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EFFECT OF BALANCED SCORECARD ON FIRM VALUE: THE CASE OF QUOTED MANUFACTURING COMPANIES IN INDIA

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Abstract
Investigating how the Balanced Scorecard (BSC) affects the value of a company is the driving force behind this research. The financial results of 25 businesses listed on the Bombay stock market have provided proof of the same. Production is the main focus of these businesses. Secondary sources provided the data used in this investigation. For the five fiscal years beginning in 2019 and ending in 2023, the company's financial statements serve as the primary data source. In order to provide a summary of the study's variables' behaviour, descriptive statistics have also been computed. Using a multiple regression model, we have evaluated our hypothesis. The meaningful association between the dependent variable (Firm Value) and the independent variables (BSFINP, BSBUSP, BSCUSP, and BSLGRP) may be examined using a regression model. Firms should leverage views to build business value, according to this study's conclusions. Companies with fewer procedures tend to be more valuable and successful than those with many. The results show that businesses should follow BSC's advice as it will boost their value and performance.

Keywords: Firm Value, Business process, Financial perspectives, customer perspectives, Learning and Growth perspectives.

1. Introduction

In the past, measuring a firm's success with only accounting or financial data was the main way to determine its value. But, it has been observed that customers and other stakeholders of corporate firm believes that only financial analysis and supply and demand chain is not sufficient in measuring a firm value (Muhammad, 2010).

Due to the managers have high expectations, this tool has generated much managerial and academic interest. Everybody needs to work together to bring out the required cultural and mental changes. Employees had to apply for the recently created positions, and this uncertain circumstance, which endangered their job security and professional possibilities, openly "stimulated" a shift in attitude. Undoubtedly one of the most significant recent accounting advances is the Balanced Scorecard (BSC). Organisational value, competitive market position, and firm value are all expected to be enhanced by empowering senior managers to effectively manage their organisations' key operations (Kaplan and Norton, 2001).

The quality of a company's relationships with its clients and employees is an important intangible asset. The loyalty of both customers and employees are interdependent, making their retention essential to a company's success. A company's measurement/value framework, often known as a scorecard, should

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represent the quality of important connections.

A BSC is based on the premise that learning is essential for improving internal company processes, which in turn improves customer satisfaction and, ultimately, financial results. According to Kaplan (2010), businesses who fail to continuously improve would inevitably fall behind their competitors, since the BSC places an emphasis on progress rather than just reaching set objectives.

Using the BSC, company leaders can track and manage the value their business units provide to current and future customers, identify areas for internal capability development, and plan investments in people, technology, and processes to improve future performance.

1.2 Statement of Problem

Businesses today face intense competition due to the financial markets' quick expansion, and conventional performance management seems insufficient to measure an organization's overall performance to fulfill its strategic development needs. Conventional performance management didn't consider non-financial aspects, therefore the results fail to represent whether the organization operates as a whole accurately.

Financial data is helping organisation in analyzing the fund requirement only but they are not able to put businesses in a good positions where it can operate efficiently and effectively. Study of sustainable environment and corporate governance will help companies face social complexity and environmental risk (Kaplan and Norton, 1992). The firm's future operational conditions cannot be predicted by financial indicators, which can only reflect the performance of corporate in past times (Zahiru & Wendy, 2000).

1.3 Objectives of the Study

The study's primary goals are to determine how the Balanced Scorecard affects a company's value and evaluate its benefits and drawbacks in measuring its performance. The worth of a company may be measured by looking at it through the four lenses of the Balanced Scorecard (BSC): financial, business process, customer, learning, and growth.

1.4 Research Question

How much would an organization's value be affected if the four perspectives of the Balanced Scorecard (BSC) were applied: financial, business process, customer, learning, and growth?

1.5 Research Hypothesis

The four perspectives of the Balanced Scorecard (BSC) (financial, business process, customer, learning, and growth) do not significantly affect the firm’s value.

2.1 Conceptual Framework

Balanced Scorecard (BSC)

BSC had introduced in 1992 by Kaplan and Norton who had created the tool for performance measurement of corporates in order to solve drawback of using financial measurement tools for performance analysis of firm. According to them (Kaplan and Norton, 1992), BSC is "a strategic management technique for communicating and evaluating the achievement of the mission and strategy

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of the organization". The Balanced Scorecard (BSC) is a conceptual framework for measuring performance that conveys an organization's strategy into specific objectives, measures, targets, and initiatives grouped under the four perspectives of financial, customer, business process, and human resources, including innovation and learning (Kassahun, 2010). In order for a business to function at its best, every single perspective reflects a different part of the corporate organization.

A Financial Viewpoint

According to Al-Najjar & Kalaf (2012), a company's financial metrics may tell you a lot about how stable it is financially as a result of its management and operations decisions in the past.

Financial measures provide vital information about financial performance of the company which can be used in generating report progress, boost morale and communication, and identify issues (Waggoner, Neely & Kennerley, 1999).

