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**DEPARTMENT OF ECONOMICS**

**COMPETITIVENESS OF FIRMS  
IN INDIAN AUTOMOBILE INDUSTRY**

**BY**

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***Abstract***

Although opening up of the economy in early 1990's gave the much-awaited impetus, the Indian automobile industry has grown in last five years as never before. Well supported by the changing economic conditions particularly in the financial sector and in foreign direct investment, increasing number of global players are entering Indian economy by way of joint ventures, collaborations with the domestic firms or wholly owned subsidiary, which has led to increase in competition among firms in the industry.

The competitiveness among the firms in Indian automobile industry has been assessed by understanding the factors that determine its competitive advantage. The efforts have been made to construct a competitiveness index for a sample of fourteen firms for the year 2005-06, which represents around 85% of each segment of the industry namely passenger vehicles, commercial vehicles, three-wheelers and two-wheelers. About 50% of the sample firms have recorded above industry average performance from all the segments of the automobile industry. The marginal difference between the competitiveness of different firms reveals the tough competition among the firms in the automobile industry in India.

**Key Words:** Automobile, Evolution, Liberalization, Current Status, Competitiveness, Financial- Non Financial.

**JEL Code(s):** L62

# **COMPETITIVENESS OF FIRMS IN INDIAN AUTOMOBILE INDUSTRY**

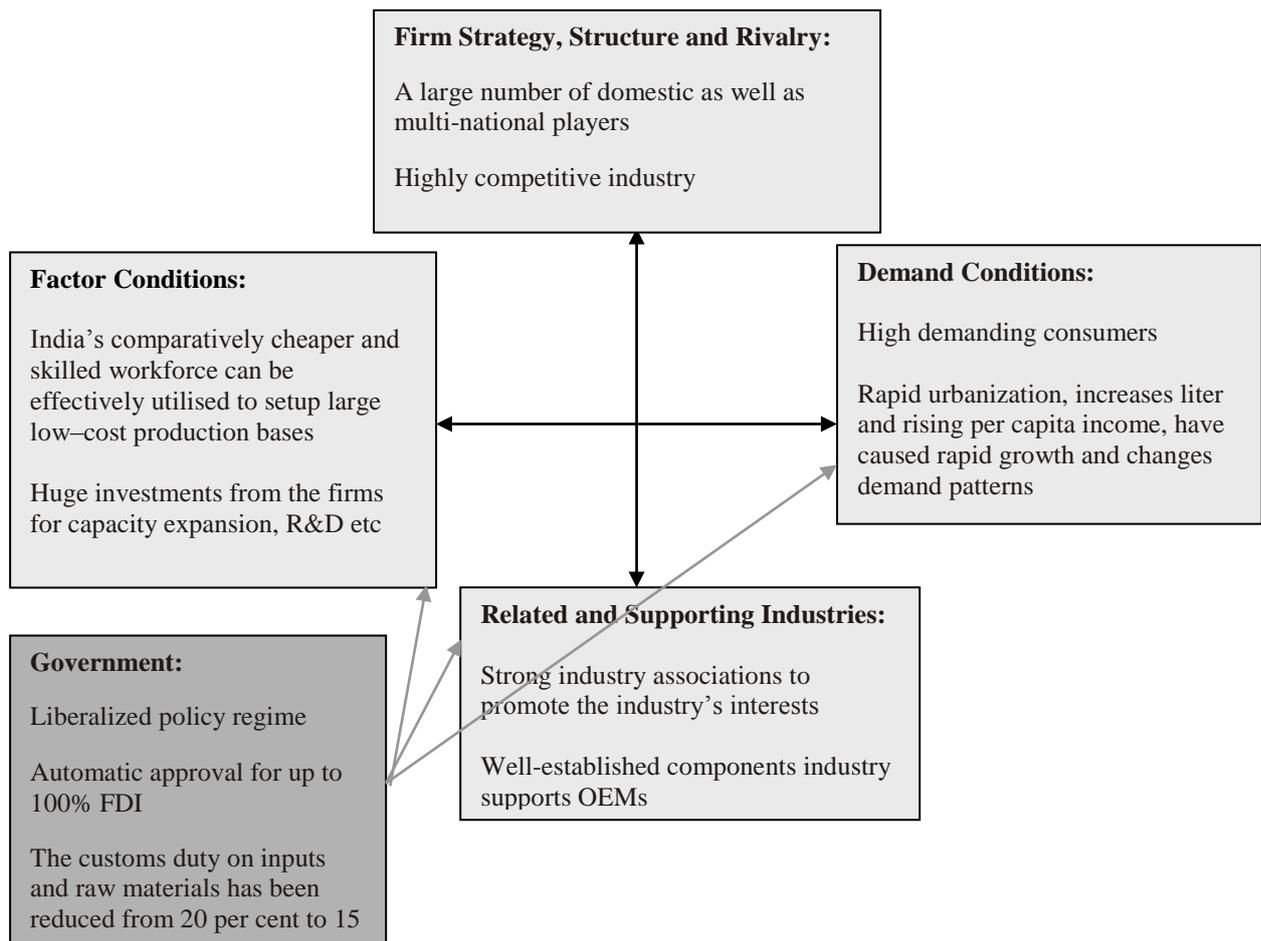
**L. G. Burange  
Shruti Yamini**

## **1. INTRODUCTION:**

Automotive industry, globally, as well as in India, is one of the key sectors of the economy. Due to its deep forward and backward linkages with several major segments of the economy, the industry has a strong multiplier effect of industrial growth. The rise in efficiency and productivity helps directly and indirectly to accelerate the efficiency of other sectors through factor movements of goods and people in the economy. Therefore the industry is recognized as one of the drivers of economic growth contributing significantly to the overall GDP of the nation. It has been identified at different forums as a sector with a high potential to increase exports and employment. It also helps in attaining two critical goals of the common minimum programme that of increasing manufacturing output and of providing employment. Although indirectly but it also facilitates the third objective of increasing agricultural productivity through farm mechanization and the needs of agro-produce transportation (Ministry of Heavy Industries and Public Enterprises 2006 b).

The Indian automotive industry has flourished after economic liberalisation in 1990s like never before. This extra-ordinary growth of the industry is mainly due to higher disposable incomes of the middle class and resultant increase in their living standards. This is well supported by the economic conditions particularly in the financial sector, which has played a big role in boosting the demand and sustaining a long-term growth in the industry.

India has several competitive advantages over the world in the automobile sector. The competitive landscape of the industry has been developed using the Porter's (1990) Diamond Framework by India Brand Equity Foundation (2006) as shown in Figure 1.



**Figure 1:** Competitive Picture of Indian Automobile Industry

The present paper has tried to bring out the competitive flavour of the Indian automobile industry. Intense competition has gripped the industry in recent years with major world players entering the market bringing better technology and experience. Therefore the study on competitiveness of firms in the industry in domestic market, in the present state is interesting to examine. With this objective, an effort has been made to construct an index, which can benchmark the firms according to their competitive position in the industry.

The paper is organized in five sections where the second section discusses the structure and evolution of Indian automobile industry throwing some light on its current status too. The third section deals with the methodology. Section four has the results and analysis, followed by conclusion.

