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INDIGENIZATION:

**THE ONLY SOLUTION FOR SUSTAINABLE
DEVELOPMENT OF INDIA:**

**EVIDENCES FROM AUTOMOTIVE
INDUSTRY AROUND THE WORLD:**

VOLUME 1

©AUTHOR: DR. ASHISH MANOHAR URKUDE

(Based on his D. Litt./ Post Doctorate Thesis (Management) submitted to RSTM Nagpur University)



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ACKNOWLEDGEMENT

Dearest Almighty God,

Words are inadequate to express what I feel.

My Sadguru Swami Madhavnath (Late Mr. Madhav Vishnu Wakade, Sadashivpeth, Pune), my father Mr. Manohar Govind Urkude, mother, Mrs. Perna Manohar Urkude, sisters Ms. Ashwini and Dr. Amita, my wife Mrs. Surekha, my daughters Ms. Ayushi and Ms. Arya, my Ph.D. Guides Late Dr. Madhukar Rode and Dr. Arun Ramchandra Bapat, His Excellency Honourable President of India Dr. A. P. J. Abdul Kalam. Many Scientists, Economists, Military personnel, Engineers, Managers and Roadside Mechanics, many true Gandhian Thought leaders, Sarasanghchalak Rajju Bhaiyya and many swayansewaks, and many Swadesi movement leaders like Mr. Rajiv Dixit, many industrialists most prominently Mr. Rahul Bajaj, even experts in many other fields and of course good friends of mine have requested to keep their name secret as they feel getting work done devotedly for the sake of the humanity or for the sake of the nation, is more important than name, fame and vote of thanks.

Thanks to Almighty, who helped at every moment, for this almost nil plagiarism book, when was written since 1992, till 2004, except for the published data taken from the surveys, and from the authentic organisational data from SIAM, or JD Power or PCRA, AMA, FADA, ACMA, FICCI, SEBI, etc.

Though Author is working on this project since 1992, many felt that the complicated statistics and research methodology be kept away in case this book has to be read by all, hence, this book has simple hypothesis testing been kept, with some cases, live examples those happened before 2004 A.D.

What is applicable to India is true for every other nation too, and hence with due respect, I tried to kept myself away from blame game, it also proves that, more the indigenisation more will be the new ways to think about similar as well as different things, and implement too, and thus, every nation should be self reliant in the coming era to let human society achieve the Millennium Development Goals (MDG) of UNO, hence this small effort, otherwise as my other book suggest it would be a Million Year Development Goals (MYDG).

Yours Sincerely,

Dr. Ashish Manohar Urkude.



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Aim: Totally indigenous car and all the high end technologies



=> Made In India = Customer Delight.

AIMS AND OBJECTIVES:

To make each and every car technology according to the latest and future internal and external customers' demand. To keep upgrading present technology to cope up with future, through continuous R & D. All the technology will be developed in India using all Indian resources. This will make India self-reliant on the technological field. It'll achieve the ultimate goals on total Techno-Socio-Economic Standards. It'll delight the customers till they reach the self-actualisation level in the field of car technology. As Car stands at the middle of the basic technology to the space age future technology once this is achieved India can achieve the indigenisation of space and future technologies as well.





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INDEX

CHAPTER NO	CHAPTER	PAGE NO
	Front Page	1
	Aims and Objectives	2
	Acknowledgement	3
	Index	
0	Prefaces	
1	Introduction and Chapter wise Concepts	
2	Review of Literature	
3	Worldwide History of few car companies from the technology development point of view	
4	Worldwide History of car technologies and Customers' Response to them	
5	Indian Car History from indigenisation point of view	
6	History of Customer Behaviour in India in response to car technologies	
7	Car market has become Buyers Market due to sheer customer dominance: A case study of small car market in India.	



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8	Critical Analysis of the Present car market in India: Performance of Domestic Car companies, the Multinational Car companies and the Fate of the Joint Ventures.	
9	Contribution of foreign car makers into Indian market	
10	Bringing Indigenous Car Technologies up to present world norms and quality standards	
11	Technologies Spin Off: Influence and Contribution of Car technologies to other technological fields	
12	Legal Issue	
13	Disadvantages of not indigenising the Car Technologies: Wake up call for India	
14	Problems and Limitations in the present Indian system	
15	Possible Solutions over the recurring car indigenisation problems	
16	R & D in the Car Technologies: A Worldwide Preview	
17	Modifying Indian Car R & D for indigenising present and futuristic car technologies	



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18	Upgrading Skills of the Indian Human Resources	
19	Results of the upgraded skills of human resources on the car indigenisation organisation and on the country	
20	Developing the Prototypes and then tuning all the Indian resources for indigenisation of car technologies	
21	General Guidelines to Set up Indigenous Car and Car components manufacturing unit: A Practical Implementation at very basic level	
22	Requirements of Foreign Investments for indigenisation purpose only	
23	Present Costs and Estimation of manufacturing most frequently required car parts indigenously in India and Total Project Viability	
24	Automobile Finance and Engineering Economy for the indigenous cars for the total customer satisfaction	
25	Indigenisation of Services in the Car Sector by Conventional means and using the IT and	



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	the Web	
26	Business Opportunities in the Most promising Technologies in the Future Car markets as per the customers' demands	
27	Business Opportunities in the car modifications useful in various professions as per customer demand	
28	Consumer Demand and Business Opportunities in the second hand indigenously made cars in India	
29	Indigenisation of Technologies required for the Servicing, Maintenances, Road Safety, Traffic Management, Driver Safety, and Driveability	
30	Managing Investments for indigenisation of total car sector	
31	How to build Giant Indian Car MNC at par with GM, Ford, and Toyota?	
32	Advantage India: Making India Self Reliant on the Techno-Socio-Economic Front	
33	New Ideas and Future Needs in India from the indigenisation of car technologies and	



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	sustainable development point of view	
34	Role of Information Technologies on indigenisation of the car technologies	
35	Indigenising the maintenances machinery for Happy Motoring	
36	Services and Safety Features: Expectations of the senior citizens in India while Indigenisation of car technologies	
37	Improving road conditions by using indigenously built machineries	
38	R & D and Advancement in Tata Indica Technologies: First step towards 100% indigenous car technologies	
39	Summaries	
40	Conclusion	
41	Recommendation for further studies and research.	
Appendix: A1	Bibliography and References	
Appendix: A2	Experts' who devoted their valuable time	
Appendix: A3	Customers' Sample Providers	



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Appendix: A4	Successful Communications for this project	
Appendix: A5	Research Papers Published/ Presented by the Researcher till 2004	
Appendix: A6	Request Letter to Honourable President of India Dr. A. P. J. Abdul Kalam to indigenise all the technologies in India related to Automotive Industry	



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0. PREFACES

CONTENTS OF PREFACES

SN	TOPIC
P1	The prime concern of this project
P2	Reasons
P3	Advantages of the indigenously built cars over the MNC foreign built and bought cars
P4	Management Aspects
P5	Some difference in the developed car market and the Indian car market
P6	Present Car market the worldwide scenario
P7	What is the indigenisation of the cars and how can customers influence its development.
P8	What are the activities that are need to be performed by the Indians?
P9	What are the Results of building the CARS INDIGENOUSLY according to the customers influence?
P10	Where the Indigenisation must be targeted?
P11	Why Indigenously built car only?



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P12	Technology in the cars and plant set up
P13	The Cost difference
P14	The cost of indigenisation
P15	Is the project viable?
P16	The Major possible involvement expectations
P17	Chart 1 and Chart 2
P18	Importance of the higher up Institutes and organisations
P19	When can it be done?
P20	Which departments need to be concentrated more?
P21	Where is the special attention required?
P22	How can it be made possible?
P23	Research Activities (an independent survey) to know the advantages of this project.
P24	Let us know why ultimately customers buy an indigenously built car?
P25	What are the expectations about the indigenously built car as a product?
P26	Why customer's impact on technologies and impact of technologies on customer behaviours.
P27	Conclusion



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WHY RESEARCH ON:

INDEGINISATION THE ONLY SOLUTION FOR INDIA: EVIDENCE FROM AUTOMOBILE INDUSTRY

P1. THE PRIME CONCORN OF THIS PORJECT:

Indian engineers, businessmen, executives, the students and the knowledgeable customers and all the other decision makers can built the cars and the car technologies totally indigenously in India (which is not done at present), that too using all the indigenous resources of the latest world standards according the growing needs of the customers and that too with customers' contributions through proper communication and thus can manage the perpetual success at all the levels in the global competitive market. Similarly, Indians will be making car industry as one of the techno-socio-economic engine of growth. Simultaneously with the bench marking and the technical spin-off, Indians will achieve the same goal in the other allied fields too. This way Indians will keep themselves abreast with the latest technologies and current market trends to achieve stability at the Techno-Socio-Economic front.

OR

Total Indigenisation of the car and its technologies in India can happen through customer expectations, their suggestions, their creative needs, their innovative exceptions and through almighty customers' influences into



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considerations in every possible way, at every possible level and in every possible field. It is surely the new found way to make India self reliant on the Techno-Socio-Economic front.

P2. REASONS: WHY INDIGENISATION OF CARS ACCORDING TO THE CUSTOMER BEHAVIOUS AND WHAT IS THE IMPACT OF CUSTOMERS ON THE CAR TECHNOLOGIES DEVELOPMENT? WHY IT IS THE BEST POSSIBLE SOLUTION TO AVOID FUTURE TECHNO-SOCIO-ECONOMIC CALAMITIES IN INDIA? :

The Ministry of Heavy Industries and Society of Indian Automobile Manufacturers (SIAM) have carried out a study in which they have predicted (Times of India- 20th July, 2002) that, as Indian Gross Domestic Product (GDP) growth is 6.5% and industrial growth is at 8%, during 10th plan, i.e. during the period of 2002 to 2007 A.D. (SIAM- 2002 Survey) Car sales is going to touch one million mark where as the demand may increase to 1.5 million in the event of any further industrial growth.

So, increase in the number of cars sells in India will require due attention to the following factors:

a. Remember, Multi National Car Companies (MNCC) especially carmakers like General Motors, Ford, Toyota, Mitsubishi, have individual yearly turn over nearly one third of the total of all the Indian companies yearly turn over. In the national sense, in 1997, according (The Hindu- 7th July, 1997) Gross National Product (GNP) of India in USD was \$427 Billion (almost Rs.





2000000 Crores), and at Indian Stock Market Sensex at 5000 BSE acquires \$150 Billion i.e. 700000 Crores. Where as, Swadeshi Jagaran Manch in 2001, have stated in their booklet that, Japanese MNC Toyota has an yearly turn over of more than \$132 Billions, Japanese Mitsubishi has yearly turn over of more than \$140 Billion, similarly it is the case with many more FORTUNE 500 companies which are working in India. FORTUNE 500 companies are the 500 topmost profit making companies in the world. (The Week- Jan-2001)

b. Through thorough Research and Development and various kind of motivations, at all the hierarchical levels, in all the possible departments in their organisations all the MNC carmakers try to dominate the world market.

c. Developing countries like India is looked as a highly potential market due to its one of the most populous and lucrative consumers. It is estimated that India is the second biggest small car market in the year, 2010 (Editorial, Motor India Journal, May, 1996).

d. MNCC carmakers try to target these lucrative customers with result-oriented approach. Consumers are given high doses of concessions and advertisements. Even internal customers in the organization are motivated and encouraged with all kinds of monetary and other gains, for doing so. The Indian Express- In their editorial- Mexican Crisis- Jan 8th 2001 has





stated that due to this phenomenon, only one or few organizations grow where as the sustainable development on the Indian side has hampered.

e. Where as, till these organizations arrived in India, Indian organizations like Premier Automobiles Limited (PAL) and Hindustan Motors (HM) tried to rely on their old and trusted car models. Auto India Monthly Magazine, May 1996, has stated, this false conceived tradition made PAL to close few of their plants due to heavy losses. Now a day, it is the case with many other heavy industries, and small-scale industries (SSI) too.

f. On one side MNC carmakers rely on their own human resources and machineries, but utilize the material resources of these targeted countries, thus MNC carmakers are exploiting the host nations. India is one among them. This has resulted into world known Economic crisis like Mexican crisis, and the latest Argentina crisis i.e. the total collapse of the Mexican and Argentinean Economy.

g. In the Daily Tarun Bharat, 29th May 2001, in his article, Mr. Kaushikkar, has stated that MNC invasion in many countries also resulted in the collapsing chain of the SSI to medium scale industries in India, China, Pakistan, South Korea, Indonesia, and other Asian and Latin American countries.

h. The huge unemployment level, big inflation in the Economy, huge job cuts, and other socio economic problems like rich becoming richer and poor





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becoming poorer, in the developing countries, are certainly due to this MNC carmakers and other similar companies and their supporting machinery.

i. This problem of MNC car (LMV) invasion can make Indian economy in bad shape, if India does not take this indigenisation program very seriously. As, at present MNC are bringing small cars; next they will bring their other products too to capture the Indian highly potential and lucrative market. This will increase the unemployment, recession, dependency of technology and such other things in India. (Pamphlet from Aazadi Bachao Andolan-Wardha).

j. Thus, India is moving towards dependency because of this MNC car (LMV) invasion, from its Independent status.

k. It has been observed since time immemorial that any country, which is not, self sufficient in the latest Technology in communication, transportation and in the defence sector and also in the Socio-Economic Agendas always loses its self-reliance, self-sufficiency, and lastly everything it has, that too into the hands of greedy people who have unlimited demands to be fulfilled. All the MNC carmakers are best examples of these exploitation and parasite kinds of activities.

l. If taken in the way above mentioned, instead of getting exploited from MNC we may use our own resources for development of our own technologies. Why not Indian makes all the things they are doing under their MNC counterpart. (This is but a hypothesis)



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m. So, researcher can foresee, if implemented seriously Indian car manufacturing and thus indigenisation program will be supported by its Technical work force. India has the second biggest technical workforce in the world has been clearly mentioned in The Times- Magazine-USA- review on Pokharan Atomic Blast, Nuclear Neighbours in South Asia- June 1998.

If this project is implemented, will be the biggest employer in the world more than even the Indian Railways of India which currently the biggest employer in India. Thus, Mr. Keshub Mahindra of Mahindra and Mahindra Auto, India has predicted that after two decades Indian technology with its sheer cheap cost and versatility will rule the world.

n. The same infrastructure facility is required in the various other fields like manufacturing Electrical Generators, Electrical Motors, Elevators, Military Tanks, Military vehicles, Aeroplane, Medical Equipments, Household appliances, etc. Thus manufacturing small cars can become the major step in the field of Technology and in turn the self-reliance of the India. (This is the part of the Hypothesis)

o. The money will be spent in India with all kinds of transactions. Thus, the economy will remain vibrating all the times.

p. Mr. Rahul Bajaj in his interview on the T.V. in Star Plus, in April 2000, has optimistically stated that if cars, scooters, or any other vehicle are exported, naturally Indian companies will become multinational companies.





He is expecting some twenty odd MNC from India dominating the world market, and few of them car companies and two wheeler companies too.

Thus with quality cars of India, which are built indigenously can bring laurels and hard earned foreign exchange as well.

q. It has been observed that most of the vehicles launched in India are not new products but are tested for few years, like Matiz, Santro, and Wagon-R may it be in other name. However, later on the spare parts of poor quality are dumped in the third world including India. These are the majority of people thinking in India. In the letter to the editor, May 2001, Overdrive, Mr. Sidhdharth, has claimed this with umpteen examples, and very thoroughly. Anyhow, latest versions of cars are never launched in India, with improvements and old product is always sold in India. As, India does not have any strict anti dumping norms. Therefore, India must develop its all-new norms according to new standards to tackle new methods and technology.

r. Once, Indian market gets matured with the developed Technologies, which are perpetually improving. It will be having its own Laws, Acts, Wider amendments in laws, RTO rules, Patent laws, etc. which can form the wider base for all other future developments, in LMV and later on in the other allied fields too. This will be true indigenous set up of all laws, terms, and standards, etc. for the future trends.





s. Indians will put maximum contribution in R &D, too. Technology transfer, according to the Frontline- Monthly Magazine- June-1998, itself is a multibillion-dollar business in the world market to save this indigenisation is the best possible solution.

t. Even secondary car market in India for foreign cars made from MNC companies is quite significant. Overdrive- 1999- Survey stated that, it is of the order of Rs.250 Crores or \$50 million. Therefore, when Indian cars surpass this credibility of the cars this revenue loss will also reduce significantly.

u. It has been observed in Daewoo in Korea, Suzuki in India that at first attempt to start with the business these MNC carmakers collaborate with the local companies may it is at 50:50, but later on, they try to get the other half reduced. The Hitvada- 20th June 2002, in the article by anonymous person has stated that, otherwise, these MNC attempt any possible measure and management tactics to acquire that company fully. He has given example of Maruti's Indian bid has been reduced from 51% to mere 26%. Thus, The Telegraph, in its editorial in June 2002, has stated that, the Daewoo has succumbed to the battle with mighty Ford MNC from USA.

v. Look at the advertisement of Qualis:

- i. The status symbol and Esteem attached with it them: 'Live the Qualis life'. Smooth as raw silk' attached to Hyundai-Sonata.





Mercedes- Benz in an 'E-class of its own'. Josh machines from Ford the Ford-Ikon.

ii. If such attachment of the status and esteem always go to the premium class cars with the MNC then the sell of 12000 cars per year loses: $12000 \times \text{Rs.}1000000 = \text{Rs.}12000000000/=$ i.e. \$250 million is siphoned out of India. This is according to the latest, March- April 2002, Economic Times- News paper review. Thus India is losing is upper class society to the MNC. So, the hypothesis is, once the small cars set up is done successfully, Indians can shift simultaneously to this premium cars segment, with minor changes in the plant set up. Then other similar set up for the other allied segment can also be done simultaneously. This also forms the part of the hypothesis.

iii. So, the hundred percent premium car markets is captured by MNC through the following appealing aspects, which are collected from different sources:

- Fast spreading information about company through Internet, TV Ad, Newspaper, Pamphlets, etc.
- Fast spreading of product information, may it be 16 BIT computer, may it be hybrid car, may it be MPFI, may it be any other new development in the car it is projected with so much force that consumers have at least a look at it or may even have a test drive.





- Some special feature about the product is highlighted in its specifications,
- Consumers or even future customers are requested to get free literature which Indian companies can not afford,
- In all the multibillion MNC, everything has been computerized, product design, development, suggestions, training of customers and employees, every organization transactions, sales and bidding, posting of order by customers, customer grievances, etc. and at higher pace through computerized methods decisions are implemented.
- MNC are attracting customers with more such programs such as customer orientation, customer satisfaction, quality product and service for car consumers, supply chain management and integration, costing and performance of internal and external customers, improved design process for improving cost as well as quality and customer satisfaction, attaining six sigma and zero defect in every process, overhead cost reduction and expanding business reducing all overhead costs.
- MNC are manufacturing many individual part, assemblies, sub assemblies, with perpetual increase in





productivity with consistent quality improvement using TQC, TPM, Kaizen, JIT, SQC, waste reduction, mistake proofing, doing things right the first time, improving control rather than inspecting defects, so reducing rework and rejection, reducing inventories, improved and frequent operator training, immediate and collective quality problem-solving in quality circles or similar teams. These things are also highlighted while they sell the cars and make the customers believe their company and thus improving stock market position as well.

- To satisfy customers MNC keep their productivity growth always higher.
- In USA, these companies also keep the competitive edge higher than the other world standard so any time their own MNC enter into the competition at world level they perform well.

w. Due to higher wages than any where in the world, due to relative differences between the Dollar and that currency in the developing nation or the third world, MNC from USA and MNC many more developed countries, attract much of the intellectuals and highly skilled work force.

- i. These employed people are paid for their high performances,
- ii. Rise in profit giving good results,





- iii. Giving very good suggestions,
- iv. Giving some internal spying future acts of competitive companies,
- v. Showing any skills which can give the organisation distinct edge over other competitors,
- vi. If research scientists give futuristic developments,
- vii. If some employees give tremendous breakthrough over chronic or temporary problems, etc.
- viii. Many times it has been observed that the whole team working on the decisive problem is awarded,
- ix. Many times the whole organization including shareholders is also given high share of the profit.

Thus, brain drain is triggered always if such things occur anywhere in the world. During 1994 to 1998 only Telco, MUL, PAL, HM lost more than one fifth part of the high skilled staff to the MNC. If it is happening with all the kinds of different companies then it's a very difficult situation. The companies in India had to send few employees to work with these car brands with whom they are collaborating. To know to and to get all the benefits, and advantages, what are been given in US, EU, Australia, and other industrial countries.





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x. Table P1:

Losses India is suffering due to lack of Indigenisation efforts:

S	Field and Machinery Used/ purpose	Rs. Crores
A	Medical field	0
1	X Ray Machinery	40
2	Whole Body Scanning Machine	20
3	Dental Machine	20
4	Eye Checking Machine	10
5	Magnetic Resonance Imaging	50
6	Artificial Anaesthesia Machine	10
7	Artificial Respiratory System	15
8	Ultra Sound Detector Machines	10
9	Artificial Kidney	10
10	Artificial Heart, etc.	20
B	Computer field	0
1	The Computer Chips	200
2	The Mother Board	250
3	The Key Board	2
4	The Printer	240
5	The Scanner	25
6	The Web/ Internet Camera	2
7	The Mouse	2
8	The Hard Disc	240
9	The Cathode Ray Tube	100
10	Whole Computer System	500
C	Heavy Machineries/ Technology	0
1	Earth Moving Machineries	25
2	Steel Plant Set up	20
3	Forging and casting machineries	100
4	Electricity Power Plant	1000
5	Aeroplane Manufacturing	25000
6	Air Craft Carrier, Ship building yards, Submarine	50000
7	Military Technologies	2000
8	Electronic goods manufacturing machinery	25000
9	Aluminium, Copper, Zinc, etc. Technology	25000
10	Food processing machineries	100
D	Automobile field	0



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1 Engine of MNC cars	50000
2 Gear Box of MNC cars	1000
3 Driving Axle of MNC cars	500
4 Computerised fuel injection system	50
5 Steering System of MNC cars	50
F Pharmaceutical Field	0
1 The Tablet making Machines	10
2 The Capsule making Machineries	20
3 The Wrapping Machineries	10
4 The Bulk Medicine Manufacturing Machines	20
5 R & D for new medicines on dreaded diseases	50
E Other fields	0
1 Xerox Machinery	10
2 Calculator	10
3 Printing Machines	10
F Household Machineries	0
1 Washing Machine	25
2 Air Conditioning	25
3 Television	25
4 Music System	25
5 Refrigerator	25
6 Mobile Telephones	25
7 Geysers/ Boilers/ Heaters	25
8 Mixer Grinder	25
9 Crusher	25
10 Oven	15
G FMCG Machineries	0
1 Soft Drinks plant set up	50
2 Cosmetics machineries	50
3 Chocolates making machineries	50
4 Hot Drinks	1500
5 Fruits Process Machineries	100
6 Milk Products making machineries	50
7 Machineries for Glassware	50
8 Machineries for Stationary and Books	50
9 Machineries for Interior decorations	50
10 Machinery for manufacturing other hygiene products	50
H Sports Goods	0
1 Machineries for English Willow Cricket Bats	20
2 Golf goods machineries	5



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3	Video Games	50
4	Machineries for manufacturing Foot Ball, etc.	10
5	Synthetic Track manufacturing	25
G	Chemical Industry	0
1	Textile Technology Machineries	100
2	Sugar Technology Machineries	100
3	Soap and Acid Technology Machineries	100
4	Paint Technology Machineries	100
5	Fertilizer Industrial Machineries	100
6	Other Important Chemical manufacturing machinery	100
H	Military Systems	0
1	Army-	0
	a. Rifles	2000
	b. Tanks	100
	c. Howitzers	100
	d. Communications systems	50
	e. Mountaineering Equipments	10
	f. Cold Conditions Equipments and suits	15
	g. Missiles Systems	400
	h. Spareparts and other things	2000
2	Navy-	0
	a. Air Craft Carrier	100
	b. Navy Communications Systems	500
	c. Fighter Crafts like sea harrier or helicopters	500
	d. Speed Boats	10
	e. Submarines equipped with Missiles	2000
	g. Under water equipments for soldiers	10
	h. Spareparts and Other things	1000
3	Air Force	0
	a. Fighter Crafts	400
	b. Helicopters	200
	c. Advanced Jet Trainers	200
	d. Supporting system machineries Air crafts and other electronics machineries etc.	5
	e. Air borne Missile Systems	50
	f. Spareparts parts and supporting equipments, etc.	500
4	Other	1000
	Approximate Total Losses India Suffer	195986



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<i>every year in Rupees Crores</i>	
<i>Approximate Rate of U. S. Dollar in Rupees</i>	45
<i>Losses in Billion U. S. D. (\$)</i>	40.00

Interpretation of the table: These yearly figures are shown as per the respective departments in India. E.g. Military survey: Swadeshi Udan, Seminar-cum-Exhibition on Indigenisation of Indian Air Force Needs– Souvenir- 2000.

y. Remember, in the yearly review of Auto Car- Monthly Magazine- December-2001, it has been claimed by the Volkswagens that the Beetle is the most sold small car in the world and it is around 4 million, which comes out to more than \$4 Billion turn over till date. Does not it show the importance of the small car industry and its indigenous manufacturing?

z. Lastly but not the least, look at the military systems and vehicles including IAF fighter planes, Tanks, Howitzers, etc. you'll find that sources of their spares, sub assemblies and even moulds and castings have either been used much if are in India or there spare parts are available from the host country at a unaffordable cost. One fact must be kept in mind that the Engine in the car if maximized with certain dimensions makes what can be known as the turbo charged engine for the tank, or for the military trucks, or for the military Jeeps. Some more advanced feature like adding turbines etc. make the Aeroplane too. It is the case in the Naval Engine and other





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important Navy systems too. Therefore, the conclusion always is the total indigenisation of the car and these further systems.

