A STUDY ON THE PREFERENCE OF AUTOMOTIVE SAFETY SYSTEMS IN COIMBATORE REGION

By

ANURADHA A

Roll No.: 0906MBA1836

Reg. No.: 68309200372

A PROJECT REPORT

Submitted to the

FACULTY OF MANAGEMENT SCIENCES

in partial fulfillment for the award of degree

of

MASTER OF BUSINESS ADMINISTRATION

CENTER FOR DISTANCE EDUCATION

ANNA UNIVERSITY CHENNAI

CHENNAI 600 025

August, 2011

BONAFIDE CERTIFICATE

Certified that the Project Report titled "**A STUDY ON THE PREFERENCE OF AUTOMOTIVE SAFETY SYSTEMS, IN COIMBATORE REGION**" is the bonafide work of **Ms. ANURADHA A** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

Signature of Student

Name : ANURADHA A
Roll No. : 0906MBA1836
Reg. No. : 68309200372

Signature of Guide

Name : Dr.R.HEMANALINI
Designation: Assistant Professor in Management
Address : KCT Business School,
Kumaraguru College of Technolog
Coimbatore – 641049.

Signature of Project-in-charge

Name : Dr.V.R.NEDUNCHEZHIAN
Designation : Professor, KCT Business School,
Kumaraguru College of Technology,
Coimbatore – 641049.

Certificate of Viva-Voce-Examination

This is to certify that **Ms. ANURADHA A** (Roll No. **0906MBA1836**; Register No. **68309200372**) has been subjected to Viva-Voce-Examination on 10-Sep-2011 (Date) at 11.00 A.M. (Time)at the Study Centre Kumaraguru College of Technology, Coimbatore-49.

KUMARAGURU COLLEGE OF TECHNOLOGY KCT STUDY CENTRE COIMBATORE

Internal Examiner
Name : Mr. A. SENTHIL KUMAR.
Designation : Assistant Professor (Senior Grade)
Address : KCT Business School,
Kumaraguru College of Technology,
Coimbatore - 49.

External Examiner
Name : Mr. A. SENTHIL KUMAR.
Designation : Assistant Professor (Sen gr
Address : Department of Manage Stud
Anna University,
Chennai - 600 025.

Coordinator
Study Centre
Name : **Dr.VIJILA KENNEDY**
Designation : Professor & Director,
Address : KCT Business School,
Kumaraguru College of Technology,
Coimbatore – 49.

Date: 10-Sep-2011

ABSTRACT

The objective of the current study "Customer perception about automotive safety system in Coimbatore region" is to determine the customers and people who are interested in automobiles safety system and are willing to buy cars with safety features. India has a nasty distinction of having highest (in number) road accidents leading to over 1, 30,000 deaths a year. Safety is now a priority with most new-car buyers, but it still doesn't command everyone's full attention neither the auto industry nor the government.

The study reveals that most of the customers prefer safety from the start and it also clearly indicates the awareness among customers on the automotive safety system. The study helped to analyze the essential steps needed to prevent from road accident.

The findings from this study are important for government and manufacturers to assist in setting priorities with regard to the promotion and publicity of vehicle safety features for consumers in order to increase their knowledge regarding vehicle safety and to encourage them to place highest priority on safety in the new vehicle purchase. Airbags, Anti lock Braking System and seatbelt are the three safety features where the customers want to make as mandatory in all cars.

ACKNOWLEDGEMENT

I express my sincere gratitude to our beloved Director, Centre for Distance Education, Anna University-Chennai, **Dr. VIJILA KENNEDY**, Director, KCT Business School, Cbe & Coordinator, KCT Study Centre and **Prof.K.R.AYYASAMY** Professor in Management, Kumaraguru College of Technology, Coimbatore -49 .

Great honor and indebt gratitude to the Counselor **Mr.A.SENTHIL KUMAR,** Asst Professor(Sr.Grade), KCT Business School, Cbe &Counselor - MBA programme, KCT Study Centre, Coimbatore-49 and my inspiring guide **Dr.R.HEMANALINI,** Assistant Professor in Management, KCT Business School, Coimbatore-49 who have taken great interest in helping me on and often in the successful pursuit of my project. I am very much fortunate to get such a good guide, who encouraged me constantly with good counsel and helped me to complete the project successfully on time. I extend my heartfelt thanks and obeisance to all the faculty member of distance education and all non teaching staffs of KCT Business School for their care and help provided for me for the two years of my degree program.

I am very grateful to my parents Mr. **ATHMANATHAN**, Mrs. **SUSILA** ,my brother Mr. **JOSEPH SAHAYA RAJ** ,my Sister-in-law Mrs. **CHRISTY,** my sister Ms. **RAMYA** and also my friends, for their advice and encouragement that was the source of inspiration and strength for completion of my project work.

ANURADHA.A.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ABREV.	EXPANSION
ABS	ANTI LOCK BRAKING SYSTEM
ISA	INTELLIGENT SPEED ASSIST
TPMS	TIRE PRESSURE MONITORING SYSTEMS
NHTSA	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

CHAPTER-1
INTRODUCTION

1.1 AUTOMOTIVE SAFETY

Automobile safety is the study and practice of vehicle design, construction, and equipment to minimize the occurrence and consequences of automobile accidents. Improvements in roadway and automobile designs have steadily reduced injury and death rates in all first world countries.

Global passenger vehicle sales exceed 60 million units per year while continuing to experience strong growth, especially in emerging markets around the world. With the increasing number of vehicles on the road, safety has become a focal point of consumers, governments, and society.

Car accident is one of the major causes of death in many countries. Many researchers have attempted to design and develop techniques to increase car safety in the past recent years. In spite of all the efforts, it is still challenging to design a system adaptive to the driver rather than the automotive characteristics. Researchers working on the subject of **Automobile safety** to study and practice of safety in vehicle design, construction, and autogenetic equipment to minimize the occurrence and consequences of automobile accidents.

Automotive safety systems are two types, "Active Safety" and "Passive Safety". Active safety refers to technology assisting in the prevention of a crash and passive safety refers to components of the vehicle (primarily airbags, seatbelts and the physical structure of the vehicle) that help to protect occupants during a crash.

Automotive safety system classified in the automotive sector the term Active Safety (or **Primary Safety**) refers to safety systems that are active *prior* an accident. This has traditionally referred to non-complex systems such as good visibility from the vehicle. Now days however, this area contains highly advanced systems such as anti-lock

automatic braking. This compares with Passive Safety (or **Secondary Safety**), which are active *during* an accident. To this category belong e.g. seat belts, deformation zones and air-bags. In engineering, **active safety** systems are systems activated in response to a safety problem or abnormal event. Such systems may be activated by a human operator, automatically by a computer driven system, or even mechanically. In nuclear engineering, active safety contrasts to passive safety in that it relies on operator or computer automated intervention, whereas passive safety systems rely on the laws of nature to make the reactor respond to dangerous events in a favorable manner.

Active Safety Systems of Vehicles

- The vehicle's mirrors, headlamps, reflectors, and other lights and signals
- The vehicle's brakes, steering, and suspension systems
- Automatic Braking systems to prevent or reduce the severity of collision.
- Infrared night vision systems to increase seeing distance beyond headlamp range
- Adaptive high beam which automatically and continuously adapts the headlamp range to the distance of vehicles ahead or which are oncoming
- Adaptive headlamps swivels headlamps around corners
- Reverse backup sensors, which alert drivers to difficult-to-see objects in their path when reversing
- Backup camera of vehicles
- Adaptive cruise control which maintains a safe distance from the vehicle in front
- Lane departure warning systems to alert the driver of an unintended departure from the intended lane of travel
- Tire pressure monitoring systems or Deflation Detection Systems
- Traction control systems which restore traction if driven wheels begin to spin
- Electronic Stability Control, which intervenes to avert an impending loss of control

- Electronic brake force distribution systems
- Emergency brake assist systems
- Cornering Brake Control systems
- Pre crash system of vehicles
- Automated parking system

Passive Safety Systems of Vehicles

- Seatbelts limit the forward motion of an occupant, stretch to slow down the occupant's deceleration in a crash, and prevent occupants being ejected from the vehicle.
- Airbags inflate to cushion the impact of a vehicle occupant with various parts of the vehicle's interior.
- Laminated windshields remain in one piece when impacted, preventing penetration of unbelted occupants' heads and maintaining a minimal but adequate transparency for control of the car immediately following a collision. Tempered glass side and rear windows break into granules with minimally sharp edges, rather than splintering into jagged fragments as ordinary glass does.
- Crumple zones absorb and dissipate the force of a collision, displacing and diverting it away from the passenger compartment and reducing the impact force on the vehicle occupants. Vehicles will include a front, rear and maybe side crumple zones too.
- Side impact protection beams.
- Collapsible universally jointed steering columns, (with the steering system mounted behind the front axle – not in the front crumple zone), reduce the risk and severity of driver impalement on the column in a frontal crash.
- Pedestrian protection systems.
- Padding of the instrument panel and other interior parts of the vehicle likely to be struck by the occupants during a crash.

1.2 RESEARCH BACKGROUND

In the past decades, there has been a significant increase in the amount of consumer interest in the safety performance of vehicles. Undoubtedly, deaths and injuries on roads are manmade disasters. Automotive Safety has not been given importance in our country. Crashes are predictable and preventable and can be controlled effectively, if automotive safety systems are given importance by people, professionals, vehicle manufacturers and government. This project also helps in understanding the preference of automotive safety system by car users.

1.3 PROBLEM IDENTIFIED

- Indian car drivers, Owners and Manufacturers are not giving much Importance to Safety System in car.

- In India, all the major players in the volume market do not offer airbags on the Base and Middle variants.

- The increase in Number of deaths in road accident every year.

- There are no strict guidelines set by the Indian Transport Authorities on standardized safety equipment in cars.

- Airbags had a huge positive influence on vehicle safety but the awareness of airbags among Indians is very poor.

1.4 NEED FOR THE STUDY

About 8 million cars are made in India every year and the market is growing like never before, the increased buying of cars has led to increased road traffic and road accidents too. India has a nasty distinction of having highest (in number) road accidents leading to over 130,000 deaths a year. While there are several factors for the road accidents, it is good to have a car that has security features loaded.

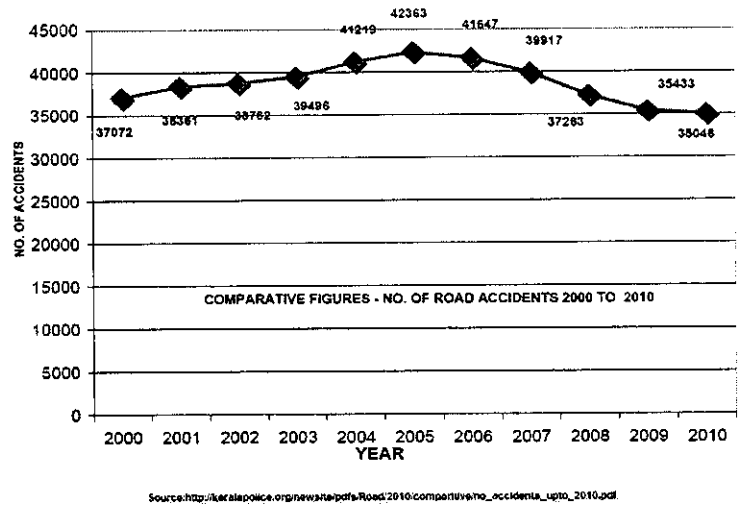


Figure 1.1.0: Number of road accidents from 2000 to 2010.

Statistics on causes of death show that more than 25% of deaths occurring in a year are due to vehicle crash or vehicle rollover. India has a nasty distinction of having highest (in number) road accidents leading to over 1, 30,000 deaths a year.

An effective safety system in vehicles could reduce the deaths due to accidents. But in Indian vehicle drivers and owners are not giving much importance to the Safety Systems. The Study about the preference of safety system in India will increase awareness about safety and encourage users to espouse safety in travel.

