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SHARE HOLDER FACING PERFORMANCE MEASURES IN SUPPLY CHAIN MANAGEMENT: A CASE STUDY IN BATTERY MANUFACTURING COMPANY

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Abstract

Supply Chain management (SCM) has been recognized as one of the best means by which enterprises can make instant improvements to their business strategies and operations. Companies are making fundamental changes in the organization of and technology employed in their manufacturing operations, but they ignore their costing systems. Moreover, a traditional cost system does not report the activity information needed to gain insight into how to improve the Supply Chain performance. Good information about activities helps to focus effort on improving overall performance. It helps to set improvement priorities and provide feedback about progress. Here is an attempt to draw supply chain performance measurement from shareholder perspective using information available in balance sheet and profit & loss account. The study has been made in a leading battery manufacturing firm in India.

Keywords: Supply Chain, performance measures, Supply Chain Operations Reference (SCOR) model.

1. INTRODUCTION

During the last few years, the focus has shifted from the factory level management of supply chains to enterprise level management of supply chains (Joel D. Wisner, G. Keong Leong, Keah-Choon Tan, 2005). World-class firms recognize the

central role of performance measurement in their success and are often compulsive about their performance measurement efforts. Supply chain management aims to reduce costs, risks and lead times associated with these transactions, thus adding value. It seems clear from the literature that the information available from a traditional

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costing system is not sufficient for the continuous improvement programs that are essential to competitiveness in rapidly changing market environments. Generally, the balance sheet and profit & loss account of any firm will provide raw information showing net profit/loss after all deductions. Here, we made an attempt to calculate some performance measures that reflects the total supply chain management effectiveness of the firm from stake holder's point of view. The calculations are very simple and are represented as percentages, which can be clearly understood by stakeholders. At the same time, these figures provide some basis for management to continuously improve its supply chain performance. By continually monitoring some of these measures, management can take better decisions regarding financial commitments. This also

provides basis for improved inventory control, asset utilization, financial leverage, productivity and so on.

2. LITERATURE REVIEW

The supply chain or the successive stages of production for a firm will vary by firm and industry. The stages are sometimes referred to as the value chain and thus use is made of such terms as supply chain management or value (sometimes value added) chain management (Christopher Maule, 2006). In e-commerce era, companies can build up supply chain relationship via internet technologies. Facing the severe global competition, how companies sustain in volatile relations becomes an essential supply chain management issue. Among

Table 1: The scor card template-Share holder facing performance measures.

S.No	Level-1 performance measure	Working definition
1.	Gross margin	It is calculated by subtracting cost of goods from Revenue and is often expressed as % of remaining dollars to sales.
2.	Operating Income	It is calculated by subtracting cost of goods and sales, general and administrative (SG&A) expenses from revenue and often expressed as % of remaining dollars to sales.
3.	Net Operating Income	It is calculated by subtracting cost of goods, sales, general and administrative (SG&A) expenses and taxes from revenue and often expressed as % of remaining dollars to sales.
4.	Economic Profit	It is calculated by subtracting cost of goods, sales, general and administrative (SG&A) expenses, taxes and cost of capital from revenue and often expressed as % of remaining dollars to sales.
5.	Return On Assets	It is calculated by dividing Net Operating Income by Total Net Assets.
6.	Return On Sales	It is calculated by dividing Net Operating Income by Total Revenue.
7.	Return On Investment	It is calculated by dividing Net Operating Income by Total Invested capital.
8.	Earnings Per Share	It is the adjusted income available divided by diluted weighted average shares outstanding.

literatures in exploring the individual effects of trust, switching cost, and information sharing on supply chain performance, the interactive effects of these factors have not been investigated yet (Fu-ren Lin, Yi-Pong Lo, Yu-Wei Sung, 2006). Recent developments in supply chain management information systems have greatly increased the ability of firms to integrate processes, systems, and information with their supply chain partners (Tim Mc Laren, 2006). The level of supply chain integration was measured for each dimension by having respondents from each case choose the statement that best describes their case's current situation. Each statement corresponded to the Functional Focus, Internal Integration, Linked Network, and Integrated Network levels of supply chain integration (Chopra, S. and Meindl, P., 2001). The performance of a supply chain can be evaluated in many ways, e.g., higher flexibility, customer orientation, customization, and better cost-effectiveness (Martin Smits, Willem-Jan van den Heuvel, Wim Huisman (2006).