Look at the chart India is loosing almost \$41 Billion as revenue every year, due to lack of indigenisation efforts.

Thus, India's One Tenth of the GDP is wasted every year due to lack of indigenisation efforts.



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P3. ADVANTAGES OF THE INDIGENOUSLY BUILT CARS OVER THE MNC FOREIGN-BUILT-BOUGHT CARS:

As this means, conceiving a totally Indian made Car, which is designed and developed according to Indian conditions, systems, and environment.

Huge employment generation i.e. each individual car is made up of almost thirty thousand smaller to bigger parts. It is estimated that with each part there are two hundred odd jobs associated with them even if the car is not manufactured in India. Hence if we calculate the job potential it comes out to be almost eight million when the cars are manufactured indigenously.

Major step toward indigenisation will go to Heavy Machineries used in Steel plants, Power Stations, Household goods, Medical Machineries, etc.

There are more such advantage which are stated below collected from innumerable sources:

- a. **More revenue** generation in India itself,
- b. **Flow of money** and all other transactions are more in India only,
- c. **Supporting industries get encouragement** and hence huge amount of development in the Automobiles sector of the country; simultaneously other Mechanical industries also get developed.
- d. **Huge industrial development** as a bench marking increases. For example look at the history of development of cars made by Ford and GM and USA's industrial development, goes hand in hand.





e. **Self-reliance at the technological front**, ex. Hyundai Conglomerate in Korea is manufacturing almost all latest mechanical and electronics devices in their own country. It started with small cars set up.

f. **Increase in standards and services** in the supporting services, ex. Competition of quality services has changed the living styles of the EU countries and USA as well.

g. **Research and Development** in this field motivates building higher end technologies.

There are three kinds of technologies in the world: Basic technology in which basic tools are developed, Secondary technologies in which cars, refrigerators kind of things are developed and the higher end technology like the space shuttle kind of things are developed. Thus when car set up is developed, as mentioned earlier this same technology is the base for the other higher end technology, like, Jet Engines, Space Shuttle, and etc. that can also be developed in future.

h. **Patriotic feeling** of contribution among the consumers, ex. Ninety percent Americans buy the car manufactured in USA, to get the patriotic feeling, 1996, Saturn Project survey of General Motors, USA.

i. **Communication is easier** if the technology is local, ex. As happened with the Tata-Indica, the local dealer, service stations, Engineers, complained about the damping and system of the car. With immediate effect, CEO responded with replacement kit an excellent example of **customer care**.





Thus, all the consumers got satisfied. This has added the ten thousand odd customers in the Tata-Indica car-selling list.

j. **Service centre** will improve their performances and gets boost for easier accesses. Ex. Till date Indians are far behind in the field of servicing and services sector. Once indigenisation is implemented, every other company will try to buy indigenous resources and thus demand for the indigenous resources will increase.

k. **Increase in Skilled technical work force.** People with Technical know how of the technology, increases as happened with Bajaj-two wheelers, Tata Trucks, Mahindra and Mahindra Jeeps, etc.

m. **Cheaper access** to more and hence more consumers that are indigenous get added to the market of the car and hence allied services as well. Ex. In early days Indians had to import air-conditioning etc. but now indigenous air-conditioning fitted gives the better results.

Mr. **Ratan Tata has rightly claimed**, January 2002, Tata Indica monthly review, that, **much the indigenisation lesser the cost.** Therefore, Cost of the overall technology, cost of the Spareparts, Cost of the product the car is much less than the MNC made cars, or foreign made cars. Ex. It is estimated that every part imported costs more than half than indigenously made part, may it be Tyre or may it be air-conditioning, even the engine, or the gearbox.





n. Due to easy communication access in the local language any serious problem with the car or the consumer can be dealt immediately, ex. Since last fifty years, it is observed that the **local and indigenous technology spreads its wings faster**. Therefore, even the roadside mechanic can rectify the problems.

o. Inside the national territory **immediate action or implementations** is possible with solid proof to implement it. This facility is not with MNC car manufacturer.

p. All the **local and national factors** are considered while design and development of the cars ex. More factor of safety given to each and every part of the car may it be the doors, may it be engine parts, the wheels, etc. it will give more life to the car.

q. **Profit to the indigenously built carmakers is ultimately used for further development** of the product for benefits to the internal and external customers of the organization. This is exactly reverse in case of MNC carmakers, which try to set up plant in India. Ex. MNC carmakers put their profit in the expansion of the plant but with advanced machineries and with job cuts. This makes availability for local public with less decision power in the MNC car 's market. Other half of the profit is siphoned out of India. Therefore, no national obligations and little national services are followed by the MNC carmakers. Reverse is the case with the fully indigenously made cars will be.





r. **Indigenous resources are used at every front of the indigenisation thus benefit is to every concerned person and the socio economic factor of the country.** Many social, national obligations are looked after whenever there is indigenisation.

India can become self-reliant in the field of cars related technology. Even independences in the marketing and economic field can be achieved apart from independently Nation building criteria.

s. It is always said that **‘Buying a MNC car is but buying dependence’ as that money is siphoned out of India** and the main parts are manufactured in the foreign land and for repairs you’ve to look out for the foreign hands belonging to the host nation and MNC car makers.

t. With the advancement in the technology and the product, the **basic raw material** developing industries, like steel, brass, etc. **have to upgrade their products** or add new products in to their category. Thus, this total indigenisation of car program can trigger the enhancement of the other industries too.

u. Regarding **service industries** the servicing stations, the denting painting shops, the Spareparts shops, the electrical appliances shop, the Repairing shops, the engine overhauling shops and other dependent business will adopt the new techniques in this field.

v. Further more the **suggestions** from the mechanics’ level will help in **improvement of the indigenous product and processes.**





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w. **Dealer network, Service station network**, will get advanced infrastructures to give support to the new concepts in the market.

Insurance sector, RTO rules, Law sector, and other regulations will see new amendments and new wider range of developments.

x. **Competition** in developing new product and procedure among the vendors, SSI, ancillary units, Forging units, Casting units, Electronics units, Electrical units, other metallurgical units, painting plants, Tyre-tubes manufacturing units **will enhance the products** and their **efficiency** thus helping making indigenous car a true excellent product.

y. Under the **spin off**, this **indigenous car technology is the base for many products and processes**, therefore, whenever there is a need, the same machinery can manufacture the emergency needs of military systems, the medical equipments or even the house hold appliances and even the big generators. Thus, in wider perspective India becomes self reliant with this adventure.

z. **Financial institutions** will develop new schemes to **compete worldwide** competition. Ex. Indian giants ICICI, SBI, and other indigenous organizations are coming out with low EMI schemes to lure the Indian customers. Thus, more institutes that are Indian will get developed and will spread their horizons keeping the growth clock ticking.

And the last but not the least: One of the biggest advantages of the indigenisation is the encouragement to the R & D technical section will get.



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Many new versions of engines, electronics devices, gearboxes, carburettor, fuel injection pump, body of the car, etc. and many more patents, many more inventions and many more implementations will be there. There will be positive competition for betterment of technology development and its commercial implementation will boost the Technical sector. Even, proprietary organizations will be able to develop the advanced technologies.

P4. SOME MANAGEMENT ASPECTS:

PART A: A Perspective:

In this Management of indigenously built car technologies its market in India with direct influence and suggestions from the customer and then knowing the customers impact on the car technologies has following management aspects. Its Management includes:

- i. Planning of all the resources and activities,
- ii. Organising all the well planned activities,
- iii. Motivating the human resources to achieve the target of higher goals of indigenisation,
- iv. Coordinating all the activities to move on the well defined track,
- v. Getting Result at all the levels, and
- vi. Feedback of the product, process, services, etc. to get on the top, in the world car market in the coming future.



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It includes Kaizen i.e. Continuous Improvement of product (small car), the sales services (before and after), and continuous improvement in the quality at every stage.

It includes some more important things like, studying the History of the car Manufacturing for better implementations and keeping the record in the knowledge bank of the company:

- a. For the first time in the history Mr. Henry Ford manufactured the Ford-T model car on the assembly line, hence history of car manufacturing is closely linked with the history of small car. For few years the company did not faced any challenge from the competitors. However, after 1950's there were as many as 10 giant organizations in the world, which could manufacture more cars than as many cars as Mr. Henry Ford could in 1930s.
- b. In fact, GM became the biggest manufacturer of the cars in all the categories.
- c. Volkswagen- Beetle became the most sold cars in the world. To be precise 45 million worldwide, till date.

Thus, this volume of sales of the Beetles shows that the small car (LMV) market forms the backbone of the Automobile Industry, in any country. Therefore, the management includes managing these amounts of huge resources.





d. After USA, Japan, UK, Italy, France, Russia, Korea, and later on even India could set up a plant as Hindustan Motors and PAL.

e. The next step is flexible plant set up for versioning.

f. In 1980's, Maruti has revolutionized the Car Market with the help of Suzuki Motors Japan. After CKD for few years, the Suzuki provided all necessary details, even blue prints, and manufacturing details for few parts to be manufactured in India.

g. The next step will be total indigenisation of small cars or claiming Built Operate Transfer (BOT) kind of procedure from the of the whole Maruti plant.

h. HM and PAL are already manufacturing Cars but failed to compete the strong and professional set up of Maruti-Suzuki and the TATA the Indian companies and all other MNC as well.

i. Apart from this, Engine with some twenty thousand odd parts in it and Gear Box with five hundred odd parts in it, which form the major part of the manufacturing, is still not manufactured fully indigenously in India, as it requires huge and intricate set up of the Indigenous Industry, with perpetual effort to keep product updated for its performance. Some, multi point fuel injection; fuel injectors, electronic devices, etc. are still not manufactured fully indigenously and hence imported from the MNC host countries. This will be given prior importance in the indigenisation of small cars.





j. Every year India loses around Rs.100000 Crores of revenue due to lack of Indigenisation efforts. Especially in the Automobile field India loses around Rs.50, 000 Crores.

k. However, Sundaram fasteners, which export few parts like Engine-Head Gaskets to the FORD Motors USA, and only few other manufacturers succeeded in doing so, due to various reasons.

l. India has huge human resources in the form of Engineers and half a million skilled workers. Therefore little bit of Management is required to Indiginize these parts in various cars.

m. Indigenisation means Right form the Designing and blue prints to the Development, then all sorts of Maintenance and Services are done through Indians.

n. The Education Institutes, Industrial Organizations, Private research organizations, Government organizations related to this field move cohesively to attain the aim of indigenisation of LMV small cars. As they are convinced, that one car development needs a total developed Indian market and Industrial set up. Mining sector, Metallurgical sector, Steel plants, Aluminium plants, Copper plants, Forging Industry, Casting Industry, Plastic Industry, Rubber Industry, Glass Industry, Electrical Equipment Industry, Tyre and Tube Industry, Road Development Equipment, Road Architecture, Civil Engineering works like flyover, Fast track roads, Servicing Centres and equipments, Dealership network, etc. As automobiles





form the backbone of the countries, this project of indigenisation has significant importance.

PART B: Innovative technological management Project is required:

In this mainly four phases has to be planned involving specific steps like below:

First Step: Project Planning:

- Specified objective of the project,
- Specified customers of the project with their expectations,
- Definite start and stop dates of the project preparation,
- Staffing Requirements,
- Reporting lines,
- Budget.

Second Step: Project Staffing:

- Recruiting masters in their field,
- Organising the best staff recruited,
- Developing the culture of productivity and quality for the project team,
- Co-ordinating liaisons and developing shared supervision of team members between the project and the functional homes of the team members.

Third Step: Project Monitoring:





- Developing the measures to know the technical progress in the project,
- Developing a modular task structure for organising the work,
- Developing techniques to track technical progress,
- Developing the modes of problem solving and debugging during the project,
- Developing the program for modular testing of the system,
- Developing proper documentation for the project as the project progresses,

Fourth Step: Project Completion:

- Prototyping the product of the project,
- Evaluating the performance of the prototype,
- Transferring the final project to the internal project customers,
- Providing the factory men possible helps to achieve the target.

Furthermore it has been observed that to get success in these kinds of project requires thorough analysis and objectives on the following points:

- a. Achieving technical performances,
- b. Achieving results within the window of opportunity,
- c. Achieving the results within the specified budgets,
- d. Achieving result to satisfy internal customers first,
- e. Achieving Economic benefits,





- f. Granting effective rewards for successful performance to project personnel.

Then, there are few things, which are already been mastered in India, and there are few things that need to be mastered. On this aspect Mr. Aaron Shenhar the Expert in this field suggested four distinct kinds of implementations according to the risk involved and investment and expertise requirements:

- a. Low-Tech Project: It is the one in which no new technology is involved. E.g. wiring harness of the car electricity.
- b. Medium-Tech Projects: In this some new technologies and some minor technological innovations are there. E.g. The change in the shape of the car.
- c. High-Tech Projects: It uses only key technologies as components but in which the integration of these technologies is a first-time achievement. E.g. designing of the Sumo Car happened in India in the Telco Factory at Pune.
- d. Super High-Tech Project: It is the one in which new key technologies must be developed and proved along with their integration into a new first time system. E.g. India develops a microprocessor controlled fuel injection system indigenously in India.

PART C: Managing the Research in the Technologies:

The research can be carried out on following three fronts:





- a. *Improving Current Product the Car*, for maximum indigenisation with innovations, E.g. Tata-Indica is the car, which is not fully indigenous can be fully indigenised. Its design, its fuel system, fuel manufacturing technologies, etc.
- b. *Creating Next Generation of Technologies* for new models, processes, and services. E.g. For stepping up from the Tata-Indica towards more luxurious cars needs new models and technologies designing and developments, right from designing to the robotic technologies for manufacturing.
- c. *Creating Radical Innovative research*: In this the things, which do not exist in India, will have to be developed indigenously. Like driving the car on the hydrogen fuel engine, fuel cell technologies, etc.

P5. SOME DIFFERENCES IN THE DEVELOPED CAR MARKET AND THE INDIAN CAR MARKET:

It is an independent survey:

It is the difference between the US, European Union and Japanese conditions for developing and driving a car (LMV) on their roads with their Indian counterpart. The MNC do not develop their cars according to these conditions and bring the cars in the Indian market. Where as the indigenously built cars will have the distinct advantage of perceiving the car for the Indian conditions only.





Table P2: Showing the difference in the conditions of India and other countries:

SN	Factors considered for Design & Development	Conditions in USA, Japan, Europe, Australia, And other advanced countries.	Difference in Indian Conditions
1	Temperature in degrees Celsius	-20 to +30 degrees Celsius	Range in India minus 40 to plus 55 degrees Celsius from Kargil in Jammu and Kashmir to Churu in Rajasthan.
2	Weather	Normally pleasant	Hot and dry weather not suiting these machines
3	Climatic condition	Cold to pleasant	Hot And Temperate
4	Humidity	More humid climate	Relatively dry climatic





			conditions.
5	Rains	No monsoon rains	Four months compulsory monsoon rains
6	Snow	Compulsory in winter	95% population do not exposed to snow
7	Road Conditions	Far Better than Indian	All terrain sinusoidal bumpy roads everywhere
8	Load carrying tendency of people while going on tour	Compact as easy availability and access	They take lot of things as luggage as availability is restrictive than luxurious needs
9	Psychology of driving	Different cars for different purpose ex. For household purpose, for week end, for utility purpose, for office, etc.	For all purpose the same is used, of course, if its typical middle class Indian family.





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10	Life of the vehicle decided	Maximum 8 years	Once bought it is supposed to be for the life time
11	Car owners Average Age Range	14 years to 65 years	25 years to 60 years of Age
12	RTO Norms for maintenance of vehicles	Very Strict for even wipers, mud guards, etc.	RTO norms are not so strict, many old vehicle even today don't have turning lights and mud guards etc.
13	Driving and Rules	Very Strict and different ex. Right hand drive, lanes on TOL roads, etc.	Average
14	Junk yards/ Scrap yards	Compulsory scrapping unless taken special permission to do	No such rule even if RTO prescribes life of the vehicle to be almost



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		so once fifteen odd years, prescribed life of but nobody car is over throws away their vehicle.
15	Servicing and Maintenance	Yearly contracts No such strict are there and contracts except consumers follow in the warranty these norms to period, people do avoid any not follow these mishap. norms strictly.
16	Research and Development	Every month new Absolutely no version of car is R&D in few of the there and plants in India. upgraded rules to No support and encouragement encourage the and this there are technological people still driving advances. 50 years old models in the form of Ambassador and PAL vehicles.





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17	Quality Standards	GM, Ford, Toyota, Mitsubishi, Suzuki, Renault, Rolls Royce like companies have standards better than ISO & QS.	Indian Countries could reach these ISO and QS standards in 1990's. Many can reach the standards as comparable to these companies soon.
18	Technology	A huge gap has been developed between Technologically advanced and developed countries to the other countries.	May be India is left behind these countries but the 'All kinds of Experts' and skilled workers, Technocrats and Beurocrats and Executives will take India to this height within coming few years.



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19	Service Equipments	Equipments used are very advanced and technology in them is the latest one.	MNC are bringing all these to India for faster working and thus Indian will develop these technologies very soon.
20	Spare parts	Heavy penalties for duplicate parts	Spurious parts are too many and government norms are not so strict.
21	Cost of Vehicle	Approximately, it is equal to of one-month salary even if taken as minimum wages act as a base.	No such criteria.
22	Yearly maintenances cost	Bearable though costly in Indian terms but US, Japanese can	Even Lower middle class customers can't afford the





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		afford it, as it has become their habit, they have access for earning capabilities.	maintenances cost of the cars.
23	Yearly Turnover of the companies	GM- \$550 Billion, Ford- \$500 Billion, Toyota- \$450 Billion, etc. even more than GDP all developing countries.	All companies together in India forms the turnover not more than even \$50 Billion Dollars.
24	Mentality for progressive Technology	Extremely high in all these countries and money to invest is also more than desired so immediate implementations many a times.	It is high in India but big shot businesspersons not ready to invest in unproven field of R & D work.



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25	Transportation norms	Extremely strict rules and regulation.	Indian RTO are still in the process of developing the Traffic sense among every citizen.
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P6. PRESENT CAR MARKET THE WORLDWIDE SCENARIO:

After Ford-T few more popular models like, Volkswagen-beetle, Maruti-Suzuki-Zen, Maruti-Suzuki-800, Wagon-R, Alto, Fiat-Uno, Mercedes ML-55-AMG, Rover 25, Clio, Fiat, Fiat Eco-basic, Tata-Indica, BMW Straight-line, Hyundai-Santro, Daewoo-Matiz, etc. Let us see some exclusive features in the car market.

- i. Suzuki's Wagon-R is more popular in Japan,
- ii. Mercedes-Benz ML-55-AMG is more popular in Europe,
- iii. Volkswagen-beetle is the most sold car in this section,
- iv. Maruti-Suzuki-Zen manufactured with Japanese collaboration in India is sold in more than 36 countries in the world,
- v. Renault has run the first fully battery charged car in the world,
- vi. Eco-Basic is the first Hybrid (Battery-Petrol) commercial small car in the world,
- vii. Nitro is the first liquefied Nitrogen driven small car in the world.





viii. India's, Tata-Indica is the highly potential and first Indian made small car using various assemblies and individual part from various Indian companies. Only few parts are imported from foreign MNC.

ix. Where as, Sumo utility vehicle was the first vehicle fully designed in India by Telco.

x. Clio is the first and the only car in this section, which is driven by women only.

xi. Hydro the small car is driven on the Hydrogen fuel. Scientists are looking for better version and a wider acceptance of Hydrogen driven cars. Hydrogen is the most abundant fuel/ element in the universe and available in plenty on the earth.

xii. Volkswagen-Beetle is running on the road with its very new look.

xiii. Almost every year car manufacturer like GM, Ford, and Toyota, etc. come out with a new version of a car every after six months, such is the competition.

xiv. Honda is conducting Car race in Australia every summer. The specialty of this race is but all the cars are designed and developed by the Honda and are Solar Battery charged vehicles.

xv. According to JD Power survey, Korea's Hyundai- Santro is the best-sold car in India in the year 2001.

xvi. Many of the cars imported in India are in the CKD complete knocked down conditions in India. This include premium cars like Mercedes- Benz,





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Ford- Mondeo, Honda- City, Honda- Accord, Mitsubishi- Lancer, Daewoo- Matiz, Hyundai- Santro, Toyota- Qualis, Ford-Icon, etc.

xvii. Of these, Daewoo-Matiz had wider base, almost in the One hundred and fourteen countries in the world, for its looks, fuel consumptions and for safety norms. However, its production in India has stopped due to crisis in the parent company based in Korea.

P7. WHAT IS INDIGENISATION OF THE CARS AND HOW CAN CUSTOMERS INFLUENCE ITS DEVELOPEMNT?

A. It is nothing but Manufacturing the cars indigenously using all the indigenous resources, including:

- i. *Men*: Men for performing all important activities form planning, organizing, coordinating activities from main manufacturing plant and supporting vendors, SSI, MSI, sub plants, sub vendors for achieving target of making small cars of pre-planned numbers,
- ii. The *Machinery*: The machinery as far as possible will be made in India and maintained by the Indians.
- iii. The *Market set up* and the over all plant set up of the plant and the infrastructure will be cone by the Indians only using indigenous resources.
- iv. The *Material*: Material abundances and resources and consumer abundance is main cause the MNC carmakers come to India. Using same material Indian themselves can excel in this indigenously built car field. All-



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important iron and steel is abundant in India, brass, bronze, copper, aluminium, glass, rubber, are available in plenty and readily in every part of India.

v. The *Money*: Whenever it is a need Indians contribute heavily. When convinced about the plan of these technical hype revolutions in the country lot of people have shown interest will come forward to do the job. They just are asking for the government support.

vi. The all-important *Motivation* also should be from the Indigenous people of India the Indians. The government is getting convinced about the indigenisation matter as it has realised the over-dependency factor from MIG-21, MIG-27, etc. It has taken giant step towards indigenisation of Military services and is coming forward to do the same job in other fields of Automobiles, Medicines, Computers, and other important field. Here researcher has asked for the same things from the Ministry of Heavy Industries about the same task they are doing or if trying. He has asked the NOC to publish the losses India suffered due to lack of Indigenisation efforts.

B. One of the most important factors of this project is that the technology with which small cars (LMV) are developed, with the same technology with micro improvements, many other most important machineries and equipments are be developed.





Few examples can be: a. Electrical Generators, b. Dynamos, c. Elevator Brakes, d. Lifts and pulleys, e. Agricultural Tractors, f. Heavy Trucks, g. Dumpers and tippers, h. Medical appliances like hearts, i. pumps, j. X Ray machines, k. Washing machines, l. Cooking gas using LPG, m. Thermal plants, n. Boilers, o. other heavy machineries, etc. Infact the list is unending.

Thus, if India becomes self reliant in the field of small car (LMV) manufacturing, slowly but surely improved quality equipments will also be seen in other fields, as happened in USA, in European countries, in Japan and in Korea as well.

P8. WHAT ARE THE ACTIVITIES THAT ARE NEED TO BE PERFORMED BY THE INDIANS?

- i.** The Technocrats from R & D team to the Developers, and Manufacturers to the Maintenances men, and even the roadside garage men should be Indian.
- ii.** If Indians want to develop similar technologies as that of the EU, USA, Russian, Australian then Indians must also have one of the books translation section. This translation section will translate all the technological books those are to be developed in Indian context. This will give details about the technological design, drawing, development procedures, manufacturing processes, metallurgical details, intricacies of





the in and out of the real technology. The German, USA, and other countries while developing their own weapons and other technologies, when books were not available adopted same thing earlier.

iii. At the same time the product, the car (LMV) must be kept up to date at the world standards at all the levels in the production and other procedures to gain profit and name world wide.

iv. In addition, the Beurocrats and the important Decision makers must also be Indians to look after the benefits and obligations towards the nation.

v. The political will and the financial commitment from the Government is most essential prerequisite in this indigenisation endeavour. Indian Government has to do the following job:

- a. Making a big issue of the indigenisation,
- b. Understanding the long term advantages,
- c. Introducing special fast service cell,
- d. Allowing special amendments in the RTO rules and Judiciary systems as well,
- e. Encouraging R & D firms, PSU, Private sector units,
- f. Encouraging Quality agencies unite together to overcome obstacles.
- g. Raising fund for the same,
- h. Encouraging Insurance and Banking sector,
- i. Making judiciary provision for the same.





P9. WHAT ARE THE RESULTS OF BUILDING THE CARS INDIGENOUSLY ACCORDING TO THE CUSTOMERS INFLUENCE?

In the indigenisation of cars itself India can generate almost one million additional jobs. At every step of indigenisation we require skilled or unskilled work force i.e. while Research, Design, Drawing, Development, Manufacturing, Maintenances, Finances, Marketing, Dealer Networking, Customer service cell, for road side garages and service stations, etc. it needs Human Resources, Mobilization of huge amount of other Resources. Thus, there is perpetual motivation among the citizens of India and thus National Economy remains vibrant all the times.

P10. WHERE THE INDIGENISATION MUST BE TARGETED?