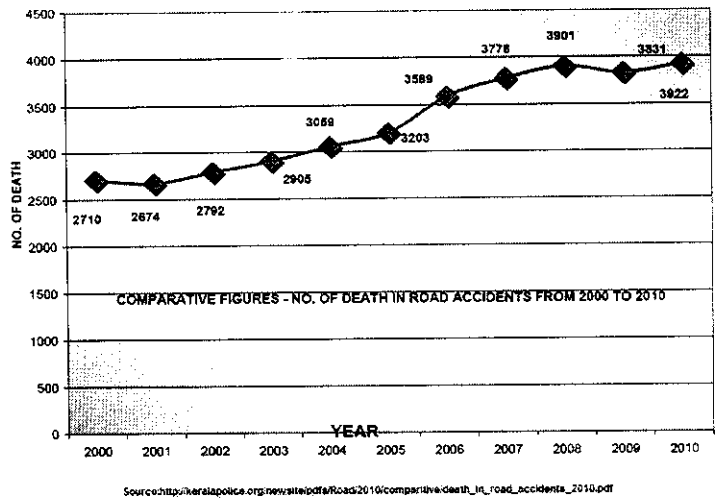


Figure 1.1.1: Number of death in road accidents from 2000 to 2010.

Thus it is felt that a study of this kind is warranted in order to understand the present scenario with respect to the automobile safety system.

1.5 OBJECTIVES OF THE STUDY

PRIMARY OBJECTIVE

- ✓ The main objective of this study is to find out the Customer Perception about Automotive safety systems.

SECONDARY OBJECTIVE

- ✓ To find out the factor influencing the people at the time of purchasing Automobiles.
- ✓ To establish the need for safety system in Indian Vehicles.
- ✓ To understand the value of Safety system in Human Life.

1.6 SCOPE OF THE STUDY

- ✓ The problems facing the automobile users and steps are taken by the users to overcome from this situations are to be realized.
- ✓ It is now necessary to get information from customers' side and as there is an increase in demand for safety system technologies.
- ✓ This study is conducted to get a clear view about the perception of automotive safety system in Coimbatore region.
- ✓ The region of Study is restricted to Coimbatore.
- ✓ The Segment of Automotive Safety System under Study is restricted to "car"
- ✓ The Area of research consists of
  - ➢ Owners, drivers and prospective owners and drivers of cars.
  - ➢ People who are aware\unaware of Automotive Safety system.

1.7 DELIVERABLES

The deliverables of this study are,

- ✓ Customers' preferences for the automotive safety system.
- ✓ Customers' awareness about safety measures for preventing accidents..
- ✓ The relation between the gender and pro activeness towards safety.
- ✓ Factors that preclude consumers from opting safety systems. Safety regulations, safety systems that can prevent accidents.

CHAPTER-2
LITERATURE SURVEY

2.1 REVIEW OF LITERATURE

American Consumers Placing More Importance in Auto Safety Systems, According to TRW Automotive Survey:

American consumers are finding safety systems such as smart airbags, vehicle stability control and anti-rollover systems to be more important than they were five years ago, according to a consumer research study conducted nationwide last week for TRW Automotive Inc., a global leader in automotive safety systems.

Preliminary results of the study, conducted the week of July 28, 2003 by the Dohring Company, North America's largest provider of custom market research to the retail automotive community, include:

- ✓ 74 percent of respondents said vehicle safety features and options are more important to them than they were five years ago.

- ✓ 80 percent of respondents said the automakers are doing a good job developing and making available vehicle safety features today.

- ✓ Almost 47 percent of respondents said they were only somewhat or not at all satisfied with the way the dealer sales representatives educate the consumer on the proper use of vehicle safety systems.

Early analysis of the findings of the TRW Automotive consumer study also indicated that

- ✓ Almost 73 percent of respondents said they felt only somewhat informed or not at all informed about how vehicle stability control systems work, yet more than 58 percent said that the availability of stability control systems would be important or very important for their next vehicle purchase.

- ✓ More than 76 percent of respondents said the availability of an active seat belt retractor -- such as that used in the Mercedes Benz Pre Safe system would be important or very important in their next vehicle purchase decision, while 84 percent see advanced occupant sensing/smart air bag systems as important or very important.

- ✓ 76 percent see future enhanced vehicle control systems that integrate electronics, braking, steering and suspension as important or very important, while almost 63 percent see anti-rollover/active roll stability systems as important or very important in their next vehicle purchase consideration.

- ✓ Almost 57 percent thought future driver assist or lane guard systems that help prevent inadvertent lane departure would be important or very important in their next vehicle purchase decision.

- ✓ Side impact/rollover canopy airbag technology was selected by more respondents than any other system as the safety option consumers would be willing to pay extra for, with 42 percent of respondents.

"Today's consumers want safety technology and indications are when they understand what benefits the technology can bring, they are willing to pay for it,"

Future Testing of Active Safety Systems by Falke Hendriks, Riné Pelders and Martijn Tideman, Active safety systems are increasingly becoming available in trucks and passenger vehicles. Developments in the field of active safety are shifting from increasing driver comfort towards increasing occupant safety. Furthermore, this shift is seen within active safety systems: safety functions are added to existing comfort systems,

Automotive Active Safety Systems by Sun, Zongxuan; Chen, Shih-Ken, Global passenger vehicle sales exceed 60 million units per year while continuing to experience strong growth, especially in emerging markets around the world. With the increasing number of vehicles on the road, safety has become a focal point of consumers, governments, and society. This special issue is focused on reviewing the history and background of automotive safety systems by presenting recent developments.

Moneycontrol, Aug 14,2007, Airbags may soon be mandatory in all cars from 2010. With the Euro 4 emission norms also coming in to play costs could go up by as much as Rs 30-40,000 reports CNBC-TV18.

Pawan Goenka, President - Automotive Biz, M&M said, "It will have an impact on affordability. The new regulation and new emission norms will jack up price and make it difficult for the middle class who depend on their monthly salary to buy a vehicle."

Indian Auto companies like M&M, and Maruti are making the transition to airbags as they gear up to enter international markets to comply with safety regulations. But manufacturers are worried about higher costs

Vehicle safety-at what price?

Ferguson and Williams (1996) concluded many consumers equate safety with particular features such as airbags and anti-lock brakes. While safety is not an overriding factor in the purchase decision for many consumers, it appears to be central to the process of narrowing down vehicle choice for many consumers. Furthermore, the majority of consumers do not actively seek out safety information such as government and industry crash test results. Hutz and Becker (1999) report findings consistent with Ferguson and Williams (1996). They reported that vehicle safety together with the price-performance relationship, fuel economy and costs, is an important criterion in determining the purchase decision.

As well as understanding the role and importance of vehicle safety in the

willing to pay for vehicles safety features in order to reduce their risk in the event of a crash.

Electronic stability control applies active control to the brake or steering to maintain vehicle lateral stability. For example, under a split-mu road surface, an equal amount of brake forces applied to the left and right wheels can steer the vehicle toward the side with greater friction. Braking pressure can be reduced or modulated to create differential braking torque and compensate for split-mu road surfaces.

Active steering control can also be used to maintain vehicle stability by changing the lateral forces generated at the front or rear axles. Implementing these technologies requires road and vehicle state information, such as the road-friction coefficient, vehicle yaw rate, lateral velocity, and slip angle.

2.2 RESEARCH GAP

The studies conducted by others in this domain concentrated on gauging American and European consumers expectations from safety systems. These studies also focused on people's willingness to pay for the safety features. The role and influence of vehicle safety in the purchase decision of cars have been analyzed by these studies.

But this study analyzes customers' preferences in automotive safety system, especially in cars, not limited to active or passive safety system, but to all major safety features in a car. This study also analyses the influence of presence/ absence of safety features in cars in buying decisions. The study also intends to explore if gender and concern for safety features are related.

CHAPTER-3
RESEARCH METHODOLOGY

3.1 TYPE OF PROJECT

This study involves collection of data directly from the target respondents, and the data collected is used for further analysis. The type of the research carried out is descriptive research.

3.2 TARGET RESPONDENTS:

This study analyses what safety features customers preferred in cars they own or would like to own. So the population is characterized by people, who own car\ are interested in car and people who knows\are planning to learn interested in driving. The region of study is Coimbatore. So the target respondents are,

- People who owns cars in Coimbatore.
- People who are interested in cars and would like to own cars in Coimbatore.

3.3 ASSUMPTION, CONSTRAINTS AND LIMITATIONS:

3.3.1 Assumptions

- The respondents have given accurate and correct information without any bias, during the survey.

3.3.2 Constraints

- The research about the topic is up to the knowledge of the researcher.
- The time period for this study is 3 months.

3.3.3 Limitations

- The quality of the primary data collected depends on the targeted respondent's reliability in providing the data.

3.4 SAMPLING METHOD:

The sampling technique used for the study is Stratified random sampling.
The area under study is split into various geographical locations.

In every geographical location, a systematic sampling is being done to collect the data.

Confidence Limit: 95%
Confidence Interval: 5

$$Sample\ Size = Z^2 \frac{(p)(1-p)}{C^2}$$

Where,
Z is 1.96, at 95% confidence level
p is percentage picking a choice, expressed as decimal
C is confidence interval expressed as decimal

Sample size:

Sample size is about how many people surveyed. As the population is an infinite, the sample size selected for this study is 150, and the researchers believed 150 is a sufficient to judge the perception of customers.

3.5 DATA PROCESSING

3.5.1 Method of data collection

The method of data collection involved in this study is through primary data collection technique.

3.5.2 Tool for data collection

The tool used for data collection is Questionnaire. Prior to use the questionnaire for data collection, it is validated through a pilot study.

The questionnaire is a structured technique for collecting primary data in survey. It is a series of written questions for which the respondent provides answers.

3.6 TOOLS FOR ANALYSIS:

Following tools are used for analysis

- ✓ Percentage analysis
- ✓ Weighted Rank Analysis
- ✓ Chi Square test

3.1.9 PERCENTAGE ANALYSIS

Percentage analysis refers to a special tool in analysis for making comparison between two or more data and to describe the relative terms, the distribution of two or more series of data.

$$Percentage\ analysis = \frac{Number\ of\ respondents}{Total\ respondents}\ x\ 100$$

3.1.10 WEIGHTED RANK ANALYSIS

Weighted average score analysis is important in any study to know the impact of each variable (question) for easy comparison and prioritize the vital variables involved in the study.

The weighted average is computed as

$$\text{Weighted rank score} = \sum x_i w_i / \sum x_i$$

Where

wi denotes weights and

xi denotes the frequency of each category.

3.1.11 CHI SQUARE TEST:

Chi-square enables as to explain whether or not two arrributes are associated. In order that we may apply the chi-square test either as a test to judge the significance of association between attributes, it is necessary that the observed as well as theoretical or expected frequencies must be grouped in same way and theoretical distribution must be adjusted to give the same total frequency as we find in the case of observed distribution.

For a contingency table that has rows and columns, the chi square test can be thought of as a test of independence. In a test of independence the null and alternative hypotheses are:

Hypothesis Ho: The two categorical variables are independent or not associated.

Alternative Hypothesis Ha: The two categorical variables are related.

Karl Pearson developed a test for testing the significance of discrepancy between the experimental values obtained under some theory or hypothesis.This test is know as **chi-square** test of goodness of fit. Karl Pearson proved that the statistics

$$X^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i}$$

Where

Oi - Observed Frequency

Ei - Expected Frequency E = R*C/N (R -> Row Total and C -> Column Total)

N - Grand Total

n - number of cells in the table.

Chi-square is used to test whether the difference between observed and expected frequencies are frequent . To find chi-square table value, degree of freedom should should be calculated. Degree of freedom is calculated using the formula.

Degree of freedom = (r-1) (c-1)

Where,

r = numbers of rows

c = numbers of columns

The table value of this degree of freedom is seen using 5% or 1% of significance. If chi-square table value is greater than the chi-square calculated value, null hypothesis is accepted or null hypothesis is rejected.