In recent years, organizational performance measurement and metrics have received much attention from researchers and practitioners. The role of these measures and metrics in the success of an organization cannot be overstated because they affect strategic, tactical and operational planning and control. Performance measurement and metrics have an important role to play in setting objectives, evaluating performance, and determining future courses of actions (A. Gunasekaran, C. Patel, Ronald E. McGaughey, 2004).

One of the more recognized methods for integrating supply chains and measuring their performance is Supply Chain Operations Reference (SCOR) model

developed in 1996 by the Supply Chain Council, a non profit global organization.(Joel D. Wisner, G. Keong Leong and Keah-Choon Tan, 2005) This organization has provided performance attributes relative to customer, organization and share holder. In this paper, we made an attempt to measure the share holder facing performance measures taking the attributes from "The SCOR card Template" (Supply Chain Technology news, March, 2002).

Conventionally, the performance of any firm is in general assessed in terms of production quantities, sales volume and profit after tax, book value of share and earnings per share etc. The annual reports of the firms provide the information about the above in the form of comparative statement showing performance in past few years. But this raw information is not sufficient to assess the supply chain performance of the firm. Now a day, the need arose that the firms should follow Activity Based Costing (ABC) systems to express the performance indicators so that its performance can be assessed and necessary steps could be taken to improve the performance (A.Gunasekaran, et al, 2005).

3. PRESENT SYSTEM

The company produces Industrial and automotive batteries and supplies to various sectors like telecom, railways, power controls and exports. The company has adapted and partially implemented supply chain strategy for the past two years. The company has not totally integrated its supply chain activities. They are concentrating on few measures such as inventory number of days (RM, WIP and FG), percentage of non moving inventory to total inventory,

Table 2: Supply chain performance measurement (SHARE HOLDER FACING)

Table – 2: SUPPLY CHAIN PERFORMANCE MEASUREMENT (SHARE HOLDER FACING)								
COMPARATIVE STATEMENT FOR YEARS 2001 - 2007 (figures in rupees)								
Sl. No	Particulars	Year ended 31-03-2001	Year ended 31-03-2002	Year ended 31-03-2003	Year ended 31-03-2004	Year ended 31-03-2005	Year ended 31-03-2006	Year ended 31-03-2007
1	Net Sales	1,550,126,420	1,882,197,254	1,736,532,458	1,759,017,304	2,368,057,275	3,918,558,196	6,139,861,593
2	Cost of Goods Sold	1,138,770,578	1,478,594,148	1,287,612,678	1,323,570,460	1,974,090,758	3,065,262,755	4,674,262,142
3	Gross Profit	411,355,842	403,603,106	448,919,780	435,446,844	393,966,517	853,295,441	1,465,599,451
4	GP as % of Net sales	26.54	21.44	25.85	24.76	16.64	21.77	23.87
5	Operating Income	170,180,904	122,196,445	81,948,246	-39,428,691	3,200,315	271,743,852	646,360,149
6	OI as % of Net sales	10.98	6.49	4.72	0	0.14	6.93	10.53
7	Earnings Before Interest & Tax	231,062,203	181,698,164	111,789,130	2,152,902	66,243,764	345,262,289	744,098,953
8	EBIT as % of Net sales	14.9	9.65	6.44	0.12	2.8	8.81	12.12
9	Net Operating Income	201,241,636	116,579,781	68,458,306	4,531,162	17,433,171	210,263,796	502,549,080
10	NOI as % of Net sales	12.98	6.19	3.94	0.26	0.74	5.36	8.18
11	Economic Profit	195,777,055	109,909,135	64,680,493	2,776,827	15,984,744	196,828,281	471,624,787
12	EP as % of Net sales	12.63	5.84	3.72	0.16	0.68	5.02	7.68
13	Net Fixed Assets	746,159,247	1,094,716,045	1,087,119,186	1,001,400,993	961,523,483	1,091,696,676	1,629,972,178
14	Net Current Assets	926,104,338	656,859,207	703,253,087	829,536,977	973,684,231	1,099,700,330	2,187,920,684
15	Total Net Assets	1,672,263,585	1,751,575,252	1,790,372,273	1,830,937,970	1,935,207,714	2,191,397,006	3,817,892,862
16	Return On Assets	12	6.66	3.82	0.25	0.9	9.59	13.16
17	Total Revenue	1,611,007,719	1,941,698,973	1,766,373,342	1,800,598,897	2,431,100,724	3,992,076,633	6,237,600,397
18	Return On Sales	12.49	6	3.87	0.25	0.72	5.26	8.06
19	Return On Investment	10.77	5.86	3.38	0.22	0.8	8.37	12.63
20	Earnings per share	19.64	16	6.5	1.22	7.63	20.94	41.31