## **2. OVERVIEW OF THE INDIAN AUTOMOBILE INDUSTRY:**

The automotive industry in India is poised for a giant leap forward as it is being rapidly integrated into the global automotive supply chain. Global automotive firms are looking towards India not only for its growing market but also as an efficient supplier base.

### **2.1. Structure of Automobile Industry in India:**

The Indian automotive sector has a presence across all vehicle segments and comprises of key component manufactures, concentrated in regional clusters.

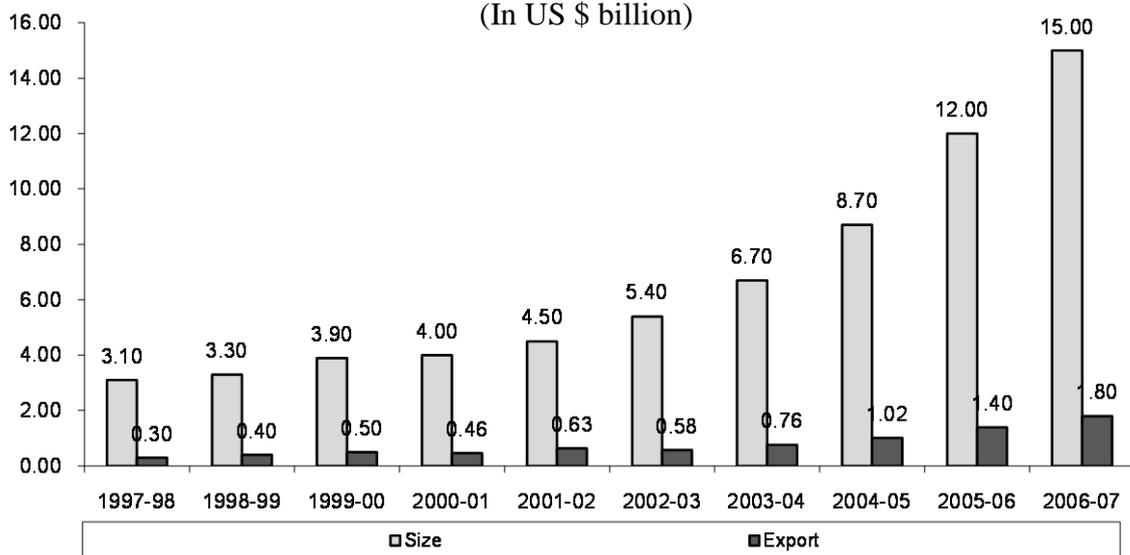
The Indian automobile market is still in its evolutionary stage. Therefore, no fixed or widely accepted method of segmenting the market has evolved as yet. Segmentation has mostly been done on the basis of product types, its weight/size or product uses. It is categorized into following four segments namely; Commercial Vehicles, Passenger Vehicles, Two Wheeler and Three Wheelers, which covers 5%, 14%, 77% and 4% of the total market share of the industry respectively (Society of Indian Automobile Manufacturers 2007).

It has been noticed that due to its strong backward and forward linkages, the auto industry has grown in clusters of inter-connected companies, which are linked by commonalities and complementarities (Ministry of Heavy Industries and Public Enterprises 2006a). While automobile manufacturing units are located in all regions of the country, there have been certain concentrations in some pockets. Following global trends, the Indian automotive sector also has most auto suppliers located close to the manufacturing locations of Original Equipment Manufacturers (OEMs), forming regional automotive clusters. Broadly, the three main clusters are centered around Chennai, Mumbai and Delhi. However, Pune is also developing as a new cluster in the country.

The efficiency of vehicle production is closely linked to that of the supplier base (Singh 2004). In India the auto component industry is one of the important key sectors of the auto industry.

The freeing of the industry from restrictive environment has on the one hand helped it to restructure, absorb newer technologies, align itself to the global developments and realize its potential; on the other hand, this has significantly increased industry's contribution to overall industrial growth in the economy. The firms have resorted to common platforms, modular assemblies and systems integration of component suppliers and e-commerce (CII-DSIR-IIFT 2004). The total numbers of auto component companies, which are member of Automotive Component Manufacturers Association (ACMA), are 536 at present and more than 10,000 firms in unorganized small sector, in tierized format (Ministry of Heavy Industries and Public Enterprises 2006b). The industry is however dominated by a few industrial business houses. The industry in the country has made rapid strides and is growing at a fast pace, which may be summarized in the following Figure 2. The industry has grown at an annual compound growth rate of 17% over the last few years from 2000-01 to reach a size of around US \$10 billion in 2005-06, while component exports have grown at around 25 % per annum (IBEF 2006).

**Figure 2: Size and Export of Indian Auto Component Industry**  
(In US \$ billion)



Source: ACMA 2007

The auto component industry has the potential of becoming export driver of the auto industry due to increasing globalization of the supply chains and cost advantage in many component groups supported by relatively (compared to other developing markets) well-developed labour skills and engineering base (Khisty 2000). This will help the industry to mark its global presence.

## 2.2. Evolution of Indian Automobile Industry:

The history of the automobile actually began 5,000 years ago when the first wheel was used for transportation, probably on Mesopotamian chariots in 3200 BC (The Great Idea Finder 2005). The dawn of automobile in India actually goes back to 4000 BC when wheel was first used for movement in India in form of chariots. Since then it has traveled a long way, from chariots to bullock cart, to the jet-age.

It was in 1898 that the first motorcar rode down India's roads in Mumbai. Mumbai had its first taxicabs in the early 1900. Then for the next many years, cars were imported to satisfy domestic demand. Till the First World War, about 4,000 cars were directly imported to India from foreign manufacturers (Auto India Mart 2007). The growing demand for these cars established the underlying requirements of the Indian auto market that these merchants were quick to pounce upon. Between 1910 and 1920 the automobile industry made a humble beginning by setting up assembly plants in Mumbai, Calcutta and Chennai. The import/assembly of vehicles grew consistently after the 1920s, crossing the 30,000 mark in 1930 (India Infoline 2007).

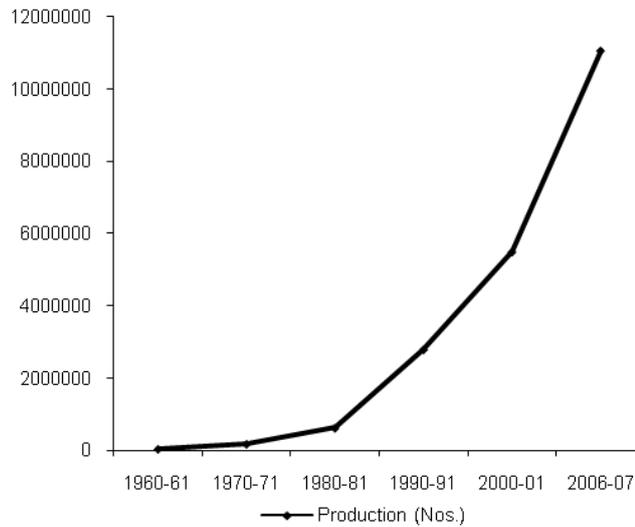
The Hindustan Motors (HM) was set up in 1942 and in 1944; Premier Autobackmobile (PAL) was established to manufacture automobiles in India. However, it was PAL who produced the first car in India in 1946 by assembling 'Dodge De Soto' and 'Plymouth' cars at its Kurla plant in Mumbai, as HM concentrated on auto components and could produce their first car only in 1949. After a short period of time, it was another company, Mahindra and Mahindra, which manufactured sturdier utility vehicles, namely the American Jeep.