Customer Perspective

According to Kairu, Wafula, Okaka, Odera, and Akereke (2013), this viewpoint emphasises the capacity of the company to provide high-quality goods or services and satisfy consumers.

This determines the organization's market share, customer retention, and level of satisfaction among customers.

Business Process Perspective

Business processes viewpoint, according to Gekonge (2005), focuses on the internal business outcomes that result in financial success and happy customers. This consists of metrics for the business operations, like cost and quality.

Growth and Learning Point of View

According to Kaplan and Norton (1992) (Gekonge, 2005), when looking at a company's innovative ability, learning, and growth, it is important to consider the following factors: the skill set of employees, the effectiveness of information systems, and the effects of organisational alignment. Metrics like as knowledge management, staff happiness, and staff retention are part of it. What makes the above so important is that it demonstrates how the balanced scorecard offers a thorough model that links the accomplishments of individuals to the goals of the business unit.

2.1.1 Firm Value

Value maximization (for shareholders) is frequently used to describe a company's main goal (Berle & Means 1991). Value maximization means value of shareholder’s equity in which present value of benefits has been included on annual basis (Blair, 1995). This definition states that a firm's worth can only be maximized when long-term benefits are maximized.

A financial indicator of a company's market value can be identified as Enterprise value (EV), total Enterprise value (TEV), or Firm value (FV). It is the total of the claims of all claimants, including preferred and common stockholders as well as secured and unsecured creditors. Value maximization is an organization's main objective. The value of a company considers how managerial choices may affect

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profitability over the long run.
It should be noted that when economists claim that a corporation's objective is to maximize profits, they really mean that the firm wants to maximize its value, which is the present value of all past, present, and future earnings. (2011) Dolenc, Stubelj, and Laporek.
According to Brigham & Houston (1999), company value is the consideration paid to the financial market and corporate organization management as a firm expands. This value
Researchers may use different metrics in place of share value. The majority of them substitute Tobin's Q for the company's market value (Yermack, 1996; Siallagan & Machfoedz, 2006). Both Brigham and Houston (1999) and Wahyudi and Prawesti (2006) use the market value to book value proxy ratio.

Q-Model by Tobin
Moeljadi (2014) states that Tobin's Q model was defined as the market value of equity divided by the book value of debt, as a percentage. As a measure of a company's financial health, Tobin's Q compares its market value to its total assets.
Tobin's Q is calculated by dividing the firm's total market value by its total asset value. The current market price of share capital divided by replacement cost is called Tobin's q. In other words, q is equal to the market value of installed capital divided by its replacement cost.
James Tobin, a pioneer in the field of finance, proposed that the following ratio, known as Tobin's q, influences companies' investment decisions.

$$q = \frac{\text{Market value of the economy's installed capital}}{\text{Market price of the installed capital or its replacement cost}}$$

The stock market places a higher value on an economy's installed capital than its market price or replacement cost if q is larger than 1.

2.2 Theoretical Framework
Prescriptive and emergent theories are the two basic groups into which corporate strategy-related theories fall (Lynch, 2000). Some examples of prescriptive theories of strategy include theories that aim to maximise shareholder value or profit, theories that focus on resources or games, and theories that take sociocultural factors into account.
While the survival-based theory, uncertainty-based theory, and human resource-based theory are among the emerging theories of corporate strategies. To further clarify or justify our work, the study was based on ideas of shareholder value maximization and survival.

Shareholders' Value Maximization Theory
When Milton Friedman stated in the NY Times in 1970 that "there is one and only one social responsibility of business: to use its resources to engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition, without deception or fraud," he introduced the concept of shareholder value maximization. According to the shareholder value maximization thesis, managers have a responsibility to advance shareholders' interests to the greatest extent still allowed by law or in the interests of society as a whole.
Business terms like "shareholder value" and "shareholder value maximization" or "shareholder value

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model" imply that a return on share capital paid by company helps in identifying the actual performance of company (Kennerly, 2010).

This theory was chosen because it best illustrates the social responsibility of business, social responsibility is to manage available resources efficiently and generate growth in profit without any default or misrepresentation. It is the accountability of management to maintain shareholder value and achieve the vision of value maximization so that society keeps interested in the company.

The Survival-Based Theory

Herbert has created the survival-based theory, that is also called as "survival of the fittest" hypothesis (Miesing & Preble, 1985).

According to social Darwinism, it is a common business practices of competitors to act in pleasure-seeking ways to create the strongest companies that successfully adapted to their environments or developed into the most productive and profitable ones among them.

The survival-based view in strategic management consider that strategies framed in such a way that would implement within company efficiently and if any change occurs that would be adopted by company without any difficulty in the competitive environment (Khairuddin, 2005), Company should be survival in every situation that proves how competitive and powerful it has in the industry.

According to the survival-based hypothesis, a company will not succeed if it does not adapt to its constantly changing environment and become efficient within it. As a result, the one that operates effectively and successfully adapts to its surroundings is the one that genuinely survives and turns things around.

