

CHAPTER 2:

LITERATURE REVIEW

2.1 Introduction:

The previous chapter deals with an introductory part containing the overall prospect of the study and its goal, contributions, and scope, etc. This chapter presents a review of relevant literature on cost behavior, cost efficiency, firm performance and the strategies, and how the resource-based theory have contributed to the selection of an appropriate strategy. It focuses on the overall understanding of the conceptual structure, framework, and challenges of adopting a better cost structure in India. The cost structure has undergone periodic changes due to change in global economic environments and policy makings by developed countries.

2.2 Cost Components:

Cost components calculated prices into specific components, which indicate meaningful matters for the user, such as user-defined cost structure, sales prices, and valuation prices. In general, there are four main cost components, namely, Prime Cost, Works Cost, Office Cost, and Total Cost. Industry wise cost components are differing.

Cable (1973) and Sutton (1974) both found an inverted-U-shaped relationship between advertising to sales ratios and concentration ratios for samples of consumer goods industries (in consumer goods industries, advertising tends to be the most obvious expression of differentiation). Advertising intensity reached a peak in oligopolistic and duopolistic markets.

Harris and Hazard (1992) viewed that a pivotal element is the profile of cost structure of the firms. The cost structure is measured in terms of proportions of fixed costs and variable costs of a firm. Consciousness about the impact of cost structure on firm performance is an essential element in decision making.

Evidence in Anderson (1995) is the impact on overhead costs of experience producing a complex mix of products. A study, conducted by Jaffe and Palmer (1997), estimated the relationship between total R&D expenditures and pollution abatement costs. They found a positive link with R&D expenditures (an increase of 0.15% in R&D expenditures for a pollution abatement cost increase of 1%), but no statistically significant link with the number of patents.

Beiting et al (2011) conducted a study on superior performance on corporate social responsibility (CSR) strategies. The findings of this study showed that the relation is driven by both the social and the environmental dimension of CSR.

2.3 Cost Behavior:

The understanding of cost behavior is fundamental to management accounting. The traditional idea of cost behavior is that costs can be treated as fixed or variable based on their relationship to volume or a related cost driver.

In cost accounting literature, cost behavior can be classified into two, namely fixed costs and variable costs. Variable costs proportionally change by changing in driving activities; the magnitude of the change in cost only depends on the rate of change in activity level, not on the direction of change (Noreen and Soderstrom, 1997).

The relationship between costs and activity was observed by Solomon and Stabos in the 1960s and 1970s. Subsequently, a number of theories have been advanced. Mintz (1999), however, says that, if there is a disproportionate increase in costs against sales, financial statements will show a weakness in management control. This analysis may be misleading, because if SGA expenses are sticky, as sales increase a proportional increase in costs will occur, but if sales decrease, there will not be a proportional decrease in costs. Noreen (1997) stated that costs are either fixed or variable, depending on the level of activity; variable costs change based on a change in the level of activity.

Examining cost behavior has important implications for managers making decisions as well as for understanding and predicting firm performance. The traditional view of cost behavior has been that the costs are either fixed or variable with respect to changes in volume. This view holds that changes in costs are driven solely by the magnitude of change in the cost driver. The direction of change in the cost driver has no role to play with this model. Several studies (notably, Noreen and Sorderstrom, 1994, 1997) have been discussed regarding the limitations of models of cost behavior that are based on the assumption of a linear cost structure.

Hamermesh and Pfann (1996) provide a comprehensive discussion of the econometric implications of asymmetric adjustment costs for production inputs.

We have used “sticky” throughout the study in the sense of the management accounting literature; that is, sticky costs are those that respond asymmetrically to activity changes.

Cooper and Kaplan (1998) asserted that cost stickiness occurs when managers direct a supply of contract costs that is not cost-effective. The managers may decide to keep all resources in the way; while a firm may report a decrease in revenue, costs do not decrease like revenue does.

Several studies have found that the increase of cost is higher when the volume of activity increases compared to the cost decline during the volume of activity decreases (Cooper and Kaplan, 1998).

Anderson, Banker and Janakiraman (2003) (hereafter referred to as ABJ) conducted a study to investigate whether the actual behavior of costs differs from the traditional view of costs being simply fixed or variable with respect to changes in activity levels. ABJ argued that managers act rationally to maximize expected profits and based on their perceived likelihood of reversal of demand decline, managers trade off the costs of reducing capacity with the costs of maintaining excess capacity. ABJ present evidence showing that when sales decrease in the current period, costs decrease less than proportionately compared to when sales increase in the current period. ABJ (2003) document asymmetric cost behavior in Selling, General and administrative costs, conditioned on the direction of contemporaneous sales changes. They show that costs decrease less when activity levels decline than they rise when activity levels increase and they refer to this as the ‘sticky’ behavior of costs. ABJ argued that it is also important to consider the direction of sales change. In their analyses of cost behavior, ABJ demonstrates that there is an asymmetric cost behavior for periods when sales increased compared to periods when sales decreased. They show that in proportion to changes in sales, costs increase more during periods of sales increases than they fall in periods of sales decreases. They termed this as the ‘sticky behavior’ of costs. ABJ’s analysis highlighted a major deficiency of the traditional model.

A study conducted by Anderson et al. (2003) on 762 firms over a 20-year period showed a 0.55% increase for a 1% increase in SGA expenses, but a 1% decrease

for a 0.35% decrease in SGA. The findings of the study indicate that executive costs will show different reactions from ascending and descending changes in sales revenue. In other words, cost stickiness means a possible increase in costs for an increase in revenue is much more effective than a simultaneous decrease in revenue.

Suberamaniam and Weidenmier (2003) developed the basics of cost stickiness dependence on the cost of items. This stickiness contributes to the dimensions of management behavior. Anderson et al. (2003) and Suberamaniam & Weidenmier (2003) found that this stickiness is connected to the economy. Noreen and Soderstorm (1997) do not share this view and Cooper and Kaplan (1998) believe the behavior of costs results from management characteristics. Their fundamental theory says that cost stickiness results from a series of managing contracts to increase resources (raw material, human capital, etc.), the violation of which will result in a loss (decrease in demand). Managers may decide to retain their resources. Firms may report a decrease in revenue, but the costs will not decrease. Other research on the difference in intensity of cost stickiness in different sections of an organization clearly shows that intensity is related to the core sections.