Indigenisation can be targeted on the following areas:

1. Setting up of the plants for manufacturing and development of cars: Setting up of the plant needs machinery which India imports every time. This makes India loose billions of dollars over the foreign exchange. It also is but the bought up dependence or may be called as losing independence in socio-economic front. If right from the start Indians do, all the things indigenously taking help of indigenous companies. Encouraging indigenous companies to enter in this field to master it. E.g., BHEL, ARAI, TATA, Mahindra and





Mahindra, Kirloskar, and others can be encouraged to enter in this field and gain advantages.

2. *The Technology:* MNC car manufacturer, manufacture the cars in the manufacturing plant situated in other country than India and bring it in India in SKD condition, that is, semi Knocked Down condition. These parts are then assembled in India, and then the product is then sold as small car. Hence, at the same time, there is no technology transfer. So, Indians must ask for Technology transfer from the MNC car manufacturers, and simultaneously must also try to develop on the experience of the human resources the cars better than the MNC cars in coming future.

3. *Maintenances of the machinery:* The machineries need maintenance every time Indians imports it. Every time technicians are called to do maintenances from the host countries, which is from the head quarters of the foreign-based MNC car manufacturer and owner. Again, the country is made dependant by buying these machinery. Therefore, priority must be given to manufacture these manufacturing machineries.

4. *Manufacturing each and every part of the small car:* Indian organizations import spare parts every time. Besides wasting person-hours in keeping idle those machineries, India gets totally dependent on the parent company for that particular job performed by that particular machinery. Thus, it is nothing but a bought dependence on those MNC car manufacturers.





5. *Self-reliance*: In addition, to other aspects, in case of MNC cars the car owners are to depend most of the time on the authorized dealers as no roadside mechanic can correct if there is problem in the MNC cars. Along with it, the MNC sell costly Spareparts and the costlier services to the Indian customers.

6. *Avoiding self-exploitation under pressure*: The MNC car manufacturer allow the indigenous people in some jobs but they keep the important decision making executive posts reserved for the people belonging to their own countries. In the economics, it is called as the bonded labour and a total exploitation of the indigenous people of India. Therefore, Indians must also demand for these key positions or create a situation like top decision power must also be kept with the Indians while the cars are sold in India.

7. *Transfer of technology be encouraged or avoid importing*: Encourage, these MNC car manufacturers to build the cars using all the resources from India in India for few years and then transfer the whole plant to the indigenous Indians. Even it be called as Built, Operate, and Transfer i.e. on BOT basis for stipulated time.

P11. WHY INDIGENOUSLY BUILT CAR ONLY? :

1. Go to Telco, go to Mahindra and Mahindra, go to MUL, go to Escorts, go to Ashok Leyland and lastly go through the CII Directory you will find that half of the Indian technological businesses are totally dependant on the





Cars and Automobile sector only. Therefore, the aim of this project is total indigenisation of the cars. Similar techniques can be used with the benchmarking in the other allied fields too.

2. It means the product is manufactured wholly by the Indians and from the Indians but product is for the entire world. Thinking globally.

3. It means the complete Set up of the manufacturing plant. The ancillary units, the vendors, and the sub-vendors are Indians located at every possible corner in India itself.

4. It means Indians have done the designing of various parts. Right from the screw to the big shafts are designed and manufactured in India by the Indians, and all the Indian and foreign buyers are enjoying the benefits from it.

5. All the parts from screw to the big assembly will be manufactured uninterruptedly. Though they are manufactured in thousands of different and distant locations situated at thousands of kilometres from the main plant, in India; still they reach the main plant Just In Time (JIT).

6. The Indians do the servicing and maintenances of the machines in the plant.

7. After that, Indians also do sales, the after sales services and maintenances. The mechanic and the Engineer can be a skilled person who is the owner or may be a person who is uneducated but a skilled owner of the roadside garage.





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8. The latest techniques like KAIZEN, TQM, TPM, and JIT and with Quality standards like Zero Defect, Six Sigma, QS 9000, ISO 9000, and ISO 14000 can be applied.

9. It follows the norms mentioned for Ecological balance like Euro1, Euro 2 and Euro 3 or Bharat1 and Bharat 2, etc.

10. It follows all the technological safety norms. The car passes the endurance test for its all the parts. It also passes all the crash tests e.g. head on collision, oblique collision and horizontal crash. Its glass when crashed crumble into pieces which will not hurt the driver.

11. Its tire when punctured the vehicle will not dash the side by vehicle. It will have a collapsible steering, etc.

12. It follows all the metallurgical norms for the metal selection.

13. The management upgrades its model as per the time and need, and helps the earlier versions to do so according to the latest market norms and International and parallel national standard.

14. The marketing set up is as such that whenever the customers face any problem he has the access within his reach. All the nearest service stations are infact all-purpose service centres for that particular brand of car.

P12. TECHNOLOGY IN THE CARS AND PLANT SET UP:

For the safety of the world and to lure the customers, the manufacturers take very bold steps one of them is the Technological advancement. The



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Technology is developing at a very rapid pace everywhere in the world. Thus, the Scientists and the Engineers have brought the following changes in the cars:

1. The manufacturing process has developed at a rapid pace. E.g. Earlier Suzuki used to assemble one car in several hours but now it takes only 19 seconds to do same job.
2. Robotics technology has given pace to the assembly line production of the car.
3. Painting technology has improved the metal version and the life of the car,
4. Tyre technology has improved the grip over the road and has helped to increase the speed of the car,
5. Fuel efficiency or average of the car has increased considerably.
6. Exhaust technologies has been improved to almost negligible emission. The catalytic converter of three stage type if fitted, reduces the harmful emission of Nitrogen Oxides (NO_x), Sulphur dioxides (SO₂), Harmful Hydrocarbon wastes (HC), etc. emissions to the prescribed norms in that country or even to the world wide standards.
7. To reduce the after accident hazards many small car makers have placed collapsible steering system or added the air bag at the top of the steering to protect the face and thoracic portion of the body, many added steel bars to various parts of the body of the car, shock absorbing bumpers are but the





common phenomenon. Latest news is, the computerized sensors are being provided to make a car accident proof.

8. There is Autopilot in the Aeroplane; scientists are successful in the cars also to provide a Autopilot capability. The car has been actually driven on autopilot i.e. there is no human driver present when the car is driven. The advanced computer and the sensors are very much successful in it. Of course, the remote always remains in the hands of the humans if there is such a case.

9. Wide ranges of fuels are now been used to run the cars. The gasoline or petrol, diesel, methanol, ethanol, hydrogen, gohar gas, ammonia, nitrogen, compressed natural gas (CNG), LPG, LNG, and many are still getting added to the list.

10. Electrical / Battery driven cars are on the increasing demand. Solar cars are driven successfully.

11. The Cars are designed automatically on the computers using software. You have to specify just the dimensions and within minutes, the whole blue print is ready. On the other hand, it took few years for thousands of Scientists and Engineers to do this kind of designing and development of blue prints.

12. The Global Positioning System (G.P.S.) and the Auto Pilot cars are on the verge of, to be launched into the market. Simply set the car to go to the





destination on its computer, its autopilot with same technique as the Aeroplane drives the car in heavy traffic to its perfect destination.

13. The most advanced road car convertible to boat to move on the water, then made to fly in the air, then to go under water, is becoming possible in the test conditions.

Thus, there is no limit to the technical advancement in this field.

P13. THE COST DIFFERENCE:

For the same products when manufactured in India and USA we get the following cost difference and ultimately Indian customer has to pay it in India, due to huge difference in the Dollar and the Rupees difference in value.

Table P3:

The cost difference and the viability of the indigenisation of car project:

SN	Name of the few Part to be Manufactured in India	Manufacturing Procedure	Manufactured at MNC Prices in USA in Dollars -Rupees Approximately	If Manufactured in India at Indian Prices
1	Tyres	Special	\$100(Rs.5000)	Rs.1500/=
2	Tubes	Pulverizing etc.	\$15(Rs.750)	Rs.200/=





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3	Piston and Forging & Rings Machining	\$200(Rs.10000)	Rs.9000/=
4	Fuel Injector Forging & Assembly Machining	\$1000 (Rs.50000/=)	Rs.22000/=
5	Clutch Disc Casting Assembly	\$700(Rs.35000)	Rs.30000/=
6	Carburettor Special Gaskets	\$5(Rs.250/=)	Rs.200/=
7	Injectors Forging & Machining	\$25(Rs.2500/=)	Rs.500/=
8	Spark Plug Special dies	\$10(Rs.500/=)	Rs.60/=
9	Brake Fluid Ethylene glycol liquid	\$25(Rs.500/=)	Rs.200/Liter
10	Rubber Seals/Washer Pulverizing s	\$2(Rs.100/=)	Rs.20/=
11	Petrol Pipes Casting	\$25(Rs.2500/=)	Rs.700/=
12	Distributor Special dies	\$50(Rs.2500/=)	Rs.1000/=
13	Electrical Wires Drawing metal	\$2(Rs.100/=)	Rs.25/Meter
14	Hose (Pipes) Special method	\$100(Rs.5000/=)	Rs.2000/=



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15	Radiator Pipes	Casting	\$10(Rs.500/=)	Rs.100/=
16	Bleeder pipes	Casting, machining	\$5(Rs.250/=)	Rs.20/=
17	Wheels	Forging & Casting	\$200(Rs.10000/=)	Rs.5000/=
18	Inlet Valves in Engine	Forging & Casting	\$50(Rs.2000/=)	Rs.1000/=
19	Valves in Tyre-Tubes	Forging & Casting	\$10(Rs.500/=)	Rs.100/=
20	Condensers	Special method	\$50(Rs.2500/=)	Rs.500/=
21	Cylinder Head cover	Casting	\$100(Rs.5000/=)	Rs.1500/=
22	Dynamo Pulley	Casting	\$50(Rs.2000/=)	Rs.800/=
23	V- Belts of Pulley	Special methods	\$25(Rs.2500/=)	Rs.250/=
24	Steering Box	Forging & Casting	\$25(Rs.2500/=)	Rs.1000/=
25	Steering Gear	Forging & Casting	\$25(Rs.2500/=)	Rs.1500/=



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26	Nut	Forging Machining	& \$1(Rs.50/=)	Rs.5/=
27	Screw	Forging Machining	& \$1(Rs.50/=)	Rs.5/=
28	Exhaust Valves (Engine)	Forging Casting	& \$25(Rs.2500/=)	Rs.1600/=

Interpretation of the Table:

For the References, all the values are the latest seen from the Catalogues, World Car Guide 2001- Daily Express, 47th Edition, Pedigree, UK, for all the companies in the world.

Few values are taken from the Overdrive 2003 December issue, Auto Car Magazine-December issue 2003, Auto India, Car and Bike and other Indian magazines. Few costs are from Economic times, The Hitavada, Times of India, Sakal, Tarun Bharat newspapers.

P14. THE COST OF INDIGENISATION:

1. In Indian context, when each and every part of the car is compared with cut to cut intricacies in the car parts of MNC cars, it takes almost forty percent less charges for the same machineries with same quality at every phase of manufacturing the car and its distribution and in the other marketing procedures.





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2. In the present scenario, because of the MNC cars deals, India is loosing almost One and Half Billion Dollars every year due to lack of transfer of technology and for not at all manufacturing the same cars in India. Even if Gear Box, Engine, and the Driving Axles of the cars are considered, the loss mounts to almost One Billion Dollars.

3. Thus, setting up R & D wing for the will be the first step. Indigenisation should be made compulsory, in all the Automobile Manufacturing organization in India. Next step would be giving targeted plan of action to Indiginize the whole car. Later on, other machineries and infrastructure set up can solve these problems.

4. Finances required for the overall permanent set up of manufacturing require one billion dollars. It is the same amount what India is spending every year on the import of the cars and car parts made by MNC from non-Indian companies. This is a permanent solution over the chronic crisis of dependency. This will be generating huge employment potentials and it will mobilize every kind of resources in the country.

Thus, it will be making India a pulsating economy in the world.

15. IS THE PROJECT VIABLE?

YES.

Certainly, when it comes as a challenge to the national pride Indians can make the whole car. Researcher can even claim for many breakthroughs in



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this field if Indians enter in this field. Indian can make the cars relatively at cheaper cost than what MNC carmakers are doing. In India all the overheads, developing techniques always cost lesser than what the Western, Europeans, and Japanese charge due to very reason of higher living standards and higher start ups of the projects.

Ex. a. The piston of an engine when manufactured in India with all the similar characters and quality materials always costs forty percent lesser than what MNC always charge.

Ex. b. The whole Engine costs almost one hundred and eighty thousand rupees. Whereas it's Indian counterpart when manufactured in India costs thirty percent less.

Ex. c. When Bridgestone Tyres manufactured in India its price got reduced to almost twenty five percent of its original price.

Ex. d. When India imported the Benzene Hexa-Chloride (BHC) and Dichloro-Difluoro-Trichloro-Ethylyene (DDT) the insecticide, and other pesticides, it cost them more than a dollar per kilogram pack but when NOCIL manufactured it indigenously; a dollar was enough to sell a pack of five kilogram. A phenomenal decrease in prices was due to efforts of the Engineers and Agricultural experts NOCIL had. NOCIL went on to develop the indigenous machineries to manufacture their plant machineries as well. Therefore, why cannot the Automobile Engineers in India achieve the target of Automobile indigenisation?





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2. When it was thought HR Development program and Executive Development Programme or even for training and improving skills of the technicians, Indian spending are usually twenty five percent chargeable than what their Western and Japanese counterparts do.

3. India has almost half a million Technical associated work force to do the Indigenisation of Automobiles, may be highest in the world of Automobiles. If unemployed technical work force is used then it can become a strong work force of almost one million.

4. When asked many people has come forward to do the job. This includes the retired masters in the field of Automobiles who are ready to do honourably if the association is formed. These includes the technicians who were always in contact with the cars for repairing, overhauling, denting and painting, while replacing the parts and while doing their own innovative implementations. Few scholars but unemployed youth are ready to do wholehearted job if given proper training.

5. Lot of senior experts is calling it as a matter of life and death for the Indian Industries. Therefore, this project must be taken as challenge and monetary gains must given less importance than other long-term goals such as self-reliance in the field of Technology and Technical power. Otherwise, dependency will be a borrowed and on purpose bought gift for India via MNC profits in this sector.



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6. Few car customers like Dr. M. B. Nagarkar, feel that in the field of software India is leading only due to its brainpower. On the other hand in the automobile field only twenty percent of software field's brainpower in R & D is required hence in coming years if India starts this project India is going to win the car race i.e. India can become the global leader on this front. Another reason is many developed countries have the money to spent now but lack the human resources with high skills and qualifications and the brain power as much the India have. Hence, this kind of project is very much viable project. (Reference: Dr. M.B. Nagarkar, In his Editorial- Ek Nava Itihas- i.e. One New History, Marathi Magazine: Swaroopyog- January-February 2004, 2004 Year's 10th Volume).

7. Next in his address Dr. M.B. Nagarkar categorically states that by the end of 2006 A.D. India along with the its all the South Asian neighbours will be having the free trade zone. Thus, if the project in this thesis like Rupees One Lakh Car gets into reality India won't have to look for the market around the world. These all developing countries will get the 'modern car' at its cheapest cost.

Hence, also it also proves that this project will be big success, as customers are demanding four-wheeler at less than Rupees One Lakh than two-wheeler costing nearly Rupees One Lakh. This also proves the viability and gravity of this thesis.

P16. THE MAJOR POSSIBLE INVOLVEMENT EXPECTATIONS:





United efforts of all the concerned Indian, especially efforts from:

1. Research Scientists: These able citizens of India will be carrying out research in the field of car development according to the Indian conditions at par with the international norms or may be even better than these international norms. They will collect, from every possible source, the data and knowledge needed to make the car run effortlessly, with minimum fuel consumption, and having very much lesser Preventive and Breakdown maintenances than what MNCC cars needed to be done. It has been observed that all MNC vehicles are not designed for the overall tough Indian conditions than their host countries and/or western countries. They take into consideration some conditions like that of the roads that are perfectly even as in the case of developed countries. Many factors like hot and humid climate of the nation is not considered hence suffer heavy corrosion of the cars, etc. In all these scientists will technically give more Factor Of Safety to every part they design to suit the tough terrain and climatic conditions present in India. Research is required in following fields:

- Design,
- Drawing,
- Product,
- Marketing,
- Commerce,
- Costing,





- Metallurgical,
- Development,
- Kaizen through TQM and TPM and
- The other supporting services.

2. *Design Engineers:* Designers will consider more factors of safety for each and every intricacy in the designs of each and every part of the car than what the MNC and the norms maker have considered while running car on the Indian roads.

3. *Development and Manufacturing Engineers:* They'll take immediate decision for the development. They will develop the casts the moulds etc. and manufacture each and every part in India considering more factors of safety and with better alloys of metals developed in India better than the MNC car manufacturers.

4. *Plant and Machinery maintenances Experts, and Financial and HRD experts:* They keep the indigenous car manufacturing plant always to the perfection to achieve the TQM, Kaizen, TPM, Quality of the product with prescribed norms and with highest the possible productivity from the Human resources and Machines. They will suggest all the things about how the plant must be designed to get maximum out put with minimum input of time, money, material, and human efforts. They will keep the same record while production is on as in a perpetual process.





5.Experienced Automobile Repair and maintenance Experts: They will convey all their experience while the car research is going on. These experts will tell the Scientists about the intricacies of the faults in every part of the car so that Scientists and Engineers together will take care of these faults being cut off or drastically reduced, while the car is at its initial phase of designing and development.

6.Knowledgeable Consumers: Ultimately beside repair mechanics and assembler in the plant the consumers and the drivers are the people who are always directly in touch with the product the car. Therefore, consumer survey will keep their small car product and its accessories' development updated by obvious reasons.

7.Interested Businessmen: These good citizens of India are interested simultaneously in the long-term goal of the nation and profits of the organizations. Though they took least interest in the R&D earlier, they realized that after 1995 A.D., R & D has become prior necessity for the organizations to keep consumers happy with the product and to survive in the world of competition. They will keep their small car product updated, and keep the internal and external customers happy to keep organization running on the well-defined track.

8.Financial Giants: ICICI, SBI, IDBI, will be funding the giant technical hubs and plants to be built for the overall development of the nation and the Indian society. They will also be providing loans at the lower rates to SSI,





MSI, Vendors, Sub vendors, and ancillary units giving the JIT production to the main plant for the manufacture of the small car indigenously.

9. *Industrial Associations* like MIDC, GIDC, and others will be giving support to develop the ancillary units and vendors and the sub vendors, SSI, MSI which in turn will support the major manufacturing plant for the just in time production of the Cars (LMV).

P17. Look at the Chart 1 and Chart 2:

If the Universities, Institutes, and the Industries go hand in hand Indians can achieve miraculous improvement with its knowledgeable people to perform the various important tasks. More practical and more theory can become the devoted technical person. Hence, care must be taken that students are well groomed for the job they will do in future.





TABLE P4: AUTOMOBILE COURSES OFFERED IN INDIA: CHART 1:

The courses in the Automobiles can be divided into the following categories:

SN	Course Title	Course Description and Kind of Training Offered.	Pre-Qualification Required	Hierarchical Rank and Position Offered
1	(ITI) ITI Diploma	Automobile Repairing Only.	SSC/10 th std.	Worker
2	(DE) Diploma Engineering	Automobile Engineering (Designing few parts and Repairs)	12 th or ITI	Mechanic
3	(BE) Bachelor of Engineering	Automobile Engineering (Advanced Designing, Developing and Repairs)	12 th or DE	Service Engineer





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4	(ME / MTech) Master in Engineering/ Technology	Automobile Engineering (Advanced Designing and Advanced Developing)	BE or BTech	They do Actual Implementation of Designing and Development, which Ph.D. people plan.
5	(PhD) Doctor of Philosophy in Engineering	Specialized Topic in Automobile Engineering (Advanced Designing and Advanced Developing)	MTech / ME	Planning for Research and Development at Strategic Level.
6	(D.Sc.) Doctorate of Science in Engineering or D.Litt. Doctor of	Specialized Topic in Automobile Engineering (Advanced Designing	Ph.D. in Engineering or PhD in Technologies Management equivalent	Extraordinary Contribution in Engineering with work, invention, or discovery.



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Letters in and	honorary
Technology Advanced	work
Management Developing)	

SPECIAL MENTION:

Industries also can afford the Training course for the newly appointed employee in its organisation. This program ranges from a week to few weeks depending upon the requirement of the skills of the employee to be developed.

TABLE P5: CATEGORIES OF THE COLLEGES: CHART 2:

Showing Number of Colleges (NOC), Strength of College (NCI), Facilities, and International Ranking of the College/ University (Uni.):

S	College	NCI	SOC	Colleges: Urban Area	Colleges: Rural Areas.	International Ranking
1	ITI Government	20	20	Good Facilities	Very poor facilities	Not Applicable
2	ITI Private	25	20	Good Facilities	Very poor facilities	Not Applicable
3	DE Govt. Polytechnic	10	30	Good Facilities	Very poor facilities	Not Applicable
4	DE Private Polytechnic	5	30	Good Facilities	Very poor facilities	Not Applicable
5	BE	5	60	Good	Very poor	Not





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	(Government + Private) Automobile			Facilities	facilities	Applicable
6	MTech (IIT)	5	60	Excellent facilities	Not Applicable	Excellent
7	MTech/ ME REC+ Private	20	8	Excellent facilities	Not Applicable	Good
8	MTech / ME Private Colleges	2	8	Good facilities	Not Applicable	Not Applicable
9	Ph.D. (IIT)	5	Not Specified	Excellent facilities	Not Applicable	Excellent
10	Ph.D. REC+ Government and others	20	Not Specified	Excellent facilities	Not Applicable	Excellent
11	D.Sc. or D. Litt.	All Uni	All Uni.	Excellent facilities	Not Applicable	Excellent

INTERPRETATION OF THE TABLE P4 AND P5:

1. ITI Diploma in Automobiles: It offers the 10th passed students the basic of the every kind of Automobile Repairing and Overhauling of the Engine. There are many colleges in this category government and government recognised as well.



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2. Diploma in Engineering: This course is offered to the students who have cleared ITI or passed 10th standard or 12th standard.

3. Bachelor of Engineering: There are following colleges which offer this course in India:

- i. Vishwakarma Institute of Technology, Pune.
- ii. Bansilal Ramnath Charitable Trust, Pune.
- iii. Kasegaon Education society's College of engineering and Polytechnic Sakharale, Taluka Walva, District Sangli, City Sangli, Maharashtra State.
- iv. Terna Institute of technology, Ternanagar, District Osmanabad, Maharashtra state.
- v. Madras Institute of technology, Chennai, Tamilnadu state.

4. Master of Engineering/Master of Technology: Master of Engineering / Technology Degree is offered, when the student carries out some specified research in Automobile related topic.

5. PhD (Engineering): This is the doctorate degree offered to the candidate for research in the Automobile field over some specified specialized topic.

6. D.Sc. (Engineering/ Science) or D.Litt.(Management): This is the highest degree confirmed to the person after his contribution above the PhD level.

P18. IMPORTANCE OF THE HIGHER UP INSTITUTES AND ORGANISATIONS:

Institutes like Indian Institute of Technology (IIT), and also Indian Institute of Management (IIM), Automotive Research Association of India (ARAI),





Pollution Control and Research Association (PCRA), Institution of Engineers (IE), Indian Cost Accounting working Association (ICWA), Indian Finance and Cost Accountants (IFCA), Confederation of Indian Industry (CII), etc. and these organizations can do lot of breakthroughs individually, one of them can be as follows:

IIT Professors pursue lot of research with the help of students and assistants in the field of the automobile. These research-scholars must get the support to go ahead for implementations in the factories of the Indigenisation program. Similar is the case with hundred and fifty odd Engineering colleges. If the wild idea of designing and developing all the intricate parts of the Automobile united with the help of students as a part of final year project is implemented then whole of the project can be achieved in one year itself, provided all technical institution take part by division of parts done judiciously.

IIM management students and the Professors can give us the best viable project for this indigenisation program. As a research project for a full batch of Finance these scholars can give us viability of the each and every part of the small car, thus the future developers will have the ready made go ahead in the project.

ARAI approves the Automobile products developed by the individual organizations or individuals in India with its final testing. The Engineers and the Scientists at the ARAI have shown interest in this kind of project





when contacted and are ready to go ahead with this kind of challenging projects. They are ready to pass the well-designed car parts to the international norms.

PCRA will be approving the Engines from the cars with proper pollution control implementations. They will support all kinds of the Catalytic converter. They will also suggest the modifications to be done if the engine emission is not up to the internationally specified norms.

Institute of Engineers, All India Council of Technical Education (AICTE) will highlight the advantages of the Indigenisation and constantly give support through to this program through IE conducted courses, seminars, and journals.

ICWA the cost accountants will be focusing on how to optimise each and every part of the cars thus giving maximum benefit to everybody concerned with the small cars with maximum precaution of safety.

IFCA and the Chartered Accountant will be always keeping the Finances of the companies on the well-defined course of action in the annual budget with maximum productivity.

CII and Mechanical Engineering and Automobile associations will keep all the organizations together and make them prosper perpetually for the benefit of the nation and humanity.





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P19. WHEN CAN IT BE DONE?

- a. If Indians start coming together for this common cause of Indigenisation program at there earliest the better it would be. As, in the market the car that gives consistent performance with early market capture generally dominates the car world. This has been the worldwide experience since last few decades, so Indians must come out with a grand small car with best design with the most factor of safety in all the parts with the most economic advantage to the Indian people and for others too while the Indians export it.
- b. If all the giant car companies come together like Tata Motors, Mahindra and Mahindra and form a Indian Union of Cars and make a indigenous car company it can be achieved within few years of time.
- c. Few experts claim that if Luxury cars are targeted by 2010 these things can be achieved. Thus making India technological giant in the world.

