

# Identifying the Factors for Achieving Sustainability for Indian Car Market



Sunil Anand, Piyush Singhal

**Abstract:** *In today's competitive business scenario, the Pivot in supply chain is Consumer satisfaction. This could be considered as the most important internal goal to achieve in order to be active and leader in the business environment. Along with this when value chain partner are focusing on customer satisfaction external factor like the environmental issue are also important to make the business model a sustainable. All these issues forces the manufacturer and rest value chain partner to become Agile in nature. The consumer is also part of this continuously changing innovative environment, which is mainly meant for them only and to a large extent for sustainability. These volatile and continuously changing environment may also effects consumer satisfaction level in some or other aspects while using the product and at the time of use end. The agility in Supply Chain may leads to a shorter product life cycle and forces the consumer to cope with the secondary car market within few years of purchase. Also the role of government and dealer outlets regarding environmental effects like NGT legislatives and support of dealers for creating awareness among consumer regarding pollution control is also one of the key factors. This study focus on these factors that have impact on the satisfaction level of end-user. An effort is made to check the perceived effect of these factors on consumer, at the same time study suggest how these factors can be modulated to lower extent with the aid of eco-leasing business model in context of Indian car market.*

**Key Words:** *Agility in Supply Chain, Secondary Market, Sustainability, Eco-leasing.*

## I. INTRODUCTION

The growth in Indian car market has pressurized the actors to take inventive steps regarding consumer satisfaction at the same time reducing the effect of unsustainable burden on the earth. The need of consumer's leads the system towards an agile environment .Which not only focuses on consumer demand but also incorporates the need of sustainability. These volatile and continuously changing business environments may also affects consumer satisfaction level during the use of product and at the time of end use. Due to agility in supply chain the life cycle of the product become shorter and forces the consumer to cope with the secondary car market within few years of purchase. At the same time the role of government and dealer outlets

regarding environmental impacts like NGT legislatives and support of dealers for creating awareness among consumer regarding pollution control is also one of the key factors[1][2]. The study tries to understand these factors that have impact on the satisfaction level of end-user .An effort is made to check the perceived effect of these factors on consumer, at the same time study suggest how these factors can be

modulated to lower extent with the aid of eco-leasing business model in context of Indian car market. The study involves literature review in perspective of the factors identified is done. On the basis of various studies done problem statement is defined and objectives are formulated, which mainly focuses on the factors considered. Further the factors are tested in terms of perceived effect on the consumer satisfaction. For this a questionnaire is modeled and data collection is done through online form, taking responses from various car owners. The data collected is than organized and tested for validity. Further the analysis of data is done in the methodology part and results and conclusions are summarized at the final part of the study.

## II. LITERATURE REVIEW

India stands sixth largest producer of automobile in terms of volume .The Indian automobile industry contributes 7% to its GDP, about 7-8% of total employed population with 4% of exports and 39% of FDI inflows [3]. Thus the car market in India is growing at a rapid rate, Manufacturer find it as an opportunity to grow their business making India a global Market. This leads to rapid launch of new models to the market as per the consumer demand and some time to stimulate the demand. This make the whole system agile and all companies focus on rapid changes in their models, so that consumer can be attracted toward their brand. Also considering various other issues as suggested in introductory part, the complete literature review is divided as per the individual factors highlighted.

### A. Impact of Agility (IM)

Barve deals with the issues of agility in terms of customer satisfaction and suggested customer satisfaction is influenced by the perception of the value delivered and suggests customer satisfaction, customer sensitivity and responsiveness and cost of quality are the drivers and strongly depends on other variables [4].Huang .Y & Li S.J has done detail review about the agility. The study includes review of about 60 conceptual researches along with 40 case studies and summarized the key concepts, drivers and attributes of agile manufactures.

