INDIAN PHARMACEUTICAL INDUSTRY: MEASUREMENT AND ANALYSIS OF INTELLECTUAL CAPITAL

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Abstract

In today's Knowledge driven economy, Intellectual Capital (IC) is crucial for enhancing business performance and economic growth in manufacturing as well as service industries therefore the measure of performance also requires to keep pace with changing scenario. The present study is undertaken to measure the effectiveness of Intellectual Capital as compared to tangible assets for selected sample units. Market value added approach (MVA) is adopted for measuring Intellectual Capital. The Pharmaceutical Industry reported on an average (`3065.15) crore as a value of Intellectual Capital (IC) during present study period. The significant correlation has been found between tangible assets and net operating profit while no significant difference was found between % of Intellectual Capital to market value and % of tangible assets to market value.

Key words: Intellectual capital, Intangible assets, Tangible assets, Net operating profit

Introduction

In the era of global competitiveness, Intellectual Capital (IC) has emerged as a strategic tool that adds value to the organizations and gives a realistic picture to the stakeholders and potential investors about performance of the firms which in turn support the

corporate goal of enhancing shareholder value. As a result, organizations are now shifting their focus to measurement and management of their most valuable assets- IC. Intellectual Capital of a firm is, its possession of knowledge applied experience, organizational technology, customer relationships and professional skills that provide it with a competitive edge in the market. It is the intellectual material, knowledge, information, intellectual property and experience that can be put to use to create wealth.

Thus, the particular focus is to measure the organization's Intellectual Capital, so that contribution of intangibles to the business are measured in their own right, if measurement is feasible in practice, they will render the tangible as well as intangible assets of a company to be man aged explicitly. Prof. Baruch Lev (2001) compared the investment pattern of 1929 and 1990 and concluded that in 1929 among US companies, approximately 70 percent of their investment went into tangible assets and some 30 percent went to intangibles. In contrast, in 1990 the trend was reversed, it was found that a major part of investment goes into intangibles 67 percent such as research and development, IT software, education and competencies and internet. Further, he compared that relationship between market value and book value of shares. In 1970 it was 1:1 and in mid 1990 it had increased to an average of three times. This statistical information provided an insight into the recognizing the importance of Intellectual Capital. So, the corporate world is now devoting a lot of time and effort to manage its Intellectual assets in order to improve its shareholder's wealth. Undoubtedly, measuring the exact value of IC is difficult but there are some methods that can be used. The whole concept of IC measurement and its management is still relatively new. Accountants, business manager and policy makers have still to grapple with its concept and its detailed application and methodologies. Here an attempt has been made to measure and analyze Intellectual Capital for Pharmaceutical Industry**.**

Review of Literature

In order to measure and analyze Intellectual Capital, an intensive review of existing literature has been done which having direct and indirect emphasis on the objective of present research.

Nick Bontis (1998**)** conducted an empirical pilot study that explores the development of several conceptual measures and models regarding Intellectual capital and its impact on business performance through Principal components analysis (PCA) and Partial least squares (PLS) methods. The main finding of study shows that there is valid, reliable and significant link between dimensions of Intellectual capital and business performance. Nimah Brennam and Brenda Connell (2000) examined substantial difference between company book value and market value, which indicates the presence of Intellectual assets, not