P20. WHICH DEPARTMENTS NEED TO BE CONCENTRATED MORE?

Master Plan: The best-planned and feasible time bound program to develop well-planned small cars.

The Individual Planning of each concerned organizations: The organizations taking part in this program must give their own plans. As the LMV are made



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up of almost 30,000 distinct parts, and each part requires its unique manufacturing set up which will be done by these organizations, may it be vendors, SSI, MSI, ancillary units, or sub vendors.

Where is first attention required: Special attention is given to the more factor of safety (FOS) to each and every part designed and developed by the Scientists and Engineers. FOS in short is the more durable part with tough metal used, with slightly more, throughout dimensions for the same parts, and having more life than the conventional international standard cars. These cars will be far more durable than all the MNC or even Indian cars.

P21. WHERE IS THE SPECIAL ATTENTION REQUIRED?

Quality norms, International standards, and India's all terrain multi weather aspect be given special attention and followed well by each and every manufacturer. Availability of quality labs, performance checking labs, to check these criteria must also be given importance for making it as a well groomed habit to all concerned.

Research for the perpetual improvement of the product, procedure, internal and external customer satisfaction, product promotion be given due importance in the competitive world. Earlier this was not given importance in India. Therefore, to mould this habit in the Indians is needed special efforts.





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Coordination of the Manufacturer, Dealer and Authorized Service stations, Scientists, Engineers of the main plant, Designers, Developers of the main plant, Finance and maintenance people is must at all the times, at all the professional levels.

Weekly Review, Monthly Review, Yearly Review, Emergency Team, Prize for the best suggestion for the continuous improvement of the small car and hard work associated and is expected from it.

P22. HOW CAN IT BE MADE POSSIBLE?

1.This **project must be given equal importance at par with any DRDO** or any other emergency defence project on war front, by the Indians.

2.The **knowledgeable people** in this field of the cars should **come together**. They must realize the loss the nation is suffering due to over dependency in the field of cars on the other developed nation or on the highly exploitative MNC car manufacturers. The researcher made a survey in which he found that once the crux of the project is known many are ready to contribute to this project.

3.All the Indian businesspersons are talking about the taxes India imposes on the Indian parts. Instead, the MNC and **all the foreign cars must be taxed more than their Indian counterparts**. This will boost the morale of Indian carmakers and hence will boost the Indian economy as well.



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4.The **SSI, Vendors, and sub vendors** that manufactures the Spareparts for the small car; or even the MNC heavy machineries manufacturing main plant also manufactures Spareparts for the other automobiles. Now a day maximum SSI has developed their abilities. SSI has the capabilities to develop any of the newly developed parts in any of the MNC car entered in the Indian market, within a year of its launch. Quite amazingly, these parts may have half the life than the original Spareparts but they also are sold at half the price than the original parts. Researcher asked these manufacturer about how they come to know about the 'know how' of the 'parent technology', the 'manufacturer claimed it to be the trade secret'. If such is the case then why should not India try for the total Indigenisation of the small car? He agreed and supported the program.

5.Look at the difference in the **Prices of the Iron, Bronze, Brass, Copper, Aluminium, Plastic, Rubber, Glasses, Paints, Labour, Forging, Casting, etc. Everybody will find the huge difference in the Europeans, American, and the Indian Prices.** When compared the prices of the same cars, which are manufactured in US, European countries comes down to almost half. Infact, on this date TISCO are the cheapest Steel manufacturing empire in the world. (Hindustan Times- New Delhi- 10 December 2001). Almost same is the case with all the other metals and materials, that are required for the manufacturing of LMV.





6. When it was seen that Maruti cars, Hyundai cars, Daewoo cars, Ford cars, General Motors cars, etc. are manufactured in India the **manufacturing cost reduced to almost half**. Instead of SKD condition they are brought in India and then assembled in India, Indians must ask to manufacture the same cars in India and then sale them.

This will be the first step; next step will be the Technology transfer.

7. It has been observed that the **host MNC countries keep their key decision makers from their own country** thus if all the work is done by Indians is always been scrutinized by these men that work gets reduced to but the bonded labour. Thus it becomes a total exploitation of Indians using Indian Human resources these MNC are earning profit of Millions.

8. Therefore, Researcher has contacted many Indian manufacturers and they claimed that manufacturing the Car Engines would be the first step, so let it be done. *Therefore, researcher contacted Swadeshi Jagaran Manch, Azadi Bachao like organizations they have contacted the big bosses in the field of Engine manufacturing. One of the big businessperson has come forward and is claiming to start manufacturing within three years from 2004 A.D. (Researcher has the letter of proof).*





P23. RESEARCH ACTIVITIES TO KNOW THE ADVANTAGES OF THIS PROJECT:

TABLE P6: Independent survey to know advantage of this project:

S	Type of Research	Research about what?	Overall disadvantage to customers due to foreign built cars by MNC	Managing advantages to the customers of small car from India's Indigenously built small cars.
A	Business, Technical, Economic, & Corporate Research	1. Industry market characteristics and trends,	Many of the Indian factors are found to be neglected,	Indigenize small cars are built according to the latest trends in the world market but due importance is given while considering the Indian factors for safety and factor of safety due to mixed traffic India has.
		2. Acquisition, diversification studies,	Acquisition and diversification helps the MNC owners seating in the host foreign	Any kind of acquisition done by the Indian companies to enhance the indigenisation program must always help the Indigenisation of small cars program.





		countries, hence affects the Indians.	
	3. Market share analysis	Any kind of piece of share the MNC gets is but loss to the Indians as it is but the dependency bought as discussed earlier.	More the market share in cars is taken by the indigenously built car more is the expansion of the economy at various fronts and more the advantages the customers get
	4. Internal employee studies: morale, communication, etc.	When, more the employees are trained they try for more market share thus helping the MNC for their profits and improving	When, Indigenisation of small cars program train more the employees they will try for more market share thus helping the organization to grow its profits and uplifting the structure of the product, productivity,





		<p>uplifting the proficiency, profit, product, performance, and hence productivity, customer satisfaction which proficiency, mostly will be Indians. profit, performance, and customer satisfaction.</p>	
B Pricing	1. Cost Analysis	<p>Studies show that, Cost of the foreign built cars of any type will always be 40% more than their Indian counterpart with the same criteria. If taxes are levied then it will be almost twice as</p>	<p>In the total indigenisation of small car program every penny paid to develop the product and procedure and services of small car goes to the Indian citizen only. At every level Indian costs are much less than its counterpart American or European car products, services and its makers. May be it is even more when Rupee to Dollar conversion and tax levied are taken into</p>





		much as what	considerations. Therefore,
		Indigenously	indigenisation increases the
		built cars will	cost benefit to the Indian
		have.	consumers.
	2.Profit analysis	Where as the MNC carmakers grows their roots in that country by gaining growth and sustainable profit growth. Much of the part of profit is siphoned out of India. This profit utilized in	When profit of the Indigenous carmakers increases any further growth increases the job potentials, growth in the Indian market, technological advances, increase in the R & D investment hence futuristic growth. Some more market segment gets uplift. Consumer will get more benefits at the same prices what they are paying today.





		growing company and increasing Hi- Tech machineries and reducing jobs for the Indian Indigenous people.	
	3.Price elasticity and competitiv e pricing analysis.	In the present worldwide recession in the market capturing the market, keeping the customers loyalty, more servicing facilities, affects the	Always maximum the Indian made parts in the small car lesser is the price. E.g. Tata- Indica the maximum Indiginize car is priced Rs. 3,29,000 where as its other counterpart at the same level is more by Rs.50000 at least. Thus, more the indigenisation of every part of the cars more will be the





		<p>prices. The price benefits.</p> <p>prices are it s</p> <p>lowest possible</p> <p>ebb, for the</p> <p>long run</p> <p>benefit of the</p> <p>organizations</p> <p>involved in</p> <p>various tasks</p> <p>of cars sales</p> <p>and servicing.</p>	
	<p>4.Demand Analysis:</p> <p>a. Market potential,</p>	<p>India is looked as highly potential market due to lucrative high population of consumers. So, various techniques are used</p>	<p>Indigenously built cars will not only fulfil the demands but also improve the manufacturing capabilities of the Indian manufacturers.</p> <p>Dramatic improvement in the cars quality and number of manufacturing.</p> <p>a. Potential Market of these one million sells in the cars</p>





		increase	will also increase the
	b. Sales	unwanted	abilities of other dependent
	Potential,	increase in	avenues of cars.
		demands.	b. Early Indians start
		a. Potentially	manufacturing the whole
		people earning	cars indigenously earlier
		more than one	they will reach the
		million has	manufacturing ability of one
		tripled since	million per annum. Thus
		last four years	benefiting the Indian
	c. Sales	in India. Indian	consumers. Similarly,
	Forecasts.	are brand	market will show always-
		loyal, so these	pulsating Indian economy.
		MNC try to lure	c. So, Government and the
		these people	other decision makes must
		through	seat together and plan the
		various	future of Indian on this
		surveys to	crisis and encourage
		advertise their	indigenisation of the small
		mutual	car.
		benefits	May be 10 th five year plan
		b. In the event	concentrate more on





	<p>of GDP growth of 6.5% and industrial growth of more than 8%, increase in the sales potential of cars market will touch the demand of almost 1.5 million. At present, no Indian company can manufacture so many cars in a year where as MNC can take advantage of it. Much loss to the Indians.</p>	<p>indigenisation of Technology of small cars and allied fields. This will improve satisfaction level of Indian consumers with increase in technological advances.</p>
--	---	--





		<p>c. Sales forecast shows that for the cars sales is going to increase and it may reach one million mark by the next five year plan of 2002 to 200 7. Again, the MNC benefits will add the woes to Indian economy.</p>	
C Product	1. Concept developm ent and testing,	MNC cars use various business techniques to help their so-called	Concept of fully Indiginize cars or any other Hi-Tech product must be given very much importance. If not internal customers and consumers must demand for





		<p>technologically advanced car concept. Many give test ride to the potential consumers and let them compare with the any other car product. The car that is already a successful product in the EU, Japan, or USA is brought in the Indian market but shows little benefits to the Indian</p>	<p>indigenisation. As ultimately mutual growth is the only way to sustainable growth of the country, which is possible through thorough indigenisation of cars only.</p>
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		consumers and conditions.	
	2. Brand name generation and testing,	MNC actually make a contract with world famous Indian personality like happened with Hyundai-Santro, Shaharuk Khan was given contract, and Brand name has increased the sales due to his popularity. The advertise mentions that it is owned by	Whereas if Brand name is generated by the Indian counterpart the benefits goes to the indigenous people only. Right from the Advertiser to the manufacturers and consumers are indigenous Indians. While testing and more testing improves the quality performances generating systems in the organizations. It gives more exposure to the Indian technocrats and the marketers. The next generation consumers get benefited due to these kinds of Brands. The organization also shows



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		<p>this popular lot of respect towards the melody icon of overall system.</p> <p>Hindi Cinema and is tested okay since its launch. Thus, the brand loyalty is generated.</p> <p>Their Indian counterpart can't spend same amount of money.</p>	
	<p>3. Product testing of existing products,</p>	<p>Where as the Daewoo-Matiz claims it has most number of safety Bars, Hyundai-Santro claims it has passed</p>	<p>Tata-Indica forms the India's first car. Tata Engineering is the only company, which has its own testing facilities. Otherwise, every vehicle has to go to Ahmednagar or other test range. Thus competition has made</p>





		offset test, Tat-Indica claims it is the toughest car.	Indians to develop its own product development facilities.
	4.Competitive product studies.	Every year all these car companies bring new product in the market. Customers has been kept in inferior complex to upgrade their vehicle or at least made to buy next version of the vehicle.	Tata Engineering has made this provision in their plants. Thus becoming real global competitor in the car market. They are selling at lower costs than the MNC do.
Distributi on	1. Plant warehous	Now a day all the vehicles are	Tata Engineering also planned the inception of





Network	e location	kept normally	Tata Indica car very well in
	studies.	in the plants'	advanced and has made
		main	ware houses very well
		warehouses	equipped.
		only. Suzuki	Infact it has the best
		and other MNC	Distribution Network in
		have big	India.
		warehouses to	Number wise also Tata
		accommodate	Engineering has the most
		cars more than	number of stratified as well
		25000.	as localized distribution
		Till today MNC	network.
		has not given	
		more	
		importance to	
		number of	
		stratified	
		locations in the	
		distribution	
		channel.	
	2.	As MNC has	Tata has never faced this
	Channel	less number of	problem since 1990, when





	performan ce studies.	exposures distribution network, it takes a week to each the vehicles in the hands of customer, if the available stock is over.	they reached 300 small and big distributor numbers in India.
	3. Channel coverage studies.	There are only 22 distributors of Daewoo in India, 50 Hyundai distributors, 302 distributors of Suzuki, 20 distributors for Ford and GM, too.	If local manufacturer like Tata Engineering produces the car then it gets more than 500 distributing destinations and roadside garages at almost at every 20 kilometres on the highways.





		<p>4. Export MNC lead at If Countrymen manufacture and this front but the car and export it the Internatio when it comes return from it gives the nal to pricing, they Government most valued studies. value their car foreign currency. If the at the product is very good then international international acclamations price tag thus gives boost to the overall Indian export to other products too. customer and Government suffers the most.</p>	
E Promotion	<p>1. Motivatio n research.</p>	<p>MNC are very experienced in this area of research. Not only monetary but also at all the levels internal and</p>	<p>Local manufacturers have started all the kinds of things MNC adopt but at lesser costs.</p>





		external customers are motivated for the achievement of further goals. Many a times customers have to pay price for it also.	
	2. Media MNC adopt research,	Indigenous companies do the same things but at the lower costs from every angle. every new kind of thing to promote their product. Price of course has to be paid by the customers only and at a higher rate,	





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		too.	
	3.	With the huge	Though the local companies
	Advertisin	monetary	cannot pay but they are
	g	backgrounds	trying to fill the gap between
	effectivene	the MNC pay	the MNC and themselves by
	ss and	millions of	adopting some revolutionary
	Competiti	rupees to the	measures like new jingles,
	ve	most valued	new music, new software,
	advertisin	personalities in	new models, catchy tunes,
	g studies.	that country.	catching human moments of
		These	the prospective clients.
		personalities	Many ads became very
		include Sachin	effective thus increasing the
		Tendulkar,	killer instinct of the local
		Amitabh	firms to do better.
		Bachchan,	
		Sahahruk	
		Khan, etc. This	
		makes the	
		advertisement	
		very effective.	
	4.	Public Brand image of	‘Our own India car’ with lot



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	Image studies.	MNC vehicles like Opal- Astra, Ford, Mercedes, and Honda is well maintained in the pubic eye.	of service station and roadside garages. This is the public image of Tata-Indica.
	5. Sales force compensa tion studies,	In early days of its inception Suzuki dominated the car market with its all- possible effective productivity norms for every employee. The sales team highlighted only good	Indian companies with their wide range of network of distributors, retailers, godowns, local technology, and indigenous people have acquired all the strategies adopted by the MNC. In few years all the work culture of the sales team will be having similar kinds of out put as that of any most effective sales force in the world can have.



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			<p>qualities of their products but later on Indian public realized the high cost of maintenances.</p>	
		<p>6. Studies of deals.</p>	<p>The deals ultimately leads to higher profit of the MNC leading siphoning of the finances to the home base of the MNC.</p>	<p>All the deals ultimately generate more profits and all lead to the employment generations, revenue up gradation, infrastructure development hence development of the society.</p>
F	<p>Buying Behaviour</p>	<p>1. Brand Preference .</p>	<p>Almost Rs. 5000 Crores is been siphoned out of India every year due to Brand</p>	<p>Tata- Indica was sold like any other popular brand in the market, due to Tata tag on it. Still Tata is the trusted name in India. With every</p>



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		names like Tata vehicle part there are Mercedes- two hundred plus Benz, Honda, employments related to it. Opal, Ford, So the mouth-to-mouth Suzuki, publicity for the Tata-Indica Toyota, as the is astronomical in India due customers go to its maximum utilization of for these indigenous resources. vehicles on their trusted for years vehicles.
	2. Brand MNC Attitude.	organisations work and perfect planning with their Tata Engineering is moving heavy research towards developing the in the market brand image of Tata-India and then and also developing brand targeting attitude of the customers, in customer India. behaviour carry on





			<p>advertisings</p> <p>campaign. This</p> <p>makes their</p> <p>brand image</p> <p>suiting to those</p> <p>kinds of people</p> <p>who are</p> <p>targeted. Thus</p> <p>Brand attitude</p> <p>is developed</p> <p>and thus only</p> <p>Ford-Ikon,</p> <p>Maruti-</p> <p>Esteem,</p> <p>Honda-Accord,</p> <p>Mercedes has</p> <p>achieved the</p> <p>success.</p>	
		3. Product satisfactio n,	'Even the coin does not fall if it is kept on the top of the	If it is the same satisfaction consumers will be getting from the Indian developed cars then that company is





		<p>roof of the going to be phenomenal in</p> <p>Merc', thus is the Indian Industry.</p> <p>the</p> <p>advertisement</p> <p>of the</p> <p>Mercedes. The</p> <p>services are</p> <p>also provided</p> <p>to these kinds</p> <p>of multimillion</p> <p>cars. Not only</p> <p>satisfaction</p> <p>but also</p> <p>Mercedes gives</p> <p>the most</p> <p>valued</p> <p>customers the</p> <p>delight from</p> <p>their cars.</p>	
	<p>4.</p> <p>Purchase</p> <p>Behaviour</p>	<p>Due to limited</p> <p>dealerships</p> <p>customer has</p>	<p>Even Indianised cars cost</p> <p>less. So obviously the</p> <p>indigenisation will cost</p>





	,	but few options to visit. Still MNC compensate this shortfall with at home services. Thus the car with the best brand image having the best kinds of services in the market. Obviously it is a costly affair than the more indigenous car.	relatively less price. So the car with international quality and supporting services will obviously be developing its brand image in the world car market. In the Catalogue of the 2001-Daily Express- World Car guide 2001- 47 th Edition; Tata-Indica has got the recognition as an Indian car with International Quality, due to sheer hard work of the Indian people and recognition of the Indian car buyers.
	5. Brand Awarenesses,	Pre-launching advertisement gives advantage to the customers	With proper advertising Tata engineering has given advantages to the customer: a. easy purchasing, b. Most number of





	<p>as they get every details of the car. Every Brand tries to prove their brand the best. Thus they expose each other and customers are benefited most. But MNC have managed this factor well in India.</p>	<p>connecting link in India, c. Fair price of the product, d. Time saving due to dealer available at the nearest location, e. The best Quality product, f. Educate internal and external customer with patriotic fever, and thus reach every corner of the country through mouth-to-mouth publicity.</p>
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P24. LET US KNOW ULTIMATELY WHY CUSTOMER BUYS AN INDIGIONUSLY BUILT SMALL CAR?

Anybody who has provision for money to buy a car and is bitten by a bug called:

- i. Time Management,
- ii. Status, esteem, and position,





- iii. Class consciousness,
- iv. Career consciousness,
- v. Life pattern,
- vi. Comfort of his own family,
- vii. Family car syndrome,
- viii. Weekend family car syndrome,
- ix. Car with advanced gadgets,
- x. A patriotic bug bite,

Also if it becomes the need of that customer he buys the car.

P25. WHAT ARE THE EXPECTATIONS ABOUT THE INDIGENOUSLY BUILT CAR AS A PRODUCT?

- 1. Every customer feel that he should get out of car as fresh as he got into the car.
- 2. To fulfil this criteria car must have suitable aesthetics, ergonomics, comfort, most needed gadgets and equipments and technology.
- 3. It must fulfil the safety, technological, and legal norms of the province where ever it is driven.
- 4. It must have provisions for present and future built ups and developments if required.

P26. WHY CUSTOMER'S IMPACT ON TECHNOLOGIES AND IMPACT OF TECHNOLOGIES ON CUSTOMER BEHAVIOURS:





With the explosion of the knowledge on the World Wide Web the Communication and Network Systems in the world, the era of Internet and fast services, customer awareness is now reached at its peak in the graph.

Due to following reasons, the MNC and the Big Companies in India are very much ahead of their tiny competitors, as they are doing these kinds of things to attract customers at every second of the day. This shows that car industry will be guided and ruled by the king customers which includes technologies as well:

1. **Organisations are providing fast** courier, quick delivery services, dial-and-enjoy the home delivery to their customers, E.g. Mercedes-Benz cars, Daewoo-Matiz cars, etc.
2. Taxing effect through the **advertising explosion** on TV, Movie Theatre, Hoardings, Cable Network, etc. customers feel its effect, E.g. You will find our service centre at every corner in India a MUL advertise at every five minutes in the cricket match.
3. **Customers are provided some kind of message** through Pamphlets, Newspapers, Catalogues, Receipts with full of the product and services. E.g. Hindustan Lever and their soaps
4. Seminars, **customer interactions services, customer awareness drives**, free services, etc. E.g. MUL is conducting free services camp since few years for their all kinds of car segments.





5. **Various schemes** like bring few customers and get discount, Festive discount, etc. E.g., TATA-Indica has given extended two years free service offer to a customer who brought five customers and more.

6. **Technology awareness drive** to prove the upper hand of their Cars, E.g. In the SPICE campaign Daewoo-Matiz convinced their world wide customers that their car is the best in the segment and they received the prize for it and that is why they have reached in more than 122 countries in the world. Many bought the Matiz and thus helped it to grow in India as well.

7. The demand for the other segment of car got reduction and the cars from the MNC and the MUL and TATA got big demands. Infact the PAL had to close its few plants. Thus **if you care for the customer the customer grows your business.**

8. **The Rolls rice people give their customers the car they demand and the way they want.** Similar demand is there in US and the Japan now a day.

9. The upper middle class segment in India, which includes all kinds of **professionals** like Engineers, Doctors, Lawyers, Architects etc. are demanding better services at the cheaper cost who so ever give them this service they go to that product E.g. MUL Zen is **most preferred product** of the Anaesthetics (doctors) and Lawyers as they can carry their important recourses along with them anywhere they want.





9. Hereafter, **Technology will be developed on the customer's demands and as a part of competition.**

10. The **customer complaint** about the suspension system of the Tata-Indica made them to replace those parts on war front within a month or so.

11. The **History shows that the customers can make your product grow in the market or even they can throw you out of the market** as happened with the Montana cars in India.

12. Nowadays, **more and more profit-motivated companies are also more and more customer-care-retain-grow kind of companies.**

13. **One of the companies has gone even further it exchanges its old car after three years with new one and that too if maintained by its engineers then sales its new version at half of its costs.** Every year in Diwali, Christmas these exchange old cars with new one offer attracts more and more consumers every year.

14. **Encouraging customers always give better result.** Therefore, constant touch with the customers and their expectations keeps the LMV/ car organization on toes. It also keeps organisation ahead of its competitors.

15. **Every person who drives the car,** related to car business and even the roadside person is also a customer. This is because whether he is rich or poor, he is marketing the car by his gestures. E.g. Whenever Merc is seen everybody on the road makes a road for it right from the cyclist to the





Maruti car driver. This is because Merc is symbol of Reach and Top class family. This gesture also **gives the owner special feelings.**

16. According to the Society of Indian Automobile Manufacturers' Association of India **(SIAM), by the 2007 A.D., Indians will have annual turn over of one million cars per year.** By the end of this decade, it is expected that every one in five family will have a car in India.

P27. CONCLUSION:

It can be summarised in the form of following points-

Management of the developing small cars indigenously according to latest and futuristic needs with respect to customer behaviour and with respect to latest developments in the technologies in India, is a need of the hour and a viable job, it can be achieved by:

1. Using all the Indian indigenous resources,
2. Special attention be given to the customer behaviour as in future, king customer will be detecting the terms and condition in the field of technology and the service industry as well,
3. Allowing benchmarking to develop other industries in India,
4. Generating huge employment potential and thus allowing the socio economic growth of the country.
5. Making Indian economy and Indian technological front a self-reliant look to strive in better fashion in the future.





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6. Bringing laurels to the nation by giving the world the world-class product.
 7. Giving the best example of producing remarkable results if the nation uses all its resources cohesively and acts in a synergy.
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CHAPTER 1:

INTRODUCTION AND

CHAPTER WISE CONCEPTS



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119

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CONTENTS OF CHAPTER 1:

Sr. No.	Topic	Page No.
1.1	Key Terms	149
1.2	Broader Meaning	149
1.3	Legitimate definition	150
1.4	Hypothesis	152
1.5	Reasons	153
1.6	5W and 1H of this project	157
1.7	Major influential factors and reasons why the stress is on indigenously built cars only	162
1.8	Background why selected this topic	164
1.9	Why MNCC, brought their Cars in India?	167
1.10	How MNC car organisations capture the market?	167
1.11	Should Indians fear mighty MNC car sellers and manufacturers?	169
1.12	India's plus points in the car market in the present world context.	172
1.13	Negative factors in the present world context for the car market in India	173
1.14	Why Indigenisation of cars technologies only?	174





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1.15	Expectations of the Experts.	175
1.16	Opinion of Various Experts	176
1.17	Challenges and the opportunities in the car market	181
1.18	Advantages of developing Indigenous car with respect to customer behaviour	183
1.19	Has this kind of technique been adopted earlier in the world?	188
1.20	What will be the Result of implementation of the car indigenisation project?	189
1.21	Why is it the need of the hour?	192
1.22	Some more reasons of car technology being indigenised according to the demand of the customers in India	193
1.23	Relationship of the - Impact of the car technologies on the customer behaviour and Impact of customer behaviour on the car technologies	193
1.24	Managing the ways that can be adopted for the above-mentioned efforts of indigenisation of car technologies with respect to customer behaviour	197
1.25	How can it be achieved	197



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1.26	Chapter wise Concepts and Gist of every chapter	199 to 228.
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CHAPTER 1:

INTRODUCTION AND CHAPTER WISE CONCEPTS

1. 1. Key Terms: In this thesis more frequently you'll come across these very important terms:

1. Development of India at techno-socio-economic front using Indian resources.

2. Indigenisation of Car i.e. the whole car as the final product.

3. Indigenisation of Car Technologies:

a. The Car Technologies used to manufacture every car components.

b. It also means every latest gadgets and technologies used in the car making it as the ultimate product of luxury and comfort.