2.3 Emperical Review

The balanced scorecard and the worth of a company have been the subject of a great deal of research. To get a better grasp of the Balanced Scorecard's (BSC) implementation, Braam & Nijssen (2008) used a regression model to assess the company's success. This performance was characterised by the change in ROI over the last three years and an intangible, subjective metric. Evidence from Dutch businesses suggests that BSC is not a magic bullet for improving productivity. Rather, its application is crucial.

Kala and Bagr (2014), who conducted research on hotel balanced scorecard performance, stayed at a number of different establishments in several tourist hotspots in the mountainous Indian state of Uttarakhand. The research concluded that managers in the hotel industry in the study region would benefit by selecting a suitable set of financial and non-financial performance indicators, implementing them, and tying them to the organization's objectives.

Concerning perceived advantages, planning, control, and communication, Wasatoin (2013) examines the performance of management and BSC viewpoints in relation to one another. Additionally, she investigated if the various BSC attributes—including overall benefits, planning, control, and communication—were responsible for any particular advantages. Simple regression analysis was used to examine the hypotheses that were put forward. A key component in the implementation of each BSC feature was the level of support from upper management, as shown in the regression research.

To verify their hypotheses on all of the industrial enterprises listed on the Amman Stock Exchange in Jordan, Zuriekat, Salameh, and Nrawasdeh (2015) used structural equation modelling in their research.

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Providing managers and staff with a rationale to choose performance metrics seems to enhance their results by boosting system satisfaction, according to this report.

Noor, Mseden, and Mohammad (2015) examined the relationship between the dependent variables (ROA and ROE) and the independent factors (Balanced Scorecard Dimensions) using data from Jordanian industrial businesses listed on the Amman Stock Exchange from 2008 to 2012. According to the results, there is a strong positive correlation between all of the components of the balanced scorecard and the financial performance drivers ROA and ROE.

The Balanced Scorecard was studied by Etim and Agara (2011) to see how well it worked for companies in Nigeria. Based on real data, they were able to conclude that businesses that had implemented the Balanced Scorecard had managed to enhance their performance and reverse their losses. They contend, however, that a fifth viewpoint should be added to the basic four because of the critical roles that culture and environment play in the survival of any organisation.

Lasisi, Olajide, Hasan, and Shodiya (2014) looked at how balanced scorecard and relational competences worked together in Nigerian manufacturing companies. Relational competencies and balanced scorecard are statistically related in Nigerian industrial firms, according to the study's results.

The purpose of Akram and Tariq's (2014) study was to shed light on the level of BSC adoption and use as a performance assessment tool among Palestinian listed companies. We used non-financial perspectives such as the customer's, the internal company process's, learning and growth's, and others. We used descriptive statistics (the average and standard deviation of the BSC perspectives) and a one-sample t-test to assess our hypotheses and answer our study questions. The majority of Palestinian firms use BSC in some capacity for assessment, according to their study.

Using organisational commitment as an interference variable, Yung-Chieh (2012) aimed to validate that balanced scorecards used by Taiwan LED-listed businesses had an effect on the growth of intellectual capital. Participants in the study ranged from production department staff to department heads in charge of human resources, finance, marketing, and production. It was found that the use of the balanced scorecard by Taiwan LED-listed companies affects intellectual capital.

The balanced scorecard (BSC) is a tool for comprehensively evaluating business organisations, and Malgwi and Dahiru (2014) reviewed the literature on the topic. It makes use of the growth, learning, and financial viewpoints as well as the customer and internal business process viewpoints. Information gathered for the evaluation came from secondary sources. Although there were some negative aspects, the review's results showed that those who employed the method also found numerous positive ones.

2.4 Gaps in the Literature

Finding and highlighting disparities between the balanced scorecard's effect on firm value and some traded companies is the goal of this research, which seeks to address a knowledge vacuum in the literature.

3.0 Methodology

This study's methodology is based on a survey. This research used multiple regressions and the Pearson correlation coefficient (r) to examine the link and effect between the dependent and explanatory variables across a five-year period. Aggregate secondary data was the main way that this research

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gathered its data. The financial statements of firms trading on the Bombay Stock Exchange between 2019 and 2023 have been used to compile this data.

All manufacturing enterprises registered on the Bombay Stock Exchange make up the study's population. Consequently, as of March 2023, the Bombay Stock Exchange has 25 listed industrial enterprises whose annual statements were analysed and utilised. Methods for analysing data could include both descriptive and inferential statistics.

3.1 Model Details and Rationale

To determine if the implications of a BSC viewpoint impact the value of a corporation, a regression model is used. Following this, we establish a logistic regression model to check the predicted consequences of BSC tendencies. Here is the functional model that was created for this study:

Where:

TbQ = TOBIN Q

BSFINP = A financial viewpoint measurement

BSBUSP = Viewpoint on business processes

BSCUSP = Viewpoint of the client

BSLGRP = A view on learning and development

et = Problem Area

Where Balanced Scorecard is the dependent variables, β1, β2, β3, and β4, are regression coefficients with unknown values to be estimated; X1, X2, X3, and X4, are the independent variables. Four viewpoints—financial, business process, customer learning, and growth—make up the Balanced Scorecard. When additional variables are not part of the model, the error term (e) stands in for them.