Based on this null hypothesis is accepted when Oi < Ei

And Alternate hypothesis is accepted when Oi > Ei

CHAPTER-4

DATA ANALYSIS AND INTERPRETATION

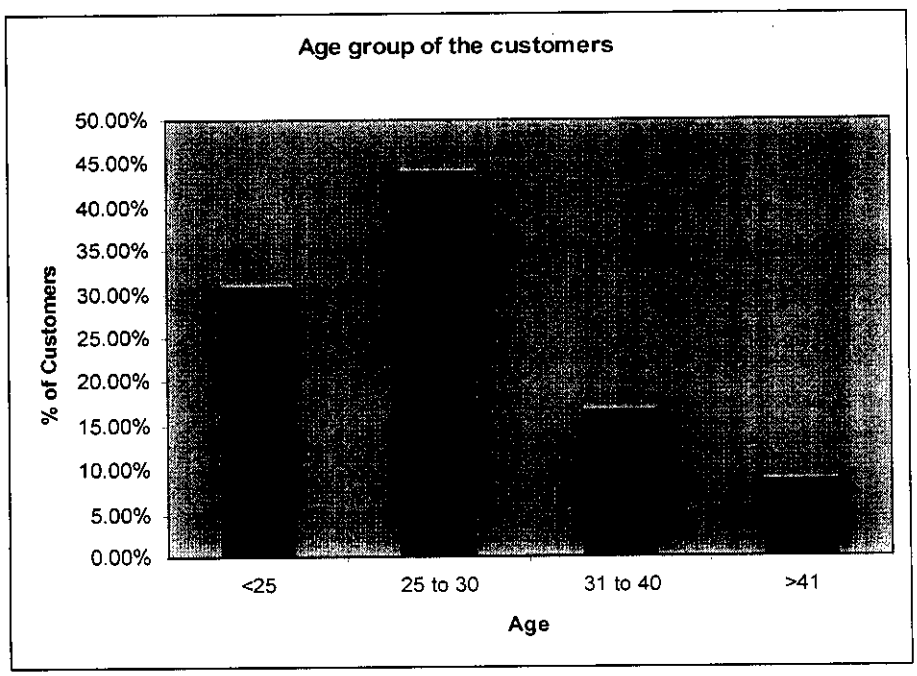
4.1 PERCENTAGE ANALYSIS ON PERSONAL INFORMATION

4.1.1 Age group of the customers

Table 4.1.1 – Age group of the customers

S.No	Age Group	No of customers	% of customers
1	<25	46	30.67%
2	25 to 30	66	44%
3	31 to 40	25	16.67%
4	>41	13	8.66%
Total		150	100

Figure 4.1.1 - Age group of customers



Inference:

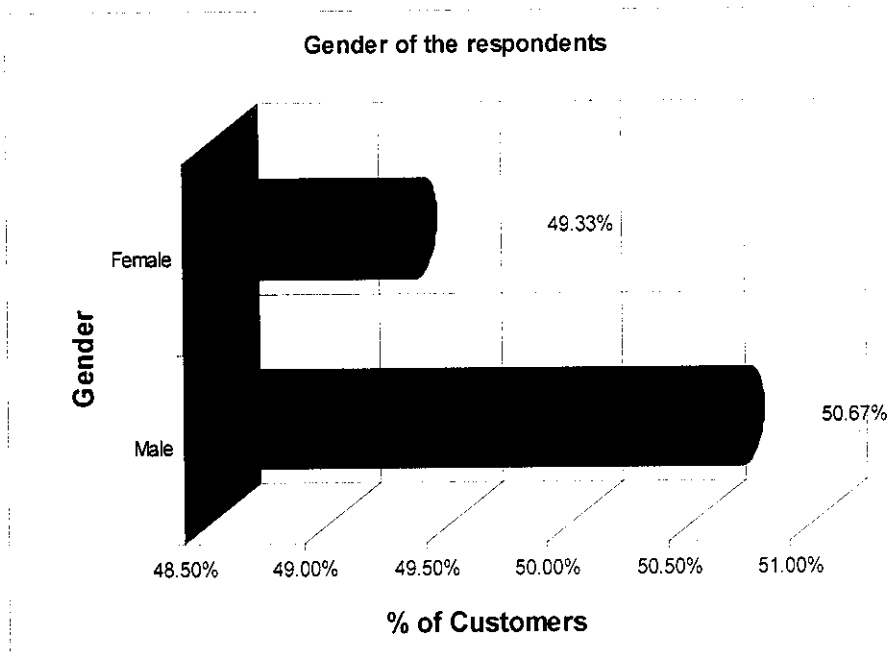
It can be inferred from the above table that the 30.67% of customers are in the age group of 25 to 30.

4.1.2 Gender of the respondents

Table 4.1.2 – Gender of the respondents

S.No	Gender	No of respondents	% of respondents
1	Male	76	50.67%
2	Female	74	49.33%
Total		150	100

Figure 4.1.2 - Gender of the respondents



Inference:

Almost both the genders are responded equally.

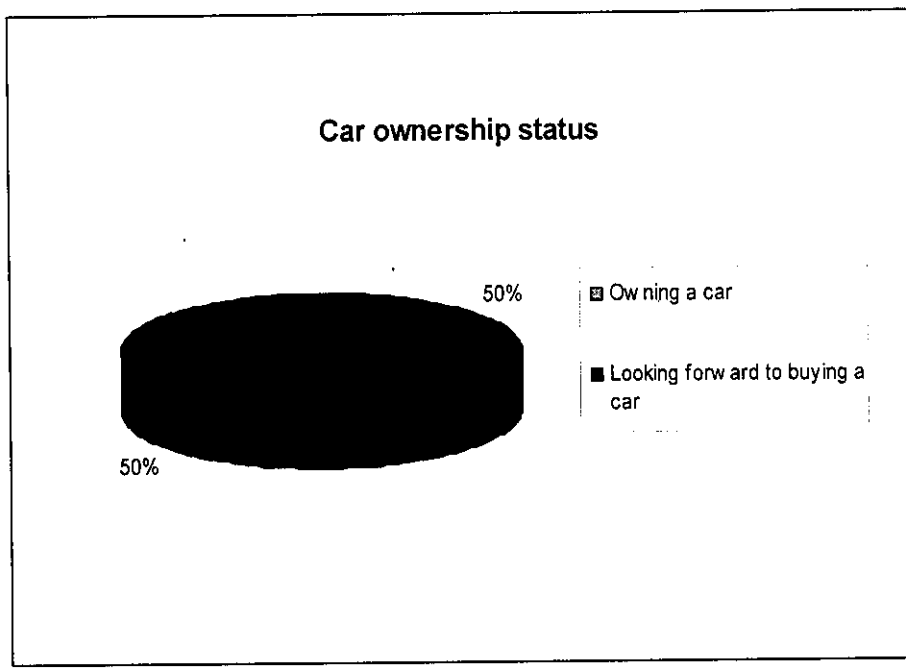
4.2 PERCENTAGE AND WEIGHTED RANK ANALYSIS

4.2.1 Car ownership status

Table 4.2.1 – Car ownership status

S.No.	Status	No. of customers	% of customers
1	Owning a car	75	50%
2	Looking forward to buying a car	75	50%
	Total	150	100

Figure 4.2.1 – Car ownership status



Inference:

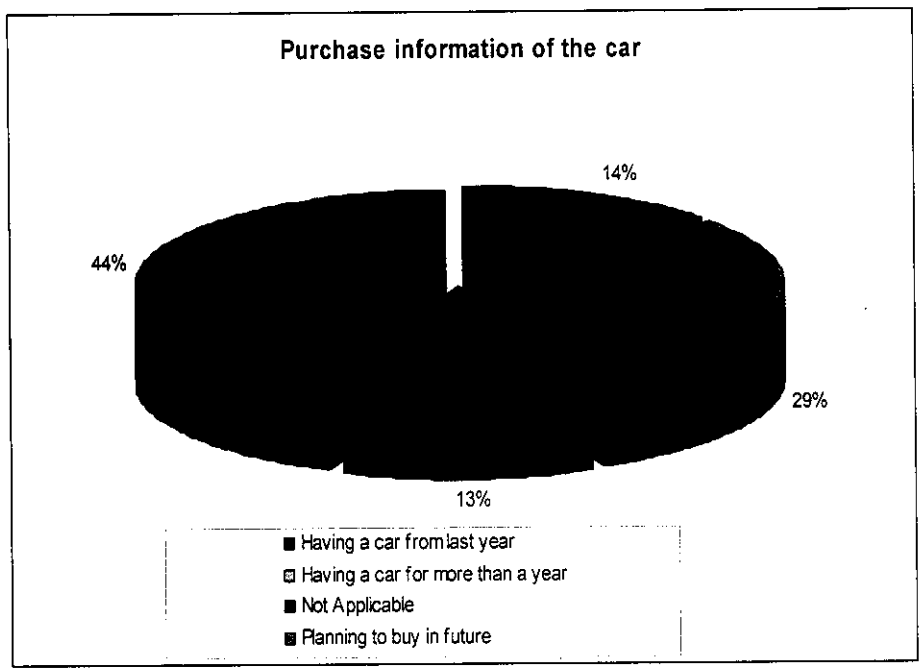
The respondents who own cars and the respondents who are interested in buying a car in future are equal.

4.2.2 Purchase information of the car

Table 4.2.2 –Purchase information of the car

S.No.	Purchase information	No. of customers	% of customers
1	Having a car from last year	21	14%
2	Having a car for more than a year	44	29%
3	Not Applicable	19	13%
4	Planning to buy in future	66	44%
	Total	150	100

Figure 4.2.2 - Purchase information of the car



Inference:

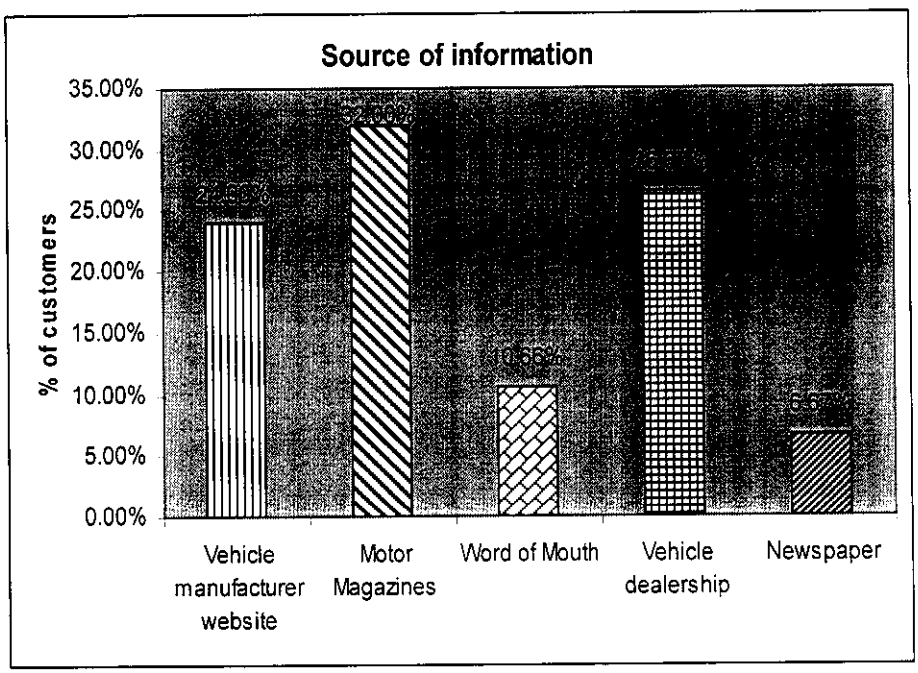
It is inferred that 44% of the respondents are interested in buying a car in future.

