INTANGIBLE ASSETS AND FINANCIAL PERFORMANCE: A PANEL ANALYSIS OF INDIAN PHARMACEUTICAL INDUSTRY

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The study aims at analysing the impact of intangible assets on the performance of firms as measured by Return on Assets (ROA) over a period of 11 years from 2000-01 to 2010-11. The sample of 50 pharmaceutical companies has been selected from BS 1000. The empirical results show that balance sheet intangible assets have a positive and significant impact on ROA. Amongst the invisible intangible assets, R&D and Salaries are found to be significantly and negatively related to ROA. After controlling for Physical Capital, Size, Age and Leverage it was found that only leverage had a significant association though negative. The study would provide a deeper insight to managers to develop and invest more in intangible assets.

Key words: Indian Pharmaceutical Industry, R&D, Visible and Invisible Assets, Panel Regression, Return on Assets (ROA).

Introduction

The dawn of knowledge and information has changed the mechanism of companies. Earlier the focus of companies was on the optimum utilization of physical and tangible assets only; but now the companies create their competitive advantage through the effective use of intangible assets owned by them. Intangible assets like Intellectual Capital (IC), trademarks, brands, patents, know-how, innovation, Research and Development (R&D), customer base, networks, organization structure etc. are the drivers and roots of the company's value (Edvinnsson and Malone, 1997; Stewart, 1997; Tseng and Goo, 2005). As a result, Intangible assets have become imperative part of company's performance and success. Intangible assets are always present in the company's operations. But, it has only been in the last couple of decades that this field has skyrocketed into prominence. Intangibles were discussed by Lawrence R. Dicksee in 1896 for the first time. The relative importance of tangible assets has

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decreased with the increase in the importance of intangible assets and hence it has taken primacy over traditional physical resources in the pursuit of competitive advantage (Firer and William, 2003). In fact, claims have been made that physical and financial assets are rapidly becoming commodities and are not primary drivers of the economy (Lev, 2001).

But somehow, despite, the growing importance of intangible assets companies do not record all intangible assets in their balance-sheets. This is because intangible assets are difficult to value and measure (Goldfinger, 1994; Sveiby, 1998; Lonnqvist, 2004; Gu and Wang, 2005; Lev, 2005; Austin, 2007; Corrado et al, 2012) and the future benefits of intangible assets are considered uncertain. Furthermore, intangibles are difficult to acquire, develop, and replicate within a firm (Itami, 1987). For the same reasons, they are also difficult to understand and for others to imitate (Dierickx and Cool, 1989; Nelson, 1991). As, Holland (2001) points out, that intangible assets are generally unrecognized due to problems of how to disclose the assets' value; therefore, it is difficult to evaluate how much profit those intangible assets will bring to the firms. Intangible assets have unusual measurement and recognition features which have made it difficult to develop a comprehensive accounting standard (Austin, 2007). As a result economic rents, growth opportunities, and other factors associated with intangible assets are not fully captured in the accounting systems. Thus, it is clear that intangibles are a hot topic where different schools of thought and several theories have developed intertwined relationships (Manzoni et al, 2011).

Current Methods of Measuring Intangibles

The traditional accounting system reveals the historical costs, thereby ignoring the inherent value of people's skill, expertise and knowledge as well as the organizational culture, networks and employees relationships. These hidden values play an increasingly important role in a new economy that is characterized by "paradigm shifts" in reporting and measuring practices (Malhotra, 2000).

From many years authors have tried to measure intangible assets but till date no best measuring method has been found. Some of them are : The Invisible Balance Sheet Assets (Konardgruppen, 1988), Economic Value Added (Stern Stewart and Co., 1991), The Balance Score Card (Kaplan and Norton, 1996), The Intangible Asset Monitor (Sveiby, 1997), IC- index (Ross et al., 1997), Technology Broker (Brooking, 1998), The Return on Asset Method, Market Capitalization Method, The Direct Intellectual Capital Method, Skandia AFS Business Navigator.