Decision Rule

The null hypothesis (Ho) is accepted and the alternative hypothesis (Hi) is rejected if the calculated value of the coefficients regression statistics is smaller than the critical value. However, if the regression result is higher, the null hypothesis (Ho) will be rejected.

4.1 Presentation of Data

Tabe 1 is describing the characteristic of data through descriptive statistics as follows:

Table 4.1 Descriptive Statistics

	Mean	**Maximum**	**Minimum**	**Standard Deviation**	**JB**	**P VALUE** (Freedom Value= 2)
TOBIN	9.519794	78.42066	0.847478	15.79742214	698.5045	0
ROTOE	22.13467	95.88995	-23.3662	22.83177712	51.29755	0
REVGR	13.04704	115.0004	-45.1738	21.40747554	121.9858	0

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SCOST	0.063876	0.177827	0.005815	0.043769086	22.53326	0
COMPX	0.261203	0.968038	0.008852	0.167697669	66.25377	0
TASST	4.433615	5.856827	3.394189	0.520763121	3.353467	0.19

Source: Researcher's computation (2024)
Note: *1% Level of Significance.

Table 4.1 shows descriptive statistics like mean, median, Minimum, Maximum, standard deviation, JB and P-value at freedom value of 2. The table provide the nature of data collected from the financials of listed companies.

The calculation provides that mean value of TOBIN Q is positive that shows average performance of companies in last 10 years i.e 2013-2023. The value of standard deviation shows that there is large difference between mean value and actual value of data so collected. P- value is 0.19at 0.01 significance level that proves that there is no significant relationship among variables of data set.

It has been observed about BSC perspectives that maximum and minimum values are having great difference this difference indicates that 4 balance score card perspectives have different effect on every company which has been considered for testing purpose. Due too business, and size of firm the BSC elements affect differently. It has been expected that those companies are having high business perspectives their firm value also high otherwise all value goes down.

Lastly, in table 4.1, the Jarque-Bera (JB) tests that the values are within or out side of outliners. The results indicate that there is normal distribution of variables at 1% level of significance so the variables are met with research objectives and available to draw general conclusion of our findings. To estimate the regression model, least squares has been used.

Hypothesis Testing:

In order to accomplish the study aim, multiple regression analysis was used to evaluate the hypotheses. We used the Balanced Scorecard (BSC) four viewpoints to test our hypothesis and investigate the associations between TOBINQ (the dependent variable) and BSFINP, BSCUSP, BSLGRP, and TASST (the independent variables). There is no significant relationship among the variables, according to the findings. Table 4.2 below presents and discusses the findings of the pooled interaction based multiple regression. For a full result, see appendix two.

Combined Regression Findings from TOBINQ:

Variables	**T-statistics**	**Prob.**
BSFINP	-0.46822	0.67
BSCUSP	-0.34857	0.74
BSLGRP	-0.56612	0.60
BSBUSP	-0.35568	0.74
TASST	-0.70004	0.52

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R-squared 0.875
Adjusted R-squared 0.720
F-Statistic 4.037191529
Prob (F-Statistics) 0.10
Durbin – Watson stat 1.98

Source: Researched computation through MS-EXCEL and IBM SPSS

The R-squared and adjusted R-squared values appeared in table 4.2 as (0.875) and (0.720), respectively. Over the course of the 10 years (2013–2024) that we tracked the firms in our sample, we found that the independent variables accounted for around 72% of the systematic variance in firm value (TOBINQ). The validity of the TOBINQ regression model is shown by the F-statistics (4.04) and its P value (0.10). There is no evidence of serial autocorrelation, according to the Durbin-Watson statistic, which yielded a value of 1.9853. Along with the aforementioned, the following details the results for each explanatory variable:

According to the data in table 4.2, we can see that the Balanced Scorecard Financial Perspective (BSFINP) had a negative effect on the firm value (TOBINQ) of the sampled quoted companies, but this effect was not statistically significant (P > 10%). This indicates that the value of a company is adversely affected by the Balanced Scorecard Financial viewpoint. So, contrary to expectations and the viewpoint of Kala & Bagri (2014), this result does not corroborate the results of Noor, Mseden & Mohammad (2015).

The sampled quoted companies' firm value (TOBINQ) was found to be negatively impacted by the Balanced Scorecard Business Process Perspective (BSBUSP), according to the t value of -0.35568 and p-value of 0.74 in table 4.2 above. However, this influence was not statistically significant at the 10% level, as the p-value was less than 0.10 value. This indicates that companies with fewer business processes are valued higher and perform better than those with more business processes because they make greater use of the business process to create value. This discovery contradicts the opinion of Wasatoin (2013) and lends credence to our aprori anticipation as well as the results of Braam & Nijssen (2008).

