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## A BALANCED SCORE CARD APPROACH TO PERFORMANCE MEASUREMENT OF FIRMS

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### Abstract

*This paper is an attempt to measure the business performance of manufacturing firm. The performance of business is measured across the financial as well as nonfinancial measures using the Balance Score Card. The data it collected across 150 firms and factor reduction is applied to extract the factors of business performance. In order to understand how the factors differ across various industry sectors Anova analysis is done. The findings have been reported along with managerial implications. The uniqueness of this research is that it helps the managers by identifying the factors that are critical to the business performance, thereby giving them a chance to monitor and control such factors judiciously.*

**Keywords:** Performance measurement, Business performance, Balanced score card, Factor analysis, Effectiveness & Efficiency measurement

### PERFORMANCE MEASUREMENT OVERVIEW

With growing complexity in business, the need for a systematic, holistic and structured way to measure the performance of business is becoming evident (Barnabe, 2010, Singh et al., 2013). The traditional practices, emphasizing on the cost and financial performance of the firm are deemed as insufficient. They are now appended by non financial parameters like flexibility; turn over time, waste reduction and so on. The changing business scenario fuelled by competition and globalization has given rise to new philosophies in business, like lean manufacturing, supply chains, virtual factories etc. To suit the new business paradigm, effective and efficient performance measurement techniques are required. This has triggered research interest in this area for developing systematic and comprehensive models of performance measurement (Gunasekaran et al., 2001; Webster, 2002). The challenge today faced by industry practitioner is to be able to measure the right things so that the performance of the firm can be improved. The performance measurement of business today is not simply measuring the individual tasks or activities but it is about measuring performance at organizational level, process level and at supply chain levels. There needs to be developed a manageable and coherent set of constructs that may define the performance and also highlight areas of improvement. Performance measurement has come a long way from measuring effectiveness, efficiency and cost to measurement of performance on a broader and more strategic level considering more number of objectives (Radnor & Barnes, 2007; Verma et al., 2013; Pourjavad and Shirouyehzad, 2014).

The Balanced Score Card (BSC) is one of the popular tools used for measuring the performance of the firm (Kaplan & Norton, 1992). BSC measures the financial as well as the non financial performance of the firm and gives a comprehensive index of the firm's performance. Though it measures the performance of the firm across several criteria yet it is comprehensive and easy to administer. Owing to this parsimony, the BSC is adopted by many business firms to evaluate their performance. The BSC and its variants have been readily adopted by the firms as they diagnose the complete health of business and also pin points the areas that need improvement. The benefits of using BSC as reported are improved communication of goals & strategy, improved organizational control and better strategic &

operational alignment. The four factors that a BSC considers for evaluating the health of the firm are- financial, customer, learning and internal, addressing the interest of all stake holders.

In this paper, the researcher has measured the performance of firms using BSC approach in order to understand what factors constitute performance measurement and how performance measurement differs across various industrial sector.

### LITERATURE REVIEW

Neely et al. (1995) defines performance measurement as measuring the effectiveness and efficiency of the firm. The authors delineates a number of approaches to performance measurement, including – the Balanced score card (Kaplan & Norton, 1992), the performance measurement matrix (Keegan et al., 1989), performance measurement questionnaire (Dixon et al., 1990) and the criteria for measurement system design (Globerson, 1985). The authors further state that all the measures of performance have their own limitations, they are short term, lack strategic focus and promote local optimization there by ruling out the possibilities of continuous improvement. They stress on the need to develop a comprehensive and systematic metrics that addresses these deficiencies. A good performance measurement system should take into account the dynamic and changing environment; it should be complaisant with the times and should be practically implementable. Neely et al. (2005) provide a comprehensive taxonomy of performance measurement system; the performance can be measured at three levels – the individual metrics, performance measurement system as an entity, relationship between measurement system and the internal & external environment in which it exists. The individual measures are subjective and their choice depends on the nature and size of the firm. The measures chosen to measure the firm's performance should be aligned to the strategy of the firm. While there are a number of generic measures identified for performance measurement, some of the widely accepted ones are – cost, time, quality, flexibility, reliability etc. There interpretation of these measures might differ widely across the industries. The performance measurement system includes the group of individual measures that are considered to assess the performance of business. They may be financial cost based or non financial in nature or a combination of the two. The performance measurement system should be balanced and

should take into account financial as well as non financial factors (Fitzgerald et al. 1991). One of the widely accepted performance measurement system is the BSC developed by Kaplan and Norton (1992). It gives a comprehensive yardstick to measure the performance of business by incorporating the financial perspective, internal perspective, customer perspective and the learning perspective; thus taking into account the interest of all stake holders.

Toni & Tonchia (2001) categorizes the PMS models into five typologies- (i) Hierarchical models that measure the cost and non cost parameters at various aggregate level from top to bottom (Berliner and Brimson, 1988; Rangone, 1996 ) (ii) Balanced scorecard models that measure the performance of the firm on diverse perspectives like- financial, operational, marketing and growth. These performances indicate the overall health of the organization and also help in identifying area for continuous improvement (Kaplan & Norton, 1992; Brown, 1996). (iii) Frustum models are models where the low level measures are synthesized into aggregate indicators. The financial parameters and the non financial parameters are treated as separate. The financial parameters and the nonfinancial parameters are aggregated at the apex as firms vision (Hronec, 1993; Lynch & Cross, 1991) (iv) Models that measure the external and internal performance of the firm as separate. The external performance is the customer's perspective of business (Johnson, 1990; Thor, 1993; Gu, and Bordoloi, 2012) (v) Models that measure the performance of value chains. These models consider the internal relationship between customer and suppliers (Moseng & Bredup, 1993; Sink & Turtle, 1989).