A study, conducted by Mark (2010), focused on costs stickiness for California Airways. For this study monthly data from June 1988 to December 2003 at 61 offices of California Airways was used. The study finds that the stickiness was substantial for operating costs, but not for wage costs. In addition, wage costs showed a faster reaction to a decrease in activity to an increase.

Anderson et al.(2003) highlighted the intensity difference in cost stickiness, between industries and a similar difference between operating costs mainly Marketing expenses, Research & development cost, and wages.

Extending the ABJ model, Balakrishnan, et al. (2004) show that other factors such as the magnitude of the changes in activity levels and the levels of capacity utilization may also influence the proportionality of the cost response.

Calleja (2006) analyzed cost stickiness using data from companies in the US, Britain, France and Germany. His results showed that an increase of 1% in sales increased operating costs 97%, and a decrease 1% in sales decreased operating

costs 91%. He also found that the intensity of cost stickiness in France and Germany was higher than in the US and Britain.

A study was conducted by Shafeyi and Mohammadzadeh (2009) to compare the behaviour of cost stickiness in Iranian firms with that of companies. They replaced the traditional model with cost stickiness, resulting in a relation between activity level changes and sales levels. Finally, they observed cost stickiness and show that, if 1% increase in SGA expenses resulted from growth in the level of sales only 0.43%.

Weiss (2010) articulated that, sticky cost means, if cost increase to a greater extent for a one percent increase in sales and decrease lesser extent for a one percent decrease in sales activities. Conversely, costs are anti-sticky. Similarly, costs are anti-sticky, when cost increases to a lesser extent for a one percent increase in sales then they decline to a one percent decrease in sales.

Poorzamani and Bakhtiary (2012) conducted a study in the Tehran Stock Exchange to investigate the impact of the inflation rate, short-term and long-term interest rates on operating cost stickiness. They observed that there is a meaningful negative relation between inflation rate and operating cost stickiness, and a meaningful positive relation between short-term interest rates and operating cost stickiness but there is no meaningful relation between long-term interest rates and operating cost stickiness.

2.4 Firm Size and Firm Performance:

The firm size can be measured in several ways namely, sales, employees, assets or value add features, MCap, etc. (Kumar et al,1999). Kirchhoff and Norton (1992) compared three measures (employment, assets, and sales) and showed that they are interchangeable because they produce the same results when tested over a seven-year period. Forbes Global 2000 uses four measures (assets, sales, profits, market cap) to rank all the large companies in the world, and Fortune 500 uses two measures (sales and profits). Both of them employ sales and profits, but profits seldom appear as a proxy for firm size in academic research. Every firm size measure exhibits advantages and disadvantages, and no measure can capture all characteristics of firm size. In general, total assets measures total firm resources;

market capitalization involves firm growth opportunities and equity market condition; total sales measures product market competition. Moreover, Hart and Oulton (1996) argue that net assets can be negative but sales positive. Because every measure has pros and cons, Hart and Oulton (1996) suggest in practice which measures to use depends on data availability.

According to Ali (2004), firm size is assumed to be a proxy of firm resources and capabilities. The effect of economies of scale can explain the increment of international competitiveness. Larger firms can lower average production costs (cost per unit of output) as output increases, and have lower average unit costs than 'smaller' firms. Large firms have the advantages of economies of scale (Gabbitas and Gretton, 2003). Larger firms can also take the edge of the importance of R&D expenditure, risk taking power and possible price discriminatory behavior (Patibandla, 1995). Mahoney et al (1972) described size influences coordination and performance. Firm size influences the strategy development process, as larger firms can afford to invest more in information gathering on markets abroad. They have the resources to evaluate the potential more realistically and can realize the benefits before any small firm or startup could (Phan, 2009). Hitt & Ireland (1984) indicate that the firm size has moderating effects on the relationships of firms' specific distinctive competencies. Onyeiwu (2003) identifies firm size as one of the significant determinants of core competencies. Based on the above reviews, the positive effect of firm size to competences is explored.

One of the most important concepts of business strategy is firm performance. Again, performance measurement refers to the process of measuring the efficiency and effectiveness of the firm (Neely, Gregory & Platts, 1995).

Two types of measures of the firm performance; First, financial measures or again objective measures, i.e. return on assets (ROA), Return on sales (ROS), Return on equity (ROE) and etc. Second, non-financial measures, i.e. Shareholders' satisfaction, Employees' satisfaction, Customers' satisfaction and etc. (Harter, 1992; Venkatraman & Ramanujam, 1986; Ong & Teh, 2009). ROA has been used by Erkens et al. (2012) as a measure of firm profitability during the financial crisis.

Stephen and Mary (2002) argue that performance is accumulated end results of all the organization's work processes and activities. According to Richard et al. (2009) firm performance bound three specific areas of firm outcomes, i.e. financial performance, product market performance and shareholder return. Liptons (2003) proposes that firm performance is the ability of the firm to persuade.

Hamann et al (2013) contend that, firm performance as an important dependent variable. Firm performance is a relevant element in management research and it is one of the most commonly used as the final dependent variable (Richard et al., 2009) in various fields of study (Cho & Pucik, 2005), (Sila & Ebrahimpour, 2005) and (Wiklund & Shepherd, 2003).

Miller and Swope (2006) state that performance assessment can be structured around seven areas, i.e. effectiveness, productivity, quality, customer satisfaction, efficiency, innovation and financial durability.

According to Adams and Neely (2002), the structure of the Performance Prism, stakeholder satisfaction, as well as its contributions act at the core of the search for success in an organization.

According to World Business Council for Sustainable Development (WBCSD) and the United Nations Environment Programme Finance Initiative (2010, March), the term ESG performance is global and has emerged to describe the environmental, social and corporate governance issues investors are considering to comprehensively understand corporate behaviour. Companies that are oriented towards ESG and address ESG issues achieve better growth, cost savings, profitability, strengthening of stakeholder relations and improving their brand and reputation.

2.5 Cost Efficiency:

There are two methods to measure the efficiency, parametric and nonparametric. Parametric estimate the efficiency of statistical methods. On the other hand, non-parametric methods rely on linear programming to calculate linear segments related to the frontier.