4. Customer Satisfaction from the car (the product).

5. Customers' influence on the car technologies.

6. Influence of car technologies on customer behaviour.

7. Every kind of Car Technologies is very essential as they form the base of the more advanced technologies.

1.2. Broader Meaning of Indigenisation: The best meaning of indigenisation is mentioned in the 'World Book'- 2000, Millennium Edition- Compact Disc.

According to the 'World Book':

1. Indigenise: - is a transitive verb, - nized, -nizing.

Meaning = *to make native; Bring under the control of the native of a country.*





Example: Not since the end of Nigeria's civil war has so much heat been generated by govt policy as the decision to indigenise some aspects of the economy (London Times).

2. Indigenous: - is an adjective,

i. Meaning = Originating in the region or country where found; native

Example: Lions are indigenous to Africa,

Shinto is the indigenous ethnic religion of Japan (Atlantic)

ii. Another Meaning (*Figurative*)= *Born in a person; innate; inherent.*

Adjective- Indigenously.

Noun- Indigenouness.

Thus, in our case it means that a to z car technologies be originated from India using every kind of indigenous Indian resources.

1.3. Legitimate definition of indigenisation of car and its technologies in India:

Indigenisation of car and its technologies categorically means, Indian citizens using their every possible own resources and knowledge of their own people to manufacture their own car and its technologies at the lowest possible cost with provision of high employment potential and for the delight of the customers who use the product; further more giving the techno-socio-economic stability to India, their own nation the motherland.

Though Indian Economy has shown an amicable strength in the present worldwide Economic crisis, it may be or may not be the same case in the





next coming similar phase of the Economy after few years from now. The reason being mastery over the situation mainly depends on how much self-reliant India is on Socio-Techno-Economic front. Present world Economics has experienced the Mexican crisis, the Japanese crisis, the American crisis, and still to follow are the Brazilian economic crisis. The major reasons observed were the hegemonies of the technologically advanced companies belonging to the developed countries over the developing countries and underdeveloped countries. The technologically advanced countries have all the resources to remain at the top of technological development. Besides skilled personnel, these countries are backed by financial powers, and supporting resources. These countries always keep the edge over the other countries by enforcing the laws in their favour, which can be clearly observed from the implemented draft of the GATT agreement. Above all technologically backward countries always remain dependant on the technologically advanced countries thus losing financial dependency as well. In one independent survey it is observed that India is losing almost five billion dollars every year since last two decades due to above mentioned technological dependencies.

In the car manufacturing case India even does not have its own indigenous robotics technology for the mass production of the cars. Also, Indian organisations do not stress much on Technological Research and Development. Hence giant carmakers like Ford and General Motors,





Daimler-Chrysler, Toyota, Hyundai, Suzuki and others are entering in the Indian market with all their might. These organisations have all the qualities to capture Indian market.

Infact sales figure of few thousand sales of cars can predict the amount of loss India is suffering on the technological and financial level. It is in the range of few billion dollars. Besides that, in today's market organisations are concentrating mainly on customer satisfaction of the product. At present the Indian market is flooded with various foreign made cars and different goods. Thus a huge amount of foreign exchange is spent on this. It is therefore thought to develop these technologies indigenously. India must manufacture each and every component of all the brands of cars indigenously in India using all possible Indian resources suitable for the Indian conditions to delight the Indian customers. This will definitely stall the domination of the giant carmakers of the world in India and can make India self reliant on the technological front.

1.4. HYPOTHESIS:

For making India self reliant on the Techno-Socio-Economic front Indians must take the indigenisation of technologies and customer behaviours issue very seriously. Indigenising the car technologies according to customer behaviour and developing technologies for customers needs has major role to play in it. In many developed nations infact the technologies used in a car





or used to manufacture the car and car itself has become engine of growth. As, ultimately it is the satisfaction of customers through products, processes and services rules the car industries. Similarly, future versions of the cars will also have the same fate.

Following are becoming prominent words in the Car World:

- a. Safety of the customers,
- b. Comfort of the customers,
- c. Use of Information Technologies and
- d. Computers for technological management;
- e. Interaction and interlinking of human and technologies

Above all Indian customers are also demanding it. As they feel after all technology is meant for these purpose only in the Car Market.

However, still the Indians have not assimilated the importance of R & D. Infact, R & D labs can develop the new cars and newest car technologies in the world according to the latest requirements of the customers.

Furthermore, if conscious customers demand the future technologies:

- a. Which supports the sustainable development,
- b. Which are developed according to the latest quality standards,
- c. According to latest environmental standards,
- d. Within prescribed satisfy norms.

Then the car companies will have to follow customer's demands to remain in the market.





Thus, technologies for customers' satisfaction and customers' demand for technology development in the car sector have mutual impact on each other.

1.5. REASONS:

Around the world Technologies are developing at astronomical rate. It is happening due to increase in innovations and creativity through R & D in every sector. Since last few decades R & D has become a twenty-four hours full time job in all the giant car companies in world. It includes GM, Ford, Daimler-Chrysler, Toyota, Renault, BMW, and others. Car industry is the pioneer in many aspects. Since last century the human's best creation according to Legendary Mr. Henry Ford has become engine of growth and creativity in many countries. Hence, this aspect of technology development and customers impact on it and vice versa, has become of very much important now. There are few more reasons which proves the importance of this aspect are:

1. More than 80% of the Industries listed in CII directory are directly or indirectly associated with the vehicle industries. Of it the car industries have the highest turnover in it.
2. A single car is composed of more than 30,000 parts including the nut and bolts, the big assemblies and the electronic gadgets as well.
3. According to the Children's Scholastic Science Encyclopaedia World over every day almost on an average one hundred thousand (One Lac) cars get





added on the road. Apart from its maintenances, services, spare parts and manufacturing units, second hand cars, recycling units, etc. makes the car industry the biggest industry in the world.

4. A latest figure on July 2003 Sakal a Marathi daily, shows that car industries have more than USD One Trillion turnovers worldwide.

5. R & D brings new technologies for the customer satisfaction of the product. Conscious customers also demand further versions of car technologies. Thus, both customer and car technologies have mutual impact. This mutual impact plays very important role in the billions of dollars profit of all the major or minor car players in the world.

6. If latest world norms are carefully observed, it is prompting 100% recyclable capabilities of every car technologies. Hence if India lags behind in R & D in the car sector and implementing strict legal code for the new car technologies, it will become a huge dumping ground of cars around the world.

7. Besides these things this mutual impact of customer and new technology development through R & D gives tremendous boost to the job generations as it is said that to every car part more than 50 jobs are associated. It also uplifts the life standards of the citizens. There is a huge revenue generation as well. Thus, India can become a pulsating economy if the indigenisation efforts are taken seriously.





8. In October, The Week, 2001, Edition for “The Great Indian Middle Class” it is been clearly mentioned that in 2000 Indian middle class stands at 300 million (30 Crores). If Indian Economy grows at 6% per annum then in 2007 A.D. it will be 600 million. Thus, Indian car market demands large number of cars by that time.

9. Society of Indian Automobile Manufacturers Association (SIAM) in 2001 have predicted that Brand new cars sold in India has touched the 6 lacs mark in 2002. In 2007 it will touch One million.

10. Tarun Bharat, 28th July 2003, has fantastic figures on Second hand car market. It is 70% of the new car market in India. It is the case world over.

11. To every car part it is supposed that there are 50 jobs are associated. As mentioned earlier there are more than 30000 parts in single car. Thus, manufacturing all the parts indigenously in India can generate more than one lac fifty thousand jobs of different skills for single model of a car. It includes roadside mechanic, petrol pump workers, pulverising man (puncture), engineers in the factory, etc.

12. The shifting to higher vehicle syndrome, The Week, October 2001, in India shows that almost five lac customers are shifting from motorcycle to the small and compact cars in India. Thus, making Indian car market one of the fastest growing market in the world.

Technology spin off shows that there large number of technologies that are first used in manufacturing the car or inside the car. These same





technologies are then modified for other uses. Like the technology of assembly line Mr. Henry Ford first used manufacturing. Perhaps Ford Motor Company's single greatest contribution to automotive manufacturing was the moving assembly line. First implemented at the Highland Park plant (in Michigan, US) in 1913, the new technique allowed individual workers to stay in one place and perform the same task repeatedly on multiple vehicles that passed by them. The line proved tremendously efficient, helping the company far surpass the production levels of their competitors—and making the vehicles more affordable.

These same technologies were used in manufacturing other products. Infact, now a days television sets, computer sets, mixer grinders, use this kind of assembly line technology for manufacturing.

1.6. 5W and 1H of this project:

Mr. Henry Ford is a leading light and legendary personality in the car world. According to him, “Car is the best creation of human being”.

Of all the Cars, Luxury car provides the peak of the comfort, the aesthetics, and the ergonomics. Infact it is the engineering marvel that makes travelling and living easier.

Let us apply 5 W’s and 1 H to the Simple as well as to the Luxury cars. The answers will vary from person to person and dictionary to dictionary. However, the extract of those answers are put into the following form of gist.

Table: 1.1: 5W and 1H of this project:





SN	The 5 W's and 1 H Questions	The Answers
1	What is a car?	Oxford Dictionary Meaning -A road vehicle with an enclosed passenger compartment, powered by an internal combustion engine.
2	Why car is so popular?	Car provides a comfortable time bound travelling option to every person seating in it.
3	Which car provides the maximum comfort?	The Super Luxury cars provide the maximum comfort.
4	Where would you find the technology spin off of the Luxury Car Technologies?	Choice of costly luxurious surroundings and possessions in the cars is used in offices as well as at homes. Something desirable for comfort or enjoyment including sofa cum bed the audio-video players, the video conferencing instruments, the mobile telephony, kinds of instruments and gadgets which are must for the person who is owner of the luxury car also finds place in offices and homes. These are important equipments but are not indispensable for the owner of the





		Luxury Car. These instruments and gadgets help the user to take important decision in the so called home like comfortable environment. The spin off of the technologies categorically means that these same gadgets, equipments, and various instruments have multiple applications in various other demanding fields.
5	When can any country reach the peak of manufacturing the technologies used in the Luxury Cars?	When the industrial background of any country reaches the height of manufacturing the higher end technologies, it can manufacture the Luxury Cars.
6	How can the Luxury Cars be manufactured?	It needs mastery over the (*) Basic Technologies i.e. manufacturing simple nuts and bolts like parts. It also needs mastery over the manufacturing of the (*) Middleware Technologies like few car assemblies, gearbox, steering gear box, the car engines, the simple calculators, the simple computers, like machines, parts or





		<p>their assemblies. Once any industrial backgrounds reach this level it is supposed to be capable of reaching the height of manufacturing the (*) Higher End Technologies like Luxury cars, the Super computer, the CAT Scan like machines, the missile technologies and the space age technologies.</p>
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This was the simple analysis of the cars and its technologies. However when it comes to impact of the car technologies on the customer behaviour, the point to mention here will the Ford-T model which made cars very popular among the masses than the classes. The technology used was very simple. It had the engine, a simple body and the steering wheel and the four wheels mounted on the shock absorbing springs.

Later on several car companies were set up around the world. Every car company brought new technologies to lure the customers and earn more profits. The competition grew to the extent that every car company tried to bring something new in their every new product.

This was the start of the versioning in the car sector. To remain in this cutthroat competition every car giant set up their Research and Development (R & D) wings literally in every possible departments right from





Finance Department to Material Process Department, Vehicle Development, Chemical Processing Departments, etc. In Marketing these companies started the market research in product, process services and the after sales services as well. Thus, every company is trying to dominate the market and the R & D wings play major role.

If Indian market and the industrial set up is observed carefully researchers will find that R & D is given the least importance. Either it is made part of Quality department or the same people who are in the manufacturing field are also doing the job or R & D. Where as in all the leaders in the worldwide market have independent R & D wings in several departments.

Customers are highly influential to the services and user-friendly comfortable technologies. Better ergonomics and aesthetics add flavour into the customer interest for the car technologies.

Take example of collapsible steering wheels with air balloon option on it. The idea of person not dieing due to steering pressure on the driver chest due to throwing of the air filled balloon was so popular that almost every car after 1972 was fitted with this technology. In this technology in case of accident the steering wheel column collapses inwardly and throws a big balloon or air filled bag within the span of 0.2 Second of impact it saves the life of the driver. On that year lot of accidents occurred. But the drivers driving one particular model Cadillac model died on the spot. The reason was its steel hard steering wheel and steering wheel column (*). Though it





was brought into notice by the rival company still every company not having collapsible steering or the balloon technology suffered.

On that year the cars not having these technologies were not at all sold.

Thus, indirectly customers dictated the terms for that particular technology for the steering wheel and steering column.

Thus impact of technology on customer behaviour and impact of customer behaviour on the technologies are influencing the advancements in the technologies sector. Car is not an exception to it.

Look at the History of the Mercedes cars. The earliest version of Mercedes car of 1897 and the present ultramodern car from Mercedes has undergone a sea change.

What are the things those are responsible for the technology changes? The major reasons were analysed from the independent survey:

- a. Customer Behaviour,
- b. Technologies developed according to the customer needs,
- c. Variety of tastes among the diversified customers around the world,
- d. Huge R &D investment of the global giants to remain at the top in the competitive world.
- e. Scientists and Engineers being creative brains demand new challenges to be developed for the future.





- f. The technology spin off shows that the technologies used in one place can be used in other applications as well. Thus, making an investment for the future.
- g. Customer Demands.

1.7. MAJOR INFLUENTIAL FACTORS AND RESASONS WHY THE SRTESS IS ON INDIGENOUSLY BUILT CARS ONLY:

1. Go to Telco, go to Mahindra and Mahindra, go to MUL, go to Escorts, go to Ashok Leyland and lastly go through the CII Directory you will find that half of the Indian technological businesses are totally dependant on the Cars and Automobile sector only. Therefore, the aim of this project is the total indigenisation of cars (LMV). Similar techniques can be used with the benchmarking in the other allied fields too.
2. It means the product is manufactured wholly by the Indians and from the Indians but product is for the entire world.
3. It means the complete Set up of the manufacturing plant. The ancillary units, the vendors, and the sub-vendors are Indians located at every possible corner in India itself.
4. It means Indians have done the designing of various parts. Right from the screw to the big shafts are designed and manufactured in India by the Indians, and all the Indian and foreign buyers are enjoying the benefits from it.





5. All the parts from screw to the big assembly will be manufactured uninterruptedly. Though they are manufactured in thousands of different and distant locations situated at thousands of kilometres from the main plant, in India; still they reach the main plant Just In Time (JIT).

6. The Indians do the servicing and maintenances of the machines in the plant.

7. After that, Indians also do sales, the after sales services and maintenances. The mechanic and the Engineer can be a skilled person who is the owner or may be a person who is uneducated but a skilled owner of the roadside garage.

8. The latest techniques like KAIZEN, TQM, TPM, and JIT and with Quality standards like Zero Defect, Six Sigma, QS 9000, ISO 9000, and ISO 14000 can be applied.

9. It follows the norms mentioned for Ecological balance like Euro1, Euro 2 and Euro 3 or India1 and India 2, etc.

10. It follows all the technological safety norms. The car passes the endurance test for its all the parts. It also passes all the crash tests e.g. head on collision, oblique collision and horizontal crash. Its glass when crashed crumble into pieces which will not hurt the driver.

11. Its tyre when punctured the vehicle will not dash the side by vehicle. It will have a collapsible steering, etc.

12. It follows all the metallurgical norms for the metal selection.





13. The management upgrades its model as per the time and need, and helps the earlier versions to do so according to the latest market norms and International and parallel national standard.

13. The marketing set up is as such that whenever the customers face any problem he has the access within his reach including the service stations.

14. In the technology spin off the technology used in manufacturing more than thirty thousand car parts with different metallurgical combinations and manufacturing technologies is also used in many home appliances and in other technical fields. Thus, the technology used in car forms the basis of development of the country. It is the case with USA, it is the case with UK it is the case with Korea. It will be the case with India if this project is taken seriously.

15. Last but not the least car has become a need of the middle class and upper class people. Their every moment counts in this competitive world. So, Railway, Buses have become absolutes for them, when it comes to emergency or hurried situations.

1.8. Background of - why selected this topic:

The main reason to select this topic is the present market condition. It is demanding a very well formulated solution over the economic crisis India along with other countries in the world is facing. This thesis can definitely give the direction to the solution over the financial crisis and how to avoid





this condition in future at least with respect to car segment in India. Thus, this thesis is the thorough research on total indigenisation and how to avoid extreme fluctuations in the small car market, and how to avoid dependency on the unknown forces, by hearing the customers demands, by getting suggestions and following what the indigenous consumers and the world market demands. This will make Indian car industry a engine of growth in future as happened in USA, Japan, UK, Italy, South Korea.

Furthermore, Researcher firmly believes in the abilities of the Indians. Still we'll see what has happened and forced researcher to select this topic.

Very often Indians are blamed for making mess of anything they work for. But it is not so. Rather it is the way since last few decade western media in unison with their advertising partners and the commodity manufacturers are using, to dominate their market hegemonies and their views on the world. India incidentally is one among their list. Same principle is adopted against the Chinese, Japanese, and Koreans as well.

Now coming to the car market. The car according to Mr. Henry Ford is the best creation of human being. Mr. Ford himself manufactured Ford- T model. He was the first to use the assembly line method in the car manufacturing plant. This was the era of 1930's.

After few more decades, there were almost a couple of dozen car manufacturers in the world.





India was one among them. Premier Padmini car by Premier Auto Limited (PAL) in collaborations with the FIAT of Italy and Ambassador car by the Hindustan Motors (HM) in collaborations with the General Motors were the two manufacturers from India.

Till late 1980's these two companies with their monotonous product and services dominated the Indian car market.

By this time western car manufacturers had reached its peak. Infact, four million Beetles car were sold. Mercedes, General Motors, Ford, Toyota, Mitsubishi, Suzuki, Renaults, Fiat, had started revolutionary measures to increase their base in the world car market. The money power and the extraordinary management tricks made these companies rule the world car market. The dependant business also made a good impact on the economy of the countries that owned these companies. Where as the countries faced the reverse impact where these companies made their base for sales or sub base for the manufacturing. By the time India realised its backlogs, these companies have attracted Indian customers as well.

So, in 1980's it was Maruti- Suzuki, which by its well-planed result oriented marketing, and servicing approach gave the severe jolt to the Indian automobile manufacturers, PAL and HM.

After 1994, many 'multinational corporations (MNC)' entered into this arena and the result was worst for the Indian players. Infact, PAL had to close few of its plants in Mumbai. HM suffered the decline in its sell.





It happened with other fields in the industry as well. This was the indication that MNC with their ferocious might entered to capture the lucrative Indian market.

1.9. Why Multinational Corporations (MNC) brought their cars in India?

Look at the growth in the middle class culture and population in India. Also see what the Economics and Finance Scientist and organisations and giant MNC research indicate.

- a. Society of Indian Automobile Manufacturers Association (SIAM) has published its research findings in February 2002. In it, it is predicted that if Indian Economy grows at the rate of 6% of its Gross Domestic Product (GDP), by 2010, India will have turn over of one million cars per year.
- b. The Week (Indian Monthly- Magazine) December 2001 Survey predicts the rise in the supreme middle class culture in India. It has stated that Indian bourgeois will increase to whopping 600 million in 2007, from 300 million in the 2001. So, India is looked at as the second most demanding market in the world, after China.
- c. Thus from the business point of view all the MNC pre-business-launch survey indicates to have an Ample Scope in the Indian Market.





1.10. How MNC car organisations capture the market?

MNC never act suddenly. They have a well-planned strategy to capture the market and exploit every situation. By now, MNC have faced every kind of situation in and around the world in various countries. So, they have a treasure house of solutions over every kind of problem. Otherwise they have the money power, human resources or the skills to tackle every kind of situations.

Mainly MNC have the following well-proven track of plan of five phases.

a. *First Phase: Pre-market Survey and Research and Development (R & D)*, at every level of the business in every department. This Overall market survey and R & D activities include:

- i. Product and Technology survey,
- ii. Process survey,
- iii. Customers survey,
- iv. Services requirement survey,
- v. Resources survey.

b. *Second Phase: Planning with healthy budget*: Many of the car manufacturing and marketing MNC entering Indian market have strong budgets. Their yearly turn over is more than one third of the Gross National Product (GNP) of India, which is \$427 Billion in the year, 2000.

Where as Fortune Magazine on the same year gives the details as follows:





- General Motors (GM) of the USA has yearly turn over of USD 135 Billion.
- Ford Motors of USA has yearly turn over of USD 130 Billion.
- Toyota corporation Japan has yearly turn over of USD 98 Billion,
- Mitsubishi Japan has yearly turn over of USD \$95 Billion,
- Mercedes Benz of Germany has yearly turn over of \$80 Billion.

Thus, in the business world these are the kind of companies who make the things happen. These budgets can even shake mighty economies of the world leave aside the small Market forces.

c. Third Phase: Attracting Internals and External Customers:

With the heavy remunerations, packages and perquisites and other extraordinary facilities these MNC attract the local high-class technocrats and the executives, forming a formidable internal customers (employees). Where as, the external customers are those who buy the car as a product and its services for their satisfactions. They are kept constantly under demand and supply of satisfactory services.

d. Fourth Phase: Maintaining the array of the customer: Thus these MNC maintain a huge array of the customers who become brand loyal after years of good services provided by the companies.

e. Fifth Phase: Trying for total customer satisfaction: All the efforts of all the organisation are directed towards only one thing - customer delight not less





than that. Lot of companies are trying for it. Few of them have achieved it, e.g. Rolls rice, Mercedes- Benz, BMW, etc.

1.11. Should Indians fear mighty MNC car sellers and manufacturers?

Part A: Plus points of MNC:

For this let us see the MNC work history, since few decades in various countries:

- a. Every MNC entering India brings its supporting conglomerates of companies from their own nation to India. They go synergistically in every country, to boost their sell. India is one among them. Even they pose a war among themselves but ultimately they know money is going to their nation and will boost their profit in long run. E.g. Pepsi and Coke.
- b. The sheer aim of earning more and more profits brings extreme competitions in the host countries. With the might of the money MNC just clean sweep the nation in every business they enter.

But, Indian market is perhaps the oldest market in the world trade, which has experienced umpteen numbers of ups and downs since ages.

In recent times, the car market, which is almost fifty odd years old, also has experienced almost all the phases in the car working culture and also in the technology since Indian independence.

- a. So by now, the overall market is stable and matured enough to take burdens from these foreign MNC invasions.





- b. Indian car market has the skilled workforce that is still supposed to be the best in the world. These workforces along with the customers are capable enough to tackle any kind of the situations.
- c. In the worldwide Economic crisis Indian Economy was one among the only stable Economies showing its might every now and then.

Thus, in the car market the businessmen have already accepted this challenge as an opportunity and are searching for the counterbalancing threats to the MNC. As a result, many dealers have stopped selling the cars. The best example around us is the Aditya Motors of Nagpur stopped selling Daewoo- Matiz, due to falling demand. Many of the plants of the MNC are closed due to these measures e.g. Daewoo Motors India Ltd.

Part B: Plus points of the India's Indigenous car market forces:

Many MNC found the Indian workforce to be the fast learners who leaked the information in the market, which strengthen the countermeasures to compete superbly. So, instead of fear in the market a confidence of competing worldwide has developed amongst the skilled and unskilled members in the market.

a. Henceforth, no panic, there is no problem of fear as such in the Indian market. Instead a stage of patriotic feelings has started developing among the middle class citizens of India. Indian bourgeois demand:

- i. Low priced car,
- ii. Low priced car services,





iii. Latest but acceptable car technology most suitable for the Indian conditions.

b. Many customers like my Engineer friends like to see their at least a distant friend working in the car organisation, which give them proud joy, and which help them take decision to buy that particular car brand. They feel that if the organisation is giving employment to the Indian people then only that organisation is transparent otherwise Indian customers feel isolated from the foreign brand, product and the organisation.

c. These all things are possible only if the car is manufactured totally on the Indian soil.

d. That is why, the sales of the Tata Indica, which uses most of the indigenous resources to built the cars, and for its services.

- o The Men (Workforce),
- o The Material,
- o The Machines,
- o The Management.

Hence Tata Indica is the most indigenised small car of India. It has grown its sells figures since its inception in the market since October 1998, (Economic Times, 1st May 2002).

d. Similarly Suzuki, Daewoo, Hyundai, Ford, and other MNC have started their few manufacturing attempts in India. Completely Knock Down (CKD)





vehicles, which were manufactured in the foreign soil and brought for sell in India, is becoming bygone era.

e. g. On 1st October 2002, (The Hindu- 1st October 2002) Ford has started manufacturing its India version of Ford- Ikon using maximum Indian resources. The Indian ancillary units use maximum Indian resources to manufacture many of the parts the said car.