In 1950s, Government of India granted approval to only 7 car dealers to operate in India. The 1960s witnessed establishment of two and three wheeler industry in India, and in the 1970s, things remained much the same. Since the 1980s, the Indian car industry has seen a major resurgence with the opening up of Indian shores to foreign manufacturers and collaborators. The 1990s became the melting point for the industry here when large number of foreign players came into the country through collaborations and partnerships. Table 1 below shows the trend of production growth in the industry. It can be seen in Figure 3 too that growth was steep only after 1980s

after the partial liberalization and steeper after total decontrol in 1991. Maximum decadal growth rate of 347.46% is seen between 1980 and 1990, when Maruti Udyog Ltd. entered the market with other Japanese two-wheeler firms.

**Table 1:** Decadal Growth of Indian Automobile Industry

Years	Production	
	Number	Growth (%)
1960-61	41535	-
1970-71	181752	337.59
1980-81	625143	243.95
1990-91	2797241	347.46
2000-01	5497416	96.53
2006-07	11065142	101.28



*Source:* SIAM 2007

**Figure 3:** Trend of Production in Indian Automobile Industry

The Indian industrial sector has undergone fundamental regulatory changes in recent times as a consequence of the economic reform programs put together between 1988 and 1991. India moved away from the control era towards the ‘open’ economy model. Therefore the policy changes in the automobile industry also took place in two phases, i.e. pre-liberalization (total control and partial de-control) and post-liberalization periods.

The automobile industry in India grew under a highly regulated and protected economic environment over the period 1950 to 1985. There were quantitative restrictions on imports of raw materials, components, and equipments through licensing and a tariff structure designed to restrict the market. Also there were restrictions on FDI, and imposition of indigenization of components production protected the domestic market. The initial changes, introduced in 1985, eased the licensing requirements, broad-based the classification of vehicles for issue of licenses, allowed selective expansion of capacity and partially relaxed controls with regard to foreign collaborations, imports of capital goods, raw materials and spares. Though

these measures represented a ‘domestic liberalisation’, the policy environment continued being geared towards imposing trade and investment regulations, constraining the growth of big business houses and regulating exchange rates (Narayanan 2001).

Liberalisation of economic policies and the outward orientation introduced since 1991 brought about a dramatic change in this industry. These new measures effectively dismantled the license *raj*, which had made it difficult for Indian firms to import machinery and know-how, and had disallowed equity ownerships by foreign firms (Krishnan 2002). In July 1991, approval of foreign technology agreements and upto 51% foreign equity investment was allowed for the automotive sector. Further in 1997, some more reforms were made where new foreign entrants required establishing actual production facilities, the minimum foreign equity was raised to \$50 million, and the minimum indigenization was to be 50% in the third year and 70% in the fifth year. The Auto policy announced by the government in 2002 (Ministry of Heavy Industries and Public Enterprises 2002) permitted 100% foreign equity on an automatic basis. The Automotive Mission Plan 2006-2016 was released in 2007, which visualizes India emerging as a destination of choice in the world for design and manufacture of automobiles and auto components with output reaching a level of \$ 145 billion accounting for more than 10% of the GDP and providing additional employment to 25 million people by 2016.

### **2.3. Current Status of the Indian Automobile Industry:**

Growth trends of key industry indicators are improving every year as seen in Table 2. Industry volumes, export performance as well as domestic sales are increasing on a steady rate. Although there is a potential for much higher growth in the domestic market due to the fact that the current car penetration level in India is just 7 cars per thousand persons compared to 12 in Sri Lanka and Pakistan and over 100 in Europe and US.

Domestic manufacturers acting as a global hub for exports is also gaining acceptance. Though exports are not necessarily lucrative, it will enable domestic

players to increase exposure and maintain capacity utilisation at a healthy level. Expansion of auto component industry is also evident today.

**Table 2:** Growth Trends of Key Variables of the Industry

YEARS	PRODUCTION		DOMESTIC SALES		EXPORT	
	Number	Growth (%)	Number	Growth (%)	Number	Growth (%)
2001-02	5316302	-	5225788	-	184680	-
2002-03	6279967	18.13	5941535	13.70	307308	66.40
2003-04	7243564	15.34	6810537	14.63	479919	56.17
2004-05	8467853	16.90	7897629	15.96	629544	31.18
2005-06	9743503	15.06	8906428	12.77	806222	28.06
2006-07	11065142	13.56	10109037	13.50	1011278	25.43

*Source: SIAM 2007*

Consolidation of the industry has gained momentum. Foreign automotive firms have arrived and are in queue. There is a long list of foreign companies that are forging alliances with their Indian counterparts. Corporate participation in these alliances varies from 10 to 100 percent of equities (i.e. wholly owned foreign subsidiaries) (Nath 2006). India is becoming an important destination for automobile research and development as it is fully equipped to take up design, engineering and components manufacture. Armed with higher buying power and an ever-increasing expectation from products and services, the customer is undoubtedly the king and has propelled a fierce competition among the major players in the market.

The following trends can be seen in the various segments of the industry today. In case of commercial vehicles, the importance of large-tonnage multi-axle vehicles and light commercial vehicles is on the rise and likely to increase further on account of superior economies in transportation they offer. The dominant basis of competition in the Indian car industry has changed from price to price-value, especially in the passenger car segment. The market for multi-utility vehicles has also been redefined. The recent years have witnessed a robust growth in motorcycle sales and a decline in the share of scooters in the overall Indian two-wheelers market hence a demand shift.

### **3. THE METHODOLOGY:**

There are numerous methodological choices encountered in the problem of construction of composite indices, which can measure competitiveness at any level of aggregation. The technique used for construction of competitiveness index for Indian automobile industry at the firm level has been discussed below.

#### **3.1. Competitiveness Index:**

One of the immediate problems in analyzing competitiveness is that despite widespread acceptance of its importance for economic performance and growth, no consensus exists on its definition and measurement. The Oxford Dictionary of Economics defines the term competitiveness as ‘the ability to compete in markets for goods or services’ and The Free Dictionary explains it as ‘an aggressive willingness to compete’. These are the most fundamental definitions of competitiveness, although are deceptive ignoring the ambiguity of the concept.

There are several interpretations to the concept of competitiveness for which some distinctions have to be made. The most fundamental being the difference between microeconomic and macroeconomic concepts. Competitiveness can be observed from different perspectives, through products, firms, industry and branches of the economy or national economies. At each level of aggregation, there are different measures or indicators of competitiveness. The second issue relating to competitiveness is the distinction between one-dimensional and multi-dimensional concepts, relating to the number of dimensions it integrates and measures. The number of dimensions included in its measurement can be seen as a mark of complexity of the concept (Siggel 2003). We are mainly concerned with the firm-level multidimensional concept of competitiveness in the domestic market.