Farrell (1957) laid the foundation to measure efficiency and productivity studies. He highlighted on two issues, how to define efficiency and productivity, and how to calculate the benchmark technology and efficiency measures. Inefficiency is defined as the distance of a firm from a frontier production function accepted as the benchmark. The basis for this measure is the radial contraction or expansion connecting inefficient observed points with (unobserved) reference points on the production frontier. If a firm's actual production point lies on the frontier then it is perfectly efficient. If it lies below the frontier, then it is inefficient. Farrell proposed efficiency consists of two components, i.e. technical efficiency and allocative efficiency. The former reflects the ability of a DMU to minimize input use as to produce a given amount of output. The latter reflects the ability of a DMU to use inputs in optimal proportions, given their respective prices and the production technology. Together, these two measures represent a total efficiency measure (Coelli et al, 1998).

The Empirical Literature on Efficiency: DEA applications are quite widely documented in the academic literature and vary with regard to what the Decision Making Units are. That may be public or private companies, departments within the companies, or even companies across countries.

There are a number of producers in DEA. Each producer has a different level of inputs and gives a varying level of outputs. DEA models compute the efficiency of a DMU relative to similar DMUs in order to determine a 'best practice' frontier.

The Charnes, Cooper, and Rhodes (CCR) model developed in 1978 for measuring the efficiency of Decision Making Units. CCR (1978) made a direct connection between a productivity index in the form of a weighted sum of outputs on a weighted sum of inputs, and the Farrell technical efficiency measure (in the case of constant returns to scale). Finding weights by the maximization of such a productivity ratio subject to best practice and normalization constraints, the so-called ratio form of CCR, corresponds to the natural science-engineering definition of efficiency.

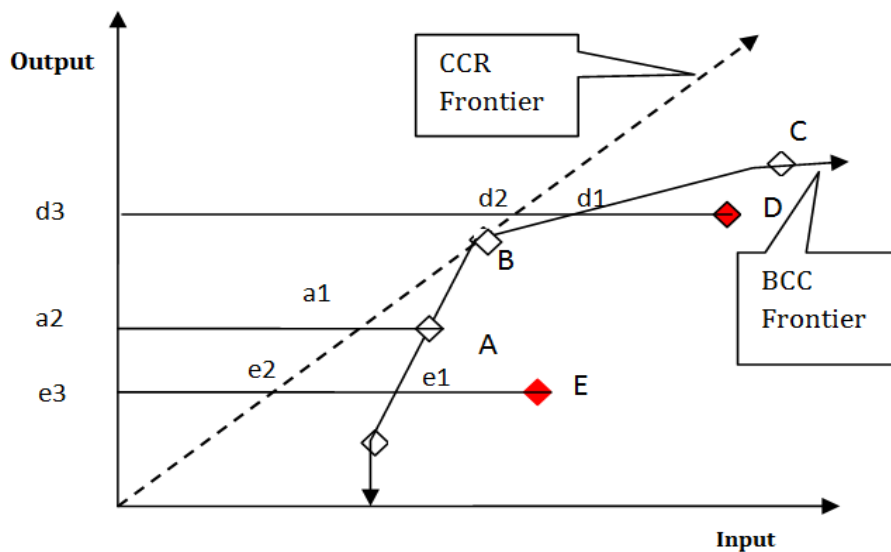
DEA uses the linear program as the base of measurement (Fiorentino et al. 2006), that allows comparing the efficiency of a combination of several units of input

(Cooper et al., 2000), and several units of output (Casu and Molineux, 1999). The advantage of DEA compared with the traditional financial ratio is that DEA is able to measure the exact relationship between various input and output that cannot be explained by the traditional financial ratio (Wang et al., 2004).

CCR and BCC Models

Two most popular and widely used basic DEA models i.e. input oriented CCR model and input-oriented BCC models to estimate the relative technical efficiency. CCR model measures the efficiency called overall technical efficiency (OTE) and BCC model measures efficiency called pure technical efficiency (PTE). OTE and PTE allow measuring scale efficiency (SE). $SE = OTE/ PTE$. *Figure 2.1* illustrates the CCR and BCC models in a simple single-input along with the derivation of the concept of OTE, PTE, and SE. The CCR model assumes CRS so that all observed production combinations can be scaled up or down proportionally.

FIGURE 2.1: CCR AND BCC FRONTIER



The CRS frontier is derived simply by the ray through the origin passing through point B. The BCC model, on the other hand, allows for VRS and is graphically represented by the piecewise linear convex frontier. The areas to the right of the two frontiers represent production possibility set. CCR and BCC models define different production possibility sets and efficiency results. As an example, the input-oriented efficiency of unit ‘E’ in *Figure 2.1* is given by e_3e_2/e_3e as yielded by the CCR model and e_3e_1/e_3e by the BCC model. The shape of the VRS frontier is

the piecewise boundary and closer to observed inefficient points which result in BCC efficiency score higher or equal to corresponding CCR score. The rationale for this is that CCR efficiency incorporates scale efficiency while BCC does not.

DMUs ‘A’, ‘B’ and ‘C’ are BCC efficient, only ‘B’ is CCR and BCC efficient. DMUs ‘D’ and ‘E’ are both CCR and BCC inefficient and their input oriented projection individualizes reference points ‘d₁’ and ‘e₁’ on VRS frontier, ‘d₂’ and ‘e₂’ on CRS frontier. The difference between ‘d₁’ and ‘d₂’, ‘e₁’ and ‘e₂’ are due to control for scale. The ratio of e_3e_2 / e_3e_1 and d_3d_2 / d_3d_1 represents the scale efficiency of DMUs ‘E’ and ‘D’. Here it is to be pointed out that the DMUs ‘D’ and ‘E’ are characterized by opposite scale properties. DMU ‘E’ is radially projected on an increasing returns-to-scale (IRS) facet of the VRS frontier, while DMU ‘D’ is radially projected on a VRS surface where decreasing returns-to-scale (DRS) holds. It is important to note that if a DMU is fully efficient under both CCR and BCC score, the DMU is said to be operating in the most productive scale size i.e. scale efficiency is 100% i.e. region where CRS prevails.