Radnor & Barnes (2007) in their research work address the development of performance measurement literature in three distinct eras - the early twentieth century, post Second World War and the mid 1980's. The early twentieth century witnessed the emergence of Taylor's theory of scientific management where management was restricted to only the shop floor. The businessmen were interested to know how efficiently the inputs were converted into output. Hence the performance measure tools used were restricted to measure simply the efficiency; and focused on micro level (Neely & Austin, 2000). These measures were severely criticized as lacking the human & social aspect. It was refuted as too mechanistic an approach, making way for further development of other PM techniques. The post Second World War witnessed the emergence of quantitative tools and a gradual broadening of the horizons of Operations management. The performance metrics with cost as well as non cost parameters were defined to measure performance. The human and the customer aspect and the softer issues were also given room in defining the performance of business (Ali and Alolayyan, 2013). Still with the escalating rate of development of business there was a strong need for performance measurement system that could give a holistic view of business. The later part of the nineteenth century witnessed revolutionary change in performance measurement system (PMM). SCOR, BSC were the techniques that were developed in this era. The SCOR approach considered a supply chain perspective of business performance. BSC considered a number of metrics to give a complete picture of business.

It may be said that performance measurement is an evergreen area of research always inviting more and more research. Due to changing business paradigms, evolution of new business philosophies and change in business priorities, there is always a need for a performance measurement system that is latest and updated. The performance measurement system should be geared to the latest business trends; it should be comprehensive and dynamic. The system should assess the health of the firm and also be such that it identifies the areas and scope for continuous development (Pourakbar et al., 2013). The current needs requires the PMS to be geared to the latest business practices like- SC, lean management, virtual factory, BPR and TQM.

The BSC considers the measurement of performance of business along financial , marketing, operations and learning perspective hence in this research it has been used to assess the overall performance of business and find out how the performance across firms differ on various constructs of BSC (Arabzad et al., 2013).

## RESEARCH METHODOLOGY

1. Chia et al. (2009) has demonstrated the use of BSC for measuring the performance of supply chain. The same scale was used with minor semantic modifications. There were 15 items in the scale to capture the response on five point Likert scale (-2 to 2). Some of the items were pertaining to financial data of the company/firm like ROI/ PBT / gross revenue etc which are usually considered as confidential. Rather than directly asking for financial figures of the company the relative response was elicited. The responder was asked to rate the current year's performance of the company relative to average performance over last few years (2-3 years). If there was a relative decrease in the performance of the parameter they may register a negative rating on the scale (-2 or -1 depending on the severity), if there was a relative improvement in the performance parameter they may register a positive rating on the scale (+2 or +1 depending upon the improvement), if there was relatively no change in the parameter, the respondent may register a 0 on the scale. Thus the entire scale was so designed to capture the relative score of the company's business performance.
2. The questionnaire captured demographic data of the firm like the age and size. The experience and designation of the responder was asked to ensure that it is filled by a person at senior level. This was felt necessary to get right responses to the questionnaire (Shin et al., 2000).
3. The first draft of the questionnaire was then discussed with the academician and industry experts, to ensure that there is no semantic ambiguity in interpretations.
4. The questionnaire was then pilot tested over a small sample size of 15. This questionnaire was filled up by the owner/ MD/ CEO of the firm as majority of the firms were small/micro small. There was no change required in this questionnaire.
5. A sample size of 150 was decided. It meant approaching 150 firm and getting their responses on the questionnaire The sample size of 150 was kept in mind considering the possibility of factor reduction of the data for analysis. The BSC had 15 items .For factor reduction it is advisable to have

a sample size that is 5-10 times the number of items.

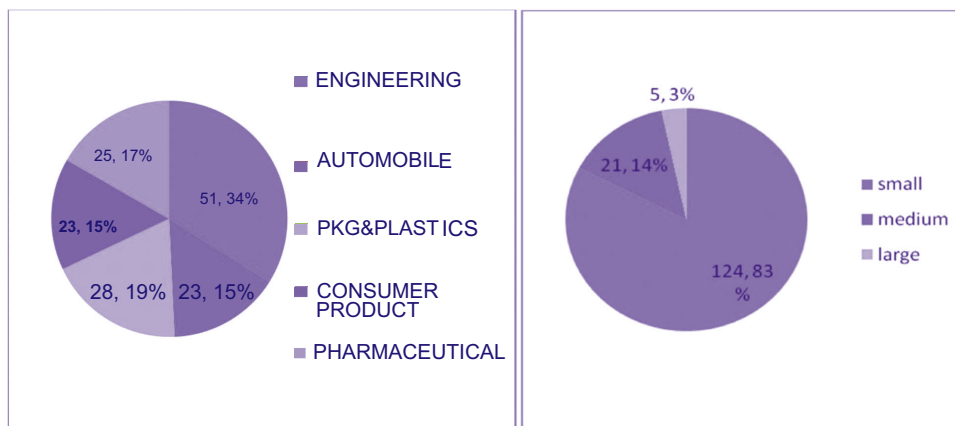
6. The firms approached were from various manufacturing clusters of central India – Sanwer road, Pithampur & Dewas for reasons of convenience and time constraints. The manufacturing units covered were from various sectors like-automobile, engineering, pharmaceuticals, plastic & packaging and consumer durables.
7. The field work was started in October 2013 and completed in December 2013 covering a sample of 150 manufacturing units. Snowball and convenience sampling was used for selecting the firm (Nargundkar, 2004; Seth et al., 2006,c). The appointment was taken on phone by the author. The data was then collecting personally by the author after proper debriefing and explanation as and if required. The responder of questionnaire was usually authority at senior level (CEO/MD/owner) in micro small, medium firms. It was a very formal and a long process to get appointment with the large manufacturers. The few large manufacturers that the author could approach, the data was filled by the finance & operational heads.
8. Since the data was collected personally, non response bias, incomplete responses and ambiguous responses were not there (Kang and Bradley,2002). Once the questionnaires were filled up, they were coded (demographic variables) and punched in the excel sheet on daily basis. By the time the data collection was over, the data coding and punching was also completed simultaneously.