4.2.3 Source of information that influenced buying decision of the car

Table 4.2.3 – Source of information that influenced buying decision of the car

S.No.	Source of information	No. of customers	% of customers
1	Vehicle manufacturer website	36	24.00%
2	Motor Magazines	48	32.00%
3	Word of Mouth	16	10.66%
4	Vehicle dealership	40	26.67%
5	Newspaper	10	6.67%
	Total	150	100

Figure 4.2.3 - Source of information that influenced buying decision of the car



Inference:

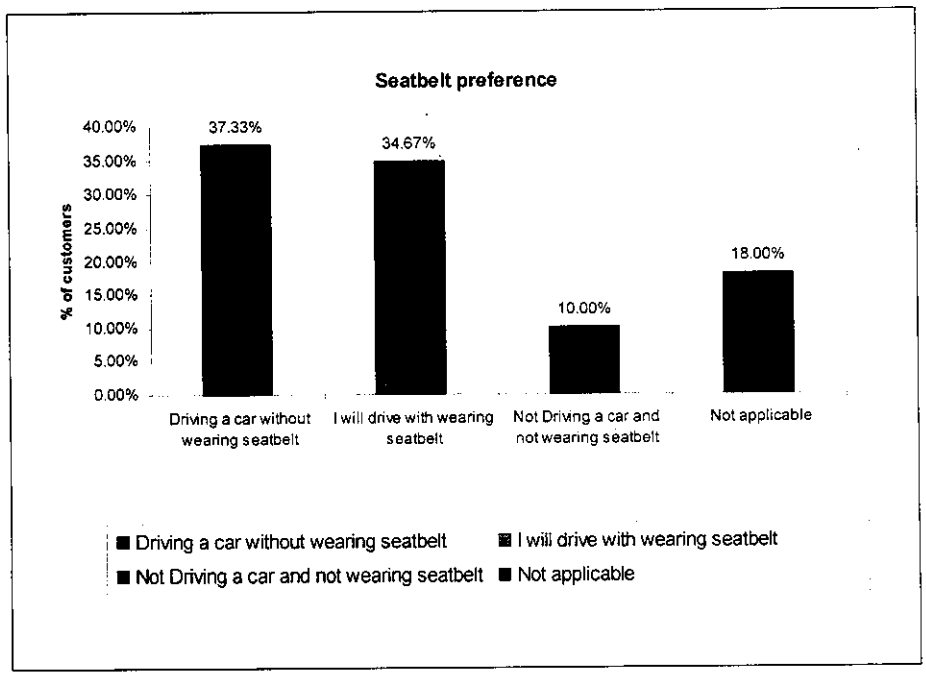
It is inferred that 32% of the respondents refer Motor magazines as source of information when they speculate to buy a car.

4.2.4 Seatbelt preference

Table 4.2.4 – Seatbelt preference

S.No.	Seatbelt preference	No. of customers	% of customers
1	Driving a car without wearing seatbelt	56	37.33%
2	I will drive with wearing seatbelt	52	34.67%
3	Not Driving a car and not wearing seatbelt	15	10.00%
4	Not applicable	27	18.00%
	Total	150	100.00%

Figure 4.2.4 - Seatbelt preference



Inference:

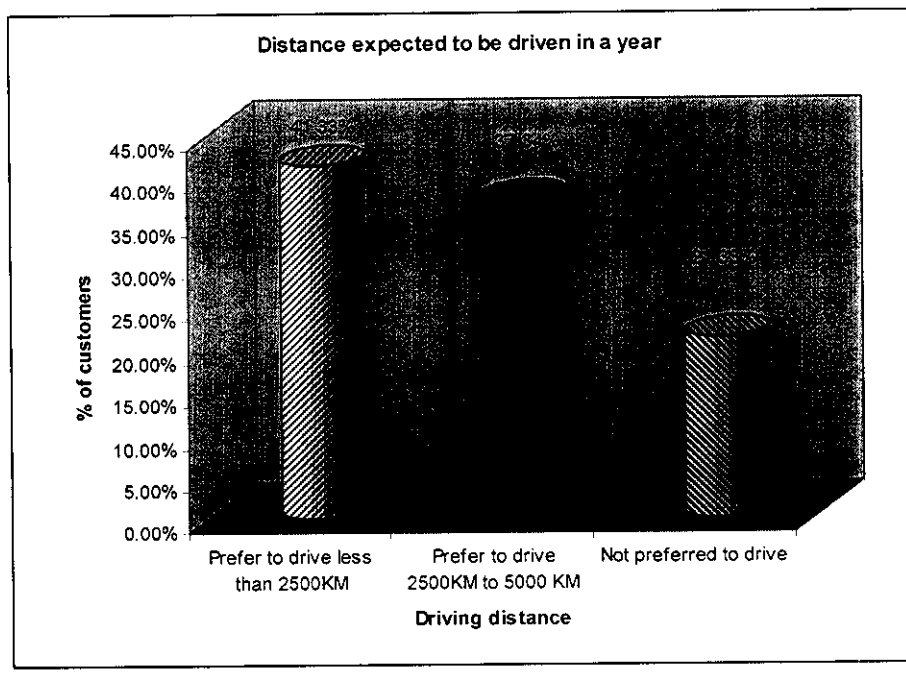
It is inferred that 37.33% of the respondents who drive cars do not wear seatelt.Only 34.67% of respondents prefer driving a car wearing seatbelt.

4.2.5 Distance expected to be driven in a year

Table 4.2.5 – Distance expected to be driven in a year

S.No.	Driving Distance	No. of customers	% of customers
1	Prefer to drive less than 2500KM	62	41.33%
2	Prefer to drive 2500KM to 5000 KM	56	37.34%
3	Not preferred to drive	32	21.33%
	Total	150	100.00%

Figure 4.2.5 - Distance expected to be driven in a year



Inference:

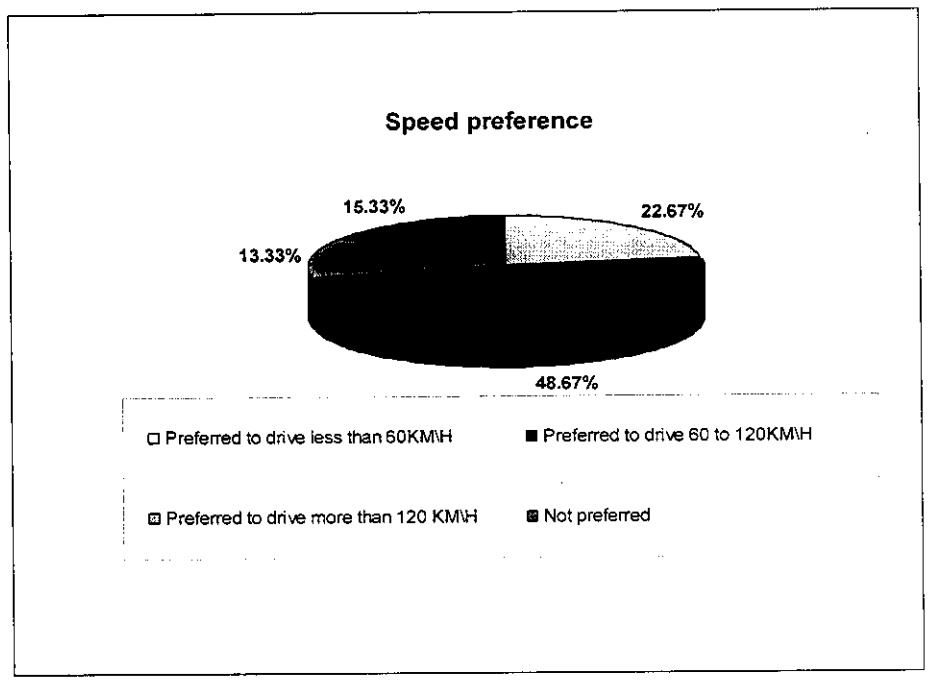
It is inferred that 41.33% of the respondents drive or expect to drive less than 2500KM per year.

4.2.6 Speed preference

Table 4.2.6 – Speed preference

S.No.	Top Speed	No. of customers	% of customers
1	Preferred to drive less than 60KM\H	34	22.67%
2	Preferred to drive 60 to 120KM\H	73	48.67%
3	Preferred to drive more than 120 KM\H	20	13.33%
4	Not preferred	23	15.33%
	Total	150	100%

Figure 4.2.6 - Speed preference



Inference:

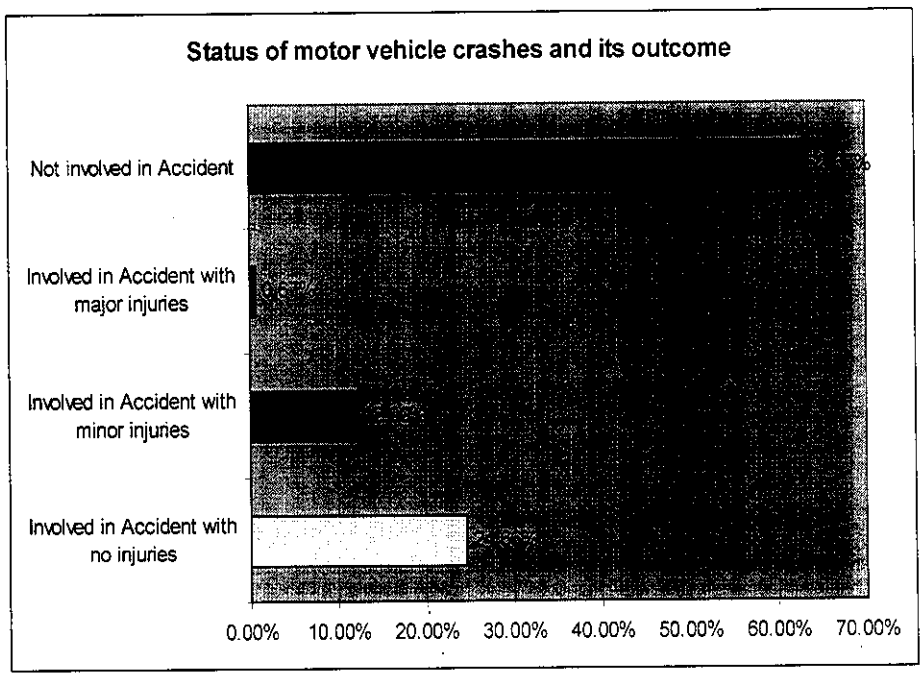
It is inferred that 48.67% of the respondents prefer to drvie at 60KM to 120KM per hour.