But, what Indian wants is the hundred percent Indian built small car.

e. Thus, see the power of the customers. They can force the so-called mighty market forces to buckle under their pressure of demands.

So, finally the answer is simply no. India must not fear any foreign entity.

1.12. India's plus points in the car market in the present world context:

- a.** Very strong technical workforce,
- b.** Huge number of bourgeois (middle class),
- c.** Stable market forces,
- d.** Highly experienced business class,
- e.** Huge amount of natural resources required for indigenisation of any kind of technology,
- f.** Survival instinct and the killer instinct of the Indian people,
- g.** Strong civilised and well cultured societies to give positive growth to the market forces,
- h.** Diversity of taste among various kinds of the people,





- i. Support from the government, state and the local public and hence availability of the required resources.
- j. Capacity to absorb good and tenacity for the impact of bad happening and hence perseverance of Indians is very high.

1.13. Negative factors in the present world context for the car market in India:

- a. Indians give least stress on the Research and Development,
- b. Though government support the MNC efforts, still it levy huge taxes on the product,
- c. Less spending capacity of the consumers,
- d. Commodity once bought becomes life long asset for the consumers unlike the average Americans who change their car after every three years,
- e. Unless proved Indians do not accept any new product thus discouraging any kind of the research and development in the car market.
- f. The law in India changes at very slow speed. Thus many a times takes lot of time to bring newly developed product to be brought on the road or in the market.
- g. People are interested in permanent kinds of job with pension and gratuity after the job span of thirty odd years. MNC never promise such kinds of job hence can pose a problem in future.





1.14. Why Indigenisation of cars technologies only?

The Super Computer forms the most complicated technology in the field of Electronics. This in turn is the latest branch of Science. Where as Automobile is an older Technology which Indians have digested and assimilated since last fifty years. So, if India can manage breakthrough in the latest branch of Science then why cannot in the basic and important old form of science? They can they should and they will. They can manage to carry out Research and Development in the cars according to the Indian customers' needs and according to the Indian conditions, they can Design and manufacture the Automobiles right from the Engine, Gear Box to the Tyres and also manufacture them at par with Americans and Japanese cars as well. The Indians can manage to pursue this task by utilising all their indigenous resources to satisfy the car customers' needs at all fronts from individual to national and humanitarian level.

Also, Indian engineers, businessmen, executives, and from students and knowledgeable customers to all the other decision makers can build the cars which comes under Light Motor Vehicle section of RTO Rules, totally indigenously using all the indigenous resources, of the latest world standards; and can manage its perpetual success at all the levels in the global competitive market. Similarly, with the bench marking, Indians can achieve the same goal in the other allied fields too.





Please remember, this form of Car and Automotive Technology also forms the basics of many other technologies right from manufacturing Heavy Machineries and Space Shuttles kind of Vehicles to the most advanced Medical Technologies. Henceforth, India can enter successfully into every other possible field of Higher End Technologies.

Here, Researcher firmly believes that the car can become a smaller part of this giant project of Technological Advances and self-reliance of Indians.

Since his student age, researcher is interested in developing and manufacturing indigenous Indian cars with using all Indian Resources. Researcher firmly believes that Indian Scientists, Engineers and Managers, Businessmen and Consumers can develop their own technologies using their own resources any time if they wish and if they come together. Now, may be, this is the write time to start this venture.

1.15. Expectations of the Experts:

Experts believe that there are three kinds of technologists in the world.

- a. Basic technologists, who can design, develop, manufacture, sell and survive in the market. These technologists include the Zero End Technologists and Basic Technologists who can design and develop products like pin, needle, and nuts and bolts and few small assemblies.
- b. Middle ware technologists who can design, develop, manufacture, sell and survive in the market. These technologists include the developer of





washing machine, the two wheelers, the printing machines, and the conventional automobiles. Small car stands at this level of the technologies.

c. Higher end technologists who can develop the space age technologies, the guided ballistic missiles, the atomic reactors, the thermal electricity generators, the super computers and the higher end super speciality medical equipments.

The experts believe that India has all these experts hence, if India can manufacture the cars indigenously. The same set up of the industries can also help in building higher end technologies at cheaper costs. As the car industry has turnover more than technological turnover in all above-mentioned fields, so experts are tilted towards developing these car technologies indigenously.

1.16. Opinion of Various Experts:

A questionnaire was produced before the experts in the Management, Engineering and Business.

Besides this the questionnaire was also placed to the technicians who are in the manufacturing of the Automobile and machine parts since last fifty years.

This table forms the extract of the survey. It clearly indicates that growth in the car business indicates the Socio-Economical and the financial growth of that country.

Table: 1.2: Growth in the Car Industry indicates the nation's





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Economical and Technological growth. Independent survey:

S N	DO YOU AGREE on the following aspects about the CARS?			
		YES	NO	REMARKS
1	Car Industry is still the biggest in the world?	YES		
2	India can Design, Develop; Manufacture its own car with its own resources?	YES		
3	US industry thrives on car industry?	YES		
4	India can develop at faster growth rate, if it can produce its 100% own cars?	YES		
5	India can generate most employment through complete set up of own car industries?	YES		
6	US have contributed most in the Research and development of the car industry?	YES	NO	50% Japan
7	Italy has the best designers in the car industry?	YES		
8	Continuous improvement in the Quality has upgraded the car industry?	YES		
9	Better versioning in the car industry is still possible in the car world?	YES		Price concern
10	Should Various impact tests be made compulsory in India?	YES		
11	Should Strict Quality tests be conducted every year in India for every car segment?	YES		



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12	Should the Service industry in car segment be upgraded?	YES	Very much
13	Will you expect a completely computer controlled Autopilot driven car in future?	YES	
14	"Car is the best invention of man"?	YES	
15	Complete set up of car industry forms the basis of higher end space-technologies?	YES	
16	Automobiles form the backbone of Transportation Industry?	YES	
17	Number of small cars shows the Economic growth in middle class people?	YES	
18	Small car is mostly driven by professionals like Doctors, Lawyers, Engineers, etc.	YES	
19	Executives must be provided with car and fare or car and petrol facilities?	YES	
20	Cars having price more than Rs.5 Lacs, have less chances of growth in India?		NO
21	Like Japan India can also manufacture Quality cars in India itself?	YES	
22	In coming 20 years India can have at least one Car Giant like GM, Ford, Toyota?	YES	



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23	Should Engineering and Management people come together to develop Industries?	YES	
24	Should India develop Cooperative Car Industry for Indigenisation of Cars?	YES	If it's basic need
25	Should Unemployed youth be utilized for the Indigenisation of car Industry?	YES	Especially Engineers
26	Can Public Sector Industries develop the better cars in India?	YES	Like BHEL
27	Price of a car in US is equal to lowest salary of one month in US?	YES	
28	Can the prices of the cars in India be brought to the level the US has?		NO
29	Should Hyundai, Daewoo and other MNC cars be 100% Indianised?	YES	Must
30	MNC should be allowed to manufacture cars only if they Transfer the Technology?	YES	
31	Indian cars can capture Chinese and Third World car market?		NO China Price
32	RTO, DTO must be very strict while allotting the Licenses for the cars?	YES	Must be.
28	Traffic manners, licensing and the car must be	YES	





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directly linked?			
Should alternative fuels like Methanol, CNG, 29 LPG, be allowed in the cars?	YES		
Should the car industry and other industries be 30 given special privileges?	NO		
Should any restriction be brought on importing 31 cars to increase domestic cars sell?	YES		
Should the Indian car industry be thoroughly 32 revived?	YES		
Should the Indian car and transportations norms 33 be revised?	YES		
Should the Indian road conditions and the 34 signals be synchronised?	YES		
Should the Indian Traffic Management be revised and Motor vehicle act be revised for the new 35 technology?	YES		
Indian middle class has increased from 300 million, still one tenth of them cannot buy car? 36 Do you agree?	YES		
37 Can Indians develop alternative fuelled cars?	YES		
38 Can Indians develop advanced technology than	YES		



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the present car technology?			
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Interpretation of Table:

The table is quite elaborative and self-explanatory. It covers almost every point related to car industry market and customer and traffic, and the nation's economy.

Experts believe in thorough revision and modification of the car industry and related matters. They believe that India's economy was built on the aspect that has become an axiom since long. Experts think, in the principle of the survival of the weakest lies the growth of the toughest economy in the world. Through this indigenisation of car program also Indians can achieve the same.

Infact small car is major link between the higher end technology and the basic technologies.

If India can develop the advanced hydrogen fuelled or the solar cell fuelled cars, India will be able to implement same thing in the other allied fields too. If India can develop the vehicle running on the mixture of at least 10% alcohol based petrol or diesel, India will be saving 10% of the foreign exchange which can be saved and utilised for the other important aspects as well. It will be a remarkable breakthrough at the national level as well.

Experts believe that India has the expert technocrats and the capable bureaucrats to handle this kind of ventures.





1.17. Challenges and the opportunities in the car market:

Let us see the present technical and marketing side of the Indian car market:

Until Nineteen Eighties, there were only few cars in the Indian Market viz. the Ambassador by Hindustan Motors and Fiat or Premier Padmini from PAL.

Since Maruti-Suzuki cars entered with well-planned set up of service stations and supporting network, the car market has totally changed for the first time in India.

Next time not only Indian Car Industry but also the Industrial world changed a lot the time when GATT got final 'yea' for implementation from Indians and also 'yea' from many countries in the whole world.

The results of 'these kinds of implementations of open economy show the world the Mexican crisis'. Mexican Economy totally collapsed due to the heavier losses in the industrial sector may be mounting to whopping \$56 Billion.

This was the same time when many more MNC added woes to this factor and destabilized the grandfathers of Indian Auto Industry. Infact Premier Auto Ltd. (PAL) had to close few of its plants in Mumbai, as they could not compete the professional and result oriented approach of the Maruti-Suzuki and later on from many more MNC.





Thus it has become a challenge and an opportunity as well to compete with these kinds of market forces.

a. It is a challenge to meet the uncompromising level of quality, time bound delivery of sales and services,

b. It is also an challenge and opportunity to become a indigenous manufacturer of car components independently and increase revenue of the country thus gaining status in the society,

c. It is a challenge and an opportunity to develop testing facilities using equipments of the world standards,

d. It is a challenge and an opportunity to grab local resources to meet the world standards,

e. Challenge and opportunity for new entrepreneurs to enter in this field with latest Research and Development unit as a heart and brain of the organisation.

f. Challenge and opportunity to develop next generation force to lead the nation towards prosperity at all the levels.

g. It is a challenge to tap upcoming three hundred million strong middle class income group of India. The Week- TN Sofres Mode Survey in December 2001 also has come out with this fact. It also sates the bourgeois will touch 600 million by the end of 2007 A.D.

h. It is a challenge before the Government of India and policy makers to manage the threats global car giants to manage socially, economically





and politically. The transition is becoming a painful exercise. India must not be fragmented at any front but synergistically improve on all these fronts. The policies must also take care of formulating the strategies as there is going to be total paradigm shift in the entire business decision process hereafter.

i. The challenge before all the Business Association and Institutes is that a fundamental change is required.

j. The Challenges before the Businessmen are huge. No small or big businessman must take it lightly as today he may not get affected but the cumulative effect of entrance of global giants who run the economic engines of several countries hurts every citizen of India.

1.18. Advantages of developing Indigenous car with respect to customer behaviour:

This can be better understood from the following table.





Table: 1.3:

Real Advantages to the nation if the car is properly built indigenously with respect to customer behaviour:

SN	Advantages
1	Flow of money towards India
2	More Revenue Generation due to repeat orders, due to customer satisfaction.
3	Employment Generations are in millions
4	Huge Industrial Development
5	Self Reliance at the Technology Front form the basic to the higher end.
6	Supporting Services get the moral booster
7	Research and Development supports higher end Technology like the space age technologies.
8	Patriotic Feeling among the users
9	Communication is much easier if the intricate technology is locally made
10	Service Centre Network has easier access
11	Development of Technically Skilled people is faster as happened with Bajaj
12	Cheaper access of the Car to more and more people





13	Cost of spare part is lesser than the foreign made cars
14	Complaint if any can be conveyed immediately in the national language.
15	Immediate action and implementations inside the nation.
16	All local country Factors considered while developing the vehicle
17	Profit to indigenous company is utilised inside the nation for the further development of the country
18	Timely availability of reliable spares, related technology and services by Indian Indigenous technicians
19	It can achieve cost reduction and ensure timely supply of parts and components through encouraging domestic manufactures and supplier may Just In Time.
20	Saving of Foreign Exchange
21	Developing more advanced technology in car sector which can be used in some other allied fields as well
22	Contribution towards expansion, diversification, R & D and stricter quality norms among the domestic industries.
23	India having huge domestic resources and expertise in every field. Indigenisation of cars with respect to customer behaviour will mobilise these resources.





Circulation of money inside India only is perhaps the biggest
24 advantage.

Interpretation of Table: It is an independent survey.

1. The car customers supposed to be most quality conscious, service conscious, and time conscious so when Indigenous resources with indigenous product provide them these they will feel the King customer consciousness. So more Indigenous customers will buy the same car and thus circulation of the money inside the country will give tremendous boost to the Economy.
2. Genuine efforts of the Manufacturer and the supplier, service industry, R & D sector, Quality and Finances will be strong enough developed to compete the MNC domination in the market.
3. Even MNC took more than forty years to get on to these stages.
4. If few parts are suffering Quality aspect then they will be taken care of and will be made to the befitting soon with the efforts of Research and Development.
5. More awareness programs like seminars, pamphlets distribution, Research and Development projects, advertisements, monthly reports, articles in the journals, etc. can make every kind of customers including





those who only once watch the advertisement can improve the required indigenisation program a boost.

6. All old and new measures for cost effective technology building like Total Quality Management, Reengineering, Business Process Reengineering, Operation research, will be generate interesting industrial results.

7. Standardisation of the cost estimation and pricing will give the transparency in the industry.

8. Joint effort of the SSI, MSI, will bring cohesiveness in the industry increasing bench marking and exchange of ideas through practices and thus improve the industry.

9. Government and the industrial bodies will seat together and solve the problems as if it is the national problem.

10. Huge employment generation will be there as each part out of thirty thousand odd parts of the car can generate almost two hundred odd jobs and thus generating at least a million jobs. This is discussed later.

11. Service industry will get the boost.

12. Vending and sub vending will percolate the technology know how among the local and indigenous people thus even road side garage can repair the car in emergency.

13. Huge foreign exchange will be saved as a part of indigenisation all resources will be Indian only. So circulation knowledge and money and services will be of Indian origin only.





14. Customers and hence Indian citizens will be of prime concern in this project.

15. Fast services means more customer satisfaction.

16. Profit generation will be percolated in the society or may be invested in other projects, which will have ultimate destination India only.

17. As local strategic managers and board of directors means indigenous people on the higher posts and even at the worker level will benefit the indigenous people only.

18. Least exploitation of Indian resources from the foreign body.

1.19. Has this kind of technique been adopted earlier in the world?

Yes.

This is a *proven technique in many other fields of the technology, in India itself.*

Take example of the tractor and other agricultural equipments, the sewing machine, the Bicycle, and a lot, the list is unending. Infact, since June 2002, (Watch Advertisement of Hero Cycles), India has become the topmost Bicycle manufacturer in the world.

Also it is the proven track record in the following countries. They have adopted this technique using some special mentioning additional features as well.

1. United States of America: They started some pilot project, when, Japanese car invaded and captured most of the American car market





in 1992. Especially mentioning Saturn car project of General Motors. Saturn manufactured Quality cars at the lowest possible price tag in U.S.A.

2. Hyundai Motors and Daewoo Motors of Korea adopted this technique to counter balance the threats of the Japanese and the U.S.A. carmakers. Infact, in many countries including India, Daewoo's Matiz version car was one of the most sold cars in 1996, (Pamphlet of the Matiz car). Where as Hyundai's Santro is the most loved car in India, December 2001, J.D. Power survey, for Asia- Pacific. Thus it proves that no market force is unconquerable in this world.
3. Chinese have put threats to the Indian truck and bus market in Nepal (Aaj Tak Television channel news- 15th October, 2002). Chinese adopt extreme chip cost tactics that nobody in the world can adopt.

1.20. What will be the Result of implementation of the car indigenisation project?

Table: 1.4:

Result of implementing car indigenisation project:

Independent survey for the selected parts in the cars.

S N	Machine unit of the Car	Number of Parts in it	Present Situation	If India stars Manufacturing it	Result of the Implementation of this Indigenisation Project





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1	Engine Unit and whole Assembly	10000+. (Ten thousand plus)	India not manufactu ring more than five thousand parts required in Indian and MNC cars.	There will be as many as parts as number of SSI, Vendors, Ancillary Units, Dealers, Service Stations, Garages, and Supporting Services.	<p>1. There will be mobilization of resources.</p> <p>2. Direct Employment generation per part is around two hundred, i.e. overall, generation of around two million at least.</p> <p>3. Supporting services will generate around eight million jobs.</p> <p>4. Revenue loss of Rs. Fifty Billion i.e. \$1 Billion, as Foreign exchange will be saved every year.</p> <p>5. <u>Divert the same money to our indigenous set up; India will be self-reliant in every field</u></p>
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					<i>of technological base.</i>
2	Gear Box Unit and Whole Assembly	500+ (Five Hundred Plus)	India not manufactu ring even half of the parts required for the gear box in many of the MNC cars	There will be as many as parts as number of SSI, Vendors, Ancillary Units, Dealers, Service Stations, Garages, and Supporting Services will be developed	<p>1. There will be mobilization of resources.</p> <p>2. Direct Employment generation per part is around one hundred, i.e. overall, generation of at least one million jobs.</p> <p>3. Supporting Services will generate around eight million jobs.</p> <p>4. Revenue loss of Rs. Twenty Five Billion i.e. \$500 million as Foreign exchange will be saved every year.</p> <p>5. Divert the same money to develop</p>



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					our own Automobiles and India will be self reliant in the automobile technology.
3	Rear Axle Assembly	100+ parts	Same as G.B. above.	Same as G.B. above.	Same as above mentioned Gear Box.

Interpretation of the table:

1.Please remember that the Engine and the Gear Box are the major components of the Car or any other Automobile. They together need a set up of the industries that ultimately can manufacture ultimately ninety percent of the basic parts of the machineries existing on the earth. May it be a small screw, a nut or may it be complicated parts like carburettor and fuel injectors and their sub parts. As we have seen in the befitting example part of this chapter.

2.Every distinct parts needs distinct and unique kind of industrial set up.

3.A car has almost thirty thousand components right from the small screw to the body and axles.

Thus if implemented this can become a revolutionary efforts in the Indian history of car market.

1.21. Why is it the need of the hour?

Following are the reasons why it has become the need of the hour.



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1. According to recent i.e. 1st October, 2002- British Broadcasting Corporation Television News, in its business news section, it has been claimed that, European norms for the car manufacturing are modified. They are put in the following format:

- a. By the end of the 2002 Recycled cars will be advised to move on the road. Means the concept will be put into the minds of the people.
- b. By 2005, 85% parts of the car must be developed in such a fashion that these car parts can be recycled completely without damaging the environment.
- c. By the end of the 2007, Manufacturers will 'have to develop' the cars, which are completely (tip to toe) recyclable.

2. Also, Indian consumers are demanding cars which can be recycled, reconditioned, which allow refurbishing, which can allow multiple replacements, which are environmental friendly, to be built here in India by the Indians (Tata- Indica Survey Report- December 2001).

3. Indian consumers though in small numbers are demanding sales of the kind – direct to consumer selling without being crushed between the Financers, Retailers, and the Dealers and the Manufacturers, (Independent Survey).

4. Since 1950 the service sector has grown more than 8% per annum. (Economic times, 12th March 2002). From 1994 it has grown by more than 17% per annum.





5. Road network of India will be second only to the U.S.A. by the end of 2004. Economic Times Survey, 12th February 2002, has shown 2466 million Indian road networks at the end of 2004. Showing customers will be tempted to increase cars owning. As by that time, Indian middle class will show increase interest in the car maintenances.

6. India has the second biggest technical and commercial workforce in the world. If this force is well channelised through this project it can reap rich harvest for India.

7. Alternative fuels like the solar fuel, Hydrogen fuel needs, and also alternative technological needs, and extinction of the petroleum are also forcing the indigenisation of the technology in India.

1.22. Some more reasons of car technology being indigenised according to the demand of the customers in India:

Besides these there are several other influential factors that will make the cars being manufactured in India indigenously.

They are as follows:

1.Small car customers have become increasingly demanding quality and services because they have a wide range of choices. Customers take centre stage at every moment of every happening.

2.Indigenisation is the best way for the import substitution and is a positive move towards Self Reliance. It will take care of the following:





- a. High cost of import due to falling value of rupee.
 - b. Restricted shipping and Cargo capacity, in spite of high or low and hence variable demands.
 - c. Long transport time for the latest vehicle in demand.
 - d. Inadequate cargo carrying capacities in India.
 - e. Different commercial practices in different countries.
 - f. Inefficiency in practicing different quality standards.
 - g. It can avoid any kind of sanction from any country in the world.
3. The technology having less foreign dependency should be developed is the need of the hour.
4. Difference between the European and American and Japanese conditions for use of car technologies is also the factor.

1.23. Relationship of the - Impact of the car technologies on the customer behaviour and Impact of customer behaviour on the car technologies:

Customers throughout the world are always demanding for the good. It can be in any form of the following:

- a. *Services:* In the Services sections the better the services given more satisfied the customers are and more they become brand loyal.
- b. *Technology used for the services:* If advanced technology is used then customers always demand quick action to satisfy his need may it be in the





form of preventive maintenances or the break down and hence emergency maintenances.

c. *Technology of the cars:* Technology of the car will never remain the same after the liberalisation and globalisation of the world market comprising of the many national economies and MNC dominated economies.

d. *Other dependant or independent resources* having direct or indirect influence on this can be various governmental and non-governmental organisations. These organisations make the patterns or follow the pattern. Who make the rules and regulations or follow them. Even individual researcher can make the big impact on the car market worldwide. Also unique demand of the unique customer can make a big impact worldwide.

e. Customers can enforce the technologist to develop certain kind of technology. Customers can give positive response to that technology if it suits them. Customers can even reject the developed technology if they find it not suiting them. Thus in the democratic set up customers are going to be the key factor. Coming century belongs to them who follow the customer appeals and try to satisfy them.

f. Customers feel satisfied if they get what they want. Infact, look at the following equation:

Depth of customer Relationship = Value of your company.

This is the reason why; the Mercedes car owners and the Rolls Royce car customers are the most brands loyal in the world.





This is the impact of technology on the customers.

Whereas,

Let us take an example of the car engine. When customers demand car engine, which gives:

- i. More Power,
- ii. High fuel efficiency,
- iii. Less maintainability factor,
- iv. At Low cost.

Then, anyhow the Research and Development team of the car organisation has to develop such a car engine, which has all these features suitable for the conditions in that part of the world. Even Research and Development team can develop the engine or modify the engine, which can run well in the customer prescribed conditions.

This is the impact of customers on the technology development.

Both the factors ultimately lead for the customer satisfaction and innovations in the technology at all the times.

This also keeps the economics of the country vibrant.

This also induces the creative brains to strive for the new technologies and new ways to the service industries.





1.24. Managing the ways that can be adopted for the above-mentioned efforts of indigenisation of car technologies with respect to customer behaviour:

The ways Indians can manage the total indigenisation of the car technologies with respect to customer behaviour are by means of pursuing the following aspects:

- a. By R & D in the resources required for the car product, R & D in customers' behaviours and R & D in the required services and R & D at the technological front.
- b. By adopting result oriented approach in the most competitive car world market.
- c. They will do it by proper utilisation of all the indigenous resources.
- d. They do it by adopting or developing new techniques to suit the very Indian conditions.
- e. They do it for the every individual's sake also for the sake of national cause as well as the humanitarian cause of sustainable development, and
- f. To satisfy the every possible need of the people concerned with the indigenously built car and its technologies.

1.25. How can it be achieved?

India is a country with vast amount of availability of:





a. Resources:

- Human Resources,
- Material Resources,
- Monetary Resources.

Then why could not Indians make a car as advanced as latest Mercedes or BMW or Ferrari kinds of cars? The reasons behind this are many. In this chapter lot of recurring and genuine problems are explained in every possible angle in every possible way in details.

The Solutions given by the experts are as important as the innovative solutions suggested in unique fashion independently in this chapter as well as the point wherever it is important and where ever possible. Hence, this thesis can be regarded as the solutions over the indigenisation of car technologies with respect to customers' demands in India.

It can be stated in the form of the following points-

Management of the developing car technologies indigenously according to the latest and the futuristic needs of the customer in India is a need of the hour. It is certainly a viable job. It is a challenge as well as an opportunity.

It can be achieved by:

1. Using all the Indian indigenous resources consciously and judiciously,





2. Special attention be given to the customer behaviour as in future, king customer will be dictating the terms and condition in the field of technology and in the service industry as well,
3. R & D is the heart and soul of this complete project. As it pumps and stimulate every kind of knowledge to solve the problem at every need of the hour, at every phase of the project, and at every situation and event of the project.
4. After successful implementation or even while development of this project, benchmarking can be allowed to develop other industries in India,
5. Generating huge employment potential and thus allowing the socio-economic growth of the country.
6. Making Indian economy vibrant at the Indian car technological front. Which can give a self-reliant look to the Indian industrial sector to strive in better fashion in the coming future.
7. Bringing laurels to the nation by giving the world, India's own world-class product the small car then luxury car.
8. So first target the small cars. Once produced the small car indigenisation with respect to customer behaviour can become the best example of producing remarkable results if the nation uses all its resources cohesively and acts in a synergy.