In addition, many authors have used the value of most intangible assets to explain the difference between the market value and the book value of firm's equity (Booth, 1998; Dzinkowsik, 2000; Roslender, 2000, Chan et al, 2001; Eckstein, 2004; Lu et al, 2010). As seen in Figure 1, the market value of equity is the sum of visible equity and invisible equity (Konardgruppen, 1988). The same can be measured from the asset side of balance sheet; External Structure, Internal Structure and Individual Competence are the invisible intangible assets (Lau, 2003).

Figure 1. The Invisible Balance Sheet

Market value: Visible + Invisible Equity
(Source: Lau, 2003)
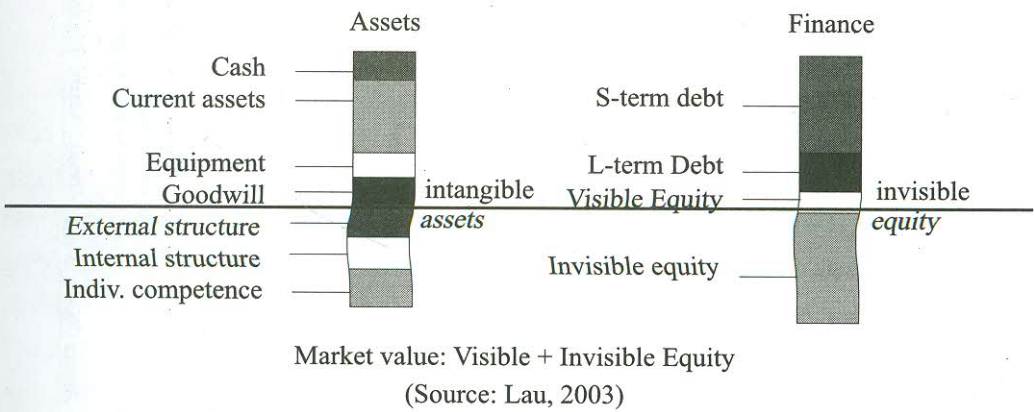
Intangibles and Performance: Literature Review

Even though the importance of intangible assets has grown, yet empirical research on intangible resources and their impact on firm performance remain scarce. The scarcity can largely be attributed to the implicit nature of intangibles (e.g. inimitability, rarity), which makes them fundamental to obtain sustainable competitive advantage but hard to measure.

No doubt that during the last two decades, several researchers have attempted to find the impact of intangible assets on companies' performance (e.g. Earning before interests, taxes, deprecations and amortization (EBITDA), Return on Equity (ROE), Return on investment (ROI), Return on asset (ROA), Return on Capital employed (ROCE), Earnings Per Share (EPS) etc. or capital market financial performance); out of which few are listed as follows (Table 1).

Many authors have also studied intangible assets using primary data. Few of them are Abdulai et al., 2012 (West Africa); Leitner, 2001(Australia); Maditinos et al., 2009 (Greece); Pierre and Audet, 2011 (Canada and France).

Table 1. Review of Literature

Author (s)	Sample	Time period	Intangibles studied as	Dependent/ Performance variable	Independent variables	Results
Megna and Klock (1993)	11 US Semi Conductor firms	1972-1990	R&D expenditure Patents	Tobin's q	Intangible capital	Intangible capital contributes to the variation in Tobin's q but fails to explain it completely.
Bosworth and Rogers (1998)	85 Australian Mining and Manufacturing firms	1991-1994	R&D intensity	Tobin's q	Total physical assets Intangible stock Growth in revenue	Physical assets were highly significant and others variables and R&D were significant and positive with the market value.
Gleason and Klock (2003)	725 US Pharmaceutical and Chemical firms	1982-2001	R&D Advertising	Tobin's q	Intangible capital	Measures of intangible capital statistically and significantly determine the Tobin's q.
Lau (2003)	930 UK and 1577 Japanese firms	1989-2000	R&D	Tobin's q	Research and Development Total Leverage Profits Dividend payments Interest Intangible assets Size	Coefficient of R&D had a highly positive and significant influence on determining value for Japan, but not for UK.
Hall and Oriani (2004)	127 firms from France, 283 from Germany, 86 from Italy, 592 from the United Kingdom and 1,366 from the United States	1989-1998	R&D	Ratio between the firm's market value and the total tangible assets (V/A)	R&D Intangible assets Sales	In France and Germany the R&D capital was positively valued by the stock market but not in Italy. All other variables, in all the countries showed a positive and significant relation with the dependent variable.
Chen et al. (2005)	75 publicly traded companiesof South Africa	1992-2002	Intellectual Capital R&D Advertising expenditure (AD).	Market to book value of equity (M/B) Returns on Equity (ROE) Return on Assets (ROA)	Value Added Intellectual Coefficient (VAIC) Value Added Capital Employed (VACA) Value Added Human Capital	Intellectual capital had a positive and significant relationship with firm's value and financial performance. M/B was positively related with VAIC, VACA, VAHU and R&D