9. The data analysis was done using SPSS software. The first step was to check the BSC data for reliability and reduce it into factors with the help of factor reduction technique using principal component extraction and varimax rotation. This resulted in 5 factors. Anova analysis was applied to see if any significant difference exists in factor score across the categorical variables considered in the study. The findings were then reported.

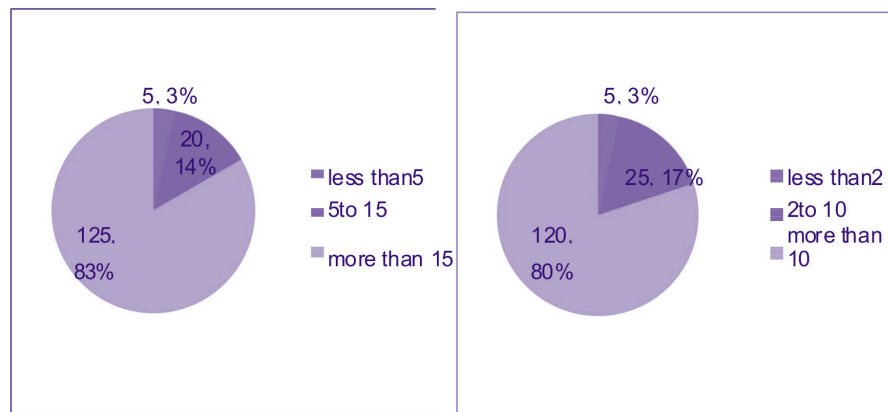
**DATA ANALYSIS**

**1. Demographical Analysis of the firm**

The data collected from 150 firms comprised of a heterogeneous mix from various industries, as snowball sampling procedure along with convenience sampling was used. The various industries covered were divided into five different sector-automobile, engineering, pharmaceutical, packaging& plastics and consumer product. Majority of the firms were engineering in nature followed by packaging &plastics, pharmaceutical, consumer product and engineering as depicted in figure 1. The data was collected from small scale industries predominantly, though a few medium and fewer large scale industries were also visited to get a fuller representation across industries (figure 1). Since most of the industries were small or medium scale, the responders were either the sole proprietor or partner or managing directors with experience ranging from 5 years to over 15 years(figure 2). The age of the focal firm was also considered in the questionnaire to ensure that firms were old and established in business (figure 2).



**Figure1: Industry sectors and size of firms**



**Figure 2 : Age of firm & experience of the responder**

**2. Data Transformation**

The data captured on the scale ranged from -2 to +2. To make the calculation simple the data was transformed to positive scale by adding + 3 to all the responses. The transformed scale and the original scale are given below. The transformed scale was used for further data analysis (Malhotra, 2010).

Original used for data collection: -2 -1 0 +1 2

Transformed for data analysis: 1 2 3 4 5

**3. Reliability Check original scale**

Reliability is a measure of the internal consistency of the scale in measuring the latent construct (Shin et al., 2000). Most of the researchers prefer measuring Cronbach alpha for reliability (Cronin & Taylor 1992, Parsuraman, et al., 1988). Cronbach alpha is defined as the proportion of the total variance of the scale explained by a common source (Cronbach, 1951).

The reliability of the scale is initially checked with all 15 items. The reliability was found to be 0.798 Alpha value of 0 .7 or higher are considered acceptable (Nunnally, 1978 and Flynn et al., 1990).

**4. Factor Extraction**

A critical assumption before applying factor analysis is to ensure that sufficient correlations are there between the items/ variables (Hair et al., 1995). The first step is to go for visual examination of the correlation matrix. If there are not many significant correlation above .3, than perhaps factor analysis is not the right tool to apply. The visual inspection of the correlation matrix reveals a good number of significant correlations between variable and hence the data is fit for factor reduction. Next is to check the overall significance of the correlation matrix with Bartlett's test of sphericity. It is the

statistical probability, that the correlation matrix has sufficient significant correlation among variables. The results obtained are significant ( $\chi^2 = 700.764, p = .000$ ) for applying factor analysis. Further the Kaiser-Meyer-Olkin (KMO) statistics is calculated to check for sampling adequacy before applying factor reduction. A measure of .9 or above is marvelous, .8 or above is meritorious, .7 or above middling, .6 or above mediocre, .5 or above miserable and below .5 unacceptable (Hair, et al., 1995). The KMO value came to be .733 which is a good score for applying factor reduction. The sample size to variable ratio was about 10–to-1 which is acceptable for sample size adequacy.

Initially all 15 items were put to factor analysis. The decision to include a variable in factor was based on factor loadings greater than  $\pm .5$ . This value of  $\pm .5$  were not taken on the basis of some mathematical proposition but on the basis of practical significance (Abdullah, 2005). The communalities of all variables were also assessed. The communality is the amount of variance accounted for that variable in the factor solution. The acceptable level of communality for item to be considered was .6 and above (Nargundkar, 2004).