4.2.7 Accident encounters and consequences

Table 4.2.7 – Accident encounters and consequences

S.No.	Accident encounters and consequences	No. of customers	% of customers
1	Involved in Accident with no injuries	37	24.66%
2	Involved in Accident with minor injuries	18	12.00%
3	Involved in Accident with major injuries	1	0.67%
4	Not involved in Accident	94	62.67%
	Total	150	100

Figure 4.2.7 - Accident encounters and consequences



Inference:

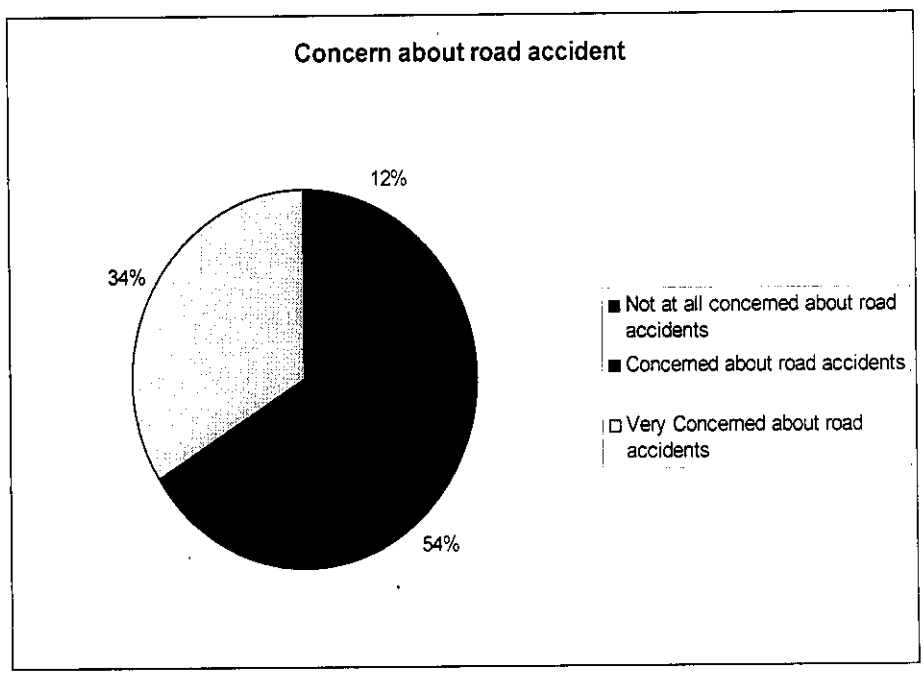
It is inferred that 62.67% of the respondents have not met with any accidents in the past 3 years.It can be observed that 12% of people who suffered minor injuries in

4.2.8 Concern about meeting with an accident

Table 4.2.8 – Concern about meeting with an accident

S.No.	Road accident concerns	No. of customers	% of customers
1	Not at all concerned about road accidents	18	12%
2	Concerned about road accidents	81	54%
3	Very Concerned about road accidents	51	34%
	Total	150	100

Figure 4.2.8 - Concern about meeting with an accident



Inference:

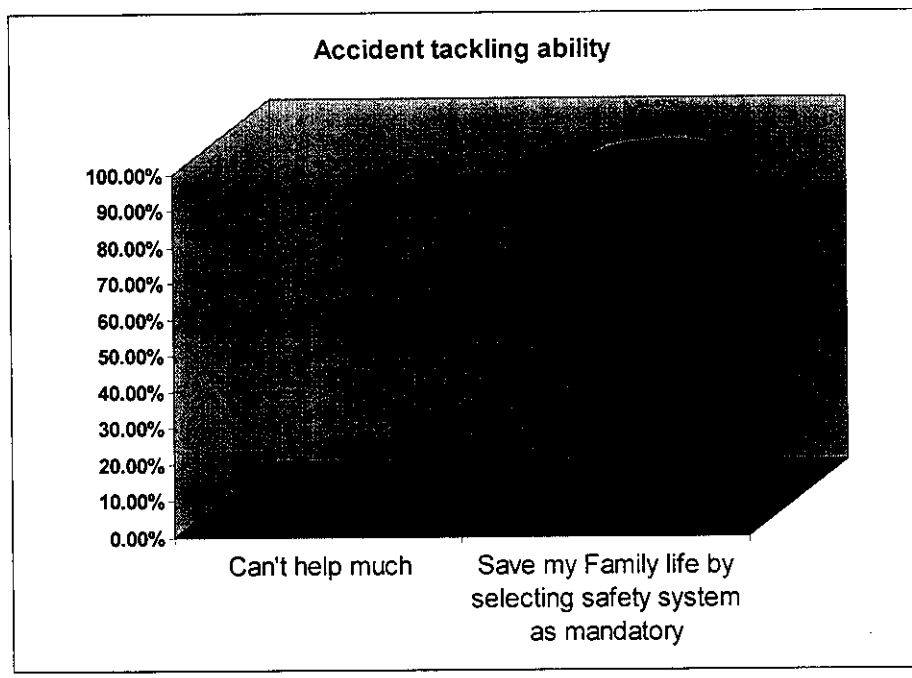
It is inferred that only 34% of the respondents are very concerned about road accidents.

4.2.9 Accident tackling ability

Table 4.2.9 – Accident tackling ability

S.No.	Ability to protect from crash	No. of customers	% of customers
1	Can't help much	8	5.33%
2	Save my Family life by selecting safety system as mandatory	142	94.67%
	Total	150	100

Figure 4.2.9 - Accident tackling ability



Inference:

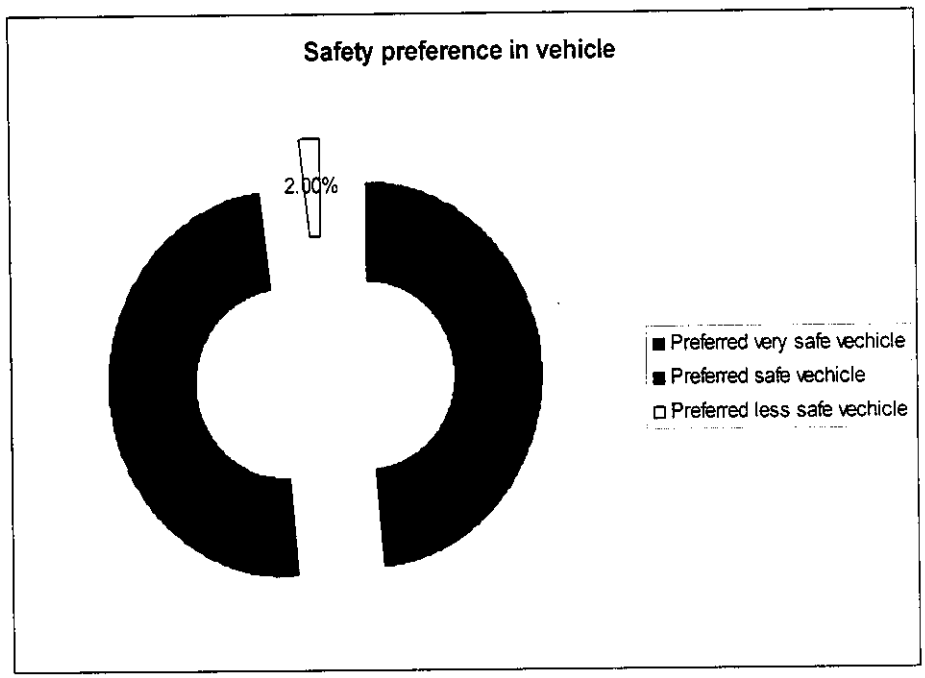
It is inferred that 94.67% of the respondents prefer safety systems to protect themselves from the impact of crash.

4.2.10 Safety preference in vehicle

Table 4.2.10 – Safety preference in vehicle

S.No.	Safety preference	No. of customers	% of customers
1	Preferred very safe vehicle	73	48.67%
2	Preferred safe vehicle	74	49.33%
3	Preferred less safe vehicle	3	2.00%
	Total	150	100

Figure 4.2.10 - Safety preference in vehicle



Inference:

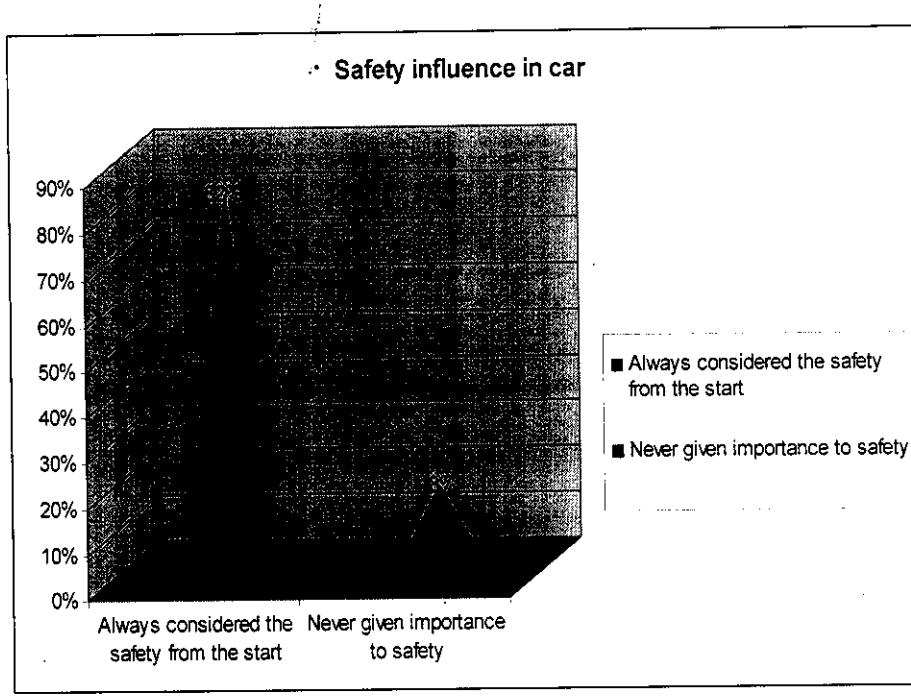
It is evident that most of the respondents prefer a safe vechicle.Only 2% of the respondents prefer a less safe vechicle.

4.2.11 Influence of safety feature options in choice of a car

Table 4.2.11 – Influence of safety feature options in choice of a car

S.No.	Safety influence	No. of customers	% of customers
1	Always considered the safety from the start	123	82%
2	Never given importance to safety	27	18%
	Total	150	100

Figure 4.2.11 - Influence of safety feature options in choice of a car



Inference:

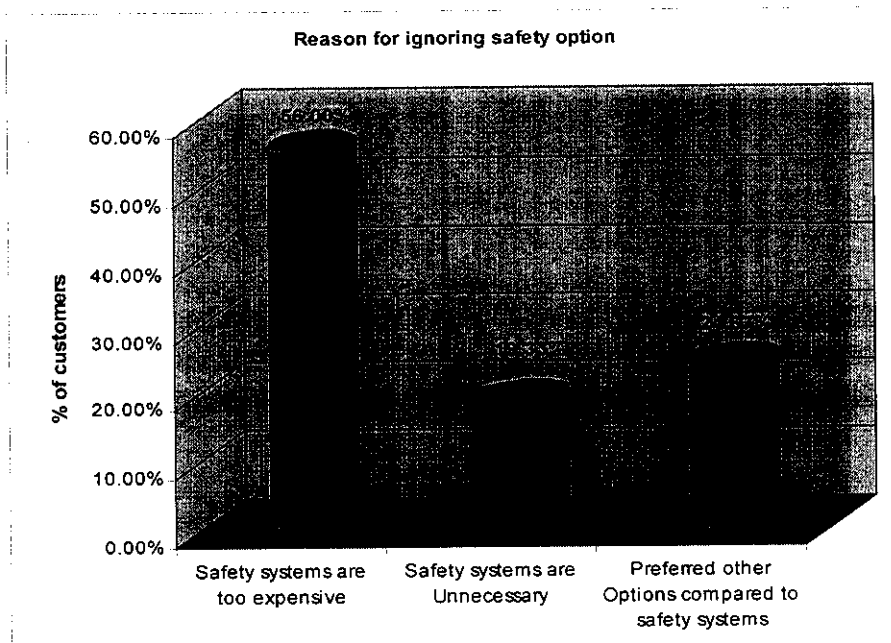
It is inferred that 82% of the respondents have considered safety as an important feature while choosing a car.

4.2.12 Reasons for ignoring safety option

Table 4.2.12 – Reason for ignoring safety option

S.No.	Safety influence	No. of customers	% of customers
1	Safety systems are too expensive	84	56.00%
2	Safety systems are Unnecessary	29	19.33%
3	Preferred other Options compared to safety systems	37	24.67%
	Total	150	100

Figure 4.2.12 - Reason for ignoring safety option



Inference:

It is inferred that 56% of the respondents are not selecting safety option because it s not affordable for them.