One of the interesting attempts to capture more than one dimension of firm competitiveness was made by Buckley et al. (1988). According to him, “a firm is competitive if it can produce products and services of superior quality and at lower costs than its domestic and international competitors. Competitiveness is synonymous with a firm's long-run profit performance and its ability to compensate its employees

and provide superior returns to its owners”. Of the micro indicators assessing the multi-dimensionality of the concept of competitiveness, the best known attempt was made by Porter (1990) in his ‘Diamond Framework’. He identified four main determinants of competitiveness of enterprises as their strategy, structure and rivalry, the demand conditions they face, the factor supply conditions they encounter, and the conditions of related industries. Although there are a multitude of factors that influence the competitiveness of firms, Porter classified those under four above-mentioned facets only.

Gelei (2003) has used the definition of firm competitiveness as ‘the basic capability of perceiving changes in both the external and internal environment and the capability of adapting to these changes in a way that the profit flow generated guarantees the long term operation of the firm’. As to him, firm competitiveness is basically a function of two factors. First, it is determined by the extent a company can identify those value dimensions that are important for their customers. These are the main features of the firm’s complex product and service package a customer expects. The second factor of firm competitiveness is the sum of resources and capabilities that make a firm capable to create and deliver the identified important value dimensions for the customer. Prahalad and Hamel (1990) call these core competences.

A *White Paper* on competitiveness by the UK Government (Department of Trade and Industry 1994) offers a multi-notion definition at the company level, which says, ‘for a firm, competitiveness is the ability to produce the right goods and services of the right quality, at the right price, at the right time. It means meeting customers’ needs more efficiently and more effectively than other firms’.

Another significant discussion on the concept of competitiveness of firms was published by ADB (2003). It states that competitiveness can be defined as a firm’s ability to survive under competition and being competitive implies succeeding in an environment where firms try to stay ahead of each other by reducing prices, by increasing the quality of their current products and services, and by creating new ones. A firm’s competitiveness can thus be examined as a function of factors such as (i) its own resources (ii) its market power; (iii) its behavior toward rivals and other economic agents; (iv) its capability to adapt to changing circumstances; (v) its

capability to create new markets; and (vi) the institutional environment, largely provided by the government, including physical infrastructure and the quality of government policies.

As competitiveness is linked to a large number of variables, defining it is in itself a research problem. So is measuring competitiveness, it being a broad, relative concept without bearing any direct relationship with economic performance indicators. The multi-dimensionality in the definition of competitiveness has made the construction of a composite index, which can measure it in some mathematical fashion, very important. Keeping this in mind, an effort has been made to build up a competitiveness composite index that can measure a firm's competitive position in the industry which it can sustain in medium to long run.

A composite indicator is the mathematical combination of individual indicators that represent different dimensions of a concept whose description is the objective of the analysis (Saisana 2002). Composite index represents aggregate measures of a combination of complex phenomena (Booyesen 2002). Composite indicators can be used to summarise complex or multidimensional issues, in view of supporting decision-makers (Saisana 2005). In the context of policy analysis, indicators are useful in identifying trends and drawing attention to particular issues. They can also be helpful in benchmarking or monitoring performance.

### **3.2. Data- Coverage and Adjustments:**

Variables are included in an index if they are relevant to the concept that is being measured (Salzman 2003). The variables that compose the competitiveness composite index for Indian auto industry have been identified on the basis of factors related to competitiveness at the firm level, considering the specific issues peculiar to the Indian automobile industry.

Total number of sub-indicators used for the competitiveness index are 62 out of which 38 (61%) are taken from PROWESS database of Centre for Monitoring Indian Economy (CMIE) and 24 (39%) from other data sources. Other data sources include a questionnaire survey, which was carried out for all sample firms. Some of

the other sources used for preparing the database are company websites, SIAM and ACMA websites and other publications.

For consumer satisfaction index, J. D. Power scores of Consumer Satisfaction Index (J.D. Power Asia Pacific 2007) have been used because of non-availability of data. The two sub-indicators for which this substitute has been used are number of customer complaints in a year and customer complaint response time. Industry averages are used for those firms not included in the J. D. Power study. One of the sub-indicators used for technological index, is environmental indicator, which includes total emissions from plants, product disposal expenditure and environmental management expenditure. Due to lack of response from the sample firms, we used Centre for Science and Environment (CSE) scores of Green Rating Project (CSE 2001), which include similar indicators.

The sub-indicators, which are used to construct the competitiveness index of the firm, are listed in Table 3. All of these sub-indicators are grouped into ten main indicators that clearly describe its components.

### **3.3. Sample Selection:**

The sample of firms has been chosen on the basis of market share data given by SIAM (2007) for the year 2005-06. Efforts have been made to include a representative sample, which covers at least 85% of the market share in each of the segment of the industry.

Other important consideration was availability of data. As about 61% of the data has been taken from Prowess Database, listing of companies on the portal become very important. This forced the exclusion of some firms not listed on National Stock Exchange (NSE) and hence on the database, even with greater market share than others. The companies of this sort in passenger car segment are Toyota Kirloskar Motor Pvt. Ltd. (4.05%), General Motors India Ltd. (2.70%) and Ford India Pvt. Ltd. (2.53%). However, Honda Seil Motors and Hyundai Motors are two companies, which are also not listed on NSE, but still they are on PROWESS hence included in the study. Piaggio Vehicles with 30.26% of market share in three-wheeler segment

had to be excluded from sample because of non-availability of data. In the two-wheeler segment Honda Motorcycle & Scooter (7.97%) and Yamaha Motor India Pvt. Ltd. (2.91%) are also excluded from the study. The details of the sample and their respective market share are given in Table 4.

**Table 3:** Description of the Sub-indicators in the Competitiveness Index for Indian Automobile Industry

INDICATORS	SUB- INDICATORS
1. PRODUCTIVE PERFORMANCE	<ul style="list-style-type: none"> <li>○ Capacity Utilization</li> <li>○ Labour Productivity</li> </ul>
2. FINANCIAL PERFORMANCE	Liquidity Ratio: <ul style="list-style-type: none"> <li>○ Current Ratio</li> <li>○ Quick Ratio</li> </ul> Leverage Ratio: <ul style="list-style-type: none"> <li>○ Debt-Equity Ratio</li> <li>○ Interest Coverage Ratio</li> </ul> Efficiency Ratio: <ul style="list-style-type: none"> <li>○ Inventory Management</li> <li>○ Debtors Turnover Ratio</li> </ul> Profitability Ratio: <ul style="list-style-type: none"> <li>○ Net Margin Ratio</li> <li>○ Return on Assets Ratio</li> <li>○ Return on Net Worth (ROE)</li> <li>○ Return on Capital Employed (ROCE)</li> </ul> Other Ratios: <ul style="list-style-type: none"> <li>○ Net Working Capital Cycle</li> <li>○ Solvency Ratio</li> <li>○ Asset Turnover Ratio</li> </ul>
3. COST EFFECTIVENESS	<ul style="list-style-type: none"> <li>○ Cost As % of Gross Sales</li> </ul> Other Cost Indicators: <ul style="list-style-type: none"> <li>○ Raw Materials, Stores etc.</li> <li>○ Financial Charges</li> </ul>
4. SALES AND MARKETING STRATEGY	<ul style="list-style-type: none"> <li>○ Market Share</li> <li>○ Department for Brand Management</li> <li>○ Number of Dealers</li> <li>○ Expenditure on Marketing</li> <li>○ Expenditure on Advertising</li> <li>○ Expenditure on Distribution</li> </ul>
5. STOCK MARKET PERFORMANCE	<ul style="list-style-type: none"> <li>○ Earnings Per Share</li> <li>○ Price- Earning Ratio</li> <li>○ Book Value Per Share</li> </ul>
6. CONSUMER SATISFACTION	<ul style="list-style-type: none"> <li>○ Number of Years of Warranty</li> <li>○ Number of Authorized Service Stations or Workshops</li> <li>○ Average Number of Free Servicing to the Vehicle</li> <li>○ Customer Complaint Response Time</li> <li>○ Number of Customer Complaints</li> </ul>

