Application of Target Costing and Performance Analysis: Evidence from Indian Automobile Industry

N. Narsaiah[a]

[a] Dr., Assistant Professor, Department of Accounting, College of Administrative and Financial Sciences, Cihan Universtiy-Erbil, Kurdistan, Iraq, narsaiah.neralla@cihanuniversity.edu.iq

Abstract

Purpose: The manufacturing companies must keep attention over challenges and for the moment of adopt technology and practices instead of observation of competition amongst competitor companies.To create automobile business successful in India, companies are essential to adopt better cost accounting techniques to minimize cost of products and service costs.

Design/methodology/approach: This research investigates the application procedure of Target Costing (TC) in automobile companies in India. This study employed Target Costing as a dependent variable while Profitability; Growth; Net Tangibility Assets (NTA); EPS and Firm Size are independent variables. The study adopted convenience sample of top ten automobile companies listed on BSE of India and panel data has covered from 2014-15 to 2018-19 years. Data was analyzed through using statistical techniques of descriptive statistical analysis, Pearson's Correlation, Simple Regression and Multiple Regression analysis and using the SPSS.

Findings: The result of the target costing impact on profitability has reported by Pearson's correlation result shown a negative relationship. Similarly, Target costing impact on Return on sales examined by simple regression analysis and revealed that there is positive correlation. Finally, Target costing impact on financial performance examined by multiple regression results revealed that there is positive correlation with Revenue from Operation; Profitability; Return on Sales (ROS) and Growth, while negative correlation revealed by Margin from Operation; ROA; Net Tangibility Assets(NTA); EPS and Firm Size.

Originality/value: Target Costing has been identified as a popular technique to accomplish automobile company's goals. Target costing consist exclusive approach to decide target price for the product and services. Target Costing ensure that new product price would be competitive in the market with substantial quality of products and services. This research investigates the application procedure of Target Costing (TC) and examined financial performance of Indian Automobile companies.

I. Introduction

Business environment twisted through the transformation, globalization and exploitation of competence and scenario controlled over the product operation's life cycle of the companies. Additionally, new competitors are entering into the market because attracted by the upshot markets and escalating customer centric positions which have enormous multifaceted today's business environment. Firms intend to implement modern production scheme as a result of changes in productivity technology. Therefore, traditional costing methods are inadequate to obtain accurate cost information for encounter the competition and sustain development of the organization. In the direction of achieve the goals of the business require accurate cost information and appropriate cost management are vital elements to become successful business enterprise and to avoid the augmented competition of business organizations. Currently, modern methods of cost accounting techniques comprise of progressive and exploratory approach to reduce cost of production and operation cost. Consequently, cost accounting keeps on established various modern methods, beyond which one of the significant cost accounting techniques is Target Costing (TC).

Target costing is a strategic cost accounting technique and the application of this technique emerged in Japanese manufacturing firms during the 1960's(Kato, 1993 and Tani et al., 1994).Nonetheless, this technique merely not using Japanese manufacturing companies which has been broadly executed by other countries. Target costing is a valuable and resourceful technique; it has a wide- ranging tactic aimed at controlling costs and managing costs. Moreover, the application of this method in manufacturing sector to reduce productivity costs through sustaining quality starting from product proposal, product development and research, product scheduling because these plays a very significant character in the manufacturing product and development as well deciding modest price of the product and reaching the target profits (Jrirh, 2011).

Cost accounting has been innovated diverse methods and practices, the most tremendous method of which is target costing because the main goals of the business organizations to hold effort in competitive business environment for survive in the long term. The dire need is to attempting those practice and techniques that sustenance to their financial existence in the international competitive market. Consequently, automobile industry in India has various challenges amongst them one of the foremost circumstances is there is no progressive growth of sales since last two years. Thus, the automobile companies need to reduction in manufacturing costs through reduce pre-production costs in other expanses including Research and Development (R&D), manufacturing design, executing planning phases, with the regards to obtain additional costs saving.

II. Review of Literature

Target costing is an extensive model and which has been defined by many categories in the literature. Target costing method was initially developed in Japanese car manufacturing companies under the suitable name of Genkakikaku or Ginka Kikaku and became illustrious in accounting literature in the 1990s (Monder and Hamad, 1991; and Nicolini et al., 2000). The opinion of Ewert and Ernst (1999) stated about target costing as a strategic management accounting system because which can manage the product costs. According to Ballard (2008) emphasized that target costing as discussion amongst acceptable cost and expected cost. In the words of Ahmed, Cullen & Dunlop (1997) confirmed that the main intention of target costing is to attempt at the entire potential for reduction of production cost while designing new product.

Afonso et al.,(2008) in their research investigated that success of new product development depend on time to market and implementation of target costing. As well their research found that companies can achieve profit through implementation of target costing and minimize the supply time for distribute the product to modest markets. Therefore, the companies can setup time duration for supplying new

products through lower costs and advanced quality of products by reducing manufacturing time to development of new product. In addition, Target costing can contribute for manufacturing new product with reasonable productivity control cost and provide better quality of product (Cooper and Chew, 1996). In the opinion of Dekker and Smdt,2003; Guilding et al., 2000; Cooper and Slagmulder, 1999 emphasized that the practice of target costing can determine cost of new product and is calculated as a result of subtract the expected profit margin from privileged market price of the product.