However three types of DEA efficiency measures of DMUs ‘E’, ‘A’ and ‘B’ are presented below-

TABLE 2.1: DIFFERENT EFFICIENCY MEASURES UNDER DEA MODELS

Efficiency Type	DMU-‘E’ (CCR and BCC inefficient)	DMU-‘A’ (CCR inefficient but BCC efficient)	DMU-‘B’ (CCR and BCC efficient)
OTE	$e_3e_2 / e_3e_1 < 1$	$a_2 a_1 / a_2 a < 1$	$b_1b / b_1b = 1$
PTE	$e_3e_1 / e_3e < 1$	$a_2a / a_2a = 1$	$b_1b / b_1b = 1$
SE	$e_3e_2 / e_3e_1 < 1$	$a_2 a_1 / a_2 a < 1$	$b_1b / b_1b = 1$

Sherman (1986) applied DEA in their study to analyze the medical-surgical areas of seven hospitals and was able to identify inefficient units that were not previously identified by regression or single ratio analysis and locate the sources of inefficiency. Ahn et al (1989) used DEA in efficiency analysis for public institutions of higher learning in Texas; while Charnes (1989) compared DEA, ratios and regression systems for efficiency measurement of electric cooperatives.

Epstein and Henderson (1989) describes the DEA method as a linear programming based technique that transforms multiple input and output measures into a single comprehensive measure of productivity efficiency.

An early study that compares alternative frontier techniques is Ferrier and Lovell (1990). They analyze the cost structure of 575 US banks for the year 1984 using both the SFA and DEA methodologies. They find higher efficiency scores with DEA compared to SFA, namely 80% and 74%, respectively. They conclude that the DEA is sufficiently flexible to envelop the data more closely than the translog cost frontier.

Kleinsorge et al. (1992) conducted a longitudinal study of the carrier by using DEA model, Clarke and Gourdin (1991) followed DEA for comparison of vehicle maintenance activities of maintenance shops.

Three types of applications have been recently reported in the DEA efficiency literature. Lovell (1993) has surveyed the literature on the traditional applications in such areas as air force maintenance units, bank branches, school and colleges, health clinics, hospitals, highway maintenance, municipalities, national parks, post offices and urban transport. The second type of applications involves a comparison of DEA efficiency with other measures of efficiency such as gross profit margins, rates of return etc. particularly for profit-oriented enterprises. For example, Schefczyk (1993), Stewart (1996) and Sengupta (1996, 1997) have discussed these issues for semi-public or private enterprises. The third type of applications explores the econometric aspects of a stochastic production or cost frontier in the framework of a DEA type model.

According to Yeh (1996), the measure of efficiency used by the DEA is the ratio between the weighted sum of the products and the weighted sum of the inputs. For each DMU, a set of weights is determined in order to show the best possibility.

Allen and Rai (1996) estimate the overall cost function of 194 international banks (from 15 countries), over the period 1988-1992, in order to determine the inefficiencies of inputs and outputs. According to their analysis, the inefficiencies of inputs are higher than those of outputs. Another result is that the DFA approach overestimates the size of inefficiency scores, compared to the SFA approach. Large

banks have the highest value of the inefficiency of inputs (27.5% of the cost) and significant levels of diseconomies of scale. For the other banks, the inefficiency is of 15% of the cost, with reduced economies of scale for small banks.

Thompson et al (1996) conducted a study of major U.S. oil companies. DEA was applied to 12 years of data for 14 major oil companies. Both their efficiency and profit potential were measured in exploration and production. Findings showed that unique resource waste (primal slack) and modeled price (dual multiplier) pairs were identified for in all but one of the inefficient firms- that is 98% of the inefficient units. Unique primal slacks mean that the projections of the respective inefficient DMUs onto the DEA-efficient frontier are unique.

Sueyoshi (1996) has explored the problems of estimating a cost frontier by econometric techniques, by first determining the distribution of efficiency from the set of the DEA models. His application is to analyze the divestiture of Nippon telegraph and telephone company over the years 1953-1992. This type of application needs to be extended further for managerial planning and control. The techniques of filtering the stochastic input, output data set and using the more systematic data components offer much promise here.

According to Berger and Mester (1997), the ratio of cost efficiency is the proportion of costs or resources used efficiently. Furthermore, when banks generate cost efficiencies of 70%, it means that there has been a waste of 30% of the costs when it is compared to best practice condition. Distance (range) of the efficiency is 0 to 1. The result which is equivalent to 1 shows that the bank has reached best practice.

Narasimhan et al (2001) refers to DEA as a nonparametric multi-factor productivity analysis model that evaluates the relative efficiencies of a homogenous set of decision-making units in the presence of multiple input and output factors. The information provided by DEA may possess a major advantage over benchmarking and other techniques where only one measure can be evaluated at a time, gaining no insight into overall efficiency (Easton et al, 2002).

Hawdon (2003) explored some of the policy developments, which affect the efficiency of resource use in the gas industry, and used data envelopment analysis

to measure relative performance at the individual country level. He used gas sales and number of customers as output variables. Labor force involved in gas production activities and capital services in the pipeline system was used as the input variables. A total of 33 countries were considered. The efficient units were identified as well as conclusions were drawn that governmental reforms towards gas industry contributed positively towards the efficiency level of companies operating in those countries.

Ruggiero (2004) showed that the biases stem from the fact, that unit under analysis is biased relative to the frontier, and the frontier is biased upward due to measurement error. He also indicated that biases can be evaded if the model is used on averaged data set.

Sinha (2010) estimated cost efficiency of the Life insurance companies operating in India for the period 2005-06 to 2009- 10 using Farrell and Tone's Measure. In both the approaches it is seen that the mean cost efficiency exhibit significant fluctuations during the period under observation.

Eller et al (2011) conducted a study of efficiencies of National Oil Companies across the different countries. They made conclude that higher degree of government ownership may reduce efficiency in producing revenues from employees and reserves and suggest that the reduced efficiency level was the result of governments exercising control over the distribution of rents. The number of employees, oil reserves, and gas reserves was considered as inputs while generating revenue was considered as the output variable.