7. TECHNOLOGY AND ENVIRONMENTAL INDICATORS	Technology Acquisition:
	○ Technology Strategy: Import or In-House Development
	○ Foreign Exchange Spending on Capital Goods
	○ Royalty know how expenses
	○ R & D Expenditure
	Technology Management:
	○ Expansion of Production Base to other Segments
	○ Number of Production Plants
	○ Product Differentiation
	○ Power and Fuel Expenses
	○ Alternative Fuel Models
	Environmental Indicators:
	○ Total Emissions
8. HUMAN RESOURCE DEVELOPMENT AND SOCIAL INDICATORS	○ Product Disposal Expenditure
	○ Environmental Management Expenditure
	○ Employment Generation
	○ Expenditure on Salaries and Wages as % of Total Cost
	○ Performance Incentives to Employees
	○ Skill Enhancing Training
	○ Certification to Plants (Health And Safety)
9. FOREIGN TRADE MEASURE	○ Safety Awareness Training
	○ Loss Due to Labour Unrest
9. FOREIGN TRADE MEASURE	○ Net Foreign Exchange Earned
	○ Exports as % of Gross Sales
10. GROWTH VARIABLES AND POTENTIAL	Growth Variables (over previous year):
	○ Total Assets
	○ PAT (NNRT)
	○ Net Sales
	○ Total Exports
	Future Plans:
	○ Firm's Investment Plans over the Next 2 Years
	○ Plans to Launch any New Models in Next 2 Years
	Contingency Planning:
	○ Insurance Premium Expenses
	○ Any Department for Disaster Management
○ Maintenance- Plant and Machinery Repairs Expenditure	

### 3.4. Normalizing Technique, Weighting and Aggregation of Indicators:

Normalisation is required prior to any data aggregation to render them comparable as the indicators in a raw data often have different characteristics. Therefore this has to be transformed in pure, dimensionless numbers. For this, number of normalisation methods can be used (Freudenberg 2003; Jacobs 2004).

**Table 4: Market Share of Sample Firms in Automobile Industry in 2005-06**

FIRM	MARKET SHARE (%)
Passenger Vehicle Segment	
1. Maruti Udyog Ltd	46.11
2. Tata Motors Ltd	16.52
3. Hyundai Motor India Ltd	13.91
4. Mahindra & Mahindra	7.35
5. Honda Siel Cars India Ltd	3.74
Total Market Share	87.63
Commercial Vehicle Segment	
Tata Motors Ltd	62.04
6. Ashok Leyland Ltd	27.00
7. Eicher Motors Ltd	7.44
8. Swaraj Mazda Ltd	3.03
Total Market Share	99.51
Three Wheeler Segment	
9. Bajaj Auto Ltd	49.11
Mahindra & Mahindra	6.23
10. Force Motors Ltd	5.72
11. Scooters India	4.22
Total Market Share	65.28
Two Wheeler Segment	
12. Hero Honda Motors Ltd	41.24
Bajaj Auto Ltd	26.29
13. TVS Motor Company Ltd	17.90
14. Kinetic Motor Co Ltd	1.08
Total Market Share	86.51

Source: SIAM 2007

The normalisation method used should take into account the data properties, as well as the objectives of the study (Giovannini 2005). Considering this we used Range Equalisation Method where variables are re-scaled between 0 to 100 with the help of equation 1. This requires points of reference relative to which indicators can be scaled. A minimum and a maximum value are identified for each of the variables. Subtracting the minimum value of the particular variable from its actual value and dividing it by the difference between the selected maximum and minimum values determine the values of the indicators. Then we multiplied this value of the indicators by 100, so that it ranges between 0 (worst performer) and 100 (best performer). This method of re-scaling the data widens the range of indicators, which makes the differences more distinct.

$$Normalisation = \frac{Actual\ Value - Minimum\ Value}{Maximum\ Value - Minimum\ Value} \times 100 \quad \dots\dots\dots (1)$$

Different factors of competitiveness have different impact on the competitiveness index, both negative and positive. For this reverse of the value i.e. '100- value' of the index is taken, which solves the issue of directionality.

For benchmarking, weights can have a significant effect on the overall composite index and the rankings. Different weights may be assigned to indicators to reflect their economic significance, statistical adequacy, cyclical conformity, speed of available of data, etc. A number of weighting techniques are available of which some are derived from statistical models, such as factor analysis, data envelopment analysis and unobserved components models or from participatory methods like budget allocation, analytic hierarchy processes and conjoint analysis.

The statistical methods could not be used for the purpose as most of them are based on the correlations between the indicators. Correlations do not necessarily represent the *real influence* of the sub-indicators on the phenomenon being measured (Nardo et al. 2005). Also there must be sufficiently large size of the sample to use most popular methods such as factor analysis and principal component analysis.

Considering the nature of the problem budget allocation method for weighting has been used. Budget allocation is a participatory method in which experts are given a 'budget' of  $N$  points, to be distributed over a number of sub-indicators, 'paying' more for those indicators whose importance they want to stress. In this experts' opinions are likely to increase the legitimacy of the composite and create a forum of discussion around which to form a consensus for policy action (Nardo et al. 2005).

In the present study, the ten broad categories of indicators were listed in the questionnaires itself so that experts in the field could assign weights to them out of 100 as per their relative importance in the competitiveness of the firm. This reduced the subjectivity in the index as officials already working in the industry have clear insight into the problem of competitiveness. The weights then were averaged across the sample firms. However, for sub-indicators, equal weights have been used as asking relative importance of 62 sub-indicators to the officials of the firm was not possible due to their unwillingness as it involved too much time.

**Table 5: Weights of the Indicators**

INDICATORS	AVERAGE WEIGHT
1. Productive Performance	14
2. Financial Performance	12
3. Cost Effectiveness	7
4. Sales and Marketing Strategy	12
5. Stock Market Performance	4
6. Consumer Satisfaction	14
7. Technological and Environmental Factors	11
8. Human Resource Development and Social Indicators	10
9. Foreign trade: Export and Import	8
10. Growth Performance and Potential	8
<b>Total</b>	<b>100</b>

After weight allocation to each component index, these scores are aggregated into a composite score. The aggregation of indices tends to be of either an additive or a functional nature (Booyesen, 2002). The most widespread method of linear aggregation is used in the index construction where the mere summation of weighted and normalised indicators is done.

The aggregate index for each of the ten indicators is derived first using relevant variables (sub-indicators). The formula used for this is given below:

$$V_i = \frac{1}{n} \sum_{i=1}^n x_i \dots\dots\dots (2)$$

where,  $V_i$  is  $i^{\text{th}}$  indicator,  $x_i$  is the  $i^{\text{th}}$  sub-indicator,  $n$  is the number of sub-indicators within the indicators.