The 15 items were put to factor analysis using principal component method and varimax rotation. The initial factor structure showed multiple loading for items 4,9,12, hence they were dropped from further analysis. The new factor structure that emerged thereafter had 5 factors across 12 items. The KMO value came to be .691 which is acceptable for further analysis (Kim and Mueller, 1978) All the items showed a good extraction (above .6). The communalities of all items was above .6 and the total variance explained was 74% (Hair et al., 1995; Zhu et al., 2002). The details of the factor analysis are given in table 1. The factors were named as finance, operational, learning, growth and marketing as per there content.

**Table 1: Factor analysis focal firm performance**

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.							.691
Bartlett's Test of Sphericity	Approx. Chi-Square					568.201	
	Df					66	
	Sig.					.000	
Component							
12 Factors	Financial-1	Marketing -2	Innovation/ Learning-3	Growth-4	Operational-5	Commun	
GROSS REV	.873					.740	
ROI	.846					.827	
PBT	.786					.660	
CUST SATIS		.827				.813	

SERV QUAL		.756				.705
ONTIME DEL		.708				.608
EMP SUGGES			.884			.793
EMP TRG			.864			.805
CUST RETEN				.827		.777
MARKET SHR	.314			.736		.670
EMP TURNOV					.829	.754
WASTE RED					.763	.740
Reliability	.813/(.816)	.697/(.709)	.761/(.761)	.685/(.689)	.518/(.524)	.720(.763)
Variance cumm	18.818	34.877	48.863	62.515	74.105	

### 5. Test for Reliability (Refined scale )

Reliability of the scale is the consistency and stability of the scale in measuring the latent construct. Reliability of the refined scale is calculated once again (.763). Cronbach alpha value is computed for each factor and it was in the range .6 to .8 for all factors except factor 5 for which it was .524 (Nunnally, 1978 and Flynn et al., 1990). This may be due to less items in the factor (only 2).

Alpha value of .7 or higher are considered acceptable for scale (Nunnally, 1978 and Flynn et al., 1990).

### 6. Interpretation of Business Performance factors

#### Finance

This factor comprises of three items namely, gross revenue, ROI and PBT. For any organization the financial assessment of business is done on the basis of gross revenue, which is the actually the capital inflow or the turnover of the firm. Higher turnover is indicative of the scale of operations of the firm. Return on investment is the return the company is getting on the investment it has made in the business. A higher ROI indicates good financial health of the firm. PBT is the earnings of the company before deducting the taxes. Higher PBT indicates efficient conversion cycle of the firm. Similar factor has been reported in the works of Kaplan & Norton (1992).

#### Marketing

This factor comprises of three items, namely, on time delivery, service quality and customer satisfaction. On time delivery means the ability of the firm to meet the delivery deadlines set by the customer. Service quality is the ability to meet the specification as set by the customer. Customer satisfaction is high if customer gets more value in the product or service. All

these factors belong to the domains of marketing and thus has been named as marketing factor. Similar factor has been reported in the works of Kaplan & Norton (1992).

Learning Employee suggestion and employee training are the two dimensions that constitute this factor. An organization that trains its employees and incorporates employee suggestions for work improvement is said to have Learning culture. Thus this factor had been named as Learning. Similar factor has been reported in the works of Kaplan & Norton (1992).

#### Growth

Customer retention and market share are the two items that constitute this factor. It measures the growth potential of the firm. A firm is expected to maintain its market share as well as capture new markets.

#### Operational

This factor is named so as it consists of two items, namely, employee turnover and waste reduction. In order to enhance business performance, other than the financial parameters, the operational parameters are also important and needs to be monitored. Similar factor has been reported in the works of Kaplan & Norton (1992).

### 7. Anova Analysis of Business performance factors across various industry sectors

The five factors of BSC extracted from the above factor reduction technique was subjected to Anova analysis to find if any significant difference existed in business performance across various industry sector. The hypotheses involved are as follows-

H<sub>0</sub>: There is no significant difference in balance score across various industry sector or sizes.

The BSC scale has reduced into five factors. The above generalized objective as presented along with research objective can now be specified into five hypotheses -

Hbsc1 o: There is no significant difference in Finance (factor 1) across the five sectors

Hbsc2 o: There is no significant difference in Learning (factor 2) across the five sectors

Hbsc3 o: There is no significant difference in Growth (factor 3) across the five sectors

Hbsc4 o: There is no significant difference in Operations

(factor 4) across the five sectors

Hbsc5 o: There is no significant difference in Marketing (factor 5) across the five sectors

The hypothesis Hbsc1o to Hbsc5o are tested by applying one way Anova between the BSC factors and the industry sector (table 8) and post hoc analysis is thereafter done. The Anova table shows a significant difference in the scores across various sectors in case of factor 2 (marketing, p=.002); factor 4 (operation, p=.03) and factor 5 (competitiveness, p=.001) (table 2).

**Table 2 : Anova analysis of BSC factor wrt industry sector**

		Sum of Squares	Df	Mean Square	F	Sig.
BSC finance	Between Groups	1.984	4	.496	1.028	.395
	Within Groups	69.942	45	.482		
	Total	71.926	49			
BSC learning	Between Groups	45.598	4	11.399	4.568	.002
	Within Groups	361.875	45	2.496		
	Total	407.473	49			
BSC growth	Between Groups	1.421	4	.355	.679	.607
	Within Groups	75.827	45	.523		
	Total	77.248	49			
BSC operational	Between Groups	3.953	4	.988	2.761	.030
	Within Groups	51.895	45	.358		
	Total	55.848	49			
BSC marketing	Between Groups	5.349	4	1.337	4.806	.001
	Within Groups	40.347	45	.278		
	Total	45.696	49			

For further analysis a post hoc test is applied. The post hoc analysis reveals the following findings at .05 level of significance –

Factor 1 (Finance) scores have no significant difference across the industry sector so the null hypothesis is accepted.