Karimzadeh (2012) conducted a study on bank efficiency in India. For this study, he applied DEA to examine the efficiency of 8 major commercial banks during 2000–2010. This study suggested that the increase of efficiency contributed positively to many economic and financial reforms, which were implemented during the evaluated period, IT innovation, competition, better supervision, and enlarged investment in new information technology.

Chang et al (2014) measure cost efficiency of electricity distribution companies by applying used data envelopment analysis. In their study they have used the input-

oriented model as the objective of an electricity distribution company is to produce an exogenous level of desirable outputs at minimum cost.

2.6 Strategic Cost Control: *CIMA* in its terminologies of cost accountancy defined cost control- “as the guidance and regulation by executive action of the costs of operating an undertaking, particularly where such action is guided by cost accounting”. Cost Reduction is a systematic effort to improve profit margins by eliminating all forms of waste and unnecessary expense without impairing the generation of revenues.

Cost reductions in the form of strategic cost management should improve profitability (Cooper, 1998). The increasing indirect costs of organizations along with increased global competition and other factors has led to the development of strategic cost management models, such as activity-based costing, to provide better cost information to managers. In particular, services organizations need good cost management information, “because virtually all their operating expenses are fixed once resource supply has been committed” (Kaplan R., 1998).

In his words, Lockyer (2000) regards to cost control as a practice of comparing the cost of a business activity with the original cost in order to ascertain if the cost is as planned.

Sikka (2003) discussed that the first step of cost control is to set up the target to be achieved. Cost control comprises all procedures and measures by which cost of carrying out an activity is kept under check and aims at ensuring that costs do not go beyond a certain level.

Anthony, et al (2005) argues that businesses use cost control methods to monitor, evaluate and ultimately enhance the efficiency of specific areas, such as departments, divisions or product lines within their operations.

Hamilton and Martha (2007) concluded that management relies on accounting data and analysis to choose from several cost control alternatives, or management may direct accountant to prepare reports specifically to evaluate. Management must identify which costs have strategic significance and which do not. Brumbaugh (2008), opinion that cost should be controlled rather than embarking on the

unscientific cost reduction that may translate to lower the quality of the product. Standards for production will be set and actual production will be made thereby bringing about variances which can only be reduced or eliminated through effective cost control.

Neetha Bapurikar (2012) attempted to develop approaches to building competitive advantage which in turn helps in reducing strategic cost in financial services institutions. According to her, firm that makes the organizational commitment, to design, implement and monitor are strategic cost reduction program can achieve dramatically increased in efficiency.

In his paper Barbole, A N (2013), specifies that the Cost reduction Techniques are now- a- days required to be implemented in each and every organization to achieve its basic goal of being 'Low-Cost Manufacturer'. When sales are reducing and uncertain every business must adapt to cost reduction strategies to avoid the losses.

Cost of Quality:

Porter (1985) is generally right that differentiation is usually costly. However, the relationship between differentiation and cost is not always so simple. As Porter (1980), too, realizes “low overall cost position may not be incompatible with differentiation.”

A product design aimed at ease of manufacturing can reduce production cost (Deming, 1986; Miller, 1992). Simplifying product design by reducing the number of parts can also result in lower cost (Porter, 1985). It may even improve quality. For example, the 1997 Toyota Camry had seven fewer parts than its 1996 counterpart. Yet, it was able to withstand a 5-mile an-hour impact, unlike the earlier model (Krebs, 1996).

An innovative process technology can also lead to lower cost (Porter, 1985). In some cases, it may even produce a higher standard of quality simultaneously with lower cost. A notable example is an introduction of solid state technology in the TV Set industry which resulted in higher reliability-and lower cost (Porter, 1983). Another example is the mobile telephone industry in which process technology not only drove cost down, it also raised performance levels at the same time

(Oskarsson & Sjoberg, 1994).

True competitive advantages achieved through higher entrant product quality and product advantage facilitate entry and lead to higher market shares (Gatignon et al, 1990).

The Indian Industries, which will have to compete with internationally, established manufacturing organizations needs to produce their products very economically (Singh & Garg, 2009). Total quality costs represent the difference between the actual cost of a product or service and what the cost would be if the quality was perfect. It should also be understood that the cost of quality is a comprehensive system, not a piecemeal tool (Chiadamrong, 2003). Companies can lose money because they fail to use significant opportunities to reduce their costs of quality (Rodchua, 2006). Organizations should consider Cost of quality as an integrated approach and long-term process, and focus on the cost factors in order to improve customer satisfaction (Kiani et al 2009). The Cost of Quality had a directly impact on the overall financial goal of a company. Even a small reduction in CoQ may boost the profitability of a company by a significant amount. The cost of quality technique resulted in cost cutting as well as quality improvement (Desai 2008; Kajdan, 2007; Vujović et al., 2010). Hence, efforts should be made to reduce the CoQ as much as possible (Srivastava, 2008).

Similarly, according to Rodchua (2006), four important factors and measures contributing to a successful quality cost program implementation. These are management support and commitment, understanding concepts of cost of quality, effective systems and application, and cooperation from other departments. Yang(2008) have observed that to measure the cost of quality, it requires both technical knowledge and accounting know-how and was a joint effort of many, including quality control, accounting, engineering, production, marketing, and service.

To run in the globalized competitive turf, companies are forced to design and produce highly quality and reliable products with competitive pricing to fulfill customer expectations (Mukhopadhyay, 2004).

2.7 Cost Optimization:

Cost optimization is a regulation that includes the business practices and business strategies relating to minimizing total cost of operation. Cost optimization has charmed the interest of business organization worldwide on account of global economic meltdown (Kanhalli & Hutti, 2013).

Neetha Bapurikar (2012) in her study attempt to develop approaches to building competitive edge which help in reducing strategic cost, and found that implement and monitory of strategic cost reduction program can achieve unexpected increased in efficiency.

Aziz Mcallen examined the optimization of cost of the production line of a factory and developed an algorithm solution (Moallem., 2006). Mittel. P.K. et al (2007) examined the issue relating to cost optimization in cement industry and suggested an approach and framework for an effective study for achieving the benefits.

Saurine Doshi et al (2009) concluded of the view that controlling the total delivered cost of products is key to profitability. He has suggested that the company should adopt strategic sourcing, re-designing distribution networks, etc. to achieve cost optimization.