recognized and measured in company balance sheets and also provides guidelines to companies for reporting on Intellectual Capital. Maria and Jose Sarabia (2005) proposed a Tree organization (TREEOR) model of valuation of Intellectual Capital of organizations based on variation of classical Lotka- Volterra equation system. The proposed model tries to measure IC of an organization to recognize the organizational mechanism of growth in analogy with growth of a tree and incorporates a bifurcation parameter that values to increase organizations Intellectual capital. Prashanta Athma and K. Srinivas(2006) measured the value of IC from financial reports of selected companies viz. Infosys Technologies Ltd., Satyam Computers Ltd. and Dr.Reddy's Laboratories and also analyze the reasons for fluctuations in the value of IC of these companies. Market value added approach is adopted for measuring IC. G. Bharathi Kamath (2007) measures and evaluates the value added to a firm by its IC using a concept of Value Added Intellectual Coefficient (VAIC). The author remarked that value is created only if efficiency of resources is leveraged and value added increase in absolute terms is also not a measure for determining the value creation only if, VAIC^{TM} is increasing then it can be said that value is being created. Shurveer S. Bhanawat (2008) measured the Intellectual Capital of Pharmaceutical companies, by applying difference between market value of firm and book value of firm. He found that present system of reporting of IP in Pharmaceutical companies is not adequate and all selected   companies fail to disclose whether an IP is self – developed or acquired. Further, Miguel Angel Axtle Ortiz (2009) analyzes various components of IC through a humanistic model called Contextual Intellectual Capital Components Valuation model (CONICCVATM) .The sample population in eight geographic regions, 16 types of industries was analyzed using 41 variables and 4 factors through Multiple Analysis of Variance (MANOVA) methodology. The author concluded that only companies inserted in equivalents contexts could be compared and demonstrates the importance of the context in valuation of Intellectual Capital .So, in light of review of literature an attempt has been made in present research paper to revisit the analysis of IC by Market value added method.

Objectives

- To measure Intellectual Capital in monetary terms for sample units.

- To examine the relationship of Intellectual Capital and tangible assets with net operating profit.

- To examine effectiveness of Intellectual Capital over tangible assets.

Hypotheses

- There is no relationship between IC and Net operating profit.

- There is no difference between percentage of Intellectual Capital to market value and percentage of tangible assets to market value.

Selection of Sample Units

Eight pharmaceuticals companies have been selected for the purpose of present study. These companies are Aventis Pharma Ltd., Dr. Reddy's Laboratories Ltd., Novartis Ltd., Aurobindo Pharma Ltd., Torrent Ltd., Sun Pharma Ltd., Cipla Ltd., Cadila Ltd.

Source of Data

The relevant data required for present research have been collected from Electronic data base software 'PROWESS' of Centre for Monitor Indian Economy (CIME)

Period of Study

The period of five years (2004-05 to 2008-09) have been taken into account. It seems that five years are sufficient to analyze and establish the trend of Intellectual Capital of selected   sample units.

Statistical Techniques Used

Under present study statistical techniques like mean, percentage (%), correlation (r), coefficient of variation (C.V) & Probable error (P.E) are used to analyze the data.

Analysis and Discussion

In present article Intellectual Capital of sample units have been calculated by applying Market value Added (MVA) approach thereafter the relationship of Intellectual Capital and tangible assets with net operating profit have been discussed in terms of coefficient of correlation. At, last the effectiveness of Intellectual Capital over tangible assets has been examined through t-test.

(A)   Measurement of Intellectual Capital: The below table1 shows measurement of Intellectual capital of selected sample units of Indian Pharmaceutical Industry.

Table 1: Intellectual Capital for Selected Sample Units
(Market value – Book value)

(` in crore)

S.No	Name of Company	2004-05	2005-06	2006-07	2007-08	2008-09	Average	C.V
1	Aventis Pharma Ltd.	2564.02	3230.52	2407.54	1810.88	1267.29	2256.05	33.19
2	Dr. Reddy's LaboratoriesLtd.	1021.32	1037.99	152.42	-1030.93	-1852.67	-134.37	-952.20

3	Novartis Ltd.	707	564.55	152.92	185.88	-53.36	311.398	100.85
4	Aurbindo Pharma Ltd.	305.13	-124.69	1162.47	369.12	-1463.71	49.664	1943.43
5	Torrent Ltd.	340.27	335.45	1158.91	861.34	137.68	566.73	75.19
6	Sun Pharma Ltd.	4751.12	5871.6	12202.8	15356.04	21808.92	11998.1	58.58
7	Cipla Ltd.	1823.42	16361.38	4326.87	12618.52	11499.5	9325.93	64.85
8	Cadila Ltd.	868.2	460	-68.2	-420	-101.3	147.74	346.38
	Overall Average	1547.56	3467.1	2686.96	3718.85	3905.29	3065.15	208.78
	C.V	97.13	161.02	153.07	173.02	214.90	159.83	