Table 4.2 shows that our sample of listed businesses' firm value (TOBINQ) was adversely impacted by Balanced Scorecard Customers Perspective (BSCUSP), with a t-value of -0.34857 and a P-value of 0.74. This indicates that the viewpoint of Balanced Scorecard customers has a favourable effect on the value of the business. In contrast to what Zuriekat, Salameh & Alrawashdeh (2015) and Akram & Tarig (2014) found, this supports what Braam & Nijssen (2008) and Kala & Bagri (2014) found.

Table 4.2 shows that the sample of publicly traded firms (TOBINQ) was adversely impacted by the Balanced Scorecard Learning and Growth Perspective (BSLGRP), with a t-value of -0.56612 and a p-value of 0.60. The results show that the firm's value and growth are negatively affected by the Balanced Scorecard learning and growth approach. Since our p-value is more than 0.10 and our t-value is negative, we cannot conclude that the null hypothesis is true. An organization's worth is unaffected by adopting

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a learning and growth mindset. This discovery contradicts the opinions or conclusions of Wasatoin 2013, Yung-Chieh 2012, and Malgwui & Dahiru 2014, while lending credence to the research of Kala & Bagri 2014 and Etim & Agara 2011.

5.0 Conclusion and Recommendation

This paper has made research on the effect of Balanced Score Card on the value of firm. Balance Scorecard has four major perspective to consider such as Financials, Customers, Business internal process and Learning and Growth. Firms uses this tool to measure their strength and weaknesses in their current business performance. It has been contemplated to quantify the effect on stock exchange of firms included on the Balanced Scorecard. To find out how the Balanced Scorecard affects the value of a company, a new model called TOBINQ was created.

The model has used measures of balanced scorecard as BSFINP, BSBUSP, BSCUSP and BSLGRP. TOBINQ is dependent variable and rest four measures are independent. Test the relationship among these measures hypothesis has been developed and multiple regression model has been developed. Five financial years starts from 2019 to 2023 has been considered for data collection. This study concludes that the Balance scorecard perspectives does not have any significant effect over the value of the firm. From the findings of this research following recommendations has been drawn:

- Firm should consider the measures/perspectives of a Balanced Scorecard. Non-financial measure along with financial measure can be used to generate firm value at maximum point. In general, firms with good financial performances considers only the financial perspectives in comparison to low financial performance.
- Business process perspective helps firm to analyse existing business process and identify the week points where firm needs improvements. Business process also helps firm in generating good value. Firm with low business process perform better as compared to firm with higher business process.
- Customer perspective is also important factor in firm's value generation. Companies that considers interest of their customers and fulfill their demand generates high value. Firms those have higher customer activities are valued high as compared to those who do not consider customer-based activities important.
- Only learning and growth is not sufficient, but it contributes in generating firm value. Learning & growth process develops skills in employees which is important for effective operations. Organisations that considers learning and growth and performs better are good as compared to those which considers learning and growth only.

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Appendix

	DATA GENERATION ON BSC							
YEAR	**COMPANIES**	**LIST**	**TOBIN**	**ROTOE**	**REVGR**	**SCOST**	**COMPX**	**TASST**
2019	Asian Paints	BSE	18.82	22.23	15.70	0.05	0.43	3.95
2020	Asian Paints	BSE	28.85	27.67	4.89	0.06	0.42	3.98
2021	Asian Paints	BSE	26.36	31.82	7.69	0.06	0.41	4.08
2022	Asian Paints	BSE	20.31	32.68	36.03	0.05	0.61	4.13
2023	Asian Paints	BS	21.50	42.75	19.41	0.05	0.56	4.19

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		E						
2019	Bajaj Auto	BSE	3.27	16.16	20.21	0.04	0.13	4.44
2020	Bajaj Auto	BSE	4.15	17.62	-1.10	0.04	0.11	4.39
2021	Bajaj Auto	BSE	2.93	15.74	-7.28	0.04	0.13	4.50
2022	Bajaj Auto	BSE	2.94	17.34	19.48	0.04	0.09	4.50
2023	Bajaj Auto	BSE	4.37	19.89	9.90	0.04	0.10	4.49
2019	Bharat Petroleum Corporation Limited	BSE	2.05	3.63	25.74	0.01	0.44	4.81
2020	Bharat Petroleum Corporation Limited	BSE	1.73	1.36	-4.34	0.01	0.36	4.85
2021	Bharat Petroleum Corporation Limited	BSE	1.36	9.10	-18.23	0.02	0.46	4.88
2022	Bharat Petroleum Corporation Limited	BSE	1.22	4.13	55.79	0.01	0.62	4.87
2023	Bharat Petroleum Corporation Limited	BSE	1.35	0.88	30.60	0.01	0.51	4.94
2019	Britania	BSE	17.52	46.70	12.67	0.03	0.26	3.61
2020	Britania	BSE	16.42	61.72	4.81	0.03	0.16	3.74
2021	Britania	BSE	17.05	73.06	12.67	0.03	0.23	3.71
2022	Britania	BSE	21.25	66.55	8.02	0.03	0.33	3.66
2023	Britania	BSE	21.29	88.80	16.80	0.03	0.23	3.77
2019	Cipla	BSE	2.37	11.72	8.64	0.14	0.38	4.20
2020	Cipla	BSE	3.91	14.38	2.30	0.14	0.38	4.24
2021	Cipla	BSE	3.76	15.30	9.81	0.14	0.31	4.30
2022	Cipla	BSE	3.53	18.33	-5.82	0.13	0.23	4.35
2023	Cipla	BS	3.39	15.57	20.61	0.15	0.25	4.39