Kanhalli, B.M. (2013) has been selected Nestle India for the purpose of the study and found that procurement process of milk and utilization process of milk in producing chocolate has been standardized. This has helped the company to minimize the cost of milk in producing chocolate which contributed to the improvement in profitability business.

2.8 Cost Strategy:

The word strategy as something that has to do with war and ways to win over the enemy. Businesses have to reciprocate to dynamic and often mild external forces for the pursuit of their mission. ‘Strategy’ as a long range paradigm of an organization's desired image, direction, and destination what they want to be and what they want to do and finally where it wants to go.

Ansoff (1965) develops a matrix that helps businesses identify growth opportunities in the market. The product/market growth matrix describes a

combination of a firm's activities in current and new markets with existing and new products. It outlines four types of growth strategies, namely market penetration, product development, market development, and diversification.

Buzzell, Gale, and Sultan (1975) classify business strategies into three broad groups: building, holding, and harvesting.

Utterback and Abernathy (1975) theoretically describe three competitive strategies associated with the innovative patterns of firms. These are performance-maximizing, sales maximizing and cost minimizing.

Miles et al (1978) propose that firms develop relatively stable patterns of strategic behavior that are compatible with perceived environmental conditions. Their typology consists of four strategic types: defenders, prospectors, analyzers and reactors. They try to achieve efficient production for current lines and, at the same time, they emphasize the creative development of new product lines.

Hofer and Schendel (1978) define six strategies using the product and market evolution of the industry in which the firm competes and its competitive position in the industry. These six strategies are, share increasing, growth, profit, turnaround, market concentration and asset reduction and liquidation.

Patel and Younger (1978) use the stages of the product life curve and competitiveness of the industry in order to determine strategic alternatives for firms. They develop a matrix that consists of 20 blocks and nine different strategies, namely all out push for share, hold position, grow with industry, harvest, selectively push for position, phased out withdrawal, turnaround, find the niche and protect it, and abandon.

Vesper (1979) describes the optimal behavior of a firm and identifies four types of business strategies-multiplication strategy, monopolizing, specialization and liquidation.

Porter (1980) suggests that differentiation, cost leadership, and focus are the strategies that provide firms with the ability to attain a competitive advantage and outperform rivals in an industry. A cost leadership strategy aims for a firm to be a low-cost producer in the industry. Companies following this strategy emphasis on

cost reductions in every activity of the value chain. Differentiation consists of offering unique products and services in various forms, such as design, brand image, customer service, and technology. A focus strategy is aimed at a segment of a market within which a firm develops uniquely low-cost or well-specified products for the market. Porter (1980) claims that organizations that follow one of these three generic strategies can show above average performances in the long-term, while firms that are stuck in the middle perform less well. He defines stuck in the middle as a firm's unwillingness to make strategic choices and its attempts to compete by every means.

Wissema, Van Der Pol and Messer (1980) specify a typology based on the market situation (external potential) and the situation of the company in the market (internal potential). Based on life cycle theory, six strategies are identified: explosion, expansion, continuous growth, slip, consolidation and contraction.

Miles and Cameron (1982) examine the range of strategic options used by six large tobacco firms. They introduce organizational adaptation as a concept, along with its goals and patterns. These patterns are domain defense, domain offense, and domain creation.

Galbraith and Schendel (1983) carry out a study and identified six strategies for consumer products, i.e. harvest, builder, cash out, niche or specialization, climber, and continuity. Four strategy types are identified for industrial products, i.e. low commitment, which is similar to the harvest strategy; growth, in which firms make investments in order to expand their market shares; maintenance, which is the union of the continuity strategy and cost reduction; and the niche and specialization strategy, in which quality is the most important criteria for beating the competition.

Hambrick (1983) assesses whether the primary strategies pursued by high-performers in the two industry settings closely resemble Porter's three strategic types. He identifies three strategies for disciplined capital goods makers. These are cost leadership, high-quality gendarme, and asset conscious focusers. Two of these strategies, namely cost leadership and high-quality gendarme, are similar to Porter's cost leadership and differentiation strategy. The third strategy, asset

conscious focusers, seems to include low share operators that carefully manage their asset bases.

PIMS study by Philips, Chang, and Buzzell found a significant and positive relationship between differentiation and market share. Because increased in market share enables the firm to reap scale economies, this study suggested that differentiation may be one way of establishing an overall low-cost position (Philips, 1983).

Schuler and Jackson (1987), based on Porter's typology, identify three competitive strategies that firms can use to gain competitive advantage i.e. innovation, quality enhancement and cost reduction. The innovation strategy is used to produce goods different from competitors. Increasing the quality level of the product is the focus of the quality enhancement strategy and under the cost reduction strategy; a firm tries to be lowest cost producer in the industry.

Herbert and Deresky (1987), review the strategic classifications in the literature. After a synthesis and categorization of the literature, they find four generic strategies associated with the stages of product/market evolution; develop, stabilize, turnaround and harvest. The main aim of the developing category is long-term growth through finding new market opportunities and developing new products. Under a stabilize strategy, the most used method to maintain both competitive position and earnings is the cost leadership approach, using efficient manufacturing processes. The turnaround strategy requires cost and efficiency controls as in the stabilize strategy. The harvest strategy emphasizes pruning expenditures and increasing operational efficiency in the short run.

Miller (1988) suggests four broad categories of dimensions that reflect competitive strategies. These dimensions are differentiation, cost leadership, focus and asset parsimony. The last dimension, asset parsimony, refers to the fewness of assets per unit output. In light of the above, four strategy types are presented: niche marketers, innovators, marketers and cost leaders.

Mintzberg (1988) proposes a typology of generic strategies based on differentiation by price, image, support, design and quality. According to Mintzberg, Porter's cost leadership is another form of differentiation so he includes

price differentiation as a fifth business strategy. The last category in Mintzberg's typology is undifferentiating in which a firm emphasizes none of the five differentiation dimensions.

Venkatraman (1989) identifies six important dimensions of strategic orientation in his study i.e. aggressiveness, analysis, defensiveness, futurity, pro-activeness, and riskiness.

Kim and Lim (1988) divide a sample of 54 firms in the high-growth electronics industry in Korea into four strategic groups, i.e. overall cost leaders, product differentiators, market differentiators and stuck in the middle. The characteristics of these four strategic groups are generally consistent with those of the generic strategies identified by Porter.