**Hbsc1 o: There is no significant difference in factor 1 across the five sectors**

Factor 2 (Learning) there is no significant difference across the scores so the null hypothesis is accepted.

**Hbsc2 o: There is no significant difference in factor 2 across the five sectors**

Factor 3 (Growth) shows a significant difference in the scores across various sectors. The factor scores higher in automobile sector in comparison to engineering (p= .010), consumer durable (p=.000), packaging (p= .028) and pharma( p=.03) sector. Also the scores of this factor are higher in engineering sector in contrast to consumer durables (p= .03).And the scores in consumer durables sector are lower than the score of packaging sector (p=.039). Hence the null hypothesis is rejected.

**Hbsc3 o: There is no significant difference in factor 3 across the five sectors**

Factor 4 (Operations) shows a significant difference in the

scores across various sectors The factor scores are higher across automobile sector in comparison to the scores in engineering (p=.008); in consumer durable ( p= .000); plastic & packaging (p= .020) and pharma (p= .001). Also the engineering firms scores higher than the consumer durable (p= .045) firms. So the null hypothesis is rejected.

**Hbsc4 o: There is no significant difference in factor 4 across the five sectors**

Factor 5(Marketing) shows a significance difference in scores across automobile and consumer durables sector ( p= .038); automobile and plastic & packaging (p= .003); automobile and pharma sector (p= .011). The factor scored higher in automobile sector in comparison to the scores of consumer durable, packaging and pharma sector. Hence the null hypothesis is rejected.

**Hbsc 5 o: There is no significant difference in factor 5 across the five sectors**

**8. Anova analysis of Business Performance wrt firm size**

The five factors of BSC extracted from the above factor reduction technique was subjected to Anova analysis to find if any significant difference existed in business performance across various industry size . The hypotheses involved are as

follows-

Hbsc o: There is no significant difference in balance score card across various industry sector or sizes.

The BSC scale has reduced into five factors. The above generalized objective as presented along with research objective can now be specified into five hypotheses -

Hbsc6 o: There is no significant difference in Finance (factor 1) across small/medium/large firms

Hbsc7 o: There is no significant difference in Learning (factor 2) across small/medium/large firms

Hbsc8 o: There is no significant difference in Growth (factor 3) across small/medium/large firms

Hbsc9 o: There is no significant difference in Operations (factor 4) across small/medium/large firms

Hbsc10 o: There is no significant difference in Marketing (factor 5) across small/medium/large firms

For hypothesis Hbsco 6 to Hbsco10, one way Anova and post hoc analysis was applied on the factor scores and sizes of the responder firms. The Anova table (3) shows a significant difference in the score across factor 2 (learning, p= .000); factor 4 (operational, p= .010) and factor 5 (competitiveness , p= .003) across large, medium and small scale firms (table 3).

**Table 3 : Anova analysis of BSC wrt size of the firm**

		Sum of Squares	df	Mean Square	F	Sig.
BSC finance	Between Groups	.053	2	.026	.054	.948
	Within Groups	71.873	147	.489		
	Total	71.926	149			
BSC learning	Between Groups	51.441	2	25.720	10.620	.000
	Within Groups	356.033	147	2.422		
	Total	407.473	149			
BSC growth	Between Groups	.064	2	.032	.061	.941
	Within Groups	77.184	147	.525		
	Total	77.248	149			
BSC operational	Between Groups	3.401	2	1.700	4.766	.010
	Within Groups	52.447	147	.357		
	Total	55.848	149			
BSC marketing	Between Groups	3.497	2	1.749	6.091	.003
	Within Groups	42.198	147	.287		
	Total	45.696	149			

- Factor 1 (finance), there is no significant difference across firms of various sizes. So the null hypothesis is accepted.

Further analysis was done using Post hoc test. The following observations can be made from the post hoc analysis table -

- Factor 1 (finance), there is no significant difference across firms of various sizes. So the null hypothesis is accepted.

**Hbsc6 o: There is no significant difference in factor 1 across small/medium/large firms**

- Factor 2 (learning) scores are not significantly different across firms of varying sizes. Hence the null hypothesis is accepted.

**Hbsc7 o: There is no significant difference in factor 2 across small/medium/large firms**

Factor 3 (growth) scores significantly differ across small and medium firms ( $p = .000$ ) the score for this factor is higher in medium size firms in comparison to small size firms. Hence the null hypothesis is rejected.

**Hbsc8 o: There is no significant difference in factor 3 across small/medium/large firms**

Factor 4 (operation) scores differ significantly across small and medium size firms ( $p = .001$ ). The scores are higher for the medium scale firms in contrast to the small scale firms. So the null hypothesis is rejected.

**Hbsc9 o: There is no significant difference in factor 4 across small/ medium/ large.**

Factor 5 (marketing) score show a significant difference across small and medium size firms ( $p = .022$ ) and across small and large size firms ( $p = .029$ ). The scores of this factor for small scale firm are significantly lower than the scores of the medium and large scale firms. So the null hypothesis is rejected.

