075752303	1.043430895	0.995405819	1.080232224	0.928923077
Mindtree	0.257973662	0.17715287	1.782272457	0.997644842	1.023673584	0.800047214
Mphasis	0.145156387	0.213780555	0.91939882	0.981701192	1.008397121	0.746024503
NIIT	0.218612041	0.200692254	1.423617175	0.9867351	1.043925562	0.741311548
Oracle	0.141142624	0.445500619	0.459420166	0.999900326	1.00828952	0.684002755
Polaris	0.153598617	0.109059941	1.569980699	0.988214182	1.107131036	0.81892638
Syntel	0.265569158	0.334161453	0.946599963	1	1.040523217	0.806791489
TCS	0.392673725	0.310597668	1.523249031	0.998053671	1.021282448	0.814251636
Tech Mahindra	0.155995984	0.156804984	0.987164703	0.882314835	1.4305011	0.79845815
Wipro	0.233195072	0.218814406	1.131024826	0.953370824	1.26148703	0.784194529

Regression Data - IT Sector (2009)

Company	ROE	Profit Margin	Capital Turnover	Financial cost rati	Finance structure	Tax effect ratio
Ancient Techno	0.005231623	0.024290174	0.435223241	0.852564103	1.010473517	0.57443609
Capgemini	0.333281056	0.13657513	2.557395931	0.99970168	1.003450331	0.95121005
Cognizant	0.406142503	1.040606764	0.407704779	1	1	0.95729545
Geometric Ltd	0.229313286	0.130089374	1.764543907	0.975881134	1.064939219	0.960258986
HCL Techno	0.28590636	0.242603786	1.256358743	0.976971446	1.147274643	0.836880087
Hexaware	0.162750776	0.249548407	0.691902166	0.997997844	1	0.958333333
HP	0.221295287	0.178703776	1.329041933	1	1	0.931750742
IBM	0.298950487	0.063145841	2.855359697	0.813471503	1.996192539	1.021054494
Igate	0.151482103	0.329631699	0.524355905	0.984432193	1.000930345	0.889439739
Infosys	0.263341804	0.340254218	1.003222	0.999734113	1	0.771675532
KPIT	0.365792541	0.12008374	2.239562864	0.902576593	1.690384615	0.831492686
Mastek	0.27352016	0.158606606	1.708520308	0.998417888	1.000486131	1.010456463
Mindtree	0.056584207	0.049524743	1.523748376	0.644044321	1.26278377	0.921966206
Mphasis	0.413314039	0.254006697	1.61028964	0.989635539	1.062480862	0.961024793
NIIT	0.294950842	0.182302615	1.802273029	0.991807424	1.002899517	0.902509668
Oracle	0.198240735	0.307568891	0.678439742	1	1	0.950034139
Polaris	0.160211521	0.10547291	1.73092543	0.995661434	1.000516717	0.880922199
Syntel	0.241871863	0.276371696	1.040992681	1	1	0.84070532
TCS	0.349256673	0.226789774	1.682733586	0.998554534	1.003052141	0.91371464
Tech Mahindra	0.52450824	0.249065719	2.333014354	0.997712717	1	0.904722604
Wipro	0.237620756	0.169894698	1.257433481	0.947445723	1.400634444	0.838185969

Regression Analysis

Using multiple regression model, by taking the five ratios of DuPont model (profit margin, capital turnover, financial cost ratio, finance structure ratio, and tax effect ratio) as independent variables, we wish to analyse their relationship with one dependent variable (return on equity). The model used in this report is

$ROE = \alpha + \beta 1\ (PM) + \beta 2\ (CT) + \beta 3\ (FC) + \beta 4\ (FS) + \beta 5\ (TE) + \varepsilon$

where, β 1, β 2, β 3, β 4 & β 5 are standardised coefficients, α is constant and ε is estimate error.

The regression analysis have been computed using the data of 21 Indian IT software companies for the years 2013 and 2009 to illustrate the change in effect of the above mentioned variables during the period of recession. The data used for computation of the ratios has been taken from balance sheet and profit and loss statement available on the capitaline website.

Table 8: Regression Analysis– IT Sector

Regression Analysis - IT Sector (2013)		
Regression Statistics		
R Square	0.819887255	
Observations	21	
ANOVA		
	Significance F	
Regression	3.91607E-05	
	Coefficients	*t Stat*
Intercept	-0.653714975	-0.47895
Profit Margin	0.852837485	6.30735
Capital Turnover	0.11912004	5.59518
Financial cost ratio	0.177836994	0.15768
Finance structure ratio	0.151493167	0.55223
Tax effect ratio	0.233706622	1.88415