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In all, every individual taking part in this exercise of making and managing the technology of car indigenisation with respect to customer behaviour must be able to reach the self-actualisation needs and will try only one thing- the customer delight.

Thus, the Thesis is also an attempt to put the present system with details and to find a solution over the indigenisation of car technologies.

1.26: Chapter wise concepts and Gist of every chapter:

It is better to proceed further knowing the concepts of each chapter coming in sequence to elaborate the theme of the thesis in details. This will be in the form of crux of the chapters.



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**Preface:**

In preface the prime concern of this project, its reasons, its advantages are discussed in nutshell on the collateral basis before moving of the main project. There are many factors taken into consideration. The main concern about not considering indigenisation issue seriously is costing India very dearly in every field like Medical, Pharmaceutical, Engineering, and even the Defence. After this world car market, Indian car market, their present position is discussed. Later on it has been confirmed from the diverse notes and simple costing and estimations that indigenous cars will cost lowest. It will be built in ordinance with the Indian players in the automobile structure. Then how it can be done is taken into consideration. It needs total revamp of various systems and/ or integration of various systems. It includes the laws for technologies, few RTO rules, and improvements in the present education system.

Infact this project can become the engine of growth for India as it will generate millions of job opportunities, develop millions of skilled workers, give Indian human resources exposure to the world market at their doorstep, it will enhance the benchmarking practices among the diverse fields and upgrade the entire systems of innumerable organisations. Later on India can also produce world class products at the zero level technologies, basic technologies, middleware technologies, and higher end technologies.





Thus, it will keep India pulsating and balanced at the techno-socio-economic front for many years to come.

Ultimately it has been observed that it is the customer internal and external who forces the market forces to buckle under its pressure. Customers do not get satisfied until they get what they want. If they don't get what they want from the organisation they want they just throw away that organisation into shambles. This factor has made customer the King in the present market. The fast communication is forcing the market services to become more flexible and inclined towards the customer satisfaction. After through analyses many customers are demanding locally made quality car products in India. As, ultimately, totally indigenous car and its technologies can give the cheaper products and services. This factor has lead to select this topic.

Chapter 1: Introduction:

In the introduction key terms, broader meaning of indigenisation, legitimate definition of total indigenisation of car and its technologies is given. Then the hypothesis is put with reasons to adopt this strategy to move on this path of car indigenisation. It also introduce the working of the giant car MNC to survive so long in the market and major reason being R & D at every level and at every phase of life cycle of the car business. Then, analysis of the Pros and Cons Indian companies and the system has been put over here. Why car technologies are selected and what are the opinions





of the experts is also seen briefly. Why they are to be made in India and what are the challenges and opportunities is next. What can be results of developing car technologies according to the customer behaviour is put in brief. Then precisely the relationship between the impact of car technologies on the customer behaviour and impact of customer behaviour on the car technologies, and how to achieve it is put into short. Paragraphs.

Chapter 2: Literature Review:

This starts with the simple analysis of global car industry and Indian car industry with respect to India. First it specifically clears the volume of market in USA, Japan and the world and the tiny market in India in terms of sheer turnovers. Then analysing the problems faced by the Indian car market is covered into brief. Starting with India's first and second-generation cars, it deals with present performance survey of cars on Indian roads. Later on it covers the growth of the cars sells in India and their manufacturing details. Then comes the most important aspect and that is manufacturing car technologies and expectations of the Indian customers in the present context. Some technical details such as differences in the developed nations car market and Indian car market is taken in to details with facts figures and graphs. Lastly it covers the present car technologies in the world market with respect to Indian context.

Chapter 3: Worldwide history of few car companies from the technology development point of view:





It covers, worldwide history of Mercedes (Germany) and General Motors (USA), the world's pioneering car companies from the technology development point of view. There are few details, which are quite noteworthy, inspiring from the indigenisation of car technologies in India point of view. Lastly it is the history of Bayerische Motoren Werke (BMW) from 1979 to 2000 from the technologies development point of view is discussed. This was the period when more number of autotronics and mechatronics was introduced in the cars and highly sophisticated robotics and automated plants were used for manufacturing ultramodern cars in BMW factories and around the world in the other world's giant car factories. This has lead to the present day volume explosion of the cars on the roads around the world. Cheaper technologies for the more number of cars means more demand from the customers and more customers means more suggestions and more suggestions from the car users more will be the development of the car technologies.

Chapter 4: Worldwide history of the car technologies and customers' response to them:

In this chapter special and prominent cases are discussed to the core. First is the Ford Motors. How they developed the technologies and how the customers contributed the development of the technologies. All the times it was internal customers means the internal employees of the organisations and then the external customers means the car users on the road





contributed significantly. May it be Mustang project or the project Taurus these customers obviously contributed the most in the car technologies development. Later on step-by-step car technologies in different Mercedes cars are briefed here. How they are developed and how they form the latest technologies. Then how these latest technologies get percolated to the general cars is also put here. As nowadays customers want more comforts and facilities at lower costs and that too using cheaper but quality technologies. Cheap and quality technologies can only be developed if the overheads are less; this is possible only if all the technologies are indigenously developed in India. This is the conclusion many customers are drawing. As even these high cost cars have few lacunae, then why cannot it be Indian companies who can give customers cheaper cars with same technologies?

Chapter 5: Indian Car history from indigenisation point of view:

In this chapter how Indian car history is closely linked to the successful implementation of Government of India's Socio-Techno-Economic development programmes and government of India's policies is seen in details. Why it was stalled and how in that periods Japan and USA made car development, manufacturing, and export was the engine of growth of their economy is taken into brief. Then in the tabular form every phase and event is been put into concise.





Why indigenisation of even few parts of Maruti-Suzuki has expanded the Indian domestic car demands is taken into next short paragraphs.

Why even Luxury car customers are demanding the indigenisation comes lastly.

Chapter 6: History of Customer Behaviour in India in response to car technologies:

Since its inception that is from 1948 a complete review of cars manufactured and sold in India is discussed put in concise form. How hegemonies of the grandfathers of the Indian car industry the Premier Auto Limited (PAL) and the Hindustan Motors (HM) dominated the Indian market and how was this period called as the sellers market is taken into account.

Then after the Suzuki-Maruti entered into the market how they captured the market is discussed in the form of brief points in the form of case study 1.

Next Case Study comes out with Maruti 800 preview from 1983 to 1997 and customers' likings for it. How it became the successful car of India is taken in a tabular form and customers' response in concise form.

Chapter 7: Car Market has become Buyers Market due to Sheer Customer Dominance: A Case Study of small car market in India.

In this chapter starting with the Car Market Segmentation with their price details are put into tabular form. Car customers are becoming king and how the manufacturers are buckling toward their more demands. How this has





modified the car segmentation is put into tabular form later. Worldwide market shares in the segment A, B and C Car segment from 1988 to 2002 is put into tabular form to reduce the sheer volume of words. Liberalisation, Privatisation and Globalisation (LPG) are the kinds of policies various governments are adopting Indian Government is also adopting. It is due to sheer fact that customers demands are exploding at every moment and are trying to grab every kind of demand in one basket. It may be in the form of transparency in business of the car company they buy, insurance- tax- five years servicing contract-free accessories, etc. Small cars customers a mainly middleclass people and they are trying to put all in their budget to make the car their life long asset. Next it comes about the picture of marketing dynamics, which, proves that customers get more satisfied if the cars are more domestically manufactured. Thus indigenisation of cars comes out to be only solution over it.

Chapter 8: Critical analysis of Present Car Market in India: Performance of Domestic Car Companies, the Multinational Car Companies and the Fate of Joint Ventures:

This chapter is divided into five parts.

In the first part customers' response to present car market is dealt in details. Right from technical details of small cars, Customer motives, pre-sales and after sales services, problems faced by the customers, fuel consumptions of the cars, Indian customers' likes and dislikes are put into





tabular forms to make them look simpler to understand. Then technocrats who are driving the car what they feel about the car are taken in to consideration. Lot of them feel that for indigenisation R & D is must to develop intricate technologies. External customers are the customers out of the organisation who use the cars where as the internal customers are involved in the car business at various steps of business in the car market. Expectations are put into here from these sides as well, all in tabular forms. Then comes a comparative study of requirement of the small car technologies and their designing aspects and consideration in USA and in India. Another most important factor is, in the developing nation like India is the shifting to higher vehicle syndrome in which right from the cycle to luxury car shift is put in to next table and graph. Next important aspect put over here that almost eighty percent of the industries listed in the Confederation of Indian Industries (CII) directory are associated directly to indirectly to Automobile Industries. Out of them R & D institutes in Automobile sector with their addresses are given here for further studies. Then comes the table of comparative ratings of small cars from the performance point of view in the Indian context with latest figures from 1998 to 2002. Next factor is the resale value of the car. Nowadays the day you buy the car and keep it home its value goes down immediately. Where as it was not the case a two decades ago, thus due to ready availability of loans and Lower Equal Monthly Instalments (EMI) the second hand car





market looked down for few years. However, it is again almost seventy percent of the total new car market. Here are resale value factors from customers to mechanic and market point of view, put into tabular form with selling prices. Another thing given is which are the factors, which should look after when you buy the cars are given in details but in concise tabular-form. Then given are few job generation and factors like business dependent on the cars. Next table comes out with survey results of comparative maintenances cost of small cars in India. In the process next comes out to be table with customers' expectations from various car business organisations in India. Next table is the survey of what highlighting points customers looks for when he buys the car, are given the priority.

In the next part three Experts' views are given with highlighting factors, like negative side of the indigenous Indian manufacturers, experts' expectations from the car market, how car sales indicate growth in the nation's economical and technological development is taken into details.

After considering all these aspects in the Part four, how can the Indians prepare for the future businesses and services in the car market are dealt in details. How to satisfy Internal and External customers is widely discussed here. How to make the present customers the life long asset to the company and how the relationship can be built up is given in details. As ultimately these are highly influential customers. Another aspect discussed is the study and visualising market dynamics hence changing market trends can





bring India up to world mark after indigenisation. Meeting customer expectations is a high profile and twenty four hours job, so how to do it in better fashion is dealt here in the tabular form and interpretation of few more tables. Next discussed is the case study, and that knows the fate of the joint venture in India from Suzuki-Maruti case. This also consolidates the need of total indigenisation of the car sector. Some international joint ventures in which the giant car companies have become the exploiter of their other halves is taken into brief. How giant multinational car companies just drift away the economies of various nations with their multibillion budgets is discussed here. This factor not only forces us to give us inspiration to start with and target the indigenisation in specified parts, assemblies, and sectors.

Chapter 9: Contribution of foreign carmakers into Indian market:

First and foremost contribution of the foreign cars makers is that it has awakened the Indian customers about their needs and comforts in their product. The technologies, and the services they must ask from the market. Second Contribution is the exposure to the strategies adopted by the world's largest car companies and other MNC. In the depth of it lies the phases and events which so important that every person realises the importance of R & D and indigenisation at each and every step. Customer focus and customer is the king the strategy they adopt and they earn profit as well as the goodwill of the customer by providing fitting services. In this topic next best





thing noted is all the MNC cars makers charge high due lot of overheads, and they also have to sale parts which are made in their parent country at higher cost. One more aspect highlighted is these foreign companies bring their conglomerates along with them into the country wherever they may go. In the cars these companies provide the accessories and equipments and tools. So, actually the car customer buys the total dependency at the technologies front, is been proven with facts and figures. In one sentence the multibillion turnovers of these companies prove their mightiness. Lastly it has been proved here that Indian middle class cannot afford high prices services and spares hence the companies which will afford these at cheaper cost will be the winner in longer run in Indian car market.

Chapter 10: Bringing Indigenous Car technologies up to present world norms and quality standards:

Various standards and norms are put into innovative tabular form. It has eased the understanding of ISO 9000, ISO 14000, and OHSAS 18000. To add the completeness within this small chapter tentative timetable for obtaining ISO and OHSAS, their prerequisites and importance are been discussed here. To enhance the understanding the examples from the Indian automobile sector are put over here. To get the future picture to the Indian car companies the example of Volvo is given here. Any company adopting this path has to take this matter very seriously as it benefits





everybody involved in the car business and the environment we live also remains better for the future generations.

Chapter 11: Technologies Spin Off: Influence and contribution of car technologies to other technological fields:

Unintended applications of any newly developed technologies are known as the technological spin off. Spin-off categorically means using the similar technologies in different forms in different fields for different purposes. Then one by one this aspect is elaborated further. First is the case where founder is car industry and spin-off is elsewhere. Next is the case, where founder is not the car industry and the spin-off has brought the technologies from other field in to the car industry. Many times customers demand for the spin off. When customers see something in Formula One (F1) Racing Car they want the same thing in their cars as well, otherwise they don't take interest in your product. Next important thing appearing in this is the prime mover of the car the car engine has so many spin-off that hardly any other technology has. Thus it has been proved that if the car technologies are been mastered in India then Indian can master Zero End Technologies, Basic Technologies, Middle ware technologies, and the Higher End Technologies. It can make Indians self reliant on the technological field. Indian Economy can become pulsating in the world market. Slowly, India can also move towards the developed Economy Status and can achieve the Socio-Techno-Economic advancement and stability.





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Chapter 12: Legal Issue:

After through studies it has been proved that there is a need of further amendments in the Motor Vehicle Act- 1988 as amended by The Motor Vehicle (Amended) Act, 1994. Just take example of the car segmentation there are no car segmentation even if the technology is exploding everyday. There is no place for the technology, which is developed after the 1988 or introduced in the Indian market. Hence further studies and critical analysis of Law education for laws for technologies in India shows that multidimensional and multiple branches in law and technologies should be developed further to ease the smooth working of the judiciary and to avoid the dumping of unwanted technologies into Indian market.

Chapter 13: Disadvantages of not indigenising the car technologies:

Wake up call for India.

In this chapter Past, Present and Future of Car industry is derived in short. MNC dominated car market has moved into rat race. Further, it has been proved that losses Indians suffer at technological front are solely due to lack of indigenisation efforts. Then come further strategies adopted by the successful MNC like GM, Ford, Toyota, and other companies in markets around the world to get success and remain at the top. Then in brief, why these factors become the wake up calls for India is discussed. In one sentence you cannot miss the engine of growth every now and then to put



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yourself in doldrums. Hence once India put itself into the shoes of world car market it has to take this step very boldly- indigenise the car technologies.

Chapter 14: Problems and Limitations in the present Indian System.

This chapter specifically describes the problems India is facing at present. Is it the Indian system, is it the human resources what is it is taken in very short paragraphs.

The Limitations are also been put into crisp form.

Chapter 15: Possible Solutions over few recurring car indigenisation problems:

There are Ten Thoughtful Solutions and their Approaches are been put here over the few recurring car indigenisation problem India is facing since long. First Solution is Knowledge Management System for indigenisation of car technologies, with diagrams and with sub arts to know in details how to implement this excellent solution over this challenging project.

Second Solution is extension of KMS with departmental expertise given huge importance. This solution specifically deals independently with different departments like R & D, Finance, Marketing, Production, and Services, to become the 'experts dealing expertise' case.

Third Solution is the TQM approach in the existing indigenous car component manufacturing SSI. This is specially dealing with existing firms SSI and MSI, which are involved in the indigenisation of car and





technologies business which form the biggest part of the internal customers, as well.

Fourth solution is the Knowledge Based TQM for the Indian firms having ISO, which are involved in vehicle sector and which can be used total indigenisation of the cars in India to satisfy the customers. Infact customers are forcing it to happen. There is a KTQM process and outputs are also given in the form of table to make this solution an easier to implement. The to prove that knowledge Based Industries have become great economic driver of the American Socio-Techno-Economic world.

Solution Five deals specifically with modification of the existing higher education system. All technical, professional courses needs a total up gradation from the core.

Solution six is improving reliability of present car services for converting potential customers into actual long time customers. This has happened with many brands. E.g. In many cases it has been observed that Mercedes owner or Ford owner or Roll-Royce owner never buys other cars, as they have become brand loyal. This analysis is put into tabular form to know how to make the customers brand loyal.

Solution Seven Next is the table, which gives solution over the India's few recurring problems. Almost all the experts have a solution over present problems in their field. Few are even applicable to various fields few are applicable to specific fields.





Solution Eight deals with the Issues Based recurring problems and solution over it.

Solution Nine is put in the form Inspirational solution in the form of successful examples. Few are from USA where most of the cars are sold and do maximum business and has might have passed through this phase in past. Taking inspiration lot of problems can be solved. Just you have to make collection of Solutions as applicable from the Indian context. As what is applicable to GM may not be applicable in Indian context but it can be applied in some other kind of form in India, which becomes perfect solution in longer run. Infact if GM can do it Indian companies can do it.

Solution Ten is perhaps the biggest problem in India and that is adulterated fuels, customers are forcing a permanent solution and they will make it happen. Thus, in this chapter also been proved that customers can force something to happen may it be technology may it be services. Inspiration also can force the reverse case as well that is technology can force customers satisfaction.

Solution Eleven deals with few more steps which can be adopted and followed as a solution.

Solution Twelve gives us some policy recommendations for the Government of India. It is put in the form as a specific background and expected policy.

Solution Thirteen to Fifteen deals with how to capitalise the new market trends and how to keep up the standards of organisation and industries.





Chapter 16: R & D in the form of Car Technologies: A worldwide

Preview:

R & D is the soul, heart and brain of the organisation. It not only brings out new creativity and innovation in the organisation, product and processes to profit but also keeps organisation always vibrating. It also brings out metamorphic steps involved in R & D of the car technology. Next comes why R & D is a continuous job and is a perpetual process at product and process level. After knowing the importance of the R & D at process, product, services level comes the laboratory where these can give the shape to future happenings. Hence, why ultramodern R & D labs be set up in India is given in brief. How R & D and indigenisation can make India a leader in every field it enters including car is put in brief. Lastly it is concluded that next generation belongs to R & D based economy and knowledge banks. The reason if somebody masters one field then R & D forces the next situation in which only those can survive which have competitive R & D to cope up with this new challenge.

Chapter 17: Modifying Indian Car R & D for indigenising present and futuristic car technologies:

After knowing the importance of the R & D, the R & D labs and its future needs in the earlier chapter in this chapter the major players in the vehicle sector, associations in India attached to automobile sector are put in brief. Then taken are the facts about materials availability. Next to follow are the





areas where R & D needed most and organisation involved in R& D and Lacunae in the R & D in the car sector. How should be the structure of the R & D organisation structure, what should be their goal, etc. are next to follow.

To make this point clear few examples like accomplishment of GM-USA over the years, GM's India Science Laboratory of Bangalore India, etc. given in brief. Lastly stated are the Exercises needed and Warning if this is not done at the war footage.

Chapter 18: Upgrading skills of the Indian Human Resource:

It is continuous phenomenon to upgrade the education system as over the fifteen years ever new branches of science, commerce and arts are developed. If due importance is not given to this point, nation can lead to disaster as happened with many countries. Hence, in this chapter an Eagle's Eye view is taken on the present education scenario and immediately how to improve the classroom teaching is followed. At broader front Application of TQM in improving skills and how to upgrade these systems is put here in brief. Upgrading Management Education System to make it world standard even at every college level and all the Universities level comes next. Next to follow is the Education that is imparted to the Internal and external customers of the car organisations is discussed in brief. Role of higher Institutes and organisations is the last to follow in this





chapter. In this way if human resources becomes the asset of any nation then that nation can become the force to reckon with in the world.

Chapter 19: Results of Upgraded skills of human resources on the car indigenisation organisation and the country:

In this chapter Latest Example from all over the world are produced as the result, which can be achieved by upgraded skills of the human resources in the organisations and the nation. First comes the nation the China and achievements due to upgraded skills of the human resources and R & D ventures. Next come the projects of Ford during which upgraded skills helped internal customers (employees and associates of the organisation) of the Ford helped them in achieving higher standards. Tow specific projects of Ford Project Taurus and Project Mustang are discussed in brief. Next to follow is of course the most successful education system of recent times the USA education system and the Higher and free education system in Germany are discussed in brief.

Chapter 20: Developing Prototype and then tuning all the Indian resources for indigenisation of car technologies:

In this chapter from the Industrial, Engineering and Management point of view how the indigenous car components manufacturing process is developed, is seen in brief. Every step in developing prototype is given in smaller paragraphs. What are the results of developing prototype and what should be are put. In nutshell, R & D at every step and tuning every





concerned industry for the indigenous product must the aim of developing prototype.

Chapter 21: General Guidelines to Set up Indigenous Car and Car Components manufacturing unit: A Practical Implementation at very basic level

This is the practical implementation Chapter. In a significant breakthrough researcher was the first to declare in India that he has developed the car worth Rupees One Lakh. This project is put here into details. Then almost thirteen such Projects Reports are given here which can practically be manufactured in India in various SSI to MSI factories from Delhi, Chandigarh, to Chennai. Infact few of these are already a big successful projects. As this project was published in The Institution of Engineers (India) Seminar, few of these projects have reached to every corner of the country, especially the rupees one-lakh car project and its outline.

Then very important aspect like helps provided from Government of India through SISI, SIDBI like organisations are put here. Incentives provided by the Government of Maharashtra and hence state level help is put here. To start the business addresses of the very important organisations are given here.

Next put up is Ready made practical approach to set up totally export-oriented business in India for the car is given. This can take 'Made in India' tag to the world.





Thus, these chapters provide a complete review of how to set up business and the opportunities waiting for the Indian businessmen in Indian car sector.

Chapter 22: Requirements of Foreign Investments only for the purpose of indigenisation

India being developing country always gets stalled on the economic front. Many projects require huge investments sometimes World Bank (WB) sometimes Asian Development Bank (ADB) sometimes some other nation or international body or organisation comes forward and helps it out. However, when it comes to these kinds of projects where total indigenisation is concerned lot of organisations are not ready to come forward to help. In one case when I send the letter to Hyundai the Korean Organisation they did not offer me the look how of the company as I was interested in indigenisation of car project. This is the case with technology know how. That is how also the Investment problem arises. May be joint venture can solve the problem as in the R & D, investment of the parent companies is huge. They are also right on this front.

Thus the investments from all the sides are welcome. May it be due to intrinsic intricate and complicated technologies, due to giant technological set up, let the domestic as well as foreign direct investment.

Then advantages put up by World Bank in 2002 of foreign investments observed worldwide, Factors moving foreign investments, and then recent





trends in the foreign investment a global review are put up here. Then taking advantages from the UNCTAD, World Investment Report 2002, and worldwide investment in specified region are given here. It follows the Category of investment in India and Foreign Investment in India 2003 results are put up here. All show that India is a good Automobile and hence Car market. As ultimately Indians will be repaying the debt/ loan / investment honestly in future. Hence, to the conclusion there will be no problem of foreign investment.

Chapter 23: Present Costs and Estimation of manufacturing most frequently required car parts indigenously in India and total project viability.

This chapter deals with worldwide viability report of this kind of project in India. Already more than a dozen carmakers, the world's giant MNC are in India, as India will have one million fresh car turnovers in the year 2007. Even for the Business Process Outsourcing India is the cheapest option with high quality destination. To make it very clear comparative cost of few important car-manufacturing activities in USA, Japan and in India. All results shows positive happening. The main difference is the very beginning of the projects in countries is more than five times its cost in India due to cost of living and investment and machinery associated with it. However, the synergistic efforts are required in India to make this project successful. In depth Analysis shows that even the education system in India needs a





have re-look at this result-oriented project. After this comes the importance of higher up Institutes and Organisations who will be contributing more through their higher involvement in result oriented activities like practical solution seminar than just holding theoretical meets. Then most importantly when this project can be done? The earlier the better is the answer. How it can be done, its viability to consumers, its advantages to customers, proves that this is the project of prime importance and this must be done with due importance only.

Chapter 24: Automobile Finance and Engineering Economy for the indigenous cars for the total customer satisfaction:

In this chapter Automobile Finance from engineering point of view, in brief its technological aspect and its costing and estimation are taken into consideration. In this chapter every phase, event, step, of the car development and selling; and how the technocrats need the finance and how it can be solved, is given in short. Then while buying the car how the finance is available and how does this finance work is put into one of the best approach the Internal Rate of Return method with Cash Flow Diagram and with proper table and details. Even few plans are suggested and few successfully implemented plans are put forth. Lastly given is the analysis and suggestions in the present finance schemes. Which are the required to make thorough awareness among the people.





Chapter 25: Indigenisation of services in the car sector by conventional means and using IT and Web:

In the world of knowledge explosion, services to the doors, mobile services, twenty-four hours services, IT and Web is going to play a major role. Still Conventional services have their own positive aspects and those are going to stay in India for few years to come as job associated to them are still in full swing. Hence, both the aspects are put in brief in this chapter.

Chapter 26: Business Opportunities in the most promising technologies in the future car markets as per the customers' demands:

This is divided into three parts. First part deals with the present situation, with expert's opinion and major reasons behind this. Also taken in brief are the reasons behind the costly cars in India due to foreign origin. Then one very important aspects about the present claims and the facts of carmakers in India are put up here. Many claim their car is totally indigenous however there are so many technologies that are not yet mastered in India. Few are put up here few are given in the Tata Indica technologies chapter, there are given such technologies which are not yet been developed in India. Next topic is dealing with the aspect in which put up are what are the business opportunities in all this exercise. There are at least one million job generation possibilities and at least few billion rupees turn over waiting for the people who can capitalise this challenge and an opportunity to grow. Some future car technologies that are been demanded by the customers are





also put up here which can generate billions in future if India masters it at its earliest. All the giant car companies have mastered the basics of all these technologies. They are waiting for that time when they can take advantage of the rest of the world realising their importance. Hence, India's present situations in these technologies are taken in brief. Even one sample solution is given here to develop indigenously built fuel cell driven car.