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		E						
2019	Dabur	BSE	19.22	7.16	12.18	0.09	0.28	3.61
2020	Dabur	BSE	20.76	6.62	0.58	0.09	0.25	3.67
2021	Dabur	BSE	18.17	7.82	13.87	0.09	0.25	3.75
2022	Dabur	BSE	14.38	8.11	13.85	0.08	0.27	3.80
2023	Dabur	BSE	14.92	7.75	6.17	0.08	0.26	3.84
2019	Dr. Reddy'S Laboratories	BSE	3.47	15.39	13.53	0.18	0.42	4.13
2020	Dr. Reddy'S Laboratories	BSE	5.51	35.35	11.53	0.16	0.42	4.21
2021	Dr. Reddy'S Laboratories	BSE	4.47	26.28	12.65	0.16	0.38	4.26
2022	Dr. Reddy'S Laboratories	BSE	3.28	19.51	7.91	0.16	0.40	4.31
2023	Dr. Reddy'S Laboratories	BSE	4.23	31.37	17.75	0.16	0.36	4.31
2019	Eicher Motors	BSE	8.31	75.31	9.34	0.07	0.10	3.86
2020	Eicher Motors	BSE	8.61	69.74	-7.32	0.08	0.08	3.92
2021	Eicher Motors	BSE	7.18	48.65	-5.05	0.09	0.11	3.99
2022	Eicher Motors	BSE	7.48	58.02	17.45	0.07	0.19	4.03
2023	Eicher Motors	BSE	7.01	95.89	38.96	0.06	0.12	4.11
2019	Godrej Consumers	BSE	13.82	17.17	7.95	0.06	0.20	3.69
2020	Godrej Consumers	BSE	14.37	11.54	-3.61	0.06	0.18	3.74
2021	Godrej Consumers	BSE	15.31	11.97	14.25	0.07	0.15	3.80
2022	Godrej Consumers	BSE	10.43	14.46	11.15	0.05	0.14	3.89
2023	Godrej Consumers	BS	11.31	14.80	10.29	0.05	0.10	3.97

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2019	Grasim	BSE	1.12	3.92	30.16	0.07	0.14	4.65
2020	Grasim	BSE	1.59	9.79	-21.74	0.10	0.13	4.63
2021	Grasim	BSE	2.32	6.88	-22.98	0.11	0.07	4.67
2022	Grasim	BSE	2.05	23.18	68.39	0.08	0.11	4.72
2023	Grasim	BSE	2.34	16.13	28.69	0.07	0.12	4.72
2019	Hero MotoCorp	BSE	3.69	84.73	4.41	0.05	0.30	4.11
2020	Hero MotoCorp	BSE	4.53	90.95	-14.31	0.06	0.19	4.15
2021	Hero MotoCorp	BSE	3.18	74.18	6.81	0.06	0.26	4.18
2022	Hero MotoCorp	BSE	3.18	61.89	-5.05	0.06	0.22	4.20
2023	Hero MotoCorp	BSE	3.69	72.82	15.59	0.06	0.25	4.22
2019	Hindalco	BSE	0.97	5.42	6.87	0.04	0.20	4.83
2020	Hindalco	BSE	1.14	2.79	-12.04	0.05	0.19	4.84
2021	Hindalco	BSE	1.79	4.47	6.11	0.04	0.25	4.84
2022	Hindalco	BSE	1.58	24.81	58.43	0.03	0.32	4.87
2023	Hindalco	BSE	1.55	14.98	13.64	0.03	0.32	4.85
2019	Hindustan Petroleum Corporation Limited	BSE	1.21	3.96	25.48	0.01	0.49	4.73
2020	Hindustan Petroleum Corporation Limited	BSE	1.08	1.73	-2.34	0.01	0.34	4.83
2021	Hindustan Petroleum Corporation Limited	BSE	1.06	7.34	-13.31	0.01	0.45	4.89
2022	Hindustan Petroleum Corporation Limited	BSE	0.90	4.50	50.08	0.01	0.51	4.91
2023	Hindustan Petroleum Corporation	BS	1.16	-6.32	25.94	0.01	0.39	4.96