inventory turn over ratio, percentage of order fulfillment from suppliers, percentage of order package distribution, percentage release of MPS on time, percentage production compliance and percentage delivery compliance. The firm is trying to implement some more performance measures as a part of its Continuous Improvement Program (CIP). So far the firm has not focused especially on share holder facing performance measures; we made an attempt to estimate its past performance to provide guidelines for future developments in the corresponding aspects.

4. METHODOLOGY

By collecting the data regarding various

cost elements from annual reports of previous years, financial analysis has been made using the following standard financial ratios and relations (Financial Management, I.M.Pandey, 2000) & SCOR Card Template (Supply Chain technology News, March, 2002).

1. Net sales = Gross sales – Excise duty on sales

2. Cost of goods sold = Direct material cost + Direct labor Cost + Manufacturing expenses + depreciation + Duties and taxes on raw materials purchased

3. Gross Profit = Net sales – Cost of goods sold

4. Operating Income = Gross Profit – Selling, General and Administrative expenses

5. Earnings Before Interest and Taxes =

Operating Income + Other Income

6. Net Operating Income = Earnings Before Interest and Taxes – Taxes

7. Economic Profit = Net Operating Income – Interest on capital

8. Net Fixed Assets = Net Block + Capital Work In Progress

9. Total Net Assets = Net Fixed Assets + Net Current Assets

10. Return on Assets = Net Operating Income / Total Net Assets

11. Total Revenue = Net sales + Other Income

12. Return on Sales = Net Operating Income / Total Revenue

13. Return on Investment = Net Operating Income / Total Invested Capital

The performance measures are calculated using above relations and the results are shown in the Table 2 .

5. GRAPHS

The graphs of the above performance metrics show how the values of particular measure are changing with time.