Study	Sample	Period	Independent Variable	Dependent Variable	Other Variables	Findings
				Growth in net sales (GR) Net value added per employee (EP)	(VAHU) Structural Capital Value Added (STVA) Research and Development expenditure (R&D) Advertising expenditure (AD).	expenditure but was not significantly related to STVA. R&D was significantly and positively related with ROA and GR but was insignificant with ROE and EP. AD was found to be negatively significant with both ROA and ROE but insignificant with GR and EP.
Ho et al (2005)	15039 US firms	1962-2001	R&D intensity (RDI) Advertising intensity (ADI)	Holding period Returns (HPR)	R&D intensity Advertising intensity Firm Size Industry Concentration Market to book value Past year returns Risk	R&D investment generated positive returns for the entire sample and the subsample of manufacturing firms but not for the subsample of non manufacturing firms. Advertising was found to be an important variable for the entire sample and the subsample of nonmanufacturing firms but not for the subsample of manufacturing firms.
Jeny and Jeanjean (2006)	197 French firms	1993-2002	R&D intensity	Book value of common equity per share	Capitalized R&D Expensed R&D	Coefficients of both the R&D expenditure was negative and significant.
Greenhalgh and Rogers (2007)	16000 firms in UK	1996-2000	Trademarks R&D	Market value of the firm (Tobin's q)	Trademarks R&D Size	Stock market values are positively associated with R&D and trade mark activity by firms. Firm size had no effect on Tobin's q but the coefficient on R&D intensity was positive and significant.
Banker et al (2008)	11 IT sectors in Taiwan	2000-2006	R&D intensity	Return on Assets (ROA)	Education (GRADUATES and UNDERGRADS) R&D intensity (RND_INT) Executive compensation (EXEC_COMP) Corporate governance (board size (BOARDSIZE), board independence (INDEPDIRECTOR) and executive ownership (STOCKHELD) VOLATILITY	Coefficient of GRADUATES,UNDERGRADS, RND_INT, STOCKHELD, VOLATILITY were positive and significant The coefficient of BOARDSIZE was negative and significant. Advertising intensity and labor intensity were also associated with higher returns for a firm. Finally, both education and R&D investments were positively

Author (year)	Sample	Period	Independent variable	Dependent variable	Other variables	Findings
					Managerial variables advertising intensity, employee intensity and capital intensity Salary received by employees in the firm	associated with a performance of IT industries.
Kamath (2008)	25 firms listed on Bombay Stock Exchange	1996-2006	Intellectual Capital	Return on Assets (ROA) Asset turnover ratio Market to Book value	VAIC and its variables	Human capital was the major component having impact on firm's productivity and profitability.
Chiang (2009)	594 US firms	1998-2007	R&D expenditure	Market value	Total Assets R&D expenditure Cash flow Risk Growth	R&D expenditure had a positive and significant impact on the market value. A close correlation was found between total assets, Cash flow and Growth and market value. Risk was negatively related with the market value of the firm
Ghosh and Mondal (2009)	50 Software and 30 Pharmaceutical Companies in India	2002-2006	Intellectual Capital	Return on Assets (ROA) Assets Turnover ratio (ATO) Market to Book Value ratio (MB)	VAIC and its variables	VAIC had significant positive influence over profitability. Assets turnover ratio and company size, measured by LCAP, no consistent relationship with profitability over the study period was found. Performance of a company's intellectual capital could explain profitability but not productivity and market valuation in India.
Ehie and Olibe (2010)	26429 US firms from Manufacturing and Service industries.	1990-2007	R&D investment (RDI)	Market Capitalization	R&D investment (RDI) Firm size (SIZE) Leverage (LEV) industry concentration (CONC)	R&D investment (RDI) had positive effect on market value. R&D investment in manufacturing firms had a stronger positive impact on firm value than in service firms. Both SIZE and CONC was found to be negative and insignificant in manufacturing and service sectors. LEV was found to be positive in manufacturing sector but negative in case of service industries.
Guo et al. (2011)	All the firms in COMPUSTAT	1994-2007	Technology Brand values	OPEPS (earnings per share from operations)	R&D expenditure Advertising expenditure	Balance sheet intangibles was positively correlated with accounting