**Hbsc10 o: There is no significant difference in factor 5 across small/ medium/large firms.**

**Findings & Discussions**

The scale used to measure the performance of focal firm is the BSC as suggested by Norton & Kaplan (1992). The standard BSC measures the performance of business firm across four factors, namely, marketing, finance, operational and growth. Similar scale has been used to access the performance of the supply chain by Chia et al. (2009). The authors have applied the BSC to study the business performance across four different clusters of supply chain, namely – IPO's, manufacturers, retailers and logistic companies. The factors that they have considered in their study are- financial, customers, internal, learning & growth to evaluate the overall performance of business. In this study the author has extracted five factors based on the items loadings and Eigen value criteria ( $>1$ ) which are discussed below-

**Finance**

The efficiency in converting the raw material is reflected through cost based metrics. In organizations, finance is the first and the foremost parameter that is used to assess the health. No matter, the importance of other non cost metrics to assess the performance of business firms is increasing yet it is the financial factor that will always remain primary. Hence all

firms should religiously record and assess the financial health of the firm. Financial health reflects the ability of the firm to sustain in the market. This factor does not how any significant difference across various industry sectors or across size of firm.

**Learning**

All firms should have regular training programs for the employees so as to abreast then with the latest knowledge and skills. Practice like continuous improvement, participative management, open suggestions system helps in enhancing the performance of the firm.

Organizations that are sensitive to changes & innovations, and regularly adopt practices like training and updating their skills are better performers in the business scenario. In a world driven by innovation, it has become indispensable for very organization to adopt the innovations as quickly as possible. An enabling culture where the employees are also free to suggest improvements and adopt for betterment helps.

It can be inferred from the results that in automobile (2.7174) and engineering sectors (1.6765), as there are continuous training and refresher courses for the employees, the organizations score higher in comparison to the scores of other sectors. The work involved in the automobile firms is such that it requires on the job as well as other modes training of the staff and employees. Moreover the focal firms that were from automobile sector were majorly large/ medium and organized industries practicing shop floor Kaizen. Employees were encouraged and rewarded for giving practical suggestion to improve work. In engineering sector also practices such as employee's suggestions and training programs are followed. This may be due to the technical nature of the job, that training programs become inevitable in such industries. Comparatively the consumer durable industry scores (.8043) least on this factor, this may be due to the fact that this sector is relatively organized. Most of the employees here are daily wage workers or contract labor with a very high turnover rate.

The medium size firms (3.0476) have scored high on this factor in comparison to the small scale firms (1.3911) as the medium scale firms are better organized and are financially better off than smaller units so they can afford training programs for employees. It has dawned on them that in order to sustain competition they have to go for an enabling and learning culture in the organization

**Marketing**

The firms should maintain their delivery schedules, commitment levels and deliver what they promise. The firms should focus on time delivery, customer satisfaction and service quality. Due to growing competition and customer expectation rising any lacuna or delay in serving the customer might result in losing the customer. This will eventually mirror in the performance of the firm. So the customers have to be well taken care of, if the firms have to excel their performance. This factor does not how any significant difference across various industry sectors or across size of firm.

**Operational**

In the given business scenario of the only way to survive and sustain in business is through cost cutting, waste reduction and

operational efficiency. The organizations should watch out for operational efficiency of conversion cycle. Any kind of waste in the industry results in lower productivity and hence depreciates the performance of the firm. The lower productivity also gets manifested in the financial metrics. Often low productivity gets clubbed with employee turnover and low motivation at work. This vicious circle may be avoided by the firm by investing in training and Kaizens.

It is revealed through data analysis that waste reduction and employee reduction is practiced in the automobile sector more than the other sectors. As already discussed in above paragraphs that the automobile firms were mostly large/medium scale and were better organized than other sector. Regular training programs for the employees, practices of shop floor kaizen, participative management all fostered waste reduction and employee retention there.

The factor scores across small scale firms (3.1976) are lower in comparison to the large (3.8000) and medium scale (3.5238) firms. The unorganized approach and the contingent practices in small firms lead to a lot of wastage and employee turnover. It is necessary that the small set up also adopt the industry best practices to enhance productivity and profitability. In the long run this the only way to sustain increasing competition.

### Growth

The firm should not only focus on capturing new markets but should equally emphasize on the retention of the customer. It is possible only when the firm provides genuine goods and services. In other words customer retention index of any firm is also an endorsement of that firm's quality. Another very important yardstick for measuring the performance of business is the ability of the firm to maintain its customer and market share. Often this factor gets camouflaged due to financial performance of the firm. It is equally important that the firm is able to retain its old market share. Maintaining the market share by losing the old customer and adding new does not give sustainability to the firm in the long run. Besides if the product is competitive then only the customers will be retained, otherwise the firms should have a relook at their offerings.

This factor has higher score in automobile (4.2174) and engineering sector (3.8627) in comparison to other sector scores. There is a general trend in recession all over the market, in such circumstances the smaller and relatively unorganized firm is unable to grow. The automobile and engineering sector firms by virtue of inertia are able to retain the customer if not enhance the market share.

The medium scale (3.5238) firms show a higher score on this factor in comparison to the smaller firms (3.19976). An obvious reason to this is the unorganized and contingent approach to business in smaller firms. Medium scale firms on the other hand are moving towards making themselves more professional and organized.

### Managerial Implications

The performance of any firm may be measured with the BSC (Kaplan & Norton), it gives a balanced picture of the business of the firm as it takes into account the interest of all stakeholders. The data collected for measuring the performance

of focal firm was reduced to five factors – Finance, Learning, Marketing, and Growth & Operational. In a standard BSC the marketing and competitiveness factor are extracted as one. The findings of this research differ due to the small sample size, bias in responses and sample not representative of population.