According to Ellarm (2006) Target Costing is significant cost accounting method for supporting manufacturers on the whole efforts to keep on cost competition whereas possible to apply standards and prerequisite demanded by customers. Fridh & Borgernas (2003) stated in their research, target costing is a product development procedure that facilitates to ascertain product cost resulting from product target price and afterward maintain the backward works of product plan and production process. In the opinion of Lockamy & Smith (2000) and Shank & Fisher (1999) target costing possibly will generate as a result while upward latest products, reduce cost of production in the course of maximum utilizing entire resources together with inclusive supply chain. Moreover, Target Costing makes use of price information from the prevailing market in order to ascertain product cost (Zengin and Ada, 2010).

Furthermore, Pierce (2002) emphasized that the target costing method must need complete information process and cross functional participation. In the opinion of Ansari et al (1997) states that the target costing is a market determined system, so that the consumers opinions are paramount significant and then consider into the account during the complete process. Therefore, there is a need to understand the consumer requirement and assess the competitor's strategy and as a result must be effective to meet that requirement is essential. Target costing facilitate in manufacturing the new product determined in terms of quality, costs and performance (Cooper and Chew, 1996). N.Narsaiah (2018) employed target costing technique for Indian Railways and invented that in his research Target costing is not merely determine the price of Indian

railways services because it is influenced with other factors like as population size, geographical factors and government subsidy policies to the customers.

Previous research studies does not employ target costing techniques to analysize cost leadership and determine performance of the companies. Therefore, this research paves the way and overcome the limitation of the previous research.

III. Theoretical Framework of Target Costing

Target costing is a strategic cost accounting technique uses for administration of a production and cost control which is relevance from the commencement of the production life process to maximize the products profitability. There are numerous definitions for target costing, the majority of which described with the intention of target costing is a practice employ in a cutthroat business market toward reduce primary costs and attain the expected profit margin. In a major definition, explained about target costing is an efficient system to determine cost of product for a chosen product with accurate quality and performance is to be estimated in order to that the estimated profit achieve from the estimated sales price (Jalali Naini et al.,2010).

As stated in earlier, Target costing is cost and management accounting technique its most important goal is to be minimize costs, although these technique main objective is assist in product development process in the direction of monitor lower cost, superior quality of product, consumers satisfaction and product launch at the right time in the market as per demand. Therefore, target cost works as a comprehensive business technique to accomplish organization objectives through innovative capable product (AL-Matarneh,2008; Jayeola & Onou, 2014).Target costing is a systematic approach which can ascertain the product cost based on the business achieve target profits through the sales of products. Target costing can achieve the product cost while product price is decided on the basis of competition.

Companies are very essential to plan for survive in the competition environment; therefore companies have to be expert in launching and promoting their product. Therefore, product quality and performance with accordance of consumer demand and companies are attempt to supply accordance with consumer satisfaction whereas companies are required to achieve expected return on their sales and making

profitability business. First and foremost significant characteristic of target costing is the development and design of products which satisfy the consumer demand despite the fact that it can assists to the companies in reach their goals.

Target costing main focus on product price and which is also most affordable price to customer in privileged market. This scenario also put emphasis on consumer satisfaction through a product with lower cost and higher quality is possible to be produced and this goal is not realizable except that contribution and attentiveness of total departments of an organisation particularly supervise and controlling the cost of production prior to happening by the cost department. The application and practice of target cost method is possible to be relevant for each business organisation but requires several prerequisites environment including of well-established market research department through specialist, inventive employees and support from the top level management. Moreover, target cost can ascertain accurate cost of production and services.

IV. Application of Target Costing Stages

The application of target costing should pursue throughout several stages, these process must start before the inauguration of the product and manufacturing stage follows by construct the plan and design. Subsequently, need to make the efforts for successful progress throughout the following stages which identified as the life-cycle of the product and there is no need to scare about the product features and quality. There is required stages to application of the target costing can be separated as follows (Margaret L. Gagne & Richard Discenza,1995; Sarokolaee, 2012; Dimi & Simona,2014 and Al-Adwan et al.,2018):

1. Determine the sales price for new product and subsequently investigate the market for projected sales volume and then set up target profit.
2. Ascertain the target cost through reduction the profit from the sales price.
3. Execute practical cost investigation for single and multiple process of product.
4. Ascertain the expected cost of the product.
5. Comparative analysis of expected cost by target cost.

6. When expected cost exceeds target cost and then replicate cost analysis to minimize expected cost.

7. Construct the ultimate decision for launching the product after estimation of target cost.

8. Administrate the production cost during the production stage and minimize the total cost through all possible approach.

III. Objectives of the Research

Each and every successful business organization must sustain competitive environment, which are associated to exclusive strategies and strategic cost management can supervise the success of the business organization during the long term. According to Naser, (2010) and Zengin & Ada, (2010) stated that target costing prime intention is to improve profitability, process, better production, reliable price, coordination between departments with marketing demand. Therefore, the prime objective of the research is to investigate the impact of Target costing application for automobile industry in India during the study. The study constitutes the following secondary objectives are:

1. To explore the application procedure of Target costing in Automobile Industry by theoretical model.

2. To investigate the target cost impact on profitability of automobile companies during the study period.

3. To investigate the automobile companies strengthen of Return on Sales (ROS) and competitiveness in the examination of cost leadership by target costing amongst the companies in India over the study period.

4. The study investigates the impact of target costing on overall financial performance of automobile industry.

IV. Hypotheses of the Research

To achieve the research objectives, the study attempt to examine the following hypotheses:

Ho_1 : To investigate for there is no significant correlation between target costing and profitability of automobile companies in India.