Author	Sample	Period	Independent variable	Dependent variable	Control variables	Findings
			Human resources	OANCFPS (net cash flow per share from operating activities) Market to book value (MB) ratio Sales growth. Market performance	Bonus and salary Firm size Industry effects	performance measures, except for OPEPS Advertising expenses and R&D expenses were negatively correlated with accounting performance measures, except for SALECHG Bonus and Salary was positively correlated with accounting performance measures, except for SALECHG R&D had a significantly negative relation with OPEPS. BONUS and SALARY had a significantly negative relation with VOLATILITY. ADVERTISING and BONUS and SALARY) had a significantly negative impact on VOLATILITY Negative relations between ADVERTISING and VOLATILITY in tech industries, and between BONUS and SALARY in nontech industries was found.
Behname et al (2012)	128 firms listed on Tehran Stock Exchange	2001-2011	Identifiable intangible assets	Market value	Identifiable intangible assets Operating assets (NOA) Operating liabilities, financial assets (NFA) Financial liabilities Inflation rate Normal and abnormal operating earnings (AOE)	Identifiable intangible assets had positive and significant impact on the market value of the firm. The effect of net operating assets, expect intangible assets on the market value of firms was significant and negative at the entire firms' level. In contrary, the effect of abnormal operating earnings on the market value of firms was significant and positive.
Wu and Hao (2012)	45 Chinese Automobile Companies	2009-2011	Book value of intangible assets.	Net profit value	Book value of intangible assets.	Intangible assets had significant and positive effect on thecompanies' operating performance
Zhu and Huang (2012)	106 Chinese IT firms	2007-2009	R&D	ROA ROE	Ratio of R&D exp. to revenue Ratio of R&D exp. to assets	A strong and positive relation is found between R&D and ROA and ROE.

Research gap identified

The evolution of Indian economy from production to knowledge stage has led to increasing importance of intangible assets. According to Global Intangible Tracker (GIT), 2007 by London based Brand Finance Institute; the most extensive global study ever conducted on intangible assets, India ranks third in the world with the highest intangible component as a percentage of the total enterprise value (TEV) – value of disclosed and undisclosed tangible and intangible asset. But as suggested by review of literature, majority of the studies have been conducted in developed countries like US (Meghna and Klock, 1993; Gleason and Klock, 2003; Ho et al, 2005; Chiang, 2009; Ehie and Olibe, 2010), UK (Lau, 2003; Greenhalgh and Rogers, 2007) Japan (Lau, 2003), France (Jeny and Jeanjean, 2006), Italy, Germany (Hall and Oriani, 2004) and Australia (Bosworth and Rogers, 1998). Very few studies are available with respect to developing countries like South Africa (Chen et al, 2005), Taiwan (Banker et al, 2008), Tehran (Behname et al, 2012) and China (Zhu and Huang, 2012; Wu and Hao, 2012). Specifically with respect to India few studies are available and that too on intellectual capital (Kamath, 2008; Ghosh and Mondal, 2009). Infact, not even a single study could be found specifically related to intangibles and performance with reference to India. Also, intangible assets have been studied with specific dimensions by various authors as specifically in relation to R&D (Bosworth and Rogers, 1998; Lau, 2003; Hall and Oriani, 2004; Banker et al, 2008; Ehie and Olibe, 2010), Intellectual Capital (Chen et al, 2005; Guo et al, 2011), Patents and Trademarks (Greenhalgh and Rogers, 2007) etc. Only a few studies have taken intangibles in totality.