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Various stages of implementation of agility are talked about, According to author most of the researchers mainly emphasizes on the theory building further validated through some case studies. These theories lack the support of practical examples that truly implemented agility from scratch, and the empirical analyses require confirming the theoretical arguments. Author suggested that research methods should be diversified to get evidences with both validity and credibility in terms of consumer perspective [5]. Agile environments provide consumers unlimited amounts of information and an ability to communicate with a sense of empowerment, such that they desire a greater role in exchanges with companies, one important outcome of this increased consumer empowerment is that consumers now desire to play a greater role in the process of value creation [6]. MacVaugh proposes an model which aimed at explaining the limits of adoption and non adoption of innovation by consumer. The study sums the extent to which new technology meets the level of easy to adopt condition and its usefulness but it does not includes the after effects to the existing market [7]. Schneberger taken automobile industry as an example to study the relation among the system inherent characteristics with the consumer specific requirement for agile transformation. The study contributed towards the holistic approach for agile transformation and its requirement with system characteristics [8]. All innovations, to some extent, represent uncertainty and pose potential side effects that cannot be anticipated. Customers may resist an innovation because it conflicts with their prior beliefs or because it threatens to create changes in their well-established routines[1]. With the introduction of more products and models into the market, the life cycle of passenger car models today is not more than five years[9]. In the case of Automobile sector, the small product life cycle threatens the end-user regarding obsolescence and dissatisfaction about up gradation in small period of time. The relation among the agility in supply chain and its impact on consumer satisfaction is needed to be checked. The literature review suggests impact of agility on consumer could be considered as a factor to evaluate.

### B. Unorganized Secondary Market (USM)

Used car segment has emerged as one of the major industries in India. According to a latest analysis, the yearly used-car demand in the Indian market is around 1.4 million cars [10]. The players of used car market in India now operate with multiple marketing channels, but the customer belief on the product sale and purchase is still a issue and must be upto the mark[11]. The Indian second hand car market is dominated by over 90 percent by the unorganized sector. This comprises of nearly 60 percent of the deals that are characterized by owner-to-owner (customer-to customer) transactions and another 30 percent through brokerage mediated by individual brokers and car mechanics, etc. only low percentage secondary market is controlled by organized sector. The consumers are worried about the authenticity of the product and the supplier in India. The major limitation of unorganized secondary car market is lack of goodwill and involvement of brokers [12]. The used car industry in India is at its nascent stage and has a long way to go before it matures. Since it is dominated by the unorganized sector

there is no space for consumer protection [13]. In the Used car market there is limited information available about the quality of the car sold and therefore buyer of used car always find himself as cheated [14]. The review of literature on secondary car market suggest the market sector to be unorganized but most of the studies emphasize only considering consumer as a buyer while no details about the consumers role as seller is taken into the account.

### C. Environmental Factor (EF)

During the review of literature related to this study, the aim was to get details about role of government and dealer outlets regarding environmental effects like NGT legislatives and support of dealers for creating awareness among consumer regarding pollution control. Harish.M, stated that problem lies with the usage of fossil fuels and urbanization and low awareness about the impact and cause of emissions among the user[15]. Christian Brand suggested through the study ,that the emission problem can be handled by assessment of effect in actual than what suggested officially by adaptation of various regulation and legislations.[16]. One of the method purposed is the labeling of emissions like CO2 labeling. It was identified that a number areas where the car labeling directive could be more effective [17]. But its effectiveness in country like India with low level of Awareness and education on issue is a point of consideration. Vooren. et al, presented studied car manufacturers' behavior in this changing socio-economic environment. The study is based on the analysis of top 15 manufacturer in Netherlands to investigate the effect of energy labels for car by analyzing the CO2 emissions .The study confirms the improvements due to the efforts of manufacturer ,but not emphasized on consumer awareness on emissions[18]. Jorgenson W .D. and Wilcoxon J P., (1990) and Berger I. and Corbin(1992) are the earliest researcher provided study showing the response of manufacturer on environmental regulation and consumer role with awareness and emphasize on awareness as important issue to consider[2]. The relation between environmental factors and consumer behavior and his individual self –perception for combating environmental Problem is important and need building awareness among consumer to tackle the issues of emission as an important concern [19]. The most important factor to control the emissions under Indian perception is to formulate proper inspection and maintenance system. A practical strategy must be devised ,which controls emission through tightening of emission norms and fuel quality specifications, Strengthening of Inspection and Maintenance system and most important Govt. should run the awareness programme. Their exist gaps in the policy regarding effectiveness and lack of coordination between various governments agencies to improve transport services and lack of people awareness[20]. The emission can be controlled trough proper maintenance and stringent environmental regulation[21].