The above table no.1 shows the IC of sample units for five years (2004-05 to 2008-09). The fluctuating trend in the amount of IC has been observed during the present study period among sample units. The highest absolute average amount of IC has been reported by Sun Pharma Ltd. (11998.1) followed by Cipla Ltd. (9325.93). Dr. Reddy's Laboratories Ltd. could not create sufficient size of IC as compared to other sample units. It reported not only least amount of average IC but negative also (-134.37). The Indian Pharmaceutical sector reported average amount of IC of (`3065.15) crore during present study period. The variation among the average amount of IC of sample units is observed to great extent. The year (2008-09) may be considered as good year for the shareholders of Indian Pharmaceutical Sector because this year reported highest average amount of IC (3905.29). The increasing trend in the average amount of IC from (2004-05 to 2008-09) has been observed except in (2006-07). The dispersion among sample units has been measured in terms of range. The range of sample units is 12132.47 (9325.93-(-134.37) crore.

As, far as consistency of average amount of IC reported by sample units is concerned, coefficient of variation of each sample units has been measured. The highest inconsistency has been noticed in Aurbindo Pharma Ltd. as it is evident by highest coefficient of variation (1943.43) and least fluctuation has been observed in Aventis Pharma Ltd. as it is proved through least positive coefficient of variation (33.19).

(B) **Correlation Analysis:** The relationship of Intellectual Capital and tangible assets with net operating profit have been examined in table2 through coefficient of correlation and thereafter Probable error based test of significance have been applied

Table 2: Correlation Analysis

S. No.	Name of Company	IC &NOP	T.A &NOP
1.	Aventis Pharma Ltd.	-0.26	0.72
2.	Dr. Reddy's LaboratoriesLtd.	-0.66	0.84
3.	Novartis Ltd.	-0.96	0.92
4	Aurbindo Pharma Ltd.	-0.67	0.74
5.	Torrent Ltd.	-0.12	0.80
6.	Sun Pharma Ltd.	0.98	0.98
7.	Cipla Ltd.	0.33	0.92
8.	Cadila Ltd.	-0.72	0.93
.	Average	-0.26	0.85
	Probable Error (P.E)	0.22	0.06
	6*P.E	1.32	0.36
	Significance	No	Yes

The table 2 shows correlation analysis of Intellectual capital and tangible assets with net operating profit to examine the relationship of IC & tangible assets with net operating profit. There is positive correlation between tangible assets of companies and net operating profit while negative correlation between Intellectual Capital and net operating profit. Out of eight sample units selected only Sun Pharma Ltd and Cipla Ltd have net operating profit positively correlated with both Intellectual Capital and tangible assets while other sample units are having negatively correlated with Intellectual Capital and net operating profit. The average coefficient of correlation of IC & NOP is (-0.26) while the average coefficient of correlation of Tangible assets & NOP is (0.85). Further, Probable error (P.E) based test of significance have been applied which revealed that significant correlation exists between tangible assets and net operating profit while no significant correlation exists between Intellectual capital and net operating profit.

(**C**) **Effectiveness of Intellectual Capital over tangible assets:** The table 3 explains the effectiveness of Intellectual Capital over tangible assets of selected sample units.