In addition, Pharmaceutical industry is deemed as one of the most high–tech, highly innovative in respect of human intervention, R&D, patents and technology. So, researchers in developing countries like India need to explore more on the impact of intangibles on performance in such knowledge based industries. Hence, an attempt to do the same has been made in this study.

Research Methodology

Sample and time period

The sample for the study is taken from Business Standard (BS) 1000 that lists leading companies of India on the basis of net sales. From the list of 58 pharmaceutical companies given in Business Standard (BS) 1000, 50 companies have been selected.

Eight companies were deleted as complete information with respect to the variables was not available for these companies. The time period for the study is eleven years i.e. 2001-2011. Intangible Assets need some time to grow therefore, the span of more than a decade has been used and it would be helpful to establish the consistency and predictability for research conclusions.

Data Source

The data is collected through secondary sources. The relevant data required for present research is collected from 'PROWESS' a database of Centre for Monitor Indian Economy (CMIE). This database was chosen because all the information required for the study was readily available in this.

Dependent Variables

Many authors have used tobin's q as the dependent variable (Megna and Klock, 1993; Bosworth and Rogers, 1998; Gleason and Klock, 2003; Lau, 2003; Greenhalgh and Rogers, 2007) and some others have used Return on Assets (Chen et al, 2005; Banker et al, 2008; Kamath, 2008; Ghosh and Mondal; 2008; Zhu and Huang, 2012). Hence, ROA is taken as a dependent variable for the study.

Return on Assets (ROA) is measured as the ratio of operating income to total assets of the firm. ROA measures how well the organisation uses all its assets. In other words, it measures how profitable a company is relative to its total assets. Thereby, giving an idea as to how efficient management is using its assets to generate earnings.

Independent Variable

The intangible assets have divided into two categories. One that are visible in the balance sheet and others that are invisible (Fig.1). The visible balance sheet assets, that is, as given in the balance sheet are scaled by total assets. The invisible assets are taken as Brand (External Structure), Technology (Internal Structure) and Human Resource (Individual Competence).

The experimental variables for measuring the invisible assets (Brand, Technology and Individual Competence) consist of three accounting-based proxies from Barth et al (2001). The variables are:

Advertising expenses (AD) as shown in profit and loss account (scaled by total sales) is

used as a proxy for Brands (Abdel-khalik, 1975; Hirschey and Weygandt, 1985; Guo et al, 2012).

Research and development (R&D) expenses as given in profit and loss account (scaled by total sales) is used as a proxy for Technology (Guo et al, 2012).

For measuring individual competence, managers' bonus and salary is used (Guo et al, 2012).

Control variables

Four control variables are included in the analysis. Size of the firm (SIZE) is determined through natural logarithm of firm's book value of total assets (Firer and Williams, 2003; Ghosh and Mondal, 2009; Zeghal and Maaloul, 2010; Chu *et al.* 2011; Wang, 2011). Age of the firm (AGE) is calculated as the difference between 2011 and the founding year of the organization (Taliyang, 2011). Leverage (LEV) is calculated as ratio of the total debt to book value of assets of the firm (Kamath, 2008; Ghosh and Mondal, 2009; Zeghal and Maaloul, 2010; Ahangar, 2011; Chu, *et al.* 2011) and Physical Capital intensity (PC) is measured by the ratio of a company's fixed assets to its total assets (Firer and Williams, 2003; Ghosh and Mondal, 2009; Ahangar, 2011; Pal and Soriya, 2012).