The review of literature to understand emissions and its control efforts, leads to indication toward the fact that most of the researcher are agreed on the implication of legislation and regulation to control pollution, but its impact in perspective of end user is not established. The common acceptance regarding the need of awareness of the end user of vehicle regarding emission control is indicated, still the way to achieve is not so clear. At the same time researcher questioned the role of government and dealer in achieving the goals. Thus review strongly suggest to consider environmental factor as an important point to be considered and the role of government and dealer outlets regarding environmental effects like NGT legislatives and support of dealers for creating awareness among consumer regarding pollution control must be checked on.

#### D. Eco-leasing (EL):

The complete review of literature is done to understand the effect of three factors namely Impact of agility(IM), Unorganized secondary market(USM) and environmental factor(EF) and its effects on consumer satisfaction. An effort is made to relate these factors with the Idea of getting solution through the concept of Eco-leasing. The study suggests shifting from the traditional automotive business model of vehicle manufacturer be the main player, directing both component supplier and the distribution and retailing system with the main source of profit as sales of vehicle [22].

The current socioeconomic system is based on the principle of linear economy, in which manufacturer produces products and the end user consumes it and dispose. This leads to entry of only virgin material at the beginning of supply chain. This linear production model puts environmental pressures due to unnecessary resource losses in several ways: production chain and end-of-life waste, excessive energy use and erosion of ecosystems [23] Leasing an automobile rather than purchasing it can reduce cost to customer as well improve on depreciation factor which makes the consumer worry [24]. An alternative business model with the concept of Eco-leasing with the principles of PSS and closed loop economy is suggested for Indian car market with a strategy which encompasses three major aspects including focus on closed-loop recycling with the concept of circular economy, move to lease rather than sell and increase the usability of product at the consumer end. All parameters will lead to a business model with a long term lease, and customer will get the benefit of warranty repairs for the complete life time of car [25]

### III. AIMS & OBJECTIVES

As per review of literature, the statement of problem can be define as identifying impact of agility in supply chain on consumer satisfaction along with unorganized secondary car market in India and role of government and dealers in tackling emission effect. The Impact of problem is that, it leads to dissatisfaction to the consumer regarding driving an old version of car, which is purchased recently, at the same time problem is of improper closing of loop, cost of remanufacturing will be more, unsustainable recovery as handled by non professionals due to unorganized secondary car market in India and Vehicle handled by customer having

low awareness about emission and its norms along with impact of legislative enforced by Govt. authorities like NGT. The objective is also to ascertain level of acceptance for new concept of Eco-leasing for Indian car market. And how all these factors relate in combinations. On the basis of this, the objectives are formulated and the view of end-user analyzed through survey by categorizing end user in terms of various demographic variable like individual age of end user, their educational qualification and age of Car. The objectives are formulated as follows:

To study the Impact of Agility in supply chain on consumer satisfaction, the perception about secondary car market on consumer, the role of government & Dealer in pollution control as perceived by customer and the level of acceptance for Eco-leasing among consumer.

To check how Impact of agility (IA), unorganized secondary car market (USM) and environmental factor (EF) are related with the level of acceptance for eco-leasing (EL).

In order to get solutions for the objectives define, the next part of study deals with the methodology part and explains the path of research which helps in getting solutions to some extent.

### IV. METHODOLOGY

The Analysis is done by collecting primary data through a comprehensive, structured questionnaire, from 320 passenger car owners via online form. A draft questionnaire was prepared and pre-tested with a group of 25 respondents to iron out fundamental problems in the instructions and questionnaire design. In order to be sure about robustness of study the respondents selected belongs to various universities and institutes associated with education. The respondents have been broadly categorized into various categories like Educational Qualification with category of UG, PG and PhD, Age of consumer, and Car age. Over all 19 questions were asked on five point likert scale under four categories developed on the basis of literature review viz Impact of agility (IA), Unorganized secondary market (USM), Environmental factor (EF) and Eco-leasing (EL). Convenience sampling technique was adopted to select the respondents. Statistical tools like Anova and Correlation & percentage analysis are used, besides graphical representations, for easy analysis and interpretation of data.