Ho_2 : To investigate for there is no significant impact of target costing on Return on Sales (ROS) to assess competitiveness in the examination of cost leadership of automobile companies in India over the study period.

Ho_3 : To investigate there is no significant impact of target costing on the financial performance of the automobile companies in India during the study period.

V. Research Methodology and Data Analysis

The main objective of this research is to investigate performance of automobile companies in India with application of target costing. This research is the empirical investigation as a result of employ target costing as the cost accounting technique because it is a massive accepted and application method in terms of production development, operations and supply chain management. In the opinion of Ellarm, (2006) emphasized that target costing is a legitimate and more precious approach to strengthen the context of awareness whereas conventional empirical analysis are unable to emphasize on the context to trace the real picture.

(a) Sample of the Research

The sample of this research is consider as to cover of listed on Bombay Stock Exchange (BSE) of Indian Automobile companies as on 31 December 2019. The sample of the companies was selected based on the convenience sample and namely of companies are: (i) Ashok Leyland Limited; (ii) Bajaj Auto Limited;(iii) Eicher Motor Limited; (iv) Escorts Limited; (v) Force Motors; (vi) Hero Motocorp Limited; (vii) Mahindra & Mahindra Limited; (viii) Maharashtra Scooters Limited (MAHSCOOTER); (ix) Maruti Suzuki India Limited; (x) Tata Motors Limited. The sample of the selected companies also represented for top most market capitalization of Indian Automobile companies.

(b)Data Sources

The sample of the research consist cross-sectional data of 10 selected automobile companies listed on the BSE in India. The data sourced from expertise which is based on the electronic data processing and maintained by individual companies. The research covers the panel data from 2014-15 to 2018-19 financial years. This research utilized financial reports of the selected companies on the source of convenience for 5 years. The selected companies which did not maintain comprehensive records on the variables were used in this research. Inferences are drawn on the basis of collected data processed, analyzed and interpreted make use of SPSS. The research covers of the 5 years data for each and every variable per selected companies in order to derive results and research examine structural changes if any.

(c)Research Methodology

The research adopted descriptive statistic, correlations and regression analysis statistical techniques for examine the automobile company's data. The research examines the variables results authentication through employ descriptive statistical analysis. The first and foremost hypothesis approach of the study is examined through employ of pearson's correlation test is employed to investigate in support of multicollinearity of the variables and which is based on the estimation of target costing and profitability of the automobile companies in India. The second hypothesis approach of the research is examined through employ of simple regression analysis test to measure, investigate and estimate the association amongst the variables to determines the strengthen of the companies competitiveness in cost leadership. Furthermore, third hypothesis approach of the research is examined by multiple regression analysis to study the financial performance of the automobile companies in India during the study period.

VI. Explanatory Variables

The research is observed the data based on dependent and independent variables they are:

Dependent Variables

(a)   Target Costing:

According to Tanaka et al.(1993) stated in their research that Target costing can setting up by three methods, they are subtraction method; addition method and integrated method. Target costing can achieved through the subtraction method, significant factors are recognized by target costing particularly price determined by competitive companies. However, target costing can be ascertained by applying the following formula:

$$Target\ Costing = Selling\ Price - Desired\ Profit$$

Besides, addition method emphasize on the company's internal factors and competences such as technology adoption, production system, supply of the products to customers, production size and strategic decisions of the company. Moreover, integrated method is the combination of the subtraction method and addition method.

Independent Variables

(a)Profitability (PROFT): Profitability is the monetary gain which is arise when the sum of business operation income more than the sum of business expenditure including depreciation and taxes require to cover from such profit. Profitability benefit will distribute amongst the shareholders on the basis of their number of shares and rights. Profitability is estimated through the Earnings Before Interest and Taxes (EBIT) divided by Total Assets (EBIT/ Total Assets). Moreover, other estimates consider into account of like Return on Assets (ROA) and Return on Sales (ROS).

(b) Growth (GROW): Companies constitute more development opportunities for enhance the abilities of companies which are relatively expansion of the existing business, develop the new product, replacement of old assets with new assets, merger and acquisition of business. Companies indicated with fantastic growth rate option and this evidence shows that of higher strength of cash flows, this scenario motivated to companies to reduce the debts. Growth rate is estimated by the percentage changes in gross total assets.

(c) Net Tangible Assets (NTA): Tangible assets are the possessions of a business organisation that consist in the physical form (Example: Land, Building, Plant & Machinery, Materials and office equipments). Tangible asset value is used to calculate in this research by the formula is that the total assets of the company minus intangible assets and subtract total liabilities.

(d)Earnings per Share (EPS): Earnings per share refer to the amount of money received on each share of investment, while total profits are distributed at the end of the financial year to the outstanding shares. Earnings per share also describe as net income per share and it is also reflects how profitable of a company on the basis of outstanding shares. EPS is calculated in this research by subtracting preference share holder dividend from net profit and dividing by the total number of outstanding shares.

(e) Firm Size (SIZE): Conglomerate companies have more diversification option and secure cash flows and profitability. Financial risk of the large companies on the account of defaulters is very smaller proportion distinguished to small size companies. Firm size is estimated in this research by natural logarithm of the company's total assets divided by natural logarithm of sales.