Hypothesis Development

Balance Sheet Intangible Assets vs. performance: Unlike tangible assets, which can always be recognized, it is not easy to evaluate the balance sheet intangibles value accurately and fairly even if they are recognized at cost. Still an asset, as defined by the Financial Accounting Standards Board, "embodies a probable future benefit that involves a capacity, singly or in combination with other assets, to contribute directly or indirectly to future net cash inflows" (SFAC 6; Paragraph 26). Thus, no matter to which category the assets belong to, assets would bring future benefits and cash inflow to the firms. In the present paper Balance Sheet Intangible Assets (BSIA) are taken as those which are given in the balance sheet and primarily include Goodwill, Patents, Copyrights and Trademarks. Patents, Copyrights and Trademarks offer monopoly power to the companies. Hence, no competitor can imitate or replicate their product. Also, Goodwill generated over years helps them to capitalize the market share and increase their profitability. Therefore, we predict that firms with more Balance Sheet Intangibles would have better future performance than firms with less Balance Sheet

Intangible Assets.

Hypothesis 1: The balance sheet intangible assets of firms are positively associated with their accounting performance as measured through ROA.

Technology (R&D) and performance: Technology plays a very important role in the value creation process of firms, especially in high tech and knowledge-intense companies like software and Pharmaceutical Industry and the expenditure incurred on technology is regarded as a long-term investment in intangible assets. Under the regulations of the Generally Accepted Accounting Principles (GAAP), purchased intangibles, e.g., goodwill can be capitalized at cost; however, internally developed intangibles, e.g., R&D and advertising, must be fully expensed as incurred. They are not recognized under the GAAP because of the measurement difficulties related to the uncertainty of their values. Although they are treated as expense in financial statements, the previous research suggests that a large portion of the benefits derived from fully expensed intangible assets is relevant to the firms' future earnings (Sougiannis, 1994; Lev and Sougiannis, 1996; and Aboody and Lev, 1998). Hence, this implies that the firms that invest more in R&D will have better future income, as well as accounting performance. Therefore, we consider research and development expenditure, as a relevant proxy for technology and assume it to be positively correlated with firms' accounting performance.

Hypothesis 2: R&D expenses are positively correlated with firms' accounting performance as measured through ROA.

Brand values (Advertising) and firms' performance: Brand is a special name that consumers give to a product or service having a high level of recognition. They are willing to pay higher prices than average prices and make more frequent purchases. As such brand carry a lot of advantages with it. As suggested by Keller (1997) a brand name ensures a greater loyalty from customers, larger profits, less fluctuation in demand, more trade alliances and supports, increased market communication and effectiveness. Those benefits generated from branded products potentially provide firms with a higher operating margin than those from unbranded products (Guo et al 2011). Even, Abdel-khalik (1975), and Hirschey and Weygandt (1985) have taken advertising expense as a proxy for brand value. Thus, we hypothesize that firms with higher advertising expenses would have more valuable brands, which in turn provide them with higher operating earnings.

Hypothesis 3: Advertising expenses are positively correlated with firms' accounting performance as measured through ROA.

Individual Competence (Bonus and Salary) and firms' performance: Human resources are the intellectual aspect of the organization. Human resources include information regarding the members of the board, the management teams, and the employee's education level, salary, and bonus. Because education level is not measurable and quantifiable, salary and bonus can be regarded as proxy for individual competence. The higher the salary and bonus, the higher are the human resources value and, therefore, the higher is the individual competence. Bonus and salary is also given as compensation to the managers having the capability to increase the firms' value through their skill and competence. Thus, they would be paid a higher bonus and salary to the management teams to encourage them to work toward maximizing the firms' value. Therefore, we predict that firms that give more compensation to their managers would have better performance than those that offer less.

Hypothesis 4: The bonus and salary of firms are positively correlated with their accounting performance as measured through ROA.

Physical Capital and performance: Physical capital intensity is used to control for the impact of fixed assets on corporate performance (Firer and Stainbank, 2003; Firer and Williams, 2003). It shows the proportion of fixed assets to its total assets. The more the proportion the better it is for the companies; provided fixed assets are utilised to their full capacity. Else, the investment in fixed assets might lead to the problem of overcapitalisation. Thus, it is assumed that company's fixed assets have significant impact on company's financial performance.

Hypothesis 5: Physical capital influences accounting performance as measured through ROA.