The scale used for measuring the performance of the firm comprises of five factors – Finance, Learning, Marketing, Growth & Operational factors. The scale had been used in this study to measure the performance of a manufacturing firm. The scale can be used to measure the performance of business across similar settings. The managerial implications of it are as discussed below-

- The scale can be used to measure the business performance of any firm with respect to the past performance. The summation of the factor scores will give the overall increase or decrease in firm's performance over the base year. The individual factor scores will help in identifying the area of poor performance so that firms can plan out remedial actions.
- The scale may be used to study the performance of firms across time and see if the performance is maintained, improved or reduced. The managers can study the trends annually, quarterly or monthly. Based on trends movement performance improvement programs may be planned.
- The scale may be used for benchmarking firms on the basis of performance score which may help in designing programs and policy for improvement.
- It may be used across various sectors to know about the performance trends across various sectors. The scale may further identify the critical dimensions of performance in various sectors.
- The scale is designed such that it assesses the performance of the firm from the base year. It is designed in such a way that it seeks only a relative response on all items in terms of increase or decrease from the base year. For any of the item / question an absolute response is not required. This facilitates responses on financial factors which people otherwise have inhibitions sharing.

### CONCLUSION, LIMITATION & SCOPE FOR FUTURE RESEARCH

The business performance of the firm is measured using the BSC (Kaplan & Norton, 1995). It is measured in terms of 5 factors, namely-Marketing, Finance, Operational, Learning and Growth. The performance of the focal firm is also studied across various sectors and sizes, the findings had been reported.

However, data was collected from 150 focal firms across one of the commercial hubs of the country, which is too small a sample to come to any generalization. A cross sectional study spanning across a wider area and covering larger population may be carried out to draw more profound results. Similarly, a sector wise study with more number of samples may be taken up to draw sector specific results. The current study is limited to only a few industrial sectors, more comprehensive study covering various industrial sectors may be undertaken. On similar lines, the study may also be conducted across large medium and small

industries with larger sample size. A comparative study sector wise and region wise may also be conducted for more conclusive results. Since, now we talk of business in terms of supply chains, study on performance measurement of various firms in the supply chain is required that may link the individual performance of firms in the supply chain to the overall performance of supply chain. Similar study may be taken up to measure the performance of supply chain.

## REFERENCES

1. Abdullah, F. (2005), "HEdPERF versus SERVPERF The quest for ideal measuring instrument of service quality in higher education sector", *Quality Assurance in Education*, Vol. 13 No. 4, pp. 305-328
2. Ali, K. A. M. and Alolayyan, M.N. (2013), "The impact of total quality management (TQM) on the hospital's performance: an empirical research", *Int. J. of Services and Operations Management*, Vol. 1 No.4 pp. 482 - 506
3. Arabzad, S.M., Kamali, A, Naji, B. and Tavakoli, M.M. (2013), "Performance evaluation of HESA laboratory units: an integrated DEA-BSC approach", *Int. J. of Services and Operations Management 2013 - Vol. 16, No.2* pp. 225 - 239
4. Barnabe, F. (2010), "A system dynamics-based Balanced Scorecard to support strategic decision making Insights from a case study", *International Journal of Productivity and Performance Management*, Vol. 60 No. 5, 2011, pp. 446-473
5. B.B., Sakakibara, S., Schroeder, R.G., Bates, K.A. and Flynn, E.J. (1990), "Empirical research methods in operations management", *Journal of Operations Management*, Vol. 9 No. 2, pp. 250-284.
6. Berliner, C. and Brimson, J.A. (1988), "Cost Management for Today's Advanced Manufacturing", Harvard Business School Press, Boston, MA.
7. Brown, M.G. (1996), "Keeping Score: Using the Right Metrics to Drive World-class Performance", *Quality Resources*, New York, NY.
8. Chia, A., Goh, M. and Hum, S. (2009), "Performance Measurement in Supply Chain entities: balanced score card perspective", *Benchmarking: An International Journal*, Vol. 16, No. 5, pp. 605-620
9. Cronbach, L.J. (1951), "Coefficient alpha and the internal structure of tests", *Psychometrika*, Vol. 6, pp. 297-334.
10. Cronin, J.J. and Taylor, S.A. (1992), "Measuring service quality: a reexamination and extension", *Journal of Marketing*, Vol. 56, pp. 55-68.
11. Dixon, J.R., Nanni, A.J. and Vollmann, T.E. (1990), "The New Performance Challenge – Measuring Operations for World-Class Competition", Dow Jones-Irwin, Homewood, IL.
12. Fitzgerald, L., Johnston, R., Brignall, S., Silvestro, R. and Voss, C. (1991), "Performance Measurement in Service Business", CIMA, London.
13. Globerson, S. (1985), "Issues in developing a performance criteria system for an organisation", *International Journal of Production Research*, Vol. 23 No. 4, pp. 639-46
14. Gu, W. and Bordoloi, S. (2012), "Performance evaluation of metro stations in Shanghai: a service contact perspective" *Int. J. of Services and Operations Management*, Vol. 11 No.2 pp. 151 - 169
15. Gunasekaran, A., Patel, C. and Tirtiroglu, E. (2001), "Performance measures and metrics in a supply chain environment", *International Journal of Operations & Production Management*, Vol. 21 No. 1/2, pp. 71-87.
16. Hair Jr, J.F., Anderson, R.E., Tatham, R.L. and Black, W.C. (1995), "Multivariate Data Analysis", 4th ed., (Prentice Hall, NJ).
17. Hronec, S.M. (1993), "Vital Signs ± Using Quality, Time and Cost Performance Measurement to Chart Your Company's Future", AMACOM, American Management Association, New York, NY.
18. Johnson, H.T. (1990), "Performance measurement for competitive excellence", in Kaplan, R.S.(Ed.), *Measures for Manufacturing Excellence*, Harvard Business School Press, Boston, MA.
19. Kang, H. and Bradley, G. (2002), "Measuring the performance of IT services: an assessment of SERVQUAL", *Int. J. Acc. Inform. Syst.*, Vol. 3, pp. 151-164.
20. Kaplan, R.S. and Norton, D.P. (1992), "The balanced scorecard – measures that drive performance", *Harvard Business Review*, January-February, pp. 71-79.
21. Keegan, D.P., Eiler, R.G. and Jones, C.R. (1989), "Are your performance measures obsolete?", *Management Accounting*, June, pp. 45-50.
22. Kim, J. and Mueller, L.W. (1978), "Factor Analysis: Statistical Methods and Practical Issues", (Sage University, Paper Series on Quantitative Applications on the Social Sciences), 1978 (Sage Publications: Beverly Hills).
23. Lynch, R.L. and Cross, K.F. (1991), "Measure Up – The Essential Guide to Measuring Business Performance", Mandarin, London.
24. Moseng, B. and Bredrup, H. (1993), "A methodology for industrial studies of productivity performance", *Production Planning & Control*, Vol. 4 No. 3, pp. 198-206.
25. Nargundkar, R. (2004), "Marketing Research: Test and Cases", 2nd ed., Tata McGraw Hills Pvt. Ltd: New Delhi, India
26. Neely, A., Gregory, M. and Platts, K. (2005), "Performance measurement system design", *International Journal of Operations & Production Management*, Vol. 25 No. 12, pp. 1228-1263
27. Neely, A. and Austin, R. (2000), "Measuring operations performance – past present and future", in Neely, A. (Ed.), *Proceedings of the 2nd International Conference on Performance measurement*, Cambridge, 19-21 July, Cranfield School of Management, Cranfield, pp. 419-26.
28. Neely, A., Gregory, M. and Platts, K. (1995), "Performance measurement system design: a literature review and