4.2.13 Priority of important features in a car preferred by respondents using Weighted rank analysis

Table 4.2.13 – Priority of important features in a car preferred by respondents

S.No.	Features	Rank Score	Rank
1	Comfort	4.72	V
2	Design\Style	4.746667	VI
3	Economy\Value	3.933333	III
4	Fuel Consumption	3.413333	I
5	Performance	3.78	II
6	Safety	4.313333	IV
7	Space	5.44	VII
8	Make\Model	5.613333	VIII

Inference:

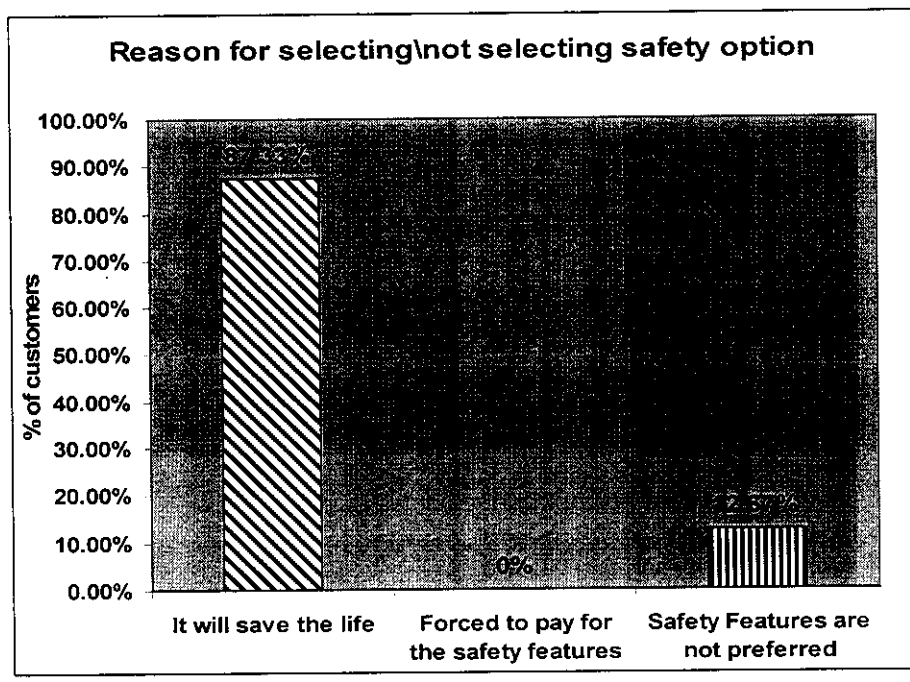
When the customers were asked to rank the features mentioned in the above table,Fuel consumption was the feature that took top priority.The Customers are selcted Performance as the second one and Economy as the third.Safety has been given only the fourth priority.While safety of human life should be given utmost importance, it's ironical that fuel consumption and economy take precedence over safety.The last preference goes to make\model of the car.

4.2.14 Reason for selecting\not selecting safety option

Table 4.2.12 – Reason for selecting\not selecting safety option

S.No.	Safety option selection	No. of customers	% of customers
1	It will save the life	131	87.33%
2	Forced to pay for the safety features	0	0%
3	Safety Features are not preferred	19	12.67%
	Total	150	100

Figure 4.2.12 - Reason for selecting\not selecting safety option



Inference:

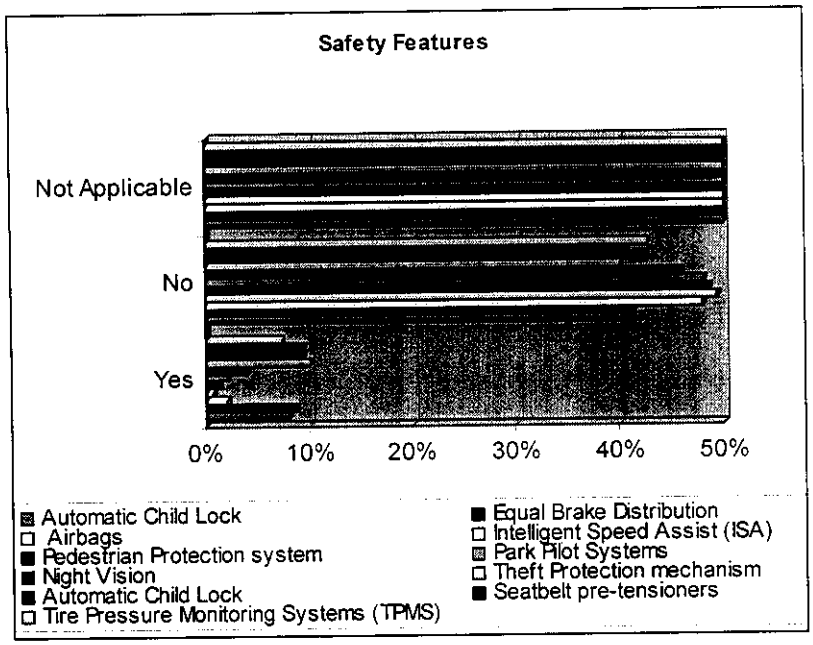
It is inferred that majority are preferring safety option because it will save the most valuable human life.

4.2.15 Types of safety features present in the car

Table 4.2.15 – Types of safety features present in the car

S. No.	Safety features	Yes	No	Not Applicable	Total	% of Yes	% of No	% of Not Applicable	Total
1	Automatic Child Lock	12	63	75	150	8%	42%	50%	100
2	Equal Brake Distribution	13	62	75	150	8.67%	41.33%	50%	100
3	Airbags	3	72	75	150	2%	48%	50%	100
4	ISA	1	74	75	150	0.67%	49.33%	50%	100
5	Pedestrian Protection system	2	73	75	150	1.33%	48.67%	50%	100
6	Park Pilot Systems	3	72	75	150	2%	48%	50%	100
7	Night Vision	6	69	75	150	4%	46%	50%	100
8	Theft Protection mechanism	15	60	75	150	10%	40%	50%	100
9	Automatic Child Lock	14	61	75	150	9.33%	40.67%	50%	100
10	Seatbelt pre-tensioners	54	21	75	150	9.33%	40.67%	50%	100
11	Tire Pressure Monitoring Systems	11	64	75	150	7.33%	42.67%	50%	100

Figure 4.2.15 - Types of safety features present in the car



Inference:

50% of customers own the car and the remaining 50% of the customers are planning to buy the car in future. This question is applicable only for car owners. The majority of the customers who is having car is not chosen safety features.

4.2.16 Ranking of types of airbags

Table 4.2.16 – Ranking of types of airbags

S.No	Safety features	Rank Score	Rank
1	Front Driver Airbags and Front Passenger Airbags	1.853333	I
2	Side Airbags	3.186667	III
3	Curtain Airbags	4.073333	IV
4	Head Airbags	3.126667	II
5	Thorax Airbags	4.28	V
6	Knee Airbags	4.466667	VI

Inference:

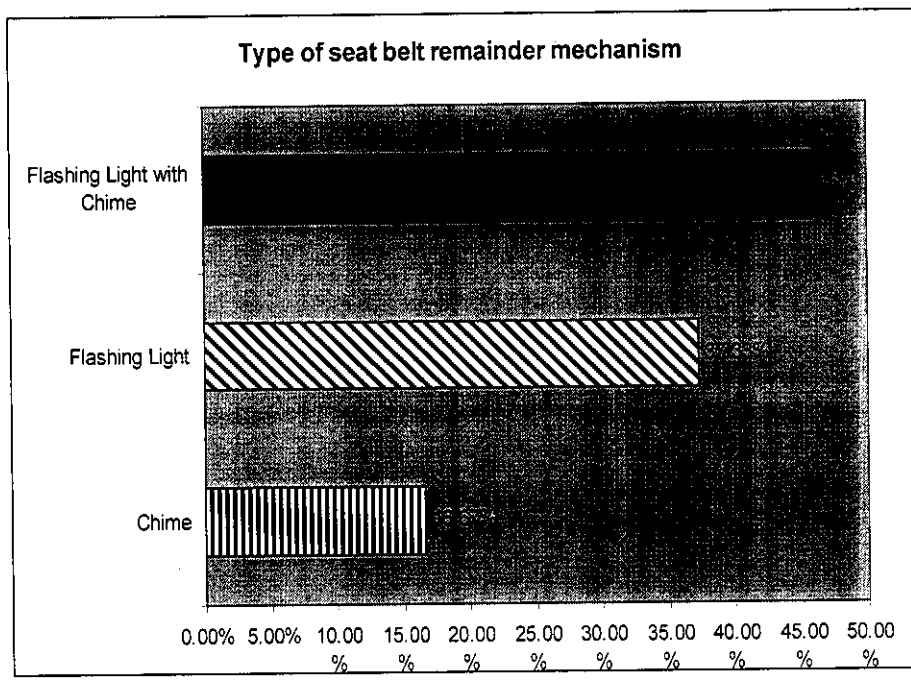
Listing all types of airbags available in a car, the most preferred is Front Driver Airbags and Front Passenger Airbags .The second top option is head airbags.The final rank has been given to the Knee airbags.

4.2.17 Type of seat belt remainder mechanism

Table 4.2.17 – Type of seat belt remainder mechanism

S.No.	Seat belt remainder	No. of customers	% of customers
1	Chime	25	16.67%
2	Flashing Light	56	37.33%
3	Flashing Light with Chime	69	46%
	Total	150	100

Figure 4.2.17 - Type of seat belt remainder mechanism



Inference:

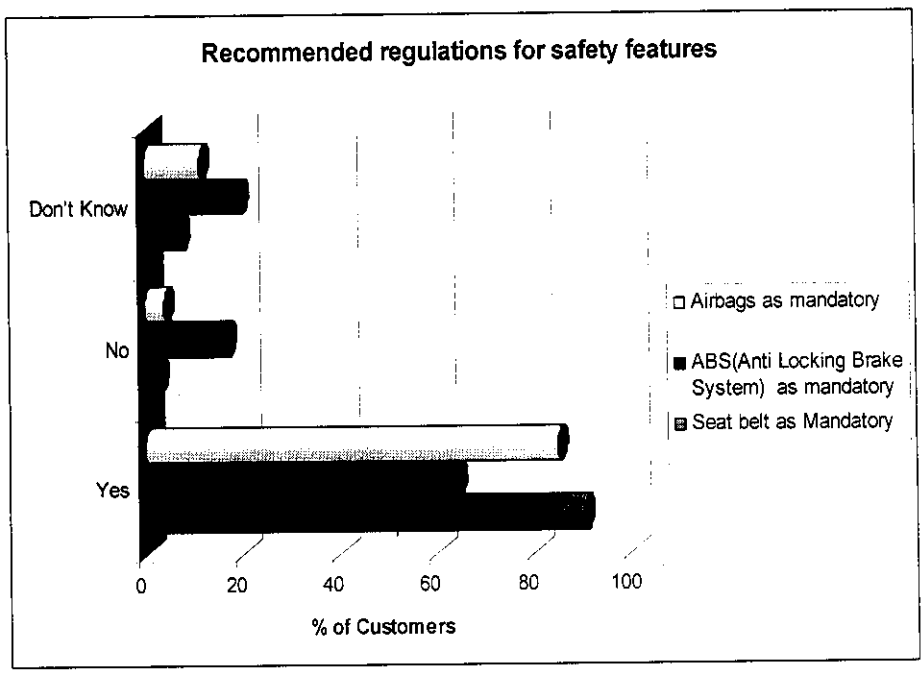
It is inferred that 46% are prefer Flashing light with chime for seat belt remainder mechanism.16.67% of respondents are prefer only chime for seat belt remainder mechanism.

4.2.18 Preference of safety regulations

Table 4.2.18 – Preference of safety regulations

S.No	Safety regulations		No of Customers	% of customers
1	Seat belt as Mandatory	Yes	135	90%
		No	4	2.67%
		Don't Know	11	7.33%
Total			150	100
2	ABS as mandatory	Yes	96	64%
		No	25	16.67%
		Don't Know	29	19.33%
Total			150	100
3	Airbags as mandatory	Yes	127	84.67%
		No	6	4%
		Don't Know	17	11.33%
Total			150	100

Figure 4.2.18 - Preference of safety regulations



Inference:

It is inferred that the majority of respondents prefer Airbags,Anti locking brake

4.2.19 Ranking of essential steps that can avoid accident preferred by customers

Table 4.2.19 – Ranking of essential steps that can avoid accident preferred by customers

S.No	Essential steps to avoid accident	Rank Score	Rank
1	Making Safety system as mandatory in all Cars	2.76	II
2	Indian Road safety Standards have to follow the Standards of European	3.173333333	IV
3	Avoid drink and drive	2.78	III
4	Creating awareness of Automotive safety system	3.553333333	V
5	Strict adherence to Traffic rules	2.753333333	I

Inference:

When the customers were asked to rank their preference among the given options to avoid accident,the first rank have been given to Strict adherence to traffic rules.The second rank have been given to making safety system mandatory in all cars.The Third and fouth rank have been given to Avoiding drunk and driving and change in Indian safety norms.