Leverage and performance: It indicates the proportion of debt to equity that the company is using to finance its assets. As per accounting framework leverage is a double edged sword. Only if rate of return is greater than cost of capital, it has positive influence on firm's performance, otherwise not. It denotes risk to the company. Hence, we hypothesise that

Hypothesis 6a: Leverage is negatively related with the accounting performance

·measured through ROA. .

Hypothesis 6b: Leverage is positively related with the accounting performance as measured through ROA.

Age and performance: Older companies are assumed to have established themselves over years in the market. But, for generating goodwill (Balance Sheet Intangible Asset), they are able to gather and accumulate sufficient reserves to invest in R&D, Advertising as well as adequate compensation of human resources; hence leading to the following hypothesis

Hypothesis 7: Age is positively related with the accounting performance as measured through ROA.

Size and performance: Large firms can benefit from economies of scale through increased production. Also, as a result of expanded operations they usually invest more in R&D to compete in the market by providing innovations. Large companies usually have diversified portfolios, which need to be managed by experts from different areas. As a result they need to develop individual competencies. At the same time they can afford more on advertisement. Hence, the following hypothesis may be framed.

Hypothesis 8: Size is positively related with the accounting performance as measured through ROA.

Research Models

For conducting the empirical research following models have been run

$$ROA = \alpha + \beta_1 BSIA + \beta_2 R\&D + \beta_3 AD + \beta_4 Salaries + \beta_5 Age + \beta_6 PC + \beta_7 LEV + \beta_8 SIZE + \mu \ldots \ldots$$
(1)

Where,
ROA= Return on Assets
BSIA= Balance Sheet Intangible Assets
R&D= Research and development expenses (Technology)
AD= Advertising expenses (Brand value)
Salaries= Proxy for Individual Competence
PC= Physical Capital

LEV= Leverage

μ= error term

$\beta_1.\beta_8=$ Slope of regression line

Results and Discussion

For studying the impact of intangible assets on the performance of the pharmaceutical industry Panel Regression was used. For checking the stationarity of the data Harris–Tzavalis unit root test was used. This test assumes that the number of panels tends to be infinite while the number of time periods is fixed (Harris and Tzavalis, 1999). All the data was found to be stationary. Then to have better results both fixed and random effect models are applied on the panel data. Results of both the models are checked through applying Hausman Specification Test (Hausman, 1978). If Prob < Chi2= 0.05 (i.e. significant) then fixed effects is used. The test suggested random effect model.

Table 2 presents the results of panel regression with ROA as the dependent variable.

Table 2: Regression with ROA as dependent Variable

Random-effects GLS regression				Number of obs	=	550
Group variable: i				Number of groups	=	50
R-sq: within =0.0666				Obs per group: min	=	8
between=0.2659				avg	=	10.8
overall=0.1923				max	=	11
Random effects u_i~Gaussian				Wald chi2(8)	=	48.77
corr(u_i, X) =0 (assumed)				Prob > chi2	=	0.0000

ROA	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
BSIA	.0000843	.0015304	2.86	0.004*	.0000113	.0000848
R&D	-45.85094	12.39948	-3.70	0.000*	-70.15348	-21.54841
AD	15.46205	18.42979	0.84	0.401	-20.65967	51.58378
Salaries	-.002638	.0006763	-3.90	0.000*	-.0039634	-.0013125
PC	-6.746873	3.131627	-2.15	0.031	-12.88475	-.6089972
LEV	-2.021782	.6230861	-3.24	0.001*	-3.243009	-.8005558

AGE	.0249432	.0507279	0.49	0.623	-.0744816	.1243679
SIZE	.082117	.3122532	0.26	0.793	-.529888	.6941219
_cons	18.37576	2.309876	7.96	0.000	13.84849	22.90303

sigma_u	7.0632002
sigma_e	6.7120123
rho	.52547764 (fraction of variance due to u_i)