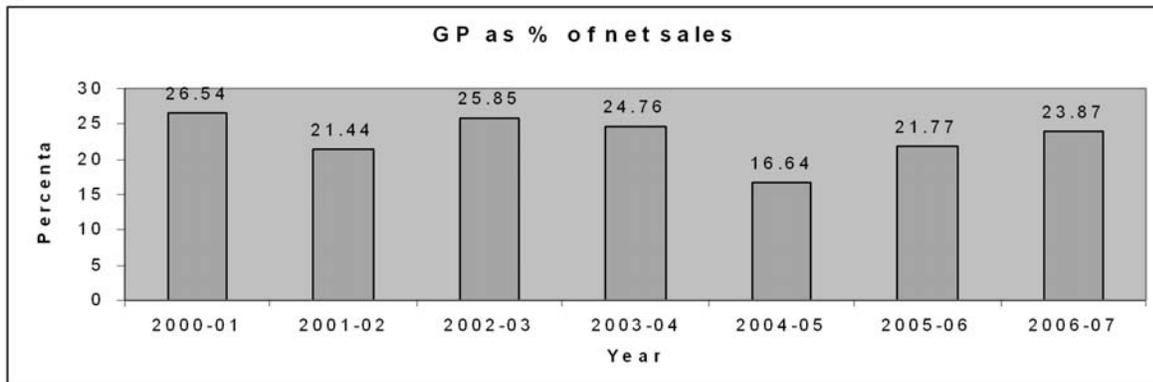


Figure 1. Gross Profit as % of Net Sales

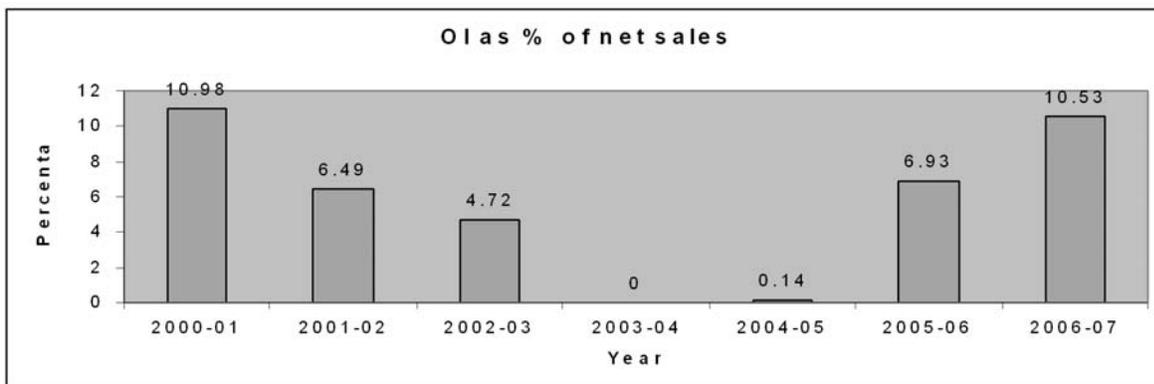


Figure 2. Operating income as % of Net Sales

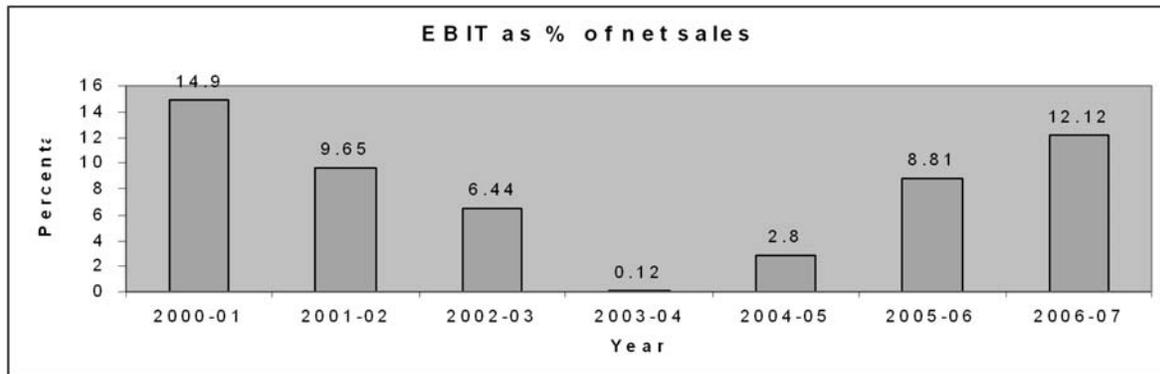


Figure 3. EBIT as % of Net Sales

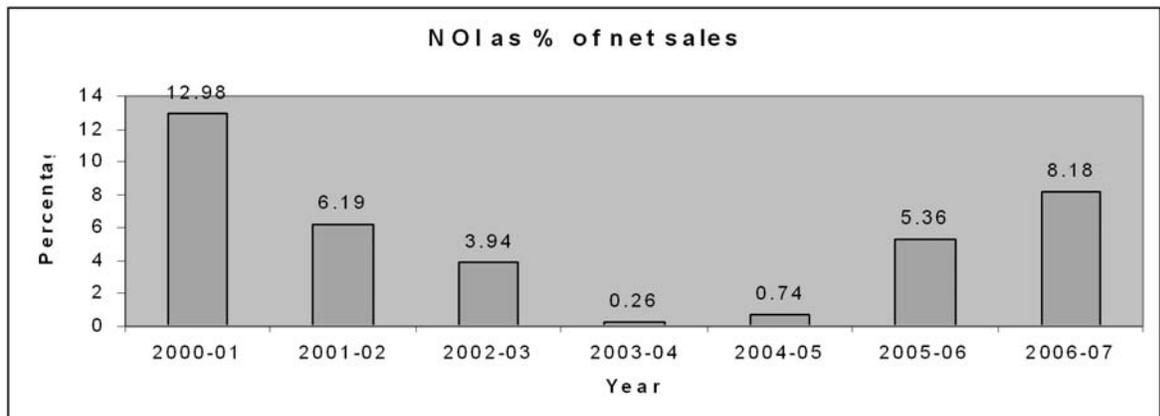


Figure 4. Net Operating Income as % of Net Sales

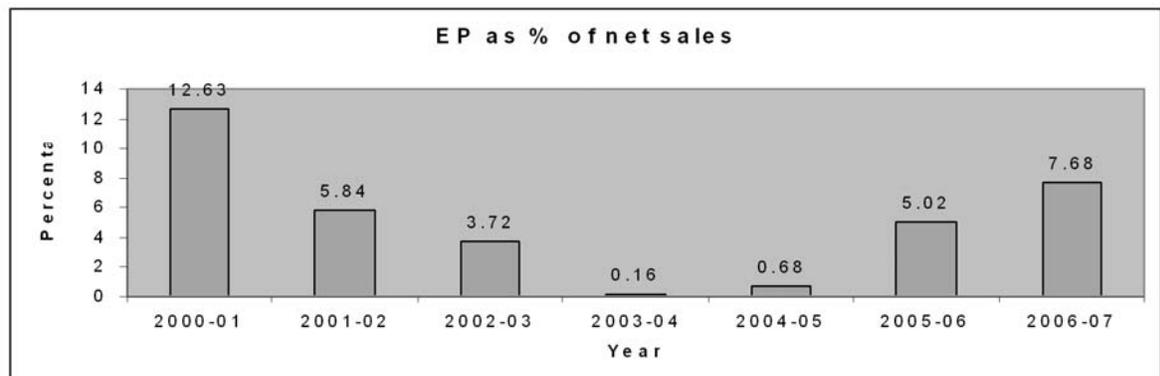


Figure 5. Economic Profit as % of Net Sales

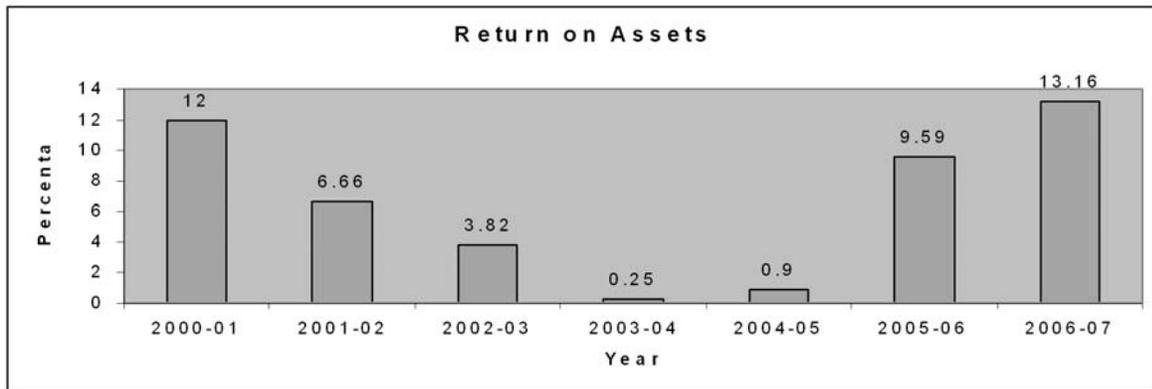


Figure 6. Return on Assets as % of Net Sales

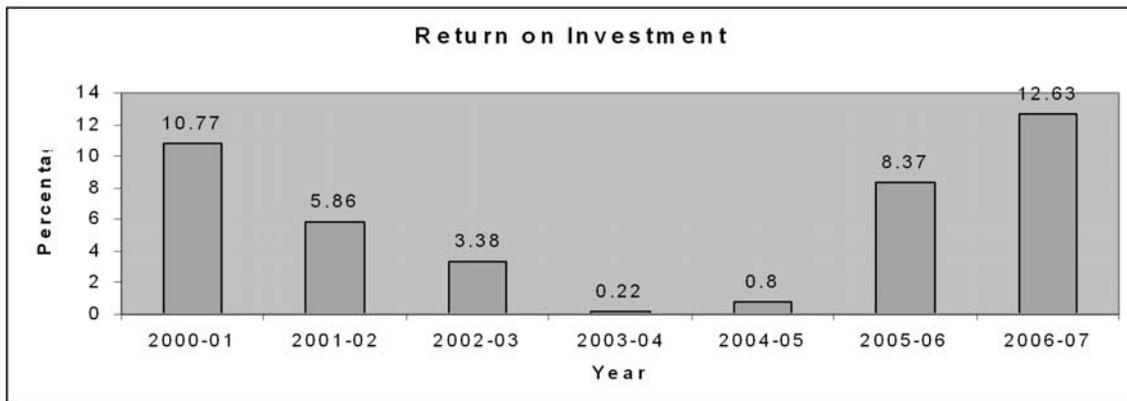


Figure 7. Return on Investment as % of Net Sales

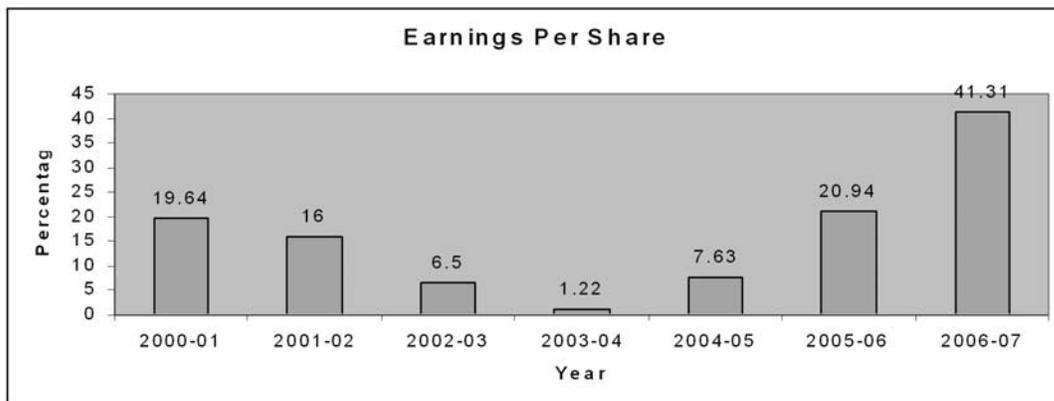


Figure 8. Earnings per share

6. INFERENCE FROM GRAPHS

From the graphs it is observed that, the percentage values of the performance indicators are declining (except for Gross Profit as % of net sales) from the financial year 2000 – 01 to 2003 – 04. The reasons for declination of these values are due to:

1. Increase in direct material cost, selling, general and administrative expenses
2. Operating Income has become even negative during the financial year 2003 – 04 because of the above reason
3. Poor working capital management
4. High inventory levels and hence low inventory turn over ratio
5. Variance between physical stock and record stock was significant
6. Long procurement lead times as major proportion of raw materials are imported
7. No tracking of consignments during transit (both for raw materials and finished goods to ware houses)