The next step is of aggregating these ten indicator indices into one competitiveness index for a firm in the automobile industry. This is done in the same manner as in equation 2.

$$C_j = \frac{\sum_{i=1}^n W_i V_i}{\sum_{i=1}^n W_i} \dots\dots\dots (3)$$

where,  $C_j$  is the competitiveness index of  $j^{\text{th}}$  firm,  $W_i$  is weight of the  $i^{\text{th}}$  indicator,  $V_i$  is  $i^{\text{th}}$  indicator ( $i=1$  to 10) and  $n$  is the number of indicators.

Then the ten indicators are grouped in two groups namely Financial and Non-financial Indicators and constructed both the indices for the purpose of analysis. We

have also averaged the scores of the sample firms to benchmark the average competitiveness in the industry.

#### **4. RESULTS AND ANALYSIS:**

Industry average score of competitiveness index has been calculated at 40.98, which is used to analyse the competitive performance of firms above and below it. It is hence used to benchmark the firms' competitive standings in the industry. Seven firms from the sample of fourteen firms i.e. 50% of the total sample size, show performance above industry average and remaining seven are below this average. The firms that showed better performance comprise from all the segments of the industry. Out of these seven, 4 of them namely Maruti Udyog Ltd., Tata Motors Ltd., Hyundai Motor India Ltd. and Mahindra & Mahindra Ltd. manufactured passenger vehicles in 2005-06. Firms like Bajaj Auto Ltd., Hero Honda Motors Ltd. and TVS Motors Ltd. produces two-wheeler vehicles, whereas Bajaj Auto Ltd. and Mahindra & Mahindra Ltd. also manufacture three-wheeler vehicles. Of course Tata Motors Ltd. is the only firm, which manufactures commercial vehicles also. This indicates the competition in passenger vehicle segment and in two-wheeler segment is relatively more intense.

The firms, which recorded performance below industry average, are mainly from commercial vehicles such as Ashok Leyland Ltd., Eicher Motors Ltd. and Swaraj Mazda Ltd. Honda Siel Cars India Ltd. is the only passenger vehicle producer that is below industry average during 2005-06. Force Motors Ltd. and Scooters India Ltd. are three-wheeler manufacturers below industry average and Kinetic Motors Co. Ltd. is the only two-wheeler producer below industry average in the ranking of competitiveness index during 2005-06.

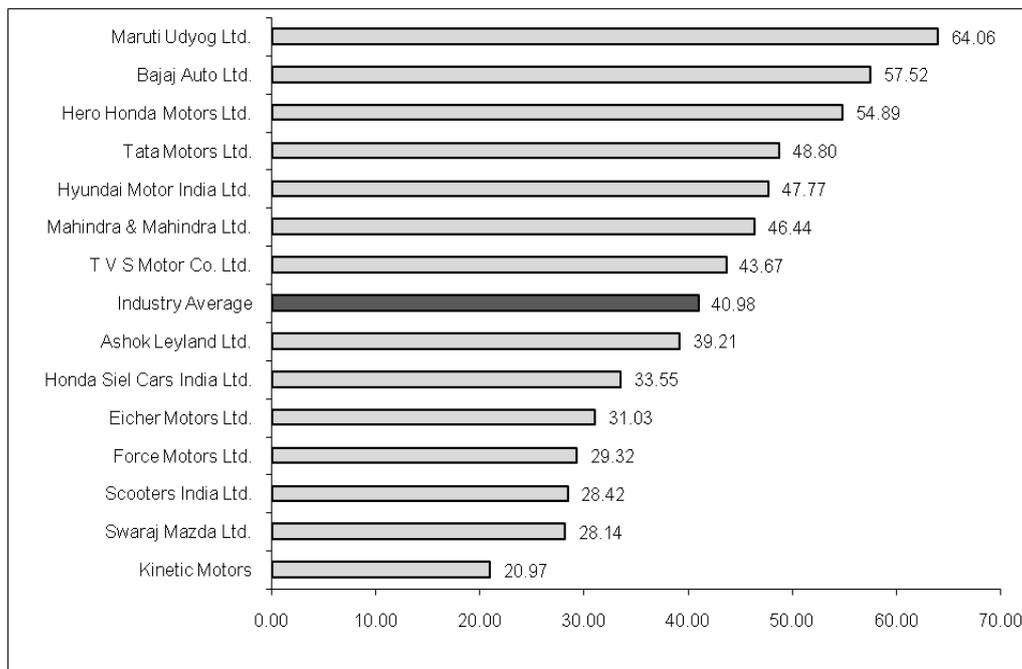
##### **4.1. Competitiveness of the Firm:**

In the overall competitiveness rankings, Maruti Udyog Limited comes first with 64.06 score. This result is largely due to its position in the productive performance and consumer satisfaction indicator. The good competitive position it enjoys in productive performance is because of its highest capacity utilization and labour productivity in the automobile industry. In case of consumer satisfaction it

holds the highest position in the industry. However the company's performance in foreign trade is scored very low and is on 12<sup>th</sup> position in the list of sample firms. This is mainly because of its negative net foreign exchange earnings due to high imports (mainly of components). The percentage of exports in total sales basket is also very low at only 3.85% where the highest is 27.32%. In all the other indicators, it has performed above average of the industry.

**Table 6: Overall Rankings and Scores of Automobile Firms**

COMPANY	RANK	SCORE
Maruti Udyog Ltd.	1	64.06
Bajaj Auto Ltd.	2	57.52
Hero Honda Motors Ltd.	3	54.89
Tata Motors Ltd.	4	48.80
Hyundai Motor India Ltd.	5	47.77
Mahindra & Mahindra Ltd.	6	46.44
T V S Motor Co. Ltd.	7	43.67
<b>Industry Average</b>		<b>40.98</b>
Ashok Leyland Ltd.	8	39.21
Honda Siel Cars India Ltd.	9	33.55
Eicher Motors Ltd.	10	31.03
Force Motors Ltd.	11	29.32
Scooters India Ltd.	12	28.42
Swaraj Mazda Ltd.	13	28.14
Kinetic Motors Co. Ltd.	14	20.97