*1% level of significance

The results show that model has 19.23% explanatory power. The model is found to be significant with Prob > chi2 = 0.0000. Further, Balance Sheet Intangible Assets (BSIA) are found to have positive and significant relationship with ROA (2.86) which confirms the hypothesis (H1). The sample is from BS 1000. These companies must have definitely established goodwill over years. Also, they must be enjoying inimitable rights on account of their trademarks. R&D (-3.70) is found to be negatively significant with ROA. Thereby, hypothesis (H2) is rejected. R&D expense is a huge/lump sum investment with no certainty of immediate benefits and hence the negative sign. Also, AD is found to be positive (0.84) but insignificant which leads to the acceptance of hypothesis (H3). This encourages the buying behavior of consumers sticking to the brand. Bonus and Salary has negative (-3.90) and significant relation with ROA. Thus, the hypothesis (H4) is rejected. It seems that the sample selected on the basis of net sales comprise of companies paying exorbitant remuneration to their executives. They still need to justify the investment companies are making to develop and maintain them. Among the control variables, PC (-2.15) is found to have significant but negative impact. Thus, hypothesis (H5) is rejected. The developing country like India is hit by inflationary pressures. So, may be the companies have bought their physical fixed assets at inflated prices. LEV (-3.24) is found to be significant and negative which accepts the hypothesis (H6b). Further, AGE (0.49) and SIZE (0.26) are positively but insignificantly related to ROA. Thereby, hypothesis H7 and H8 are accepted.

The results of the study are in confirmation with the Bosworth and Rogers, 1998; Hall and Oriani, 2004; Guo et al, 2011; Behname et al 2012 and Wu and Hao, 2012 who studied companies from different countries and proved that intangible assets have positive impact on the performance of firms. The results of Ho et al, 2005 and Guo et al, 2011 also commensurate with our findings that R&D investment is negatively and significantly

related to the performance. The results of Chen et al, 2005 and Ehie and Olibe, 2010 are also similar to our results where LEV was found to be negative and significant.

But the above results are inconsistent with the results of Lau, 2003 who showed that R&D was positively related to the firm's performance. This difference is because perhaps the sample of Lau, 2003 is from UK and Japan, which are few of the most technologically upgraded countries in contrast to developing country like India. Even, Ho et al, 2005 with respect to USA showed that R&D investment generated a positive return which was found to be statistically significant. Same thing was proved by Greenhalgh and Rogers (2007) contrary to our results with respect to UK who showed a positive relation between R&D and firm's performance. Further, Chen et al, 2005 proved that Advertisement expenditure had negative and significant association with ROA. In a study by Ehie and Olibe (2010) size was found to be negative and insignificant.

Table 3 Showing the Significant factors that affect Performance

Variables	Hypothesized Results	Actual Results	Significant/ Insignificant	Reasons for Difference
Visible Intangible Assets • BSIA	+	+	Significant at 1%	Companies are benefitting from inimitable rights.
Invisible Intangible Assets • R&D (Technology)	+	-	Significant at 1%	Huge investment with no certainty of future immediate benefits.
• Advertising (Brand)	+	+	Significant at 1%	The customers sticking to the brand.
• Salary and Bonus (Indvidual Competence)	+	-	Significant at 1%	Executives need to justify the high salary packages.
Control Variables • PC	+	-	Insignificant	The physical fixed assets purchased on inflated prices.
• LEV	-/+	-	Significant at 1%	Negative impact of trading on equity
• AGE	+	+	Insignificant	They gather sufficient funds to invest in intangibles with passing years.
• SIZE	+	+	Insignificant	The companies are enjoying the economies of large scale.

Conclusion

The paper aimed at analysing the impact of Intangible assets on the performance of Indian Pharmaceutical industry. The empirical results found that balance sheet intangible assets have a positive and significant impact on the performance of the firm. No doubt the intangible assets require huge investments and the future benefits derived from it are enjoyed after many years. But, intangible assets have been seen as critical drivers for knowledge creation, innovation and economic growth (Wu and Hao, 2012). This implies that companies should invest in intangible assets to stand for the gain. Further, the growth of technological firms like pharmaceutical industry relies on its opportunities to exploit innovative products and services, branding as well as intellectual capital; thus forcing them to strongly invest in intangible assets.

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