Robinson and Pearce (1988), from data on 97 manufacturing firms belonging to 60 different industries, identify five groups of strategic behavior, i.e. efficiency and service (a high emphasis on low cost and customer service), no clear strategic orientation (no distinct pattern), service/high-priced markets and brand/channel influence (high emphasis on customer service and innovation in marketing), product innovation/development (emphasis on specialty products), brand identification/channel influence and efficiency (marketing innovation and low cost).

Douglas and Rhee (1989) identify six strategy types in two samples namely European and U.S businesses. They are Broad liners, Innovators, Integrated marketers, Low-Quality Group, Nichols and Synergist Group.

Wright, Pringle, and Kroll (1992), based on Porter's typology, develop strategies that can be followed according to the size of the company. They suggest low cost, differentiation, low-cost differentiation and a mixed strategy for large firms. For small firms, they suggest focus low cost, focus differentiation and focus low-cost differentiation. In summary, focus strategies can be followed only by small companies.

Ward, Bickford, and Leong (1996) propose four basic strategic configurations, i.e. niche differentiator, broad differentiator, cost leader and lean competitor.

In addition to Porter's generic competitive strategies, some strategy textbooks offer a fifth strategic choice, namely best cost provider strategy (Thompson, 1999) and

integrated low-cost differentiation strategy (Hitt, 2007). These strategies imply that a firm can gain advantages by offering products with unique features at a lower price compared with its competitors. Moreover, Kim and Mauborgne (1999) describe the value innovation model in their Harvard Business Review article. Later, they introduce their ideas in a book titled Blue Ocean Strategy in 2004. According to the blue ocean strategy, a firm can outperform its competitors by creating demand in an uncontested market. Value innovation is the base of the blue ocean strategy. This implies the simultaneous pursuit of differentiation and low cost.

Huang (2001) on their study based on the analysis of the firms in Taiwan, identifies three groups. The first group, cost leadership businesses give high priority to cost reduction. Second, innovation businesses place a major emphasis on innovation and a secondary emphasis on quality but they ignore cost reductions. The third group resembles Porter's "stuck in the middle" and Miles and Snow's "reactor" groups.

Chang et al (2002) develop a typology that considers the dimensions of competitive advantages and timing of entry into the market. Three strategy categories are classified into pre-emptive/first mover, low cost/follower, and differentiation/follower.

Lillo and Lajara (2002) define the taxonomy of business strategies from data on 75 owner-managed companies in Spain. Four strategic groups are found, namely-differentiation group, innovation group and product offering group (offers a broad range of tried and tested products to a large market segment). Moreover, brand identification and a high level of advertising and promotion are key functions in this group.

Powers and Hahn (2004), using data from 98 companies in the banking industry, specify a taxonomy that corresponds to Porter's generic strategy types. They identify five groups of competitive strategies i.e. general differentiation, cost leadership, stuck in the middle, focus and customer service differentiation.

Porter three generic strategies have the strategic target on its vertical axis which can be divided into two different segments, mainly- industry wide multi-segment

and particular segment. The horizontal axis is the strategic advantage which is divided into two positions, i.e. uniqueness perceived by customer and low-cost position.

Kerem Sumer (2012), in their reviews on generic business strategies they observed that cost strategies are followed by most of the studies. Five generic strategies they identified. These strategies are-

- A. Cost Strategies:-
 - (i) Cash Flow Maximizing;
 - (ii) Cost Leadership
- B. Differentiation Strategies:-
 - (i) Market Differentiation;
 - (ii) Innovation Differentiation;
 - (iii) General Differentiation
- C. Focus Strategies:-
 - (i) Focus-Differentiation;
 - (ii) Focus-Low Cost;
 - (iii) General Focus
- D. Hybrid (Combination) Strategy
- E. No Definite Strategy

Empirical Literature: Modified Du Pont Model developed by F. Donaldson Brown was applied to observe the firm's strategies similar to other studies i.e. Palepu and Healy (2008), Soliman (2008), Little et al (2009, Philip et al. (2011), etc.; which we have discussed details in '*Research Methodology*' chapter.

The Modified Du Pont Model: The model was created by F. Donaldson Brown who came up with the model when he was assigned to clean up the finances in General Motors and has ever since been an important model for financial analysis. The original Du Pont method of financial ratio analysis was developed in 1918 by an engineer at Du Pont who was charged with understanding the finances of a company that Du Pont was acquiring.

F. Donaldson Brown identified a mathematical relationship between net profit margin and total asset turnover. The Du Pont model was -

Eq. 1: $(\text{Net income} / \text{sales}) \times (\text{sales} / \text{total assets}) = (\text{net income} / \text{total assets})$ i.e. ROA

At this time maximizing ROA was a common corporate goal and the realization that, ROA was influenced by both profitability and efficiency led to the development of planning and control for all operating decisions within a firm. This became the ascendant form of financial analysis until the 1970s (Blumenthal, 1998).

The dignity of ROA being affected by a profitability measure and an efficiency measure led to the Du Pont method becoming a widely-used tool of financial analysis (Liesz, 2002).

In the 1970's, emphasis in financial analysis shifted from ROA to Return on equity (ROE), and the Du Pont model was modified to include the ratio of total assets to equity. At that time generally accepted goal of financial management became "maximizing the wealth of the firm's owners" (Gitman, 1998) and focus shifted from ROA to ROE. This led to the first major modification of the original DuPont model. In addition to profitability and efficiency, the way in which a firm financed its activities, i.e. its use of debt or "leverage" became the third area of attention for financial managers. The new ratio of interest was called the equity multiplier, which is determined by the equation (total assets/equity).

The modified DuPont model is shown in Equations 2 and 3 below-

$$\text{Eq. 2: } \text{ROA} \times (\text{total assets} / \text{equity}) = \text{ROE}$$

$$\text{Eq. 3: } (\text{net income} / \text{sales}) \times (\text{sales} / \text{total assets}) \times (\text{total assets} / \text{equity}) = \text{ROE}$$

The modified DuPont model became a standard in all financial management textbooks and a staple of introductory and advanced courses alike as students encountered statements such as: "Ultimately, the most important, or "bottom line" accounting ratio is the ratio of net income to common equity, i.e. ROE (Brigham and Houston, 2001).