Table3: Intellectual Capital &Tangible asset to Market Value (in %)

(` in crores)

S.No.	Name of Company	2004-05	2005-06	2006-07	2007-08	2008-09	Average
1.	Aventis Pharma Ltd.	84$^{(16)}$	85$^{(15)}$	77$^{(23)}$	68$^{(32)}$	58$^{(32)}$	74.4$^{(25.6)}$
2.	Dr. Reddy's LaboratoriesLtd.	31$^{(69)}$	28$^{(72)}$	5$^{(95)}$	-37$^{(137)}$	-47$^{(147)}$	-4$^{(104)}$
3.	Novartis Ltd.	54$^{(46)}$	90$^{(10)}$	63$^{(37)}$	78$^{(22)}$	72$^{(28)}$	71.4$^{(107.4)}$
4.	Aurbindo Pharma Ltd.	17$^{(83)}$	-8$^{(108)}$	35$^{(65)}$	11$^{(89)}$	-92$^{(192)}$	-7.4$^{(107.4)}$
5.	Torrent Ltd.	49$^{(51)}$	36$^{(64)}$	63$^{(37)}$	52$^{(48)}$	12$^{(88)}$	42.4$^{(57.6)}$
6	Sun Pharma Ltd.	79$^{(21)}$	66$^{(34)}$	79$^{(21)}$	81$^{(19)}$	83$^{(17)}$	77.6$^{(22.4)}$
7	Cipla Ltd.	54$^{(46)}$	89$^{(11)}$	63$^{(37)}$	78$^{(22)}$	72$^{(28)}$	71.2$^{(28.8)}$
8	Cadila Ltd.	47$^{(53)}$	30$^{(70)}$	-6$^{(106)}$	-43$^{(143)}$	-6$^{(106)}$	4.4$^{(95.6)}$
	Overall Average	51.87$^{(48.12)}$	52.00$^{(48)}$	47.37$^{(52.62)}$	36.00$^{(64)}$	19.00$^{(81)}$	41.25$^{(58.75)}$
Calculated t-test value =0.533							
Table value (5% level of significance at 14d..f) =2.15							

The table 3 shows IC & tangible assets to market value expressed in terms of percentage (%). The inner brackets in above table represents tangible assets to market value in %. The highest % of IC to market value is noticed in Sun Pharma Ltd i.e (77.6%) followed by Aventis Pharma Ltd. (74.4%)., Novartis Pharma Ltd(71.4%).& Cipla Ltd(71.2%) while negative IC to market value is reported by Dr. Reddy's Laboratories Ltd. (-4 %) & Aurbindo Pharma Ltd. (-7.4%).

On an average Pharmaceutical Industry reported (41.25%) of IC to market value and (58.75%) of tangible assets to market value. So, it clearly indicates that tangible assets are more powerful as compared to IC. On making year wise analysis, it is observed that there is decline trend in IC to market value ratio throughout the study period except in year (2005-06), where ratio is slightly increased. The highest IC to market value ratio is noticed in year

(2005-06) i.e. 52.00% while least is noticed in year (2008-09) i.e. 19.00%. Further, the highest tangible asset to market value ratio is observed in year (2008-09) i.e. 81.00% and least in year (2005-06) i.e. 48.00%.

Further, to examine the hypothesis that there is no significance difference between mean values of IC& T.A to M.V in percentage (%), t-test has been administered (table3). The calculated value of t-test is derived (.533) where table value at 5%level of significance at 14 d.f is (2.15). So, our null hypothesis is accepted because calculated value is less than table value which indicates that there is no significant difference between % of IC & tangible assets to market value (M.V). The visible difference is only due to sampling fluctuations and not due to any major reason.

Conclusions

The following conclusions can be drawn from above analysis and discussions.

- The Indian Pharmaceutical Industry reported on an average (based on five years) amount of IC i.e (` 3065.15) crore.

- The highest absolute average amount of IC has been reported by Sun Pharma Ltd. (11998.1) crore while lowest average IC reported by Dr Reddy's Laboratories Ltd. (-134.37) crore.

- Significant correlation has been identified between tangible assets and net operating profit while not significant correlation between IC and net operating profit, as it is evident by P.E based test of significance.

- There is no significant difference between % of IC and tangible assets and % of tangible assets to market value as evident by t-test. So, null hypothesis is accepted.

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