VII. Application Procedure of Target Costing in Automobile Industry

Target Costing application in manufacturing industries have been followed by diverse procedures stages, United States firms developed system had highlighted on association amongst suppliers management and product design stages plays significant role in the Target costing practice. Moreover, later Japanese system in addition to the US firms system highlighted cost and management accounting system (Cooper & Slagmulder, 1999). Ellram (2006), described for application of target costing procedure divided into six stages in manufacturing industry. However, Target costing application procedure in automobile industry as follows (See Figure 1).

Figure 1: Application procedure of Target Costing in Automobile industry
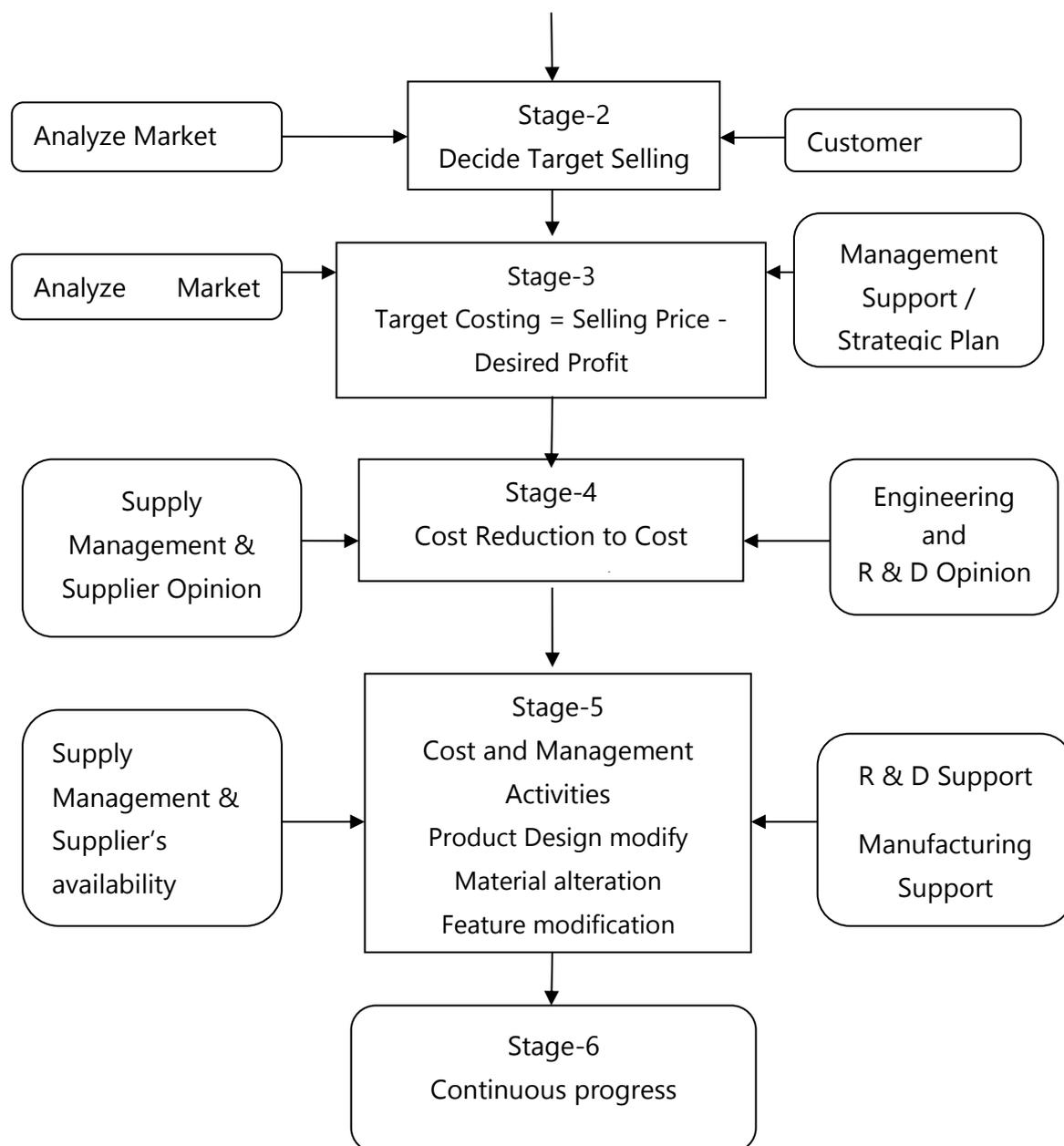
Source: Author's Research

VIII. Results Analysis and Discussion

Table 1 represents the descriptive statistics analysis of related variables of this research. Statistical results revealed that there is an enormous variation in the minimum and maximum values of each variable of revenue from operations; margin from operations; target costing; Growth; Net tangibility assets; and EPS. Whereas profitability; return on assets; return on sales; and Firm Size has reported less variation between minimum and maximum values. Moreover, inferences were drawn

from Mean statistic values of revenue from operation and target costing had reported highest mean values of 25058.93 and 23150.12 respectively and lowest Mean values are registered by return on sales and return on assets values showed 14.9264 and 14.4159 respectively. In addition, the mean value of the entire variables of the study revealed that there is no consistent average of natural logarithm for each values of variable.

Similarly, very higher standard deviation of variables of the study confirm that privileged dispersion or make wider data series for revenue from operation; target costing; net tangibility assets and margin from operation revealed highest values of 22536.77, 21140.67, 9269.85 and 2433.37 respectively. While lowest value 12.45 and 17.33 reported by return on assets and profitability respectively. Therefore, the descriptive statistical results concluded from the statistical results of the sample companies during the research period revealed that target costing and performance examination variables were fluctuating very extremely(See Table 1).