4.2.20 Ranking of safety features preferred by customers

Table 4.2.20 – Ranking of safety features preferred by customers

S.No	Safety features	Rank Score	Rank
1	Antilock Braking System	4.28	II
2	Equal Brake Distribution	6.453333	IV
3	Airbags	4.273333	I
4	Emergency call features in case of a crash	6.853333	IX
5	Intelligent Speed Assist (ISA)	6.746667	VI
6	Pedestrian Protection system	6.8	VII
7	Park Pilot Systems	8.02	X11
8	Night Vision	6.666667	V
9	Theft Protection mechanism	7.36	X
10	Automatic Child Lock on door handles	6.82	VIII
11	Seatbelt pre-tensioners	6.32	III
12	Tire Pressure Monitoring Systems (TPMS)	7.406667	X1

Inference:

Listing all the safety features generally available in a car, the most sort after feature has ben observed to be Airbags. The second top option has been ABS ie Antilock braking system. The third preferred option is seatbelt pre- tensioners .The final place is given to the Park pilot systems.

4.3 CHI SQUARE TESTS FOR INDEPENDENCE OF ATTRIBUTES

For a contingency table that has rows and columns, the chi square test can be thought of as a test of independence. In a test of independence the null and alternative hypotheses are:

Hypothesis Ho : The two categorical variables are independent or not associated.

Alternative Hypothesis Ha : The two categorical variables are related.

The equation of **Chi square = Σ (Oi – Ei)2**.

Here, Oi denotes the frequency of the observed data and Ei is the frequency of the expected values. The general table would look something like the one below:

Table 4.3.1 - Chi square general table

	Category I	Category II	Category III	Row Totals
Sample A	A	B	C	a+b+c
Sample B	D	E	F	d+e+f
Sample C	G	H	I	g+h+i
Column Totals	a+d+g	b+e+h	c+f+i	a+b+c+d+e+f+g+h+i=N

Now the expected values for each cell in the table can be calculated by using the row total times the column total divided by the grand total (N). For example, for cell 'a' the expected value Ei would be (a+b+c)(a+d+g)/N.

Once the expected values have been calculated for each cell, the same procedure can be used as before for a simple 2 x 2 table.

Table 4.3.2 - Tabulation to calculate Chi square observed value

Observed	Expected	|Oi - Ei|	(Oi - Ei)2	(Oi - Ei)2/Ei

Chi square observed value = $\Sigma (O_i - E_i)_2$.

Based on this null hypothesis is accepted when $O_i < E_i$

And Alternate hypothesis is accepted when $O_i > E_i$

4.3.1 Chi square test for association between gender and pro activeness towards safety

Null Hypothesis (H_0) : There is no association between Gender and pro activeness towards safety.

Alternative Hypothesis (H_1) : There is an association between Gender and pro activeness towards safety.

Level of Significance: 5% level.

Table 4.3.3 - Observed data on pro activeness towards safety Vs Gender

		Pro activeness towards safety		Total
		Always considered safety from the start	Never given importance to safety	
Gender	Male(76)	59	17	76
	Female(74)	64	10	74
Total		123	27	300

Table 4.3.4 – Calculation of Observed Chi square value for pro activeness towards safety Vs Gender

Observed Frequency (O)	**Expected Frequency (E)**	**|Oi - Ei|**	**$(O_i - E_i)^2$**	**$(O_i - E_i)^2/E_i$**
59	62.32	3.32	11.0224	0.177
17	13.68	3.32	11.0224	0.806
64	60.68	3.32	11.0224	0.182
10	13.32	3.32	11.0224	0.825
			$\Sigma(O_i - E_i)^2/E_i =$	1.99

Degrees of Freedom = (no. of rows - 1) (no. of columns - 1) = 1

Observed Chi Square value = 1.99

Expected Chi Square value (referred from Chi Square Table) = 3.84

Interpretation:

Since the Chi Square observed value (1.99) is less than the Chi square expected value (3.84) at 5% level of significance for 1 d.f., we accept the null hypothesis and say that Gender and pro activeness towards the safety of a car are not associated. The status of pro activeness towards the safety of a car is equally distributed over Gender.

4.3.2 Chi square test for association between gender and Seatbelt preference

Null Hypothesis (H0) : There is no association between Gender and Seatbelt preference

Alternative Hypothesis (H1) : There is an association between Gender and Seatbelt preference

Level of Significance: 5% level.

Table 4.3.5 - Observed data on pro activeness towards seatbelt preference Vs Gender

		Gender		Total
		Male(76)	Female	
Seatbelt preference	Yes	72	63	135
	No	2	2	4
	Total	74	65	278

Table 4.3.6 – Calculation of Observed Chi square value for seatbelt preference Vs Gender

Observed Frequency (O)	Expected Frequency (E)	|Oi - Ei|	(Oi - Ei)2	(Oi - Ei)2/Ei
72	35.94	36.06	1300.3236	36.18
63	31.56	31.44	988.4736	31.32
2	1.065	0.935	0.874225	0.821
2	0.935	1.065	1.134225	1.213
Σ(Oi - Ei)2/Ei =				1.99

Degrees of Freedom = (no. of rows - 1) (no. of columns - 1) = 1

Observed Chi Square value = 69.534

Expected Chi Square value (referred from Chi Square Table) = 3.84

Interpretation:

Since the Chi Square observed value (69.354) is greater than the Chi square expected value (3.84) at 5% level of significance for 1 d.f., we reject the null hypothesis and accept the alternative hypothesis and say that Gender and seatbelt preference are associated. That is, preference of seatbelt depends on gender. Males more prefer seatbelt rather than their counterpart females.

CHAPTER-5
CONCLUSIONS

5.1 SUMMARY OF FINDINGS

- From the study we can come to know that there is lot of scope is there in India to maintain safety systems as mandatory one.

- Almost 37.33 % of respondents driven a car without wearing seatbelt.

- Majority of the customers prefer safety but since it is high priced, only few customers have chosen safety systems in cars

- Performance, fuel consumption and economy\value are very important features than safety by customers.

- Amongst 50% of customers who own cars, majority have not chosen safety systems.

- Front driver and passenger airbags are preferred by most of the customers.

- Flashing light and chime indicator is preferred for seat belt warning system by majority of the customers.

- Among the essential precautions suggested by customers to avoid accidents, the most popular is strict adherence to traffic rules followed by making safety system mandatory.

- Airbags and ABS are given precedence among safety features.

5.2 SUGESSTIONS AND RECOMMENDATIONS

The below suggestions are given to the car manufactures and government to prevent the customers from accident.

- Government should make Seatbelt and Airbags as a mandatory for cars.
- Government should enforce and monitor adherence to traffic rules stringently.
- Manufactures should make airbags and ABS available in all car variants.
- The manufactures should consider price reduction to make safety systems affordable to customers.
- The government and manufactures market safety as an essential feature in cars.

5.3 CONCLUSIONS

Based on the study the following conclusions are arrived

- The customer preferences about automotive safety systems are clearly understood.
- This study clearly indicates that, features like fuel consumption,performance and economy take precedence over safety.
- Amongst all the safety features generally available in a car, the most sought after feature has been observed to be Airbags.
- Most of the people believe that strict adherence to traffic rules and making safety

- There is wide acceptance for the idea of making airbags, ABS and seatbelts mandatory in cars.

5.4 DIRECTIONS FOR FUTURE RESEARCH

Some of the points listed below are some directions for future research in this study.

- This research is conducted in specific to the Coimbatore region. It could also be expanded to cover other geo graphical areas too.

- Automotive safety systems are classified in to two types namely Active safety and Passive safety. In future a study in this area may be required to cover Active and passive safety alone.

- This study does not deal with individual safety features of automotive safety system. This could also be explored further.

APPENDIX 1 – SURVEY QUESTIONNAIRE

Questionnaire on the preference of automotive safety system in coimbatore region.

Dear Respondent,

I, ANURADHA A, working as Senior Software Engineer at BOSCH, pursue MBA in Anna University Chennai at the study center Kumaraguru College of Technology, Coimbatore. I invite you to take up this survey, carried out to study the customer preference in automotive safety systems.

This is a very important project, as it will help us to know what safety features you want in your cars. This Project will help us to find out the importance of safety system in Car. Your answers will be of immense help in making sure Cars of the future have the safety features you want.

Thank you for your co-operation.

Sincerely,

A ANURADHA

Please complete the below details: (in CAPITAL LETTERS)

Name:

Age : Gender: ☐ Male ☐ Female

Educational Qualification :

Occupation :

Income per Month:

- ☐ 10,000 to 25,000 Rs/-
- ☐ Not Applicable
- ☐ 25,001 to 50,000 Rs/-
- ☐ Above 50,000 Rs/-

Please mention your address and contact number below.

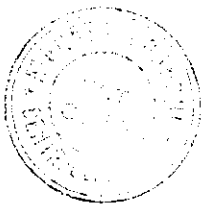
"A STUDY ON THE PREFERENCE OF AUTOMOTIVE SAFETY SYSTEMS IN COIMBATORE REGION"

Please provide a tick mark (✓) for your choice

1. Do you own a CAR?
   - ☐ Yes
   - ☐ No. I am planning to buy in the future.
   - ☐ No Idea to buy a CAR.
2. When did you purchase your new car?
   - ☐ < 1 Year
   - ☐ > 1 Year
   - ☐ Not Applicable
   - ☐ Planning to buy after some Months or Year
3. What source of information do you use when purchasing a new vehicle?
   - ☐ Vehicle manufacturer website
   - ☐ Motor Magazines
   - ☐ Word of Mouth
   - ☐ Vehicle dealership
   - ☐ Newspaper
4. Do you drive your CAR and do you prefer to wear seatbelt while driving?
   - ☐ I will drive a CAR but I don't wear seatbelt
   - ☐ Yes I will drive and wear seatbelt.
   - ☐ I wont drive and wont wear seatbelt
   - ☐ Not Applicable
5. On an average, how many Kilometers is the vehicle do you prefer to drive per year?
   - ☐ less than 2500 KM
   - ☐ Greater than 2500 KM and less than 5000 KM
   - ☐ Not Applicable
6. Which is the top speed you would like to drive?
   - ☐ Less than 60 KM/H
   - ☐ 60 to 120 KM/H
   - ☐ More than 120 KM/H
   - ☐ Not Applicable

"A STUDY ON THE PREFERENCE OF AUTOMOTIVE SAFETY SYSTEMS IN COIMBATORE REGION"

7. Have you been involved in a motor vehicle crash in the last three years and what were the outcomes?
   - ☐ Yes and no injuries
   - ☐ Yes and minor injuries
   - ☐ Yes and serious injuries
   - ☐ No



8. How concerned are you about the possibility of being in a Road Accident?
   - ☐ Not at all concerned
   - ☐ Concerned
   - ☐ Very Concerned

9. To what extent do you feel that you are able to protect yourself and your family from a Crash?
   - ☐ I can't help much.
   - ☐ I can save their life by selecting safety systems as mandatory in my Vehicle.

10. How safe do you think that you will prefer your vehicle?
    - ☐ Very safe
    - ☐ Safe
    - ☐ Less Safe

11. In what way did safety influence your choice of car?
    - ☐ I always considered safety vehicles from the Start
    - ☐ No. I never give much importance to safety future.