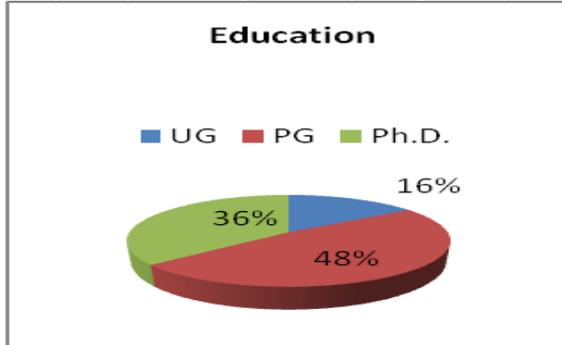
The reliability of measurements is examined using the Cronbach's  $\alpha$  test, where the coefficients are calculated using SPSS19.0. The alpha value of 0.70 or greater indicates an acceptable level of reliability [34](Peng B et al, 2018). As shown in Table 1, all alpha values are greater than 0.70, suggesting that the internal reliability of the model is good. In addition, the validity of the constructs is checked using the KMO test and the Bartlett's sphericity test and if the KMO test value is above 0.50 indicates that the data is suitable for analysis. The value of the Bartlett's sphericity test with the minimal probability of  $<0.05$  suggests that the data is suitable [26]. The results for KMO Test and Bartlett's sphericity test are also indicated in the Table 1, which validate the Measurement Tool

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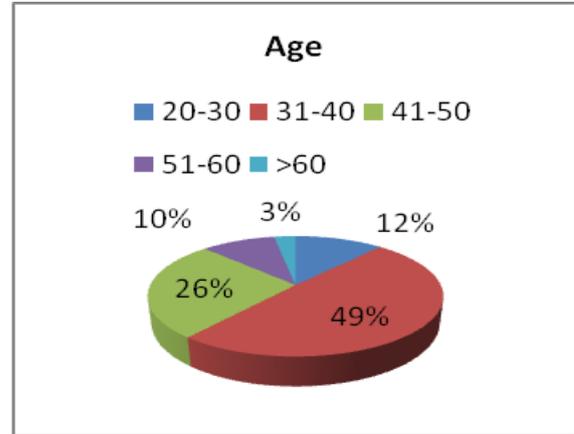
**Table I: Measurement validation**

Variable	Cronbatch's $\alpha$	KMO Measure of Sampling Adequacy.	P Value of Bartlett's Test
IA	<b>.702</b>	.712	.000
USM	<b>.794</b>	.787	.000
EF	<b>.806</b>	.817	.000
EL	<b>.734</b>	.725	.000

The data of all the 320 respondents are than tabulated under the demographic variables namely Education and the age of respondents. The details of category and frequency percentage are given in Fig.1 and Fig.2 respectively.



**Fig1. Frequency Distribution on the basis of Education**



**Fig2. Frequency Distribution on the basis of Age**

From the above figures, it is illustrated that the maximum number of study subjects were post graduated (48%) followed by Doctorate degree (36%) and Graduate (1.6%). It also shows that maximum number of persons (49%) were in 31-40 years of age followed by (26%) under the category of 41-50 and minimum number of persons were in older age (>60) years. The factors are evaluated and tested through analysis of variance (ANOVA), which is an extremely useful technique related to research in the field of Business management and Industrial Engineering. This technique enables researcher to perform simultaneous tests and allow researcher to draw inferences about whether the sample have been drawn from population having the same mean. In other word it allows to validate the results that all categories response in the same manner and the value which can be attributed to specified causes [27]. Further to establish the first objective, the dependent variables are tested with the independent categorical variable. ANOVA test is performed for the identified variable against the categorical variables namely Education shown through Table II and Age through Table III.