**Figure 4: Scores of Automobile Firms in Competitiveness Index**

**Table 7: Scores and Ranks of the Firms for Indicators**

Firm	Productive Performance		Financial Performance		Cost Effectiveness		Sales and Marketing Strategy		Stock Market Performance		Consumer Satisfaction		Technology and Environmental Indicators		Human Resource Development		Foreign Trade Measure		Growth Variable and Potential	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Maruti Udyog Ltd.	14.00	1	7.97	3	6.44	3	5.41	6	2.17	2	11.38	1	4.28	3	6.88	5	0.55	12	4.97	4
Bajaj Auto Ltd.	1.61	13	8.93	1	6.38	4	7.52	1	3.38	1	6.82	3	3.20	7	7.55	3	6.34	1	5.78	1
Hero Honda Motors Ltd.	6.59	2	8.63	2	6.90	1	6.93	2	1.81	6	8.85	2	4.05	4	5.42	9	1.75	11	3.96	7
Tata Motors Ltd.	3.01	6	5.32	11	5.74	6	6.03	4	1.98	3	3.92	6	5.25	1	7.33	4	4.91	3	5.30	2
Hyundai Motor India Ltd.	3.96	5	7.04	4	5.76	5	4.54	8	0.85	10	3.87	7	3.64	6	7.72	2	5.89	2	4.51	5
Mahindra & Mahindra Ltd.	4.01	4	5.73	10	6.54	2	6.23	3	1.86	5	3.41	8	3.85	5	6.32	6	3.35	5	5.14	3
T V S Motor Co. Ltd.	2.17	12	5.72	11	5.27	8	5.76	5	1.94	4	5.07	5	2.91	8	8.56	1	2.88	7	3.38	10
Ashok Leyland Ltd.	2.72	8	6.54	7	5.04	9	3.68	10	1.17	9	1.52	13	4.80	2	6.30	7	3.55	4	3.89	8
Honda Siel Cars India Ltd.	2.44	8	6.88	5	5.71	7	0.72	14	0.85	10	5.18	4	2.25	10	5.53	8	0.42	13	3.56	9
Eicher Motors Ltd.	2.35	11	5.79	9	4.22	12	5.13	7	1.73	7	3.04	11	1.17	12	2.10	13	3.19	6	2.31	11
Force Motors Ltd.	0.04	14	5.09	12	4.55	11	4.20	9	0.57	11	3.05	10	2.33	9	3.05	11	2.14	10	4.30	6
Scooters India Ltd.	2.73	7	6.56	6	5.29	8	1.97	13	0.57	11	3.05	10	0.46	14	3.40	10	2.34	9	2.06	12
Swaraj Mazda Ltd.	4.62	3	6.21	8	3.87	13	2.07	12	1.47	8	2.13	12	1.57	11	1.80	14	2.68	8	1.72	13
Kinetic Motors Co. Ltd.	2.40	10	2.96	13	0.80	14	3.05	11	0.51	12	3.35	9	1.01	13	2.49	12	2.68	8	1.72	13
<b>Industry Average</b>	<b>3.76</b>	<b>-</b>	<b>6.38</b>	<b>-</b>	<b>5.18</b>	<b>-</b>	<b>4.52</b>	<b>-</b>	<b>1.49</b>	<b>-</b>	<b>4.62</b>	<b>-</b>	<b>2.91</b>	<b>-</b>	<b>5.20</b>	<b>-</b>	<b>3.05</b>	<b>-</b>	<b>3.76</b>	<b>-</b>

Note: Shaded scores of firms indicate above industry average performance in that particular indicator

Bajaj Auto Limited is at the second position in the competitiveness index and 1<sup>st</sup> in the financial index as it gets 8.93 score there. It can be noted here that this company has 1<sup>st</sup> ranks in five indicators; still it has got second ranking in the overall index mainly because of poor performance in productivity where it stands 13<sup>th</sup>. The difference in the total productivity score is very wide where Maruti Udyog has got 14 and Bajaj Auto gets only 1.61 score due to its low capacity utilization of 56% and low labour productivity, which is only 0.74 as compared to 3.61 in case of Maruti Udyog. Low foreign exchange spending on technology acquisition, R & D expenditure and royalty know-how expenses has led the company to 7<sup>th</sup> ranking in technological indicators too, further pulling down the total score.

The difference of total score between Hero Honda and Bajaj Auto is only of about 2 points (both two-wheelers); hence performance wise the company is doing well as it stands at number 3 position. The company holds 1<sup>st</sup> position in cost effectiveness as it has lowest cost component in its gross sales. Also raw materials etc and financial charges are the lowest. Human resource, growth variables and foreign trade measure have pulled it down to this position although it is 2<sup>nd</sup> in other 4 sub-indicators such as productive and financial performance, sales and marketing strategy and customer satisfaction.

The overall score of Tata Motors is 48.80 on the basis of technology; the company tops the list mainly because of highest R&D expenditure and good product differentiation, as it caters to two segments in the industry namely passenger vehicles and commercial vehicles. In terms of growth, the company performs well, as sales and profits both showed good growth and also their plans to launch new models in future. However, the company's performance in other indicators is average and exceptionally poor in financial indicators such as liquidity ratios and interest coverage ratio.

In the list of competitive performance, 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> positions are held by Hyundai, Mahindra & Mahindra and TVS Motors, with very little difference in their total scores. Nevertheless, strength of Hyundai is its second highest rank in human resource and foreign trade indicator with 27.32% of export in total sales. But it lags

behind in the stock market performance as is not listed on NSE and hence its score is zero for the indicator. Mahindra & Mahindra is doing well in cost effectiveness and sales and marketing strategy whereas financial performance is relatively very poor. Human resource performance is strongest for TVS Motor Co. Limited where it is ranked first, which is offset by poor productive and financial performance.

All the firms discussed above in terms of their competitive performance in various indicators are above the industry average and hence showing good competitive behavior. The remaining other firms, which are below the industry average, are discussed below.

Ashok Leyland, Honda Sael Cars India and Eicher Motors are 8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup> in the list of competitive rankings getting 39.21, 33.55 and 31.03 scores respectively. All are very close with each other although Ashok Leyland is exceptionally good in technological indicators and average in other indicators. Honda Sael's strength seems to be consumer satisfaction where it has 3<sup>rd</sup> position but because of poor performance in sales and foreign trade the overall score is very low. Whereas, Eicher Motors has below average performance in all the indicators of competitiveness.

Firms such as Force Motors, Scooter India and Swaraj Mazda are on the 11<sup>th</sup>, 12<sup>th</sup>, and 13<sup>th</sup> rankings respectively in the list of index of competitiveness being very close in scoring except Kinetic Motors, which is 14<sup>th</sup> with very low score. Scooters India at 11<sup>th</sup> has done above average performance in financial and productive variables. Swaraj Mazda is ranked 3<sup>rd</sup> in productive performance because of 99% capacity utilization. Kinetic Motors has consistently been in the last two in four indicators, only doing better in foreign trade measure as net foreign exchange earnings has positive value. In case of other indicators, all these four firms show below industry average performance.

If we divide the industry in segments then it can be seen that the two-wheeler segment and three-wheeler segments is dominated by Bajaj Auto as it is the most competitive as reflected by its high scores. The passenger vehicle segment is obviously ruled by Maruti Udyog whereas the commercial vehicles segment is dominated by Tata Motors.

The pattern of difference of scores can be observed from the overall index of all the sample firms. It is seen that maximum difference is between the 13<sup>th</sup> and 14<sup>th</sup> positions i.e. Swaraj Mazda and Kinetic Motors (7.17) which shows exceptional relatively poor performance of the later in terms of competitiveness. Next is the difference between Maruti Udyog and Bajaj Auto (6.54) showing the dominance of the former on the automobile industry. The gap between Hero Honda and Tata motors (6.09) is also large, which is followed by Ashok Leyland and Honda Seil (5.65). All the other firms are very close in competitive scores, which show close competition among them.

#### **4.2. Financial and Non-Financial Indices:**

Competitiveness is concerned with the ability of firms to perform better than rivals, where performance is dependent on both financial and non-financial conditions of the firm. For the purpose of analysis, competitiveness index has been divided into financial index and non-financial index. The objective is to ascertain which of the two indices has more effect on the overall competitiveness index of a firm.