12. Were there any safety options (i.e., features to help prevent a crash or to protect you in the case of a crash) that were available to you that you did\will not purchase for any of the following reasons?
    - ☐ Too Expensive
    - ☐ Unnecessary
    - ☐ Preferred other options

"A STUDY ON THE PREFERENCE OF AUTOMOTIVE SAFETY SYSTEMS IN COIMBATORE REGION"

13. Which is the most important feature you look in a car? Rank them based on your preference.(From 1 to 8)

    a. Comfort
    b. Design\Style
    c. Economy\Value
    d. Fuel Consumption
    e. Performance
    f. Safety
    g. Space
    h. Make\Model

14. Do you have a safety features in your CAR and Why you preferred safety features in your CAR? Or will you prefer safety features?

    ☐ I will prefer or I preferred,because it will save my life

    ☐ Yes, I was forced to pay for that also.

    ☐ No, I wont prefer (or) Safety features are not present in my CAR.

15. What kinds of safety feature are present in your car?

a.	Anti-lock Braking System	☐ Yes	☐ No	☐ Don't know
b.	Equal Brake Distribution	☐ Yes	☐ No	☐ Don't know
c.	Airbags	☐ Yes	☐ No	☐ Don't know
d.	Intelligent Speed Assist (ISA)	☐ Yes	☐ No	☐ Don't know
e.	Pedestrian Protection system	☐ Yes	☐ No	☐ Don't know
f.	Park Pilot Systems	☐ Yes	☐ No	☐ Don't know
g.	Night Vision	☐ Yes	☐ No	☐ Don't know
h.	Theft Protection mechanism	☐ Yes	☐ No	☐ Don't know
i.	Automatic Child Lock	☐ Yes	☐ No	☐ Don't know
j.	Seatbelt pre-tensioners	☐ Yes	☐ No	☐ Don't know
k.	Tire Pressure Monitoring	☐ Yes	☐ No	☐ Don't know

"A STUDY ON THE PREFERENCE OF AUTOMOTIVE SAFETY SYSTEMS IN COIMBATORE REGION"

16. What kind of airbags do you prefer in your car? Rank them.(From 1 to 6)

a. Front Driver Airbags and Front Passenger Airbags
b. Side Airbags
c. Curtain Airbags
d. Head Airbags
e. Thorax Airbags
f. Knee Airbags

17. Which type of seat belt reminder mechanism would you like to have?

☐ Chime

☐ Flashing light

☐ Flashing light and Chime

18. Do you feel the regulation require the following safety features for new cars manufactured or assembled in your country to prevent accident deaths?

a. Seat belt as Mandatory	☐ Yes	☐ No	☐ Don't know
b. ABS(Anti Locking Brake System)	☐ Yes	☐ No	☐ Don't know
c. Airbags	☐ Yes	☐ No	☐ Don't know

19. What are the essential steps can avoid the Car Accident. Rank them below. (From 1 to 5)

a. Making Safety system as mandatory in all Cars
b. Indian Road safety Standards have to follow the European.
c. Avoid drink and drive
d. Creating awareness of Automotive safety system

"A STUDY ON THE PREFERENCE OF AUTOMOTIVE SAFETY SYSTEMS IN COIMBATORE REGION"

20. Which of the following safety features do you prefer most? Rank them. (From 1 to 12)

    a. Antilock Braking System
    b. Equal Brake Distribution
    c. Airbags
    d. Emergency call features in case of a crash
    e. Intelligent Speed Assist (ISA)
    f. Pedestrian Protection system
    g. Park Pilot Systems
    h. Night Vision
    i. Theft Protection mechanism
    j. Automatic Child Lock on door handles
    k. Seatbelt pre-tensioners
    l. Tire Pressure Monitoring Systems (TPMS)

Others:

1. If there are any other features you would like to have, please suggest them below.

Thank you for the participation!

APPENDIX 2 - CHI-SQUARE PROBABILITIES

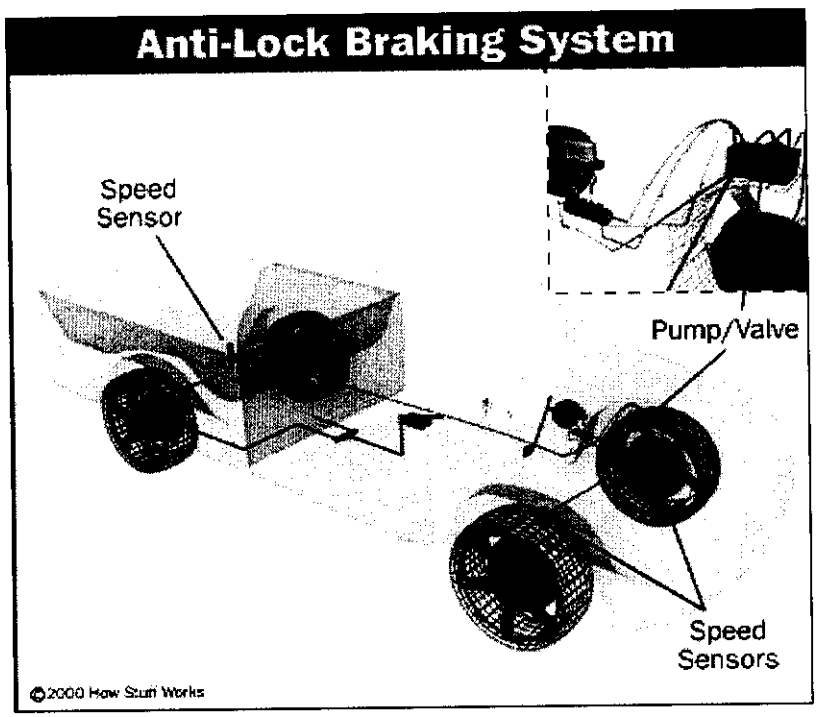
The areas given across the top are the areas to the right of the critical value. To look up an area on the left, subtract it from one, and then look it up (ie: 0.05 on the left is 0.95 on the right)

df	0.995	0.990	0.975	0.950	0.900	0.100	0.050	0.025	0.010	0.005
1	—	—	0.001	0.004	0.016	2.706	3.841	5.024	6.635	7.879
2	0.010	0.020	0.051	0.103	0.211	4.605	5.991	7.378	9.210	10.597
3	0.072	0.115	0.216	0.352	0.584	6.251	7.815	9.348	11.345	12.838
4	0.207	0.297	0.484	0.711	1.064	7.779	9.488	11.143	13.277	14.860
5	0.412	0.554	0.831	1.145	1.610	9.236	11.070	12.833	15.086	16.750
6	0.676	0.872	1.237	1.635	2.204	10.645	12.592	14.449	16.812	18.548
7	0.989	1.239	1.690	2.167	2.833	12.017	14.067	16.013	18.475	20.278
8	1.344	1.646	2.180	2.733	3.490	13.362	15.507	17.535	20.090	21.955
9	1.735	2.088	2.700	3.325	4.168	14.684	16.919	19.023	21.666	23.589
10	2.156	2.558	3.247	3.940	4.865	15.987	18.307	20.483	23.209	25.188
11	2.603	3.053	3.816	4.575	5.578	17.275	19.675	21.920	24.725	26.757
12	3.074	3.571	4.404	5.226	6.304	18.549	21.026	23.337	26.217	28.300
13	3.565	4.107	5.009	5.892	7.042	19.812	22.362	24.736	27.688	29.819
14	4.075	4.660	5.629	6.571	7.790	21.064	23.685	26.119	29.141	31.319
15	4.601	5.229	6.262	7.261	8.547	22.307	24.996	27.488	30.578	32.801
16	5.142	5.812	6.908	7.962	9.312	23.542	26.296	28.845	32.000	34.267
17	5.697	6.408	7.564	8.672	10.085	24.769	27.587	30.191	33.409	35.718
18	6.265	7.015	8.231	9.390	10.865	25.989	28.869	31.526	34.805	37.156
19	6.844	7.633	8.907	10.117	11.651	27.204	30.144	32.852	36.191	38.582
20	7.434	8.260	9.591	10.851	12.443	28.412	31.410	34.170	37.566	39.997
21	8.034	8.897	10.283	11.591	13.240	29.615	32.671	35.479	38.932	41.401
22	8.643	9.542	10.982	12.338	14.041	30.813	33.924	36.781	40.289	42.796
23	9.260	10.196	11.689	13.091	14.848	32.007	35.172	38.076	41.638	44.181
24	9.886	10.856	12.401	13.848	15.659	33.196	36.415	39.364	42.980	45.559
25	10.520	11.524	13.120	14.611	16.473	34.382	37.652	40.646	44.314	46.928
26	11.160	12.198	13.844	15.379	17.292	35.563	38.885	41.923	45.642	48.290
27	11.808	12.879	14.573	16.151	18.114	36.741	40.113	43.195	46.963	49.645
28	12.461	13.565	15.308	16.928	18.939	37.916	41.337	44.461	48.278	50.993
29	13.121	14.256	16.047	17.708	19.768	39.087	42.557	45.722	49.588	52.336
30	13.787	14.953	16.791	18.493	20.599	40.256	43.773	46.979	50.892	53.672
40	20.707	22.164	24.433	26.509	29.051	51.805	55.758	59.342	63.691	66.766
50	27.991	29.707	32.357	34.764	37.689	63.167	67.505	71.420	76.154	79.490
60	35.534	37.485	40.482	43.188	46.459	74.397	79.082	83.298	88.379	91.952
70	43.275	45.442	48.758	51.739	55.329	85.527	90.531	95.023	100.425	104.215
80	51.172	53.540	57.153	60.391	64.278	96.578	101.879	106.629	112.329	116.321
90	59.196	61.754	65.647	69.126	73.291	107.565	113.145	118.136	124.116	128.299
100	67.328	70.065	74.222	77.929	82.358	118.498	124.342	129.561	135.807	140.169

APPENDIX 3

ANTI LOCK BRAKING SYSTEM

Stopping a car in a hurry on a slippery road can be very challenging. Anti-lock braking systems (ABS) take a lot of the challenge out of this sometimes nerve-wracking event. In fact, on slippery surfaces, even professional drivers can't stop as quickly without ABS as an average driver can with ABS.



AIRBAGS

Airbags were first introduced in the early '70s and have evolved a great deal since then, due to changing laws and ongoing statistics based on usage and safety data. The National Highway Traffic Safety Administration (NHTSA) reports that a person, who uses their seatbelt in conjunction with an airbag, reduces their rate of serious injury by over 80%.

TYRE PRESSURE MONITORING SYSTEM

This technology alerts the driver with an indication that the tyre pressure is not sufficient. While a tyre blow out won't be life threatening to people in the car, it can at least hint the driver to have the tyres properly inflated to prevent a blow out.

ACTIVE HEAD RESTRAINTS

All of the modern cars are equipped with head restraints tools to avoid the drivers from head injuries. These days most of the vehicles have head restraints for their rear seats as well. For pursuing the right function, these head restraints are to be positioned the right way. You can avail them from the stores if your car doesn't have the head restraints.

CAR SAFETY BELTS

All the cars have these safety seat belts that should by default be tucked by the driver as well as the passengers. It is actually a good habit to have the safety belt on while driving. You can replace if the belts are loosened, or use an adjustable safety belt to feel better and at comfort while driving.

REFERNCES

1. Arora PN, Arora S (2008), Statistics For Management, S. Chand Group.
2. Uma Shankaran (2003),Research Methods for business,John Willey and sons Pvt Ltd
3. Dr.Shajahan S(2004), Research methods for Management, Jaico Publishing House.
4. Battacharya DK(2004),Resersch Methodology,Excel books.
5. http://www.indianexpress.com/news/india-suffers-from-the-highest-number-of-road-accidents-who/786419/
6. www.nrapo.org
7. http://www.carz4sale.in/wheels/94/car-safety-features-and-passenger-protection/
8. www.keralapolica.org
9. www.trwauto.com
10. http://www.moneycontrol.com/news/business/airbags-to-be-mandatorycars-by-2010_297807.html