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	Limited	E						
2019	Hindustan Unilever Limited	BSE	52.88	27.94	10.71	0.04	0.53	3.88
2020	Hindustan Unilever Limited	BSE	72.16	31.19	1.47	0.04	0.46	3.90
2021	Hindustan Unilever Limited	BSE	11.50	33.85	18.59	0.05	0.11	4.68
2022	Hindustan Unilever Limited	BSE	11.31	37.52	11.30	0.05	0.12	4.69
2023	Hindustan Unilever Limited	BSE	12.47	42.39	15.53	0.04	0.13	4.70
2019	Imperial Tobacco Company Of India Limited	BSE	4.90	10.17	10.75	0.06	0.19	4.76
2020	Imperial Tobacco Company Of India Limited	BSE	4.14	12.31	1.39	0.05	0.16	4.81
2021	Imperial Tobacco Company Of India Limited	BSE	4.48	10.59	-0.29	0.06	0.20	4.77
2022	Imperial Tobacco Company Of India Limited	BSE	6.14	12.22	23.87	0.05	0.19	4.79
2023	Imperial Tobacco Company Of India Limited	BSE	8.80	15.09	17.22	0.05	0.19	4.83
2019	Jindal South West Steel	BSE	1.41	26.98	18.79	0.02	0.26	4.83
2020	Jindal South West Steel	BSE	1.68	17.58	-16.75	0.02	0.15	4.93
2021	Jindal South West Steel	BSE	2.23	27.79	10.06	0.02	0.16	4.94
2022	Jindal South West Steel	BSE	1.93	55.49	68.00	0.02	0.24	5.06
2023	Jindal South West Steel	BSE	2.06	16.40	10.83	0.01	0.21	5.07
2019	Larsen And Toubro	BSE	3.05	26.70	10.51	0.07	0.51	4.79
2020	Larsen And Toubro	BSE	2.72	23.79	0.12	0.07	0.39	4.89
2021	Larsen And Toubro	BSE	3.39	40.36	-11.01	0.07	0.39	4.93
2022	Larsen And Toubro	BSE	3.30	28.04	37.76	0.07	0.45	4.94
2023	Larsen And Toubro	BS	4.10	27.92	9.41	0.07	0.41	4.95

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2019	Lupin	BSE	1.97	17.00	12.66	0.13	0.35	4.23
2020	Lupin	BSE	2.61	8.03	-2.91	0.15	0.35	4.24
2021	Lupin	BSE	2.27	13.87	0.27	0.15	0.31	4.28
2022	Lupin	BSE	1.66	-2.08	6.47	0.16	0.31	4.28
2023	Lupin	BSE	2.26	4.67	-4.36	0.17	0.30	4.28
2019	Mahindra And Mahindra Limited	BSE	1.82	8.05	10.12	0.05	0.21	4.56
2020	Mahindra And Mahindra Limited	BSE	2.54	2.23	-15.16	0.06	0.17	4.57
2021	Mahindra And Mahindra Limited	BSE	2.63	0.45	-0.98	0.06	0.15	4.62
2022	Mahindra And Mahindra Limited	BSE	3.27	8.25	27.54	0.06	0.20	4.66
2023	Mahindra And Mahindra Limited	BSE	4.06	10.93	47.90	0.04	0.27	4.68
2019	Maruti Suzuki	BSE	4.68	49.67	7.85	0.04	0.12	4.67
2020	Maruti Suzuki	BSE	4.91	37.42	-12.10	0.04	0.11	4.69
2021	Maruti Suzuki	BSE	4.26	28.01	-6.98	0.05	0.08	4.71
2022	Maruti Suzuki	BSE	4.27	24.94	25.54	0.04	0.10	4.74
2023	Maruti Suzuki	BSE	4.72	53.31	33.10	0.04	0.12	4.79
2019	Piramal Enterprises	BSE	1.27	14.38	11.64	0.10	0.03	4.52
2020	Piramal Enterprises	BSE	1.44	-23.37	-45.17	0.17	0.03	4.49
2021	Piramal Enterprises	BSE	2.41	3.21	-9.35	0.04	0.04	4.46
2022	Piramal Enterprises	BSE	0.88	0.88	21.98	0.04	0.01	4.46
2023	Piramal Enterprises	BS	1.00	11.99	115.0	0.02	0.01	4.46