**Table II: Anova analysis (Education)**

ANOVA		Sum of Squares	df	Mean Square	F	Sig.
<b>IA</b>	Between Groups	1.743	2	.871	1.390	<b>.251</b>
	Within Groups	198.787	317	.627		
	Total	200.529	319			
<b>USM</b>	Between Groups	.946	2	.473	.623	<b>.537</b>
	Within Groups	240.766	317	.760		
	Total	241.712	319			
<b>EF</b>	Between Groups	.905	2	.453	.725	<b>.485</b>
	Within Groups	197.983	317	.625		
	Total	198.889	319			
<b>EL</b>	Between Groups	.089	2	.044	.067	<b>.935</b>
	Within Groups	210.503	317	.664		
	Total	210.592	319			

**Table III: Anova analysis (Age)**

ANOVA						
BY Age		Sum of Squares	df	Mean Square	F	Sig.
IA	Between Groups	2.740	4	.685	1.091	.361
	Within Groups	197.789	315	.628		
	Total	200.529	319			
USM	Between Groups	6.018	4	1.505	2.011	.093
	Within Groups	235.693	315	.748		
	Total	241.712	319			
EF	Between Groups	.582	4	.145	.231	.921
	Within Groups	198.307	315	.630		
	Total	224.423	198.889	319		
EL	Between Groups	6.155	4	1.539	2.371	.052
	Within Groups	204.437	315	.649		
	Total	210.592	319			

Simple linear correlation is a measure of the degree to which two variables vary together, or a measure of the intensity of the association between two variables. Correlation can be applied to both between independent and dependent variables as well as on two dependent variables. Spearman's coefficient of correlation, is the measures the linear association between ranks assigned to individual items according to their attributes. Attributes are those variables which cannot be numerically measured such as intelligence of people, Satisfaction, physical appearance, honesty etc [28].

The association between two variables is often of interest in data analysis and methodological research. There are various guidelines for use of correlation coefficients. The guideline is based on the type of the data being analyzed. This guideline indicates that the Pearson correlation coefficient is appropriate for interval data on the other hand the Spearman's and Kendall's correlation coefficients could be used for both ordinal or interval data. The appropriateness of Spearman's statistical test for any type of interval data makes Spearman's correlation coefficient overall more preferable [29]. The idea behind is to check whether Eco-leasing relates to these factors, which influences the customer satisfaction and believes about the present business model and can eco-leasing have some effect on these factors. Spearman's statistical test is performed among the factors Eco-leasing (EL), Impact of Agility (IA), Unorganized secondary Market (USM) and Environmental Factor (EF). Table IV shows the values of correlation coefficient.

**Table IV: Correlation Matrix**

Spearman's Correlation Coefficients

Factors	IA	USM	EF	EL
IA	1.000	.198**	.099	.298**
USM	.198**	1.000	.262**	.394**
EF	.099	.262**	1.000	.501**
EL	.298**	.394**	.501**	1.000

\*\* . Correlation is significant at the 0.01 level (2-tailed).

## V. RESULTS AND DISCUSSION

Linear statistical models such as ANOVA provide more power to test the hypothesis of interaction. The use of ANOVA to directly test interactions and interpreting the result is quite useful. ANOVA models have proved well for linear as well as useful to capture nonlinear relations in the data.[40-32]With the same reference, the data collected was tested through ANOVA in order to draw conclusions toward first objective. The result is supported with the aid of various tables shown above.

Test of Analysis of variance is carried out taking two independent variable separately, first on the basis of Education level and secondly on the basis of age of respondent. With the site of literature review the four factors namely Impact of agility, unorganized secondary market, Environmental Factor and Eco-leasing are tested under the category of Consumer Qualification and Age. The results are discussed individually considering the four Factors

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### A. Impact of Agility

The Analysis of variance is done on the basis of independent variables i.e. Qualification and Age. The table 4 and Table 5 showed that the effect of Impact of agility factor, was statistically insignificant,  $F(2,317) = 1.390$ ,  $p = .251$  among the group taking education while considering Age the effect of Impact of agility factor, was statistically insignificant,  $F(4,315) = 1.091$ ,  $p = .361$  among the group. This confirms the population view about the fact discussed. Various studies previously focused on impact of agility in other perspective.