- research agenda”, *International Journal of Operations & Production Management*, Vol. 15 No. 4, pp. 80-116.
29. Nunnally, J. (1978), “*Psychometric Theory*”, (McGraw Hill: New York, NY).
30. Parsuraman, A., Zeithmal, V. A. and Berry, L. L. (1988) ‘SERVQUAL: A multiple item scale for measuring consumer perception of service quality’, *Journal of Retailing*, Vol 64, No. 1, ppa. 12-37
31. Pourakbar, Z., Arbabshirani, B., Hejazi, S.R. & Shirouyehzad, H. (2013), “Assessment of the performance of physical education organisation of Isfahan Province using data envelopment analysis”, *Int. J. of Services and Operations Management*, Vol. 15 No.2, pp. 215 – 237
32. Pourjavad, E. and Shirouyehzad, H. (2014), “A data envelopment analysis approach for measuring the efficiency in continuous manufacturing lines: a case study”, *Int. J. of Services and Operations Management*, Vol. 18 No.2 pp. 142 – 158
33. Radnor, J.Z and Barnes, D, (2007), “Historical analysis of performance measurement and management in operations management”, *International Journal of Productivity and Performance Management*, Vol. 56 No. 5/6, pp. 384-396
34. Rangone, A. (1996), “An analytical hierarchy process framework for comparing the overall performance of manufacturing departments”, *International Journal of Operations & Production Management*, Vol. 16 No. 8, pp. 104-19
35. Seth, N., Deshmukh, S. G. and Vrat, P. (2006c), “SSQSC: A tool to measure supplier service quality in supply chain”, *Production Planning and Control*, Vol. 17 No. 5, pp. 448-463
36. Shin, H., Collier, D.A. and Wilson, D.D. (2000), “Supply management orientation and supplier/buyer performance”, *Journal of Operations Management*, Vol. 18, pp. 317–333.
37. Singh, P.J., Mittal, V.K., Sangwan, K.S. (2013), “Development and validation of performance measures for environmentally conscious manufacturing”, *Int. J. of Services and Operations Management*, Vol. 14 No.2 pp. 197 – 220
38. Sink, D.S. and Tuttle, T.C. (1989), “*Planning and Measurement in Your Organization of the Future*”, Industrial Engineering and Management Press, Norcross, GA.
39. Thor, C.G. (1993), “A complete productivity and quality measurement system”, in Christopher, W.F. and Thor, C.G. (Eds), *Handbook for Productivity Measurement and Improvement*, Productivity Press, Cambridge, MA.
40. Toni, A.D. and Tonchia, S. (2001), “Performance measurement systems Models, characteristics and measures”, *International Journal of Operations & Production Management*, Vol. 21 No. 1/2, pp. 46-70.
41. Verma, R., Rajagopal, Mercado, P. R. (2013), “Impact of service co-creation on performance of firms: the mediating role of market oriented strategies”, *Int. J. of Services and Operations Management*, Vol. 15 No.4 pp. 449 - 466
42. Webster, M (2002), “Supply system structure, management and performance : a conceptual model”, *International journal of management review*, Vol. 4 No. 4, pp. 353-369
43. Zhu, T., Lu, Y., Wang, B. (2002), “The relative importance of website design quality and service quality in determining consumers' online repurchase behavior”, *Information Systems Management*, Vol. 26, pp 327-337

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