Regression Analysis - IT Sector (2009)		
Regression Statistics		
R Square	0.822619118	
Observations	21	
ANOVA		
	Significance F	
Regression	3.51E-05	
	Coefficients	*t Stat*
Intercept	-0.414312883	-1.658499406
Profit Margin	0.417933146	4.83491417
Capital Turnover	0.157590514	5.322510562
Financial cost ratio	0.495161644	2.53662445
Finance structure ra	0.026401455	0.376730422
Tax effect ratio	0.169705846	0.983366706

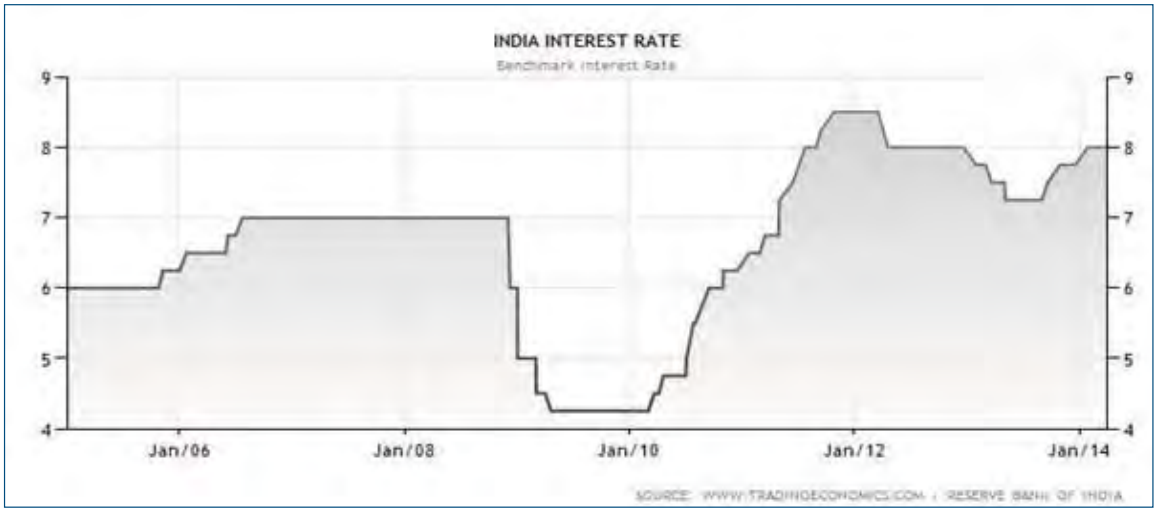
Results and Estimations

The value of R-square is 81% and 82% for the year 2013 and 2009 respectively. This shows that this model is accurate. The result shows that there is positive relationship between all variables taken into consideration. As described by the theory return on equity shows positive relationship between profit margin, capital turnover and tax effect ratio. Increase in sales, profit or decrease in tax percentage directly leads to increase in ROE.

Net Financial Leverage Factor

The net effect of finance structure ratio and finance cost ratioon ROE is a function of relative change of the two components. The net relative effect of using financial leverage is defined by net leverage multiplier, the product of two terms. As per the results of regression, there has been an increase in ROE owing to the fact that the relative reduction in income is less than the relative reduction in equity. As per the theoretical analysis, this happens when

Fig. 8: Interest Rates in India Over the Years



the interest rate on debt is less than the basic earning power. This holds true for the IT industry, hence these terms show a positive relationship with ROE.

Comparison of Years 2013 and 2009

Financial Cost Ratio Coefficient

IT had a significantly high contribution in 2009 which became normal during 2013. It can be explained as, for every 1 unit increase of financial cost in 2013, ROE increased by 0.177 whereas during 2009 the increase in ROE was 0.49 for equivalent increase in financial cost. This can be justified by the falling interest rates during 2009-10. Low interest rates during 2009 explain the coefficient being higher in 2009 as compared to 2013.

Profit Margin Coefficient

Profit margin had a very significant contribution during 2013, much higher than IT had during recession phase of 2009. As explained in the time series analysis of profit margin, opening up of opportunities and rapid growth of IT industry after the lag phase of recession has been the major factor for the change in contribution of profit margin to ROE.

Financial Structure Ratio Coefficient

The ratio had significantly less contribution to ROE during 2009. However, rise of debt has been witnessed post 2009 leading to an increase in ratio coefficient in 2013.

Capital turnover ratio and tax effect ratio coefficient have more or less remained contact over the considered two years.