Established various drivers and their association is tested wide other tools like ISM hierarchy and other techniques [4]. As quite of work already exist but in case of this study the impact of agility is viewed in a different way as the effect has been judged on the consumers already having the product rather than a to be customer, hence the initial level of analysis is performed to build a strong base.

### B. Unorganized secondary market:

A one way analysis of variance showed that the effect of Unorganized secondary Market, was statistically insignificant,  $F(2,317) = .623$ ,  $p = .537$  among the category Education and the effect of Unorganized secondary Market, was statistically insignificant,  $F(4,315) = 2.011$ ,  $p = .093$  among the category of age, both case shows the perception of consumer about the second hand market is same under all group categories and help to draw result that the perception of consumer population is toward validation of secondary car market as unorganized. Various study also signals towards the same direction. Shimpi, S., 2010 uses Chi-Square Tests, to give the result through the analysis by interpreting significant relationship between family income and make of the car, gender and Age [10].

### C. Environmental Factor

Environmental Factor, was statistically insignificant,  $F(2,317) = .725$ ,  $p = .485$  among the category Education and statistically insignificant,  $F(4,315) = .231$ ,  $p = .921$  among the category of age of consumer. The factor is formed as a construct of various variables including effect of government legislative on life span of vehicle, how dealer take part in awareness creation regarding pollution and view of customer about steps taken by government including checking outlets. The results in all category shows effect is prominent

### D. Eco-leasing

This factor is tested to validate the acceptance of new way a business among the customer. A one way analysis of variance showed that the effect of Eco-leasing, is statistically insignificant,  $F(2,317) = .067$ ,  $p = .935$  among under the category of Education and statistically insignificant,  $F(4,315) = 2.371$ ,  $p = .052$  under the category of age of customer.

Further correlation results are presented in a table 6, which enables to establish the relation of various factors with the level of acceptance of Eco-leasing. The acceptance Eco-leasing were significantly correlated with perception about unorganized secondary market,  $r(318) = .394$ ,  $p < .01$ , also the acceptance Eco-leasing were strongly correlated with perception about Environmental Factor,  $r(318) = .501$ ,  $p <$

.01, and the acceptance Eco-leasing were significantly correlated with Impact of agility,  $r(318) = .298$ ,  $p < .01$ . The results are also shown through Fig.3

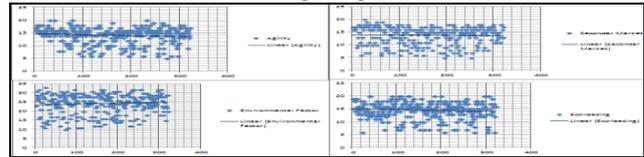


Fig3..Results on scatter plot for all four factors

## VI. CONCLUSIONS

India is one of the largest car markets and the whole world is targeting this market. All big brands want to increase their share in this market, which leads to lot many buying options for customer. This advantage also leads to some other parameters which affect the customer in direct or indirect way. More variety leads to shorter product life, more environmental burden, early interaction with secondary market, dealing with government legislation etc. Considering this as the base of study, all effects are divided into factors and are than studied in reference with literature available. The effects are categorized as Impact of Agility, Unorganized secondary market and Environmental factor. The impact of these factors are judged through the statistical analysis and conclusion can be drawn in favor of fact that, these factors are influencing all categories of respondent in the same amplitude. The results shows impact of agility on customer satisfaction, Perception of customer about unorganized secondary market and view of them on government legislation or the role of government and dealer in controlling emission along with creating awareness taken as environmental factor are as per concept hypothesized. The study is explorative, as not much is said before in the same sense. The factors have effects on consumer satisfaction as well as may leads toward unsustainable business environment. Eco-leasing is taken as the tool to make the effects moderate by suggesting a different business model for Indian car market. To check the level of acceptance about the Eco-leasing, it is also taken as a factor. The study concludes that all the three factors are correlated with Eco-leasing and can modulate with adopting eco-leasing as business model. The study is helpful to form an initial base but it has a limitation of elementary analysis as only little study is available in this context. Further Structural relationship buildup model among factors studied is needed.

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