Table 1: Descriptive Statistics Analysis

	Minimum	Maximum	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
Revenue from Operation	29.24	83026.50	25058.93	3187.18	22536.77	507906396.57	.804	.337
Target Costing	15.10	75525.90	23150.12	2989.74	21140.67	446928017.62	.785	.337
Margin from Operation	-4739	7722	1908.81	344.13	2433.37	5921292.94	.279	.337
Profitability	-7.96	59.88	20.0427	2.45	17.33	300.61	.607	.337
Return on Assets	-9.49	42.68	14.4159	1.76123	12.45	155.09	.488	.337
Return on Sales	-13.06	86.21	14.9264	2.98874	21.13	446.62	2.38	.337
Growth	-4.10	1848.28	52.5748	36.70	259.54	67364.18	7.03	.337
Net Tangibility Assets	236.44	31742.19	10046.54	1324.26	9269.85	85930236.38	.714	.340
EPS	-15.00	753.37	128.92	23.59436	166.83	27834.68	2.20	.337
Firm Size	.24	224.77	9.7395	5.37736	38.02	1445.79	4.67	.337

	Minimum	Maximum	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
Valid N (list wise)	50	50	50	50	50	50	50	50

Source: SPSS v 25

IX. Test of Hypotheses Results and Discussions

Test of Hypothesis 1

Table 2 represents the Pearson's correlation result of target costing and profitability shown that there is a negative relationship between variables. The result of statistical analysis indicated negative relationship between the target costing and profitability of automobile companies India and correlation of coefficient value exhibited is -0.073. This scenario revealed that as target costing increases in the study period and that would cause a significant impact on the profitability of the companies. Statistical inferences were drawn from the Pearson's coefficient of correlation confirm that profitability of the companies are decreased during the study period. The significance of (2-tailed) calculated value is reported by 0.615 and which indicated that this statistical value is more than the critical value of 0.05.

Furthermore, Pearson's correlation of coefficient concluded that there no statistically significant correlation between target costing and profitability of automobile companies in India. Additionally, null hypothesis of the research is accepted because results shown impact of Target costing on profitability of automobile companies in India. Therefore, ultimate conclusion of the Pearson's correlation determined that target costing have a great impact on profitability of the automobile companies in India (See Table 2 to 2.1).

Table 2: Correlation between Target Costing and Profitability

	Target Costing	Profitability

Target Costing	Pearson Correlation	1	-.073
	Sig. (2-tailed)		.615
	Sum of Squares and Cross-products	21899472863.390	-1309616.668
	Covariance	446928017.620	-26726.871
Profitability	Pearson Correlation	-.073	1
	Sig. (2-tailed)	.615	
	Sum of Squares and Cross-products	-1309616.668	14729.988
	Covariance	-26726.871	300.612

Source: SPSS v 25   * List wise N=50

Table 2.1 Descriptive Statistics

	Mean	Std. Deviation	N
Target Costing	23150.1230	21140.67212	50
Profitability	20.0427	17.33817	50

Source: SPSS v 25

Test of Hypothesis 2

Table 3 represents the simple regression analysis results of Target costing and Return on Sales (ROS) of the automobile companies in India. The research results indicated that there is a positive correlation amongst Target costing and Return on Sales (ROS). The research confirmed relationship by the significant and size of R is reported 0.416. Moreover, from the regression analysis estimated on Table 3, R-squared revealed that 0.173 or 17.3 per cent significant variation between the target costing and return on sales. As this results indicated that with affect on research by target costing occupy alone by 17.3 per cent and remain 82.7 variation by the other dependent variables and this factors were not incorporated in this research model.

Furthermore, Table 3.2 represents of coefficient analysis of Un standardized coefficient of β indicated by -415.90 per cent decreased in the return on sales with holding variable of target costing constant. The results of statistical analysis concluded that Return on Sales (ROS) predicted target costing would be 415.90 per cent lower. The variable return on sales indicated with the value of 0.003 is significantly different from 0, because the p- value is less than 0.05. This result indicated that doesn't have

impact of target costing on Return on Sales (ROS) of Automobile companies in India. However inferences were drawn from statistical analysis is that selected automobile companies are administrating their Target costing in appropriate approach, therefore, there is no significant impact of target costing on Return on Sales (ROS) over the study period and finally accept the null hypothesis of the research.

The Durbin Watson statistic test is examined the correlation (time series data) or auto-correlation (panel data) in research model. The results revealed by the Durbin Watson test is 0.268 and this statistical value is more than 0 but less than 2, this indicated that the present research data has the evidence of positive auto-correlation amongst variables. ANOVA test is a formal healthiness of test which can assist to examine the linearity of research model. Regression analysis criteria emphasize that the model must be linear and the result presented in table 3.1, F test suggest that null hypothesis would not reject. As a result, this study revealed that this research model is properly specified. F change value is reported that very significant value of 10.031 probability thus, this F test indicated that there is no significant impact of target costing on return on sales.

Moreover, Table 3.2 represent the statistical results of co-efficient analysis at 95% level of confidence interval, the t-statistics value revealed by -3.167 while p- value of t-statistic significance is reported by 0.003.Therefore, calculated value is less than the significance value hence, provide evidence that there is no significant impact of target costing on Return on Sales (ROS) of automobile companies in India (See Table 3 to 3.4).