8. Not having vendor managed inventory system or adoption of JIT concept
9. Not having advance shipment notification and prior documentation before receipt of consignments at port
10. Not having hedging for imported raw materials (A class items) as well with customers regarding price protection
11. Gaps in demand management – no formal trade off between demand and supply. The variance between actual demand and forecast demand is significant.
12. No scientific approach to capture online/current demand and built it into planning and process review with marketing
13. Dispatch vehicle loading factor has not been improved

7. PRESENT DEVELOPMENT ACTIVITIES

The firm has overcome some of the above mentioned deficiencies by taking appropriate operational decisions and improved its performance measures by refining the following:

1. By improving the sourcing and procurement strategies – staggered deliveries of imported raw materials (fortnightly deliveries).
2. By reducing inventory days of raw materials, WIP and Finished goods
3. By improving the inventory turn over ratio
4. By establishing ancillary units to produce sub contract items within the company premises
5. By improving vehicle loading factor for finished goods dispatch
6. By tracking positions of the dispatch vehicles
7. By adapting price escalation with one of its customers (railways) to take care of price fluctuations of batteries due to variations in the prices of major raw materials.

7. SCOPE FOR FUTURE DEVELOPMENT

1. The firm can adapt RFID technology to trace its products during manufacture to find out actual status of work in process, finished goods inventory and during transit to ware houses. Also this technology helps in tracking input raw material containers in ships through global positioning system (Ashwani Kumar, 2007)..
2. Adaptation of hedging for both imported raw materials (lead alloys),

separators, etc and other A class items to protect costs. Also the firm can go for price contracts with its customers of different customer segments such as telecom, power controls, etc.,

3. The firm must focus on information technology in its operations to totally integrate the firm with all its supply chain partners.

8. CONCLUSION

The above analysis gives clear picture of the supply chain performance of the firm not only from share holder's point of view but also it reflects the operational performance. If activity based costs are available, some of these metrics can be frequently calculated to closely monitor the performance of the firm. By having cost data on a quarterly basis, the performance measures discussed above can be tracked and the status of the company in over all supply chain can be assessed. Appropriate operative as well as financial decisions can be taken to improve the performance of the firm and also its supply chain.

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