Comparison of Indian IT Sector with US IT Sector using Regression Analysis

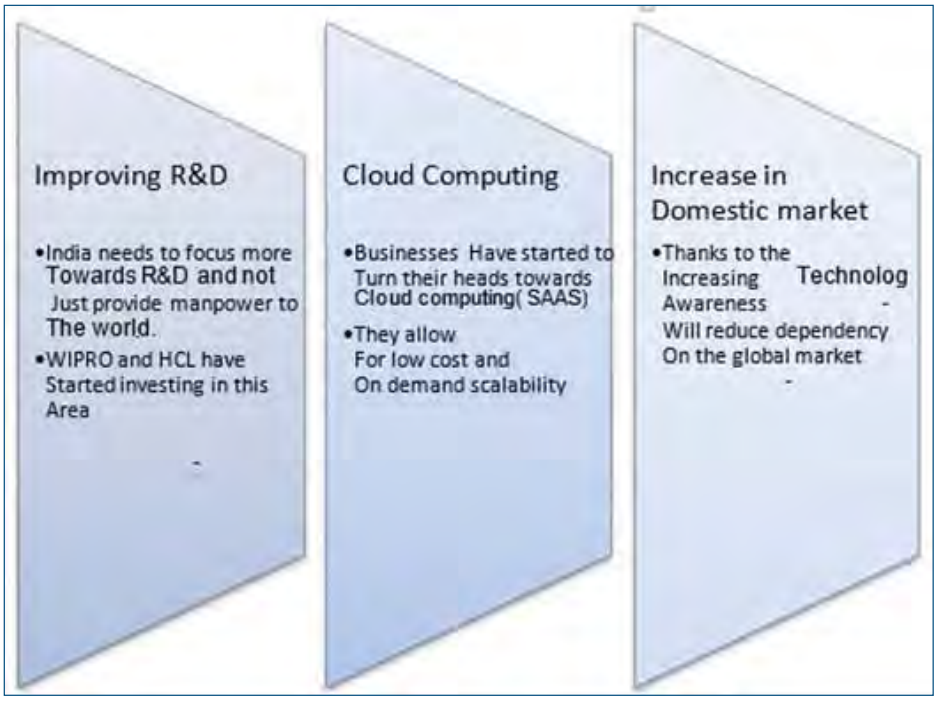
Capital turnover ratio has a significant impact to ROE of USA companies. For every 1 unit change in capital turnover ratio, return on equity changes by 0.38 whereas the change incurred in Indian companies is 0.119.

Also, financial structure ratio coefficient of USA companies is less than that of companies of India, demonstrating IT plays a less role in ROE. This can be justified by the debt to equity structure differences between the companies of two areas.

Table 9: Regression Analysis Comparison between India and USA

Regression Analysis - USA Companies(2013)		Indian Companies(2013)
	Regression Statistics	
R Square	0.76522364	0.819887255
Observations	13	21
ANOVA		
	Significance F	*Significance F*
Regression	1.96E-04	3.92E-05
	Coefficients	*Coefficients*
Intercept	-0.735602741	-0.653714975
Profit Margin	0.806216697	0.852837485
Capital Turnove	0.3838689	0.11912004
Financial cost r	0.146266094	0.177836994
Finance structu	0.081109216	0.151493167
Tax effect Ratio	0.284557551	0.233706662

Fig. 9: Scope of IT industry in India



Future Scope of IT Industry

India enjoys a market share of 52% in the global software industry and has a scope of further profit. The year 2012 was turbulent for the Indian software companies. Nevertheless, the software giants reclaimed their territories in 2013 and have started tracing a trajectory of higher growth rate of 12% as compared to 10% last year. This happened with an increase in the global technology spending, thus creating opportunities for the sector to grow.

Conclusion

The DuPont model has come a long way from being a simple two step ratio analysis to the one that can extensively explain the ups and downs of an industry in terms of its turnover, financial leverage, and tax effects. This has been made possible by the breaking up of the original components into five meaningful factors that can help to determine the overall return on equity of the firm and frame its strategies.

In the paper, major companies of the software industry were covered and their corresponding analysis done extensively. The IT sector was picked up as IT is a large contributor to the GDP of India and its study can help in the formulation of various policies and strategies.

The Time series analysis of the Indian IT sector threw light on the impact of various factors on the DuPont ratios and their corresponding impact on the overall financial performance of the software companies. A significant observation was how the global economic depression of 2007-2010 guided the profit margin, return on equity, and financial structure ratios of the industry greatly and the way companies formulated their strategies to overcome it.

The cross sectional analysis was useful in comparing the DuPont ratios of the companies with the industry average and understand why a certain firm was making loss and while the others were fairly well and vice versa.

Through the regression tools, it was derived that the return on equity (ROE) has a positive dependence on the five DuPont ratios. Here clearly the dependent variable taken was ROE and the independent ones were its five components. It can be observed that the profit margin has a larger impact on the ROE recently (coefficient being 0.85 in 2013) than it was during the recession period (coefficient being 0.4 during 2008-2009). During this

period, the financial structure ratio had a greater because the companies had started becoming more leveraged than and thus the net ROE depended greatly on the debts, i.e the financial structure of the firms.

Furthermore, the comparisons drawn between the Indian and US firms using regression helped us understand how the five parameters impacted the ROE differently across the two nations.

Thus it can be clearly observed that the five point Du Pont method was significantly useful for examining the trends of the Information Technology sector in India. It is a relatively new area of study and can be extensively exploited in studying financial structures or business models and making recommendations for further improvements.

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