Table 3: Regression Analysis of Target Costing and Return on Sales (ROS)

Model Summary[b]										
Model	R	R Square	Adjusted R Square	Std. Error of the	Change Statistics					Durbin-Watson
					R Square	F Change	df 1	df 2	Sig. F Change	

				Estimate	Change					
1	.416[a]	.173	.156	19426.119	.173	10.031	1	48	.003	.268

a. Predictors: (Constant), Return on Sales
b. Dependent Variable: Target Costing

Source: SPSS v 25

Table 3.1 ANOVA Analysis

	ANOVA[a]					
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3785514821.953	1	3785514821.953	10.031	.003[b]
	Residual	18113958041.437	48	377374125.863		
	Total	21899472863.390	49			

a. Dependent Variable: Target Costing
b. Predictors: (Constant), Return on Sales

Source: SPSS v 25

Table 3.2 Co-efficient Analysis

		Coefficients[a]									
		Unstandardized Coefficients		Standardized Coefficients	t-Statistic	Sig.	95.0% Confidence Interval for B		Correlations		
Model		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	29358.036	3374.806		8.699	.000	22572.53	36143.5			
	Return on Sales	-415.902	131.315	-.416	-3.167	.003	-679.92	-151.87	-.416	-.416	-.416

a. Dependent Variable: Target Costing

Source: SPSS v 25

Table 3.3 C0-efficient Correlations Analysis

	Coefficient Correlations[a]

Model			Return on Sales
1	Correlations	Return on Sales	1.000
	Co variances	Return on Sales	17243.634
a. Dependent Variable: Target Costing			

Source: SPSS v 25

Table 3.4 Residuals Statistics Analysis

Residuals Statisticsᵃ					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-6498.6060	34788.3828	23150.1230	8789.50536	50
Residual	-25340.83789	49794.32031	.00000	19226.87216	50
Std. Predicted Value	-3.373	1.324	.000	1.000	50
Std. Residual	-1.304	2.563	.000	.990	50
a. Dependent Variable: Target Costing					

Source: SPSS v 25

Test of Hypothesis 3

Table 4 represents the multiple regression analysis of Target costing and financial performance of the selected and listed on BSE automobile companies of India. The regression results revealed that positive relationship amongst Target costing to independent variables of Revenue from operation; Margin from operation; Profitability, ROA; ROS, Growth; EPS, Net Tangibility Assets (NTA) and Firm SIZE. The statistical analysis of multiple regression analysis estimated on Table 4 showed the R-square about 100% and it is authenticated that there is no variation amongst research explanatory variables.

Furthermore, the statistical analysis of co-efficient revealed on the table 4.2 with the Target costing to the explanatory independent variables has positive relationship through the Un standardized Co-efficient of β value with Revenue from operations; Profitability; Return on Sales (ROS) and Growth by 1.000; 3.558; 9.422 and 4.211 respectively and also p-value shown by 0.000 for the respective of all the independent variable. Therefore, the positive co-efficient relationship amongst Target costing and

independent variables results confirm that the multiple regression results statistically significant. While the negative relationship revealed with the Un standardized Co-efficient of β value with the Target costing to the Margin from Operation; Return on Assets (ROA); Net Tangibility Assets (NTA); EPS and Firm Size by -1.000; -5.642; -2.855; -1.830 and -4.702 respectively and also p-value shown by 0.000 for the concerned of all the research independent variables, consequently the negative relationship amongst Target costing and independent variables results confirm that the multiple regression results statistically insignificant with such variables.

The Durbin Watson statistic test is examined the correlation (time series data) or auto-correlation (panel data) in research model. The results revealed by the Durbin Watson test is 0.867 and this statistical value is more than 0 but less than 2, this indicated that the present research data has the evidence of positive auto-correlation amongst variables. ANOVA test is a formal fitness of test which can assist to examine the linearity of research model. Regression analysis criteria emphasize that the model must be linear and the result presented in table 4.1, F test suggested that null hypothesis would not reject. As F-Statistical test is exhibited about this research model is properly specified.

However, the research results investigated with the Target Costing impact on Revenue from Operation; Profitability; Return on Sales (ROS) and Growth established positive correlation, while through the other independent variable confirmed negative correlation by Margin from Operation; ROA; Net Tangibility Assets; EPS and Firm Size. Although, the Target Costing could have enormous impact on the selected companies business operations during the study period because statistical results impart with mixed results (See Table 4 to 4.3).

Table 4: Regression Analysis of Target Costing and Financial Performance

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df 1	df 2	Sig. F Change	
	1.000 a	1.000	1.000	.00000	1.000	.	9	39	.000	.867
a. Predictors: (Constant), Firm Size, Net Tangibilty Assets, EPS, ROS, ROA, Margin from Operations, Growth, Revenue from Operation, Profitability										
b. Dependent Variable: Target Costing										

Source: SPSS v 25

Table 4.1 ANOVA Analysis

ANOVAa						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21867425268.563	9	2429713918.729	.	.b
	Residual	.000	39	.000		
	Total	21867425268.563	48			
a. Dependent Variable: Target Costing						
b. Predictors: (Constant), Firm Size, Net Tangibilty Assets, EPS, ROS, ROA, Margin from Operations, Growth, Revenue from Operation, Profitability						

Source: SPSS v 25

Table 4.2 Co-efficient Analysis

Coefficients						
Model		Un standardized Coefficients		Standardized Coefficients	t-Statistics	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.034E-12	.000		-3.597	.001
	Revenue from Operation	1.000	.000	1.067	18728701641934296.00	.000
	Margin from Operations	-1.000	.000	-.114	-2274898973206912.00	.000
	Profitability	3.558E-12	.000	.000	7.649	.000
	ROA	-5.642E-12	.000	.000	-8.257	.000
	ROS	9.422E-13	.000	.000	12.202	.000
	Growth	4.211E-14	.000	.000	7.725	.000