For the purpose financial indicators such as different financial ratios, cost effectiveness, stock market performance and foreign trade indicators are grouped under financial index and other indicators such as productive performance, sales and marketing strategy, consumer satisfaction, technological issues, human resource and growth variables are grouped under non-financial indicators. The former has 31% of the total weights whereas the later gets remaining 69%. Importance to non-financial factors is given visibly more by the industry experts in the survey of sample firms (Table 5). Using the weighted average of the sub-indicator indices, financial and non-financial indices are constructed.

It can be seen that although Maruti Udyog stands first in non- financial index, it is on sixth position in financial index reflecting its weakness in four of the financial indicators such as foreign trade and financial ratios (Table 8). It is way ahead of all other firms in non-financial indicators as reflected by the score of the index. It can hence be said that the company can dominate the industry completely if it tries to

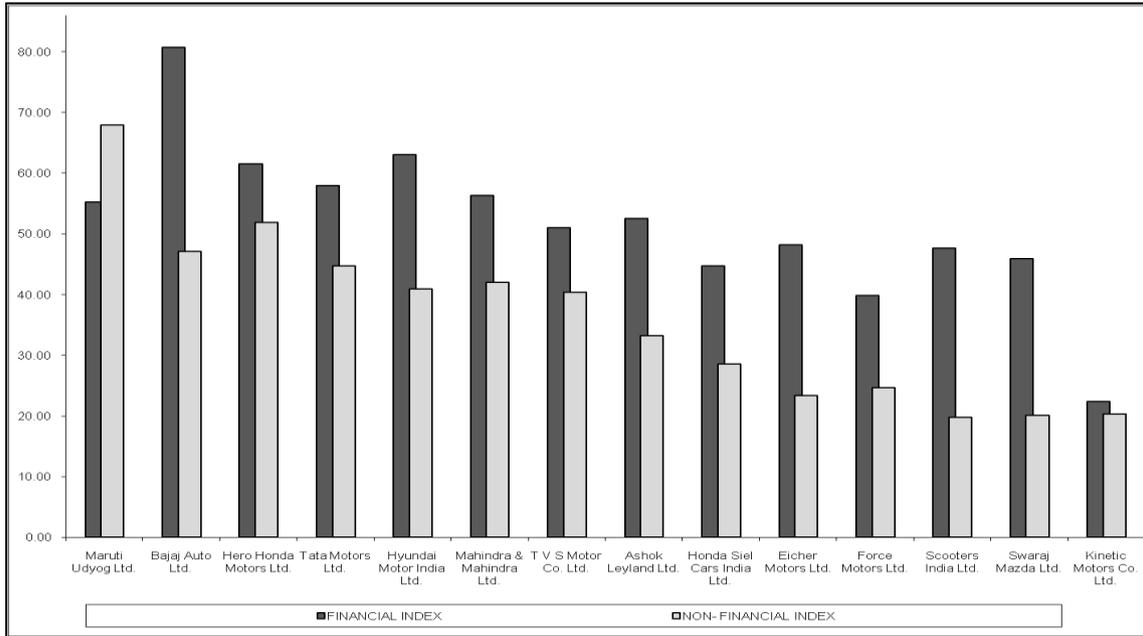
improve its financial performance. This is the only firm from the sample firms whose non-financial performance is superior to financial performance (Figure 5).

However, opposite is the case with Bajaj Auto as it has highest score in financial and is third highest in non- financial index. It has ranked 1<sup>st</sup> in all of the financial indicators except in cost effectiveness where it stands 4<sup>th</sup>. But the company has got 3<sup>rd</sup> highest rank in non-financial performance because of its relatively poor performance in productivity and technological indicators.

Performance of Hero Honda is marginally better in non-financial than in financial index. However, Tata Motors and Mahindra & Mahindra are the two firms, which have same ranks in both the indices, but the performance of Tata Motors is much superior to Mahindra & Mahindra because Tata Motors could maintain the same rank in overall index but Mahindra & Mahindra went down by one rank i.e. from 5<sup>th</sup> to 6<sup>th</sup> (Table 8). Hyundai despite of being very strong in financial performance has lagged behind due to weakness in non-financial index. There is very marginal unevenness in the comparative position of other firms, which has altered

**Table 8:** Comparison of Rankings in Financial and Non-financial Indicators

FIRM	OVERALL INDEX		FINANCIAL INDEX		NON-FINANCIAL INDEX	
	Score	Rank	Score	Rank	Score	Rank
Maruti Udyog Ltd.	64.06	1	55.27	6	68.00	1
Bajaj Auto Ltd.	57.52	2	80.75	1	47.08	3
Hero Honda Motors Ltd.	54.89	3	61.59	3	51.88	2
Tata Motors Ltd.	48.80	4	57.92	4	44.70	4
Hyundai Motor India Ltd.	47.77	5	63.02	2	40.92	6
Mahindra & Mahindra Ltd.	46.44	6	56.38	5	41.97	5
T V S Motor Co. Ltd.	43.71	7	51.03	8	40.36	7
Ashok Leyland Ltd.	39.21	8	52.59	7	33.20	8
Honda Siel Cars India Ltd.	33.55	9	44.70	12	28.55	9
Eicher Motors Ltd.	31.03	10	48.16	9	23.34	11
Force Motors Ltd.	29.32	11	39.80	13	24.61	10
Scooters India Ltd.	28.42	12	47.61	10	19.80	14
Swaraj Mazda Ltd.	28.14	13	45.90	11	20.16	13
Kinetic Motors Co. Ltd.	20.97	14	22.41	14	20.32	12



**Figure 5: Comparison of Financial and Non-financial Indices**

their overall rankings in the competitive index. However, exceptions to this are Honda Seil and Eicher Motors who have inter-changed their positions in the two indices. Kinetic Motors although has poor performance in both the indices, its relative weakness is much higher in financial than in non-financial index.

## 5. CONCLUSION:

The efforts have been made to build up an index that reflects the competitiveness of firms in the Indian automobile industry. In the process an attempt has also been made to study the current status and evolution of the industry. A composite competitiveness index is defined as the mathematical combination of individual indicators that represent different dimensions of the concept whose description is the objective of the analysis.

The finding of the study reflects the relative competitive position of the sample firms and also the overall picture of the industry. Out of fourteen sample firms, performance of seven firms was above the industry average. Maruti Udyog Limited scored highest in the group getting top most ranking mainly because of non-financial indicators such as productive performance, customer satisfaction etc. This is followed by Bajaj Auto, which has scored second rank due to better financial

performance in terms of stock market performance, financial ratios and foreign trade. Looking at the financial and non-financial index separately, it is seen that the rankings differ slightly as some firms perform better in one than the other.

It is also observed that out of first seven firms, only two are from three-wheeler segment. This shows that competition is more intense in the passenger vehicle and two-wheeler segments. The commercial vehicle segment seems to be dominated by Tata Motors.

It can be hoped that the overall index, sub-indicator index and financial/ non-financial index prove to be helpful in framing competitive policies by the firms. It will also be useful to consumers to judge the competitive performance of these firms from the product quality and investment point of view.

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