Hawawini and Viallet (1999) proposed yet mitigation to the DuPont model. This mitigation resulted in five different ratios that combine to form ROE and ROI. The modified Du Pont model is as under-

$$\text{Eq. 4: } (\text{EBIT} / \text{sales}) \times (\text{sales} / \text{invested capital}) \times (\text{EBT} / \text{EBIT}) \times (\text{invested capital} / \text{equity}) \times (\text{EAT} / \text{EBT}) = \text{ROE}.$$

The reconstructed DuPont model has become widely granted in the financial analysis literature. Pratt & Hirst (2009), Palepu & Healy (2008), and Soliman (2008) have successfully used this model for their studies. Moreover, Soliman (2004) observed that industry-specific Du Pont multiplicative components provide more convenient valuation than do economy-wide components, recommended that industry-specific ratios have increased validity.

ROA, ROE, and ROI are three indicators to measure firm profitability under Du Pont analysis. The details of three ratios are narrating hereunder-

Return on assets (ROA) offers a different take on management effectiveness and reveals how much profit a company earns for every dollar of its assets (S. Ross et al, 2008). Assets include cash in the bank, accounts receivable, property, equipment, inventory and furniture.

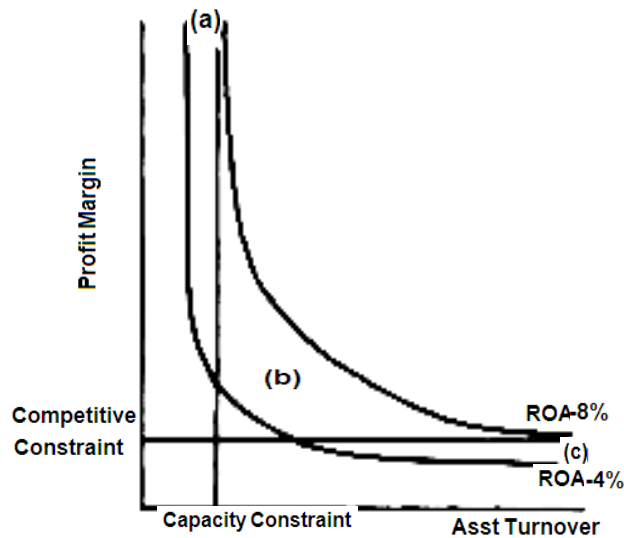
Companies with relatively high Return on Assets (ROA) in their industry clearly follow either a product differentiation or a low-cost strategy (Selling and Stickney, 1989). Therefore the ROA is an indication of a company's success in adopting either of the two strategies (Selling and Stickney, 1989).

Here, $ROA = \text{Profit margin} * \text{Asset turnover}$.

Comparatively high OPM and ATR of a firm will yield a relatively high ROA and vice versa. Although, Langemeier (2010) concludes farms with high ATRs are not necessarily those with high OPMs so farms with the same ROA could have a quite different ATR and OPM.

Little et al. (2009) suggests that companies can develop successful competitive strategies focusing on either operating profit margin (OPM) or asset turnover (AT). Companies that adopt the differentiation strategy are in the position of demanding a premium price for their products and subsequently maintain a high OPM these companies will operate in section 'a' of *figure 2.2*. In contrast, companies that follow the low-cost, strategy is unable to ask a premium price due to intense competition and therefore must strive for high AT and will, therefore, operate in section 'c' of *figure 2.2*.

FIGURE 2.2: ROA AND PROFIT MARGIN-ASSET TURNOVER MIX



Source: Selling and Stickney (1989)

Return on equity (ROE) indicates effectively how company's management utilizes investors' money. Moreover, ROE exhibit whether management is developing the company's value at a competent rate. Practically, ROE indicates the profitability of the firm by evaluating the investors' return (Griffin & Mahon, 1997).

$$\text{ROE} = \text{Stockholder's equity} / \text{Total Assets} \times \text{Total Assets} / \text{Net income} \times \text{Net income} / \text{Stockholder's equity}$$

Return on Investment (ROI), which help us to identify management' position and appraise earning of the firm. It is earned deserved from the investment made by the firm. We can derive ROI by applying following formula, i.e. $\text{ROI} = \text{Assets Turnover} (\text{Operating Income} \times \text{Total Assets}) \times \text{Profit Margin} (\text{EBIT} \times \text{Operating Income})$.

One of the strong advantages of ROE is the possibility of its disaggregation into different profitability factors. For these purposes, different factor models are used, among which DuPont analysis is one of the most popular (Bernstein et al. 2001; Stickney & Brown 2006).

Liesz (1999) investigated that the failure of small business by using the financial statement of small firms. DuPont techniques have been used. OPM, Equity

turnover, cost ratio, structure ratio, and tax ratio are considered. The result shows that poor financial planning and control rank are the reason of business failure.

Brigham and Houston, (2001) concluded that the modified DuPont model was a powerful tool to illustrate the interconnectedness of a firm's income statement and its balance sheet and to develop straight-forward strategies for improving the firm's ROE.

Sundararajan, et al (2002) contended that depend on just a few indicators of bank profitability can be ambiguous. While ROI, ROE, and interest margin to gross income remain the key measures, they should ideally be enlarged by the analysis of other operating ratios.

Vanniarajan and Joseph (2007) in their study analyzed the financial performance of Banks by applying DuPont Control Chart. The performance of the banks may be viewed in three dimensions namely structural, operational and efficiency factors are suggested by India Bank Association.

Soliman (2008), in his analysis of the components of the DuPont method, while not using the cost leadership/differentiation terminology explicitly, clearly suggests their existence. He states that asset turnover measures "asset utilization and efficiency, efficient inventory processes and working capital management". Soliman (2008) also states that profit margin is derived from "pricing power, such as product innovation, product positioning, brand name recognition, first-mover advantage and market niches".

Almazari (2012) conducted a study on Jordanian Arab commercial bank for the period 2000-2009 by using the DuPont analysis based on return on equity model and return on investment model. The return on equity model disaggregates performance into three components, i.e. net profit margin, total asset turnover, and the equity multiplier.