Coefficients					
Model	Un standardized Coefficients		Standardized Coefficients	t-Statistics	Sig.
	B	Std. Error	Beta		
Net Tangibility Assets	-2.855E-15	.000	.000	-21.157	.000
EPS	-1.830E-14	.000	.000	-3.648	.001
Firm Size	-4.702E-13	.000	.000	-8.582	.000
a. Dependent Variable: Target Costing					

Source: SPSS v 25

Table 4.3 Residuals Statistics Analysis

Residuals Statistics[a]					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	15.1000	75525.8984	23264.4937	21344.11769	49
Residual	.00000	.00000	.00000	.00000	49
Std. Predicted Value	-1.089	2.449	.000	1.000	49
Std. Residual	.	.	.	.	0
a. Dependent Variable: Target Costing					

Source: SPSS v 25

X. Conclusion

Target costing application for automobile companies is deliberate as the modern approach to shrink strategic costs that facilitate to the development of companies and achieve equivalent benefits over the competitors in market. This scenario is potential for automobile companies with the establishment of cost center and accomplish persistent growth of companies for survive in the competitive market. This research investigated results of automobile companies by application of target costing as a cost accounting technique to ROS and financial performance of selected companies of India.

The research major finding through descriptive statistics of explanatory variables by standard deviation revealed very wider dispersion for revenue from operation; target costing; net tangibility assets and margin from operation, whereas lowest dispersion

revealed by return on assets and profitability. The research determined the significance relationship between Target costing and Profitability of automobile companies in India results indicated by Pearson's correlation that there is a negative relationship between variables. In additionally, Pearson's correlation determined that target costing have a great impact on profitability of the automobile companies. Besides, simple regression analysis revealed a positive correlation between Target costing and Return on Sales (ROS) of the automobile companies in India. Also, Return on Sales (ROS) predicted target costing would be 415.90 lower than for return on sales.

Moreover, research results of multiple regression analysis of Target costing to financial performance of the selected automobile companies revealed that positive relationship by the Un standardized Co-efficient of β value with Revenue from operations; Profitability; Return on Sales (ROS) and Growth. Whereas the negative relationship revealed with the Un standardized Co-efficient of β value with the Target costing to the Margin from Operation; Return on Assets (ROA); Net Tangibility Assets (NTA); EPS and Firm Size. The results of target costing and financial performance revealed that the significant association amongst variables. The scope of the application of target costing and financial performance of automobile companies in India with R-Square value of 1.000 and p value 0.000.

XI. Future Research

This research can be possible to further extend and examine the significant relationship among the target costing and different cost components of manufacturing and service sectors. Additionally, target costing techniques strength of character in achieve cost competitive advantages amongst competative companies by comaring costs with employ target costing at various stages of manufacturing and service sector.

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Appendix 1: Selected Companies Target Costing and Financial Analysis

S.NO	Name of the Company	Revenue from Operation	Margin from Operations	Target Costing	Profitability	ROA	ROS	Growth	Net Tangibility Assets	EPS	Firm Size
1	Ashok Leyland Limited										
	2014-15	13,311.14	334.81	12,976.33	3.3219	2.55151	2.5152	3.931	2,610.99	1.2	1
	2015-16	18,560.77	389.6	18,171.17	6.4706	3.05	2.099	-4.0396	1946.36	1.37	0.68821
	2016-17	19,741.58	1,223.08	18,518.50	9.4735	8.7113	6.1954	9.9134	5811.35	4.24	0.7111
	2017-18	25,965.78	1,717.73	24,248.05	13.7619	9.9082	6.6153	23.4779	9631.5	5.87	0.6676
	2018-19	28,614.03	1,983.20	26,630.83	13.7003	10.8821	6.9308	5.1222	9658.53	6.76	0.6369
2	Bajaj Auto Limited										
	2014-15	21,103.93	2,813.74	18,290.19	37.8084	26.0437	13.3327	11.7751	10692.15	97	0.5119
	2015-16	22,151.71	3,929.67	18,222.04	41.8143	29.6208	17.7398	22.7938	13177.26	135.8	0.5988
	2016-17	21,373.52	3,827.56	17,545.96	31.1042	22.3128	17.9079	29.3028	16.989.48	132.3	0.8025
	2017-18	24,700.30	4,068.10	20,632.20	30.0789	21.1608	16.4698	12.0706	19103.86	140.6	0.7783
	2018-19	29,567.25	4,675.18	24,892.07	30.7768	21.4655	15.812	13.2916	21760.15	161.6	0.7366
3	Eicher Motor Limited										
	2014-15	4,641.26	928.58	3,712.68	59.3829	41.6611	20.007	50.2777	1221.73	342.25	0.4802
	2015-16	6,186.19	1,309.22	4,876.97	51.1328	36.1277	21.1635	62.5881	2307.37	482.45	0.5858
	2016-17	7,037.97	1,560.02	5,477.95	41.0989	28.1578	22.1657	52.8807	3889.18	573.75	0.7871
	2017-18	8,957.51	1,712.91	7,244.60	33.9753	21.9754	19.1226	40.6914	5333.57	629.07	0.8701
	2018-19	9,794.48	2,054.44	7,740.04	33.0573	21.6772	20.9754	21.5883	6947.47	753.37	0.9676
4	Escorts Limited										
	2014-15	3,962.28	74.71	3,887.57	3.1472	3.4451	1.8743	1.0686	561.77	6.26	0.544
	2015-16	3,456.05	89.38	3,366.67	4.4174	4.2977	2.5741	-4.0972	600.44	7.49	0.5989
	2016-17	4,078.19	160.44	3,917.75	12.5428	7.2714	3.9197	6.0941	640.55	13.43	0.539
	2017-18	4,953.30	344.72	4,608.58	19.8618	13.4562	6.9011	16.1056	804.54	28.85	0.5128
	2018-19	6,116.76	484.91	5,631.85	21.906	14.7288	7.8257	28.5132	1287.8	40.48	0.5313
5	Force Motors										