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		E			0			
2019	Reliance Industries Limited	BSE	1.94	5.55	28.12	0.02	0.10	5.75
2020	Reliance Industries Limited	BSE	2.54	4.88	-9.33	0.02	0.07	5.81
2021	Reliance Industries Limited	BSE	2.65	4.96	-27.09	0.02	0.06	5.82
2022	Reliance Industries Limited	BSE	2.66	5.78	72.47	0.01	0.09	5.82
2023	Reliance Industries Limited	BSE	2.97	6.53	25.03	0.01	0.09	5.86
2019	Sun Pharmaceutical Industries	BSE	3.72	3.40	30.03	0.14	0.27	4.46
2020	Sun Pharmaceutical Industries	BSE	5.05	13.38	21.63	0.12	0.29	4.48
2021	Sun Pharmaceutical Industries	BSE	6.54	8.92	2.16	0.14	0.30	4.50
2022	Sun Pharmaceutical Industries	BSE	7.64	-0.42	21.73	0.12	0.26	4.47
2023	Sun Pharmaceutical Industries	BSE	8.50	7.05	33.53	0.10	0.35	4.50
2019	Tata Steel	BSE	0.85	9.19	18.44	0.07	0.13	5.00
2020	Tata Steel	BSE	1.01	5.88	-14.41	0.08	0.10	5.06
2021	Tata Steel	BSE	1.32	14.25	39.21	0.06	0.12	5.11
2022	Tata Steel	BSE	1.00	27.01	53.35	0.05	0.15	5.20
2023	Tata Steel	BSE	1.05	12.68	-0.01	0.05	0.14	5.25
2019	United Phosphorus Limited	BSE	4.80	3.97	19.23	0.03	0.49	3.97
2020	United Phosphorus Limited	BSE	4.18	3.01	11.33	0.03	0.50	3.96
2021	United Phosphorus Limited	BSE	6.44	1.44	17.67	0.03	0.67	3.95
2022	United Phosphorus Limited	BSE	5.16	7.69	44.99	0.03	0.86	3.99
2023	United Phosphorus Limited	BS	6.34	6.50	14.19	0.03	0.97	3.88

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		E						

Machame RATIOS®									
Data Description									
TOBIN	Firm Value, Measured as (Market Value of Equity + Total Debt)/Total Asset								
RETOE	Balanced Scorecard Financial Perspective, Measured as Profit after tax/Equity								
REVGR	Balanced Scorecard Customer Perspective, Measured as Percentage in Customers Sales Growth								
SCOST	Balanced Scorecard Learning and growth Perspective, Measured as Human cost/Revenue								
COMPX	Balanced Scorecard Internal Business Perspective, Measured as								
	(inventories + Trade Receivables)/ Total Assets								
TASST	Firm Size, Measured as log of Total Assets								

Appendix 2
DESCRIPTIVE STATISTICS OF THE SAMPLED COMPANIES

	TOBIN	**ROTOE**	**REVGR**	**SCOST**	**COMPX**	**TASST**
Mean	9.519794	22.13467	13.04704	0.063876	0.261203044	4.433615
Standard Error	1.412964	2.042136	1.914743	0.003915	0.014999336	0.046578
Median	3.758124	14.4646	11.14796	0.052123	0.232497782	4.463587
Standard Deviation	15.79742	22.83178	21.40748	0.043769	0.167697669	0.520763
Sample Variance	249.5585	521.29	458.28	0.001916	0.028122508	0.271194
Kurtosis	9.718336	1.485966	4.20136	0.258029	2.52275965	0.242109
Skewness	3.14908	1.382121	1.201025	1.031965	1.260595774	0.382508
Range	77.57319	119.2562	160.1741	0.172012	0.959185381	2.462638
Minimum	0.847478	-23.3662	-45.1738	0.005815	0.008852345	3.394189
Maximum	78.42066	95.8899	115.0004	0.17782	0.96803772	5.85682

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		5		7	6	7
Sum	1189.974	2766.834	1630.88	7.984475	32.65038045	554.2019
Count	125	125	125	125	125	125
JB	698.5045	51.29755	121.9858	22.53326	66.253766	3.353467
P VALUE(DEGREE OF FREEDOM=2)	2.1E-152	7.26E-12	3.24E-27	1.28E-05	4.103718E-15	0.186984
P VALUE(ROUND FIGURE)	0	0	0	0	0	0.19

REGRESSION RESULTS

Regression Statistics	
Multiple R	0.913573
R Square	0.834615
Adjusted R Square	0.627883
Standard Error	0.879207
Observations	10

	df	***SS***	***MS***	***F***	***Significance F***
Regression	5	15.60385	3.120769	4.037191529	0.100503172
Residual	4	3.09202	0.773005		
Total	9	18.69587			

	Coefficients	***Standard Error***	***t Stat***	***P-value***	***Lower 95%***	***Upper 95%***	***Lower 95.0%***	***Upper 95.0%***
Intercept	75.84101	111.4053	0.680767	0.533386683	-233.4697424	385.1517717	-233.47	385.1518
ROTOE	-0.17903	0.382374	-0.46822	0.664002636	-1.240673807	0.882604711	-1.24067	0.882605
REVGR	-0.03339	0.095789	-0.34857	0.744982636	-0.299342688	0.232563498	-0.29934	0.232563
SCOST	-204.459	361.1595	-0.56612	0.60156491	-1207.198173	798.2810561	-1207.2	798.2811
COMPX	-38.593	108.5037	-0.355	0.740042463	-339.8474	262.6615118	-339.847	262.6615

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			68		328			
TASST	-9.26427	13.23383	-0.70004	0.522475054	-46.00728212	27.47873424	-46.0073	27.47873