S.NO	Name of the Company	Revenue from Operation	Margin from Operations	Target Costing	Profitability	ROA	ROS	Growth	Net Tangibility Assets	EPS	Firm Size
	2014-15	2,335.13	101.36	2,233.77	6.3367	5.1407	4.2881	11.2761	236.44	76.93	0.8341
	2015-16	3,031.35	179.42	2,851.93	10.8672	7.8217	5.8638	16.3403	326.25	136.17	0.7496
	2016-17	3,037.95	179.92	2,858.03	9.0379	6.9195	5.8625	13.353	1138.2	136.55	0.8472
	2017-18	3,392.37	146.95	3,245.42	7.9486	5.8335	4.2935	-3.1209	1147.78	111.53	0.7359
	2018-19	3,620.01	147.18	3,472.83	6.8341	5.1898	4.03	12.579	1222.71	111.7	0.7765
6	Hero Motocorp Limited										
	2014-15	27,518.00	2,385.64	25,132.36	50.889	36.4702	8.6482	16.8121	2466.56	119	0.2371
	2015-16	28,359.91	3,132.37	25,227.54	59.8769	42.6769	10.9526	12.1996	2824.52	156.86	0.2566
	2016-17	28,169.54	3,377.12	24,792.42	46.0718	33.3995	11.8493	37.7681	5443.46	169.12	0.3547
	2017-18	31,589.51	3,697.36	27,892.15	44.5595	31.4164	11.4716	16.3934	6630.31	185.14	0.3651
	2018-19	33,124.53	3,384.87	29,739.66	38.9724	26.3268	10.0588	9.2467	7932	169.48	0.382
7	Mahindra & Mahindra Limited										
	2014-15	38,391.61	3,321.11	35,070.50	12.6541	10.0808	8.5276	5.2933	19121.07	56.23	0.8459
	2015-16	40,386.75	3,204.57	37,182.18	12.069	9.027	7.8399	7.7544	21372.91	53.05	0.8684
	2016-17	43,378.93	3,643.39	39,735.54	11.8158	9.1156	8.2703	12.5881	25551.3	30.69	0.9072
	2017-18	48,112.32	4,356.01	43,756.31	12.8696	9.1866	8.9472	18.6358	28942.58	36.64	0.9739
	2018-19	52,960.80	4,796.04	48,164.76	12.0025	9.1011	8.9454	11.1359	31742.19	40.29	0.9828
8	Maharashtra Scooters Limited										
	2014-15	69.86	54.76	15.10	17.2022	17.2022	78.3853	6.0075	252.26	47.91	4.5566
	2015-16	117.15	101	16.15	29.9401	29.9401	86.2142	5.9717	311.99	88.37	2.8795
	2016-17	29.24	13.07	16.17	0.2181	0.2181	49.0424	1848.2777	6552.49	11.43	224.771
	2017-18	82.12	60.76	21.36	0.7441	0.7441	74.6955	25.4216	8225.27	53.16	100.378
	2018-19	95.93	72.8	23.13	0.6346	0.6346	77.5565	42.2158	11323.22	63.7	122.203
9	Maruti Suzuki India Limited										
	2014-15	48,605.50	3,711.20	44,894.30	20.3823	15.5381	7.4267	5.3889	13745.3	123	0.4779
	2015-16	56,441.20	5,364.30	51,076.90	24.8441	17.9039	9.323	25.4442	17558.9	177.58	0.5207
	2016-17	66,909.40	7,350.20	59,559.20	26.9819	19.9113	10.8035	23.2067	21722.2	243.32	0.5425
	2017-18	78,104.80	7,721.80	70,383.00	26.2811	18.4431	9.6809	13.4185	23943.6	255.62	0.5249
	2018-19	83,026.50	7,500.60	75,525.90	22.6082	16.2031	8.7195	10.5641	29127.8	248.3	0.5381
10	Tata Motors Limited										
	2014-15	35,890.50	-4,738.95	40,629.45	-7.9584	-9.4886	-13.0568	0.4197	11339.86	-15	1.376
	2015-16	42,345.39	-62.3	42,407.69	0.2749	-0.1099	-0.1454	13.4809	19759.55	-0.18	1.3228
	2016-17	43,340.62	-2,429.60	45,770.22	-3.9968	-4.1264	-5.4824	3.8857	18286.81	-7.15	1.3285
	2017-18	57,441.05	-1,034.85	58,475.90	-1.5991	-1.7476	-1.759	0.5673	16759.75	-3.05	1.0064
	2018-19	68,764.88	2,020.60	66,744.28	3.9385	3.3173	2.9198	2.8665	19286.72	5.94	0.8801

Source: *Authors Compiled data*