Chapter 27: Business Opportunities in the car modifications useful in the various professions:

The modification in car can be very simple to complicated but it makes the life inside the vehicle smooth and comfortable once you are driving on it. Big and parent company cannot offer customise built ups in the car at least in India. Hence Small Scale Industries (SSI) has huge scope in this field. May it be burglar alarm, or modification of vehicle for the doctors, advocates, engineers, like professionals. Lastly described are the advantages in these kinds of projects.

Chapter 28: Customers' Demand and Business Opportunities in the second hand indigenously made cars in India:

It is always been claimed second hand car market or used car or pre owned car market is always seventy percent than the fresh car market. That is a big turnover by all means. Another point considered is whether the demand for second hand car market has increased or has remained the same. Later on how to give more boost to indigenously built car in the second hand car





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market. Another side of this is customers who buy these cars here some tips are put up to let pre-owned car buyers know the technical details which car to buy why and how, so that it remains a transparent business at all the levels.

Chapter 29: Indigenisation of technologies required for the Servicing, Maintenances, Road Safety, Traffic Management, Driver Safety, and Driveability:

Considering the vast number of tools, equipments needed to service or repair the car and huge investments service stations and garages do, it needs to be indigenised should be the word. Similarly road safety and traffic management systems and instruments and gadgets, and driver safety devices and labs to develop them for better driveability needs to be indigenised that is what customers feel. The reason being if they are indigenised then naturally next generations of these things will be developed in India with special attention to Indian customers are given. Along with the car technologies these are few things which can make India totally self reliant on the technological front. As technical spin off in these tools, gadgets and instruments are huge.

Chapter 30: Managing Investments for the total indigenisation of Car Sector:



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There are few investments tips given in this chapter including co-operative industries, building chain of SSI, taking help from public or private banks etc. are the kinds of solution put over here.

Chapter 31: How to build a giant Indian car MNC at par with GM, Ford and Toyota?

It starts with the fact that if all the automobile industries come together then united they can withstand the opposing forces, infact can thwart that force away and can earn a huge success. Some Indian luminaries and Experts in the technological fields have their own say this regard, is taken in brief. Other than these there are few experts who have expressed their opinion, suggestions and highlighting aspects that also finds its place in this thesis. The unanimous discussion and decision can give us the amicable solution.

Chapter 32: Advantage India: Making India Self Reliant on the Techno-Scio-Economic Front:

This is what can be regarded as the biggest gain of this project and perhaps the aim as well. Some primary analysis shows that with the indigenisation R & D activities will get boost, the knowledge-based society could be developing in future. All the car parts have tremendous technical spin-off capabilities. Supporting industries get face-lift from every angle. Even some experts feel that experience has shown that growth in the car industries





shows the growth in the economy as well. Experts have shown few concerns, which must also be looked for to get the desired result.

Then Technological advantages, Social Advantages and Economic Advantages are taken separately in details. Few even claim that this is the project with unlimited opportunities.

Chapter 33: New Ideas and future needs in India from the indigenisation of technologies and sustainable development point of view:

The Automobile Technologies are growing by leaps and bound at every moment. Tremendous amount of R & D is forcing ever new technologies grow the Hydrogen fuel compression engine driven car, the fuel cell driven car, the electric car, the CNG driven cars, LPG driven cars, etc. it has no end it seems. Then in this chapter appears the latest technology in which the actual manufacturing can be seen on the digital environment the Digital Production and Materials Management (DPPM). Next to appear is Shredder and Zerdicator which will be required to crush the old and damaged cars parts, and the technology even lot of the technicians and engineers are not aware about it in India. Hydrogen is perhaps the most abundant fuel in the universe and water is composed of this hydrogen so next part deals with this. Some technical jargon is also made easy. Major companies have already entered into electric cars business; the details are given here in this chapter.





Chapter 34: Role of Information Technologies on indigenisation of the car technologies:

You name it and you have it on the Web the Internet. Hence, the problem and the solutions over the problem are discussed in this chapter. IT and Knowledge Explosion adds stuff to this. Few car Techno-Business aspects are so discussed that Indians will be motivated to take a decision whether to become a leader or the follower in the car technologies. It is the fact that at present India is the follower of few technologies due to under utilisation of resources. Next comes the generic audit pf technology for spending in the car sector, which shows positive signals to indigenisation and customers demands for it. Our talent is even recognised by the world's topmost forces hence there must not be any doubt about this. How must these technologies be materialised the technologies which are available on the Web is also given in this chapter. Then comes the giant car company versus India comparison. Without hiding anything some truths and facts of total indigenisation of cars is put here. How IT can help and streamline the happening is given here. Lastly IT has exposed working culture of the giant car companies in the world. Positively speaking Indian organisations can take advantages and built the customer demanded this car indigenisation project with due importance given to internal customers in India.

Chapter 35: Indigenising the Maintenances machinery for Happy Motoring:





It is observed that all the foreign car companies bring their conglomerate of companies for accessories, for tools and equipments and supporting instruments. Indians have to look at these companies to buy. These cost more than few million rupees. One more aspect discussed here is how to drive and remain happy without causing any mishap is taken care off with proper maintenances schedules.

Also it is becoming constant demand of the customers that all the machineries and equipments be made in India for Servicing and Maintenances so that it costs less and becomes affordable and internal and external customers friendly in India in long run.

Chapter 36: Services and Safety Features: Expectations of senior citizens in India while Indigenisation of car technologies:

The Grey haired highly experienced personalities in India have come forward they believe what they could not do, this present assertive new generation can certainly do. There are as many as couple of dozen suggestions have been put here to give the direction to this project. It is taken into Tabular form to make it shorter in language but with lot of core substance in it.

Chapter 37: Improving road conditions by using indigenously built machineries:

NHDP has developed roads on which you can drive at faster pace. However, the machineries to build them are mostly foreign made, few collaborations made, and few are indigenously made. Here totally indigenous built





machinery can literally make India world leader in the Industrial world. As this machinery with few modifications are used in mining industries as well. Thus, everybody's say, as every body is an internal or external customer of this project. Hence, his or her say is taken care off as everybody contributes something new and it can make this project a perfect national project.

Chapter 38: R & D and Advancement in Tata Indica Technologies: A First Step towards 100% indigenous car technologies:

People may say Tata Indica is totally indigenous car but it is not. That car is totally indigenous which is designed, developed, manufactured using indigenous technologies this part is taken into this chapter. What positive happening is meticulous planning of Tata Motors? Then Tata customers have come forward and said that they can target total indigenisation but shall only if they get concessions over the foreign made cars, if not then why should anybody invest? It is the right thing from businessmen point of view. Business and sentiments, national cause should go hand in hand is the aim of this chapter. These are infact expectations of R & D Engineers, Organisations, and Investors from Indian government. Lastly which are the technologies Tata Motors have not indigenised and Tata Motors are trying, is put up here. Yes Indians have a long way to go.

Then put up here are the following self-explanatory chapters and annexure:

Chapter 39: Summaries of the whole project.





Chapter 40: Conclusion of the whole project.

Chapter 41: Recommendations for further studies and research.

A1: Annexure 1: Bibliography and References.

A2: Annexure 2: Research Papers Published/ Presented by the Researcher till date.

A3: Annexure 3: Successful Communications for this project.

A4: Annexure 4: Honours Received in any from by the researcher.

A5: Annexure 5: Books Authored by the Researcher.

A6: Annexure 6: Research Projects done on this topic.

Special Note: The research process had following steps:

- i. Formulation of Problem,
- ii. Formulation of Hypothesis,
- iii. Collection of data, classification and selection of sample,
- iv. Analysis of data and
- v. Conclusions.

Hence, it may have following kinds of errors in selection of sample:

- a. Some impossible readings, b. Some decimal, c. Some in borne problem in sample, d. Sometimes it may be biased, e. Somewhere some modification.





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CHAPTER 2:

REVIEW OF LITERATURE



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211

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CONTENTS OF CHAPTER 2:

Topic No.	Topic	Page No.
	Simple Analysis of global Car industry and Indian car industry with respect to India	231
Part 1	India's first generation cars.	242
Part 2	India's second-generation cars.	243
Part 3	Present performance survey of cars on Indian roads.	245
Part 4	Growth of the cars sells in India.	250
Part 5	Manufacturing Details of the Indian cars	251
Part 6	What are the latest and maximum customers' demands?	264



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212

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Simple Analysis of Global car industry and Indian car industry with respect to India:

America's love with the car rolled the country through a century of prosperity. It took American car and auto technologies around the world. Cheap gasoline was as much responsible as the excellent road conditions for making the giants like Ford and GM in Detroit, USA. Infact Detroit has the largest car industrial base in the world worth USD 500 Billion.

Though America did not invent the car still it grab the opportunity and capitalise it. Very soon Americans dominated the car industry worldwide. Legendary innovators like Mr. Henry Ford, developed the revolutionary car manufacturing assembly line method for the first time in the world, in 1903. In 1908 he came out with the Model T. Model T was the first most affordable cars for the masses and to classes as well. Millions demanded it.

American cars also had a great impact on India. An enterprising American had introduced India's first fleet of 50 taxies in Mumbai in 1903. However on the personal cars front before World War II, cars had mainly been the playthings of the Maharajas who proffered the elegant cars of Briton and European rather than practical cars of USA.

In 1943, General Motor Corporations (GM) set up an assembly plant in Mumbai. It initially produced cars for the war effort and their big Chevrolets were to soon become the best-known cars of the time. Ford followed soon. However, both found India's new industrial policies unacceptable and closed





the shop in 1949. In 1950s Premier Automobiles produced the Dodge cars and truck for a few years, with the same fate. However, only surviving were Hindustan Motors, who remained there with their Ambassador cars till date. The next 25 years till 1984 were dark years in terms of technology revolution for the Indian cars. HM, PAL, Standard Motor corporations and Kaiser Corporations produced monotonous Indian versions of Morris, Fiat, and Standard cars. Only other vehicle other than cars was the Willy jeep.

The main reason behind this was the government was highly inspired by the visions of Gandhiji's simplicity as well as the socialist egalitarianism considered the car a playing of the elite, crippled it with restrictions and taxes and deprived the country of an industry now recognised as one of the greatest engines of the Techno-Socio-Economic development.

All through the twentieth century America however remained the major source of engineering and auto technologies. Many Indian companies and US companies developed and sold many automotive components like shock absorbers, gaskets, pistons, brake system, tyres, etc. Goodyear tyres set up their first plant in 1920 in Calcutta. Firestone followed soon. Later on Tractors from international Harvester and ford also made their mark. Tractors from International Harvester and Ford also made their marks.

In early 1980's things began to change. Japanese car company Suzuki along with Maruti Udyog Limited (MUL) revolutionised Indian car market with





their little Maruti 800 car the first modern car on the Indian roads. It set new standard of convenience, reliability and fuel economy.

At the same time Motorcycles from Honda, Suzuki, Kawasaki, Yamaha then stirred the two-wheeler market and light trucks from Nissan, Toyota, and Mitsubishi reshaped the light transport sector.

Suzuki's partnership with the Maruti, a public sector company, also resulted in customer credit becoming available for the first time from nationalised banks and several credit agencies. American Banks, like Citibank, Bank of America, ANZ Grindleys Bank, LG Countrywide and several other banks and financiers took the lead and defined the procedures that the industry was to follow. This hire purchase policy contributed to a large-scale expansion of market potential as Indian buyers could for the first time buy against their future incomes instead of having to rely on their meagre savings alone.

It stirred the Indian market. Hence, many European, American and Japanese companies began studying India's market potential. However, many company's Pre-Business Analysis show that the over taxed Indian citizen was poor customer without access to any bank or private finance. Ford study concluded that as Government or companies bought most new cars, there was no market for small cars but some potential for big ones.





The reform process that began in 1991 soon saw an invasion of potential investors from almost every automaker seriously examining the Indian market.

The annual car sales of less than 180000 units in 1990 seemed much less than what a big country like India was capable of absorbing. Automakers had seen how the markets of South-East Asia and South America had taken off and many wanted to get early toehold into this huge undeveloped market.

Many teams from BMW, Chrysler, GM, Honda, Fiat, Mercedes-Benz, Peugeot, Renault, Toyota, Volkswagen and Volvo scoured the market. They researched the potential, talked to prospective partners and made their plans.

At that time, their studies revealed that the problem with the foreign companies was that of the government policies in India. There is a huge bureaucratic control at the centre, State and local areas and too few infrastructures of power, roads and ports. A few scoffed and declared that India was just a land of promises and still more promises.

However they were impressed by the existence of a mature steel and auto ancillary industry. Even more impressing were the huge resources of well-educated engineers and managers who had a command over English and the millions of skilled industrial workers. Many automakers had earlier studied the Chinese market and preferred the prospect of projects in India





in a better social and legal climate. Many went ahead with serious plans for manufacturing projects in partnership with leading Indian Industrialists.

In 1995, a number of new cars began to roll out from new assembly plants set up by Daewoo, Peugeot, Hyundai, and Mercedes-Benz.

In 1996, the Ford Escort, Opel Astra, Fiat Uno joined the fray.

The FORD CEO, Mr. Jac Nasser, reflected the general view over this: “ The global auto industry is expected to grow by 8.3 million units between 1996 to 2006. Virtually all of that growth will occur outside North America and Europe ...and most of it will occur in the Asia Pacific region. We must establish a strong presence in Asian markets like India, Thailand, Vietnam and China.”

Most of these were large cars by Indian standards even if they were considered as just compacts in their home countries. The new projects generated huge consumer enthusiasm that was aided by enhanced financial services and credit. Sales scored to over 400000 units in 1997.

In 1998, the elegant and peppy Honda City and Mitsubishi Lancer cars took the lead among the larger cars, but toward the end of the year, a pack of smaller cars like Hyundai Santro, Daewoo Matiz, and Indian Tata-Indica entered the market at very competitive prices. These offered better space, comfort and performance, than the pin-sized Maruti 800 and collectively overtook it propelling 1999 sales to close to 600000 units.





Towards the end of 1999, another pack of well-priced subcompact cars like the Ford-Ikon, Opel Corsa along with the Fiat Sienna arrived, set to redefine India's prestige car segment. They are comfortable and spacious on the inside but a little smaller outside than cars like the Opel-Astra, Honda-City, Ford-Escort and Mitsubishi-Lancer.

With many price options they bridge the price gaps between small and large cars.

Later on compact cars segment expanded and we saw Opel Vectra, Opel Zafira, Skoda Octavia, Hyundai sonata, Honda Accord, Mercedes E220. Then we saw the multipurpose vehicle like the Ford Scorpio.

At this time Mr. Rick Wagner, COO of GM said, " India has been identified as one of the key growth market in the region by our company. The launch of new Opel-Corsa and Opel-Astra will help us further consolidate the Indian operations."

The industry anticipates that the Indian market should achieve a sale of about 8,00,000 in 2003. It will be a million, in few years from now. This will certainly make India the world's major car markets.

After a gap of so many decades Indians will have nearly 100 different variant of cars and 40 odd different models for choice. Also in these cars consumers have numerous engine and accessories options. Many consumers complain that there is now too many choices but thank God there is choice at last.





Comparing to the earlier versions of the cars, present cars are now good, reliable, safe, environmental friendly and are having good value.

Extreme critics bitterly say that Competition has done more for the car industry and the whole industries of India than all the regulations of the past decades.

From the Marketing Management point of view, the nationalities of the modern cars are also getting blurred. The Globalisation of the car companies results in components and technologies coming from many different parts of the world. The huge American gas-guzzlers have a limited appeal in the rest of the world. Hence the technology centres of the smaller Ford and GM are no longer in the US but in Europe.

Ford has nearly 7000 technicians and scientists devoted to designing cars at its technical centres located in the UK and Germany. On the other hand GM has an equal number at its German centres. Surprisingly, many smaller GM engines are sourced from Holden in Australia while components for all plants come from many different countries.

Ford did not correctly evaluate the Indian market when it set up an assembly plant as a joint venture with the Mahindra group in 1995. Ford Chose a 1300 cc engine for its Escort entry model. Though it was a very good car in its segment still Indians thought 1500 cc Daewoo Cielo or and 1600 cc Opel Astra would be a better option to invest in the car. Though sells languished still Ford moral was high. For decided to boldly soldier on





and set up a huge new manufacturing unit capable of high indigenisation contents in Indian land near Chennai. It invested USD 800 million in this project.

The result of this time was expected to be different. This, time it thoroughly researched the market and created a brand new car that company intended to introduce to tough markets like India, South Africa and South America. The new Ford-Ikon was derived from well-known Ford-Fiesta platform but had the successful “edge design” that had made the Ford Focus such a success in Europe. Though a smaller than Escort, the platform had been stretched to provide more rear seat legroom so necessary for a family car. Knowing that the Indian market was also very price sensitive, the company passed on the benefits of a high 70% local content to give consumers a very competitive price.

General Motors, which had been a bit more successful with the Opel Astra, also found that it was losing ground to more powerful cars from Honda and Mitsubishi. It also recognised that there was a need for a slightly smaller and more powerful cars from Honda and Mitsubishi. It also recognised that there was a need for a slightly smaller and more affordable prestige car and began studying the possibilities of introducing variants of its successful Opel-Corsa. A stylish new car the Opel-Corsa was developed as a family Sedan with a proper boot.





The President and the M.D. of the GM India, Mr. R. C. Swando, said: “ With changing social equations and increase in the upper middle class segment, the Indian Automobile market holds great promise in the new millennium. We at General Motors are confident that with consistent emphasis on delivering quality products such as Opel Astra and Opel Corsa with focus on total customer satisfaction, our company would be successful and emerge as trend-setter in both the segments.”

While most auto companies began as joint ventures, most of the Indian partners were unwilling to provide funds for the heavy investments needed by the auto industry, especially as many would not be profitable for many years. Ford bought out the stake of Mahindra's and GM bought out the stake of C. K. Birla to become 100% subsidiary of their parent companies.

All the new car companies had to face the problem of India's love of low priced cars. However, modern cars cannot be cheap as their manufacturing costs also carry the burden of expensive technologies for safety and low pollution.

Hence, most of the Indian buyers are realising what Mr. Henry Ford said, “Safety does not sell.” Safety was a major concern among all the international auto companies and would not make exceptions for any country. Their global reputations in the fast communication world were much too valuable.





There were similar concerns in the area of pollution. Especially, both Ford and GM introduced much more expensive Multi Point Fuel Injection (MPFI) that with electronic engine management made their car better but more expensive.

Fortunately concerns about the rising pollution resulted in public interest litigations and the courts cracked down on the Government of India, which in turn made all car companies conform to Euro-II emission standards from April 2000. Environment has become a consumer issue and most of the car companies have initiated steps to conform well before the deadlines. Now the question arise is what next is in offing?

Hence it was though by the auto experts and industrialists, that there would be stiffer competition in the Indian car and vehicular market. There would be even more competition among the car manufacturers ahead. Therefore what is required is the long-term auto policy for the indigenisation of the resources and technologies in the cars and other automobiles. Government must decide how long India will be dependent on the other countries for the automobile technologies especially on the R & D fronts.

However it is not that easy to precisely predict the shape the national long-term auto policy, the new one, being formulated by the Government will take. However, the automobile industry can draw a little comfort from the periodic hints given by the Government agencies that policy will fully take into account the different suggestions by Society of Indian Manufacturing





Association (SIAM), Confederation of Indian Industries (CII) and others or the ultimate overall achievement of 10% of industrial production of the world by 2010. Remember Auto industry is the growth drive in the developed countries. A growth driver of the economy the automobile industry's current share in industrial output is a poor 5% compared to 8-10% in the developing nations and 15-17% in the developed ones. Even the sector's share of employment is as low as 2.5% against 3.5% and 15% in the growing and developed nations respectively.

SIAM prefers a provision for making the Memorandum of understanding policy applicable to all players in the industry and discouragement of new entrants into the field till 2010 so as to provide the existing players enough time to consolidate their position. This will take care of the following things:

- * There are huge human resources available in the industries and institutions, which are still untapped.

- * Another thing is the impediments facing the industry consequence to sudden impact of economic liberalisation and difficulties in catching up with the tough competition.

- * Necessity for sufficient lead-time to the other supporting infrastructure for matching with progress of automobile industries and subsequent formulation of integrated emission norms and its technologies. With Qualitative environment model and scientific consensus prevailing in the US, it is shown that the total benefits to the air quality cannot be reaped





unless priority is given to plug the other direct sources of atmospheric pollution and to improve the infrastructure needs for the clean vehicle operation.

* There must be public awareness drive to indigenisation the technologies as well. As the technological problems in enabling proper public-interest representation for improvement is stressed. Without this the legal remedies sought after Techno-Socio-Economic problems can lead to impasse in growth.

Without all this measure there will be havoc in the Indian industries in few years from now.

In this context, it is informative to recall the warnings of Justice V. R. Krishna Iyer, retired Supreme Court Judge of India (The Hindu, august 17, 1999) in the article entitled “Judicial Remedies”. He opines that by this process we will be constrained to borrow futile imported technologies. Mandatory wayside pollution checks on the vehicles or an ineffective catalytic convertot rendered useless by adultareted fuel are just few examples.

Anyhow why should India import the technologies, which Indians can develop on their won in their country at cheaper cost in their R & D institutes like Automotive Research Association if India (ARAI), at Pune or National Environmental Engineering Research Institute (NEERI) at Nagpur?





Thus, if local players will develop well, there will be localisation norms, which could be applied to the company level instead of model and platform level.

Next in the long term policy is the clear-cut case for lowering excise duty to a uniform rate of 15% from the current almost 25% for the passenger car segment. It would drop the prices of vehicle to almost 12% to 25%. This will raise the demand of the cars by more than 25% in the year 2010.

Further, special provision needs to be made for overseas acquisitions at par with the software industry and a ban on import of second-hand vehicles for a specific period.

It has also been confirmed by the scientists that unless there is time' life of the vehicle is decided anti-pollution drive will be a futile effort.

Thus, the fast growing Car industry can become the Socio-Techno-Economic driver of the country if the Government, the citizens of India become conscious towards all these aspects of the car and its technologies.

Part 1: India's first generation cars:

Ambassador by the Hindustan Motors and Fiat-Premier Padmini by the Premier Auto limited were the only two Indian car-manufacturing companies. Thus, there were only these for the Indian customers till Maruti-Suzuki entered the pulsating Indian car market in 1980's.

Earlier in 1942, Hindustan Motors (HM) launched the Ambassador the most popular car of India as being well built according to the Indian road





conditions. It is the ruggedly built for all terrain conditions of the India. It has big acquiring space. Indian customers give very much importance to durability of the product, and Ambassador has all the characteristics to fulfil customers' demands. So, Ambassador is still surviving in the Indian Car Market. Though its sales remained constant till date, still its percentage share in the present car market got reduced drastically.

On the other hand, PAL-Fiat is also a tough car with somewhat less seating capacity as compared to the Ambassador. It is more compact than Ambassador. The organization also gave the similar services like the HM-Ambassadors did.

In this hegemony of Ambassador and Fiat-PAL four wheelers bipolar market in India, for four long decades buyers did not have any choices in this small car segment.

There used to be long delivery periods of vehicle even if after paying the full advance. Consumers used to wait for at least a year to get their already booked vehicles. Customers could not get the cars even if they were ready to pay double the price of the vehicle.

Therefore, all the time sellers dictated the terms and the conditions in the market. The after sell services were also been dictated by the authorized service stations.





First revolution in the four-wheeler small car market took place in 1980's when Maruti-Suzuki (Maruti Udyog Limited-MUL) entered with the well-planned set up of authorized service stations and dealer networks.

Part 2: India's second-generation cars:

This revolution had a big impact on the Indian vehicular market.

HM-Ambassador and PAL-Fiat tried to catch the pace of Maruti Udyog Limited endeavours.

Later on in 1994, honourable finance minister of India Dr. Manamohan Singh with his Globalisations crew opened the floodgates for many more Multi National Companies (MNC) car manufacturers.

By this time MUL had spread its roots in the Indian car market, HM-Ambassador kept its sustainable growth.

Tata is the biggest brand name in India. Tata Engineering in the 1998 entered into the car market with Tata-Indica as self-proclaimed most indigenous vehicle in the Indian market. By the end of 2002 A.D. Indian market, have more than a dozen small carmakers India's Indigenous as well as the carmakers as the Multi National Companies (MNC).

Similarly, in the two-wheeler segment conditions were not different. Bajaj with its adopted Vespa-Scooter model ruled the Indian roads, till Hero Honda hit the roads and captured much luring two wheelers market. Over all review shows that it was monopoly of Bajaj two wheelers. In the peak of the cases, Bajaj two wheeler customers had to wait for more than five years.





Whereas Hero Honda is making waves in the market as it has sold its one-millionth vehicle within the span of one decade. So, Bajaj two-wheeler organisation expanded its segment by fragmenting it to mopeds, scooters, motorbikes, and customers' response was overwhelming. Hero-Honda was also a popular motorbike within the customers in its segment.

Thus, with advancement in time the market for four wheelers as well as two wheelers never remained sellers market but it has become a buyer market. Because of this a continuous improvement in the quality of the product is required along with the reasonable cost. Similarly after sells services are also required. With the consciousness of the customers for quality the introduction of ISO-9000-2000, ISO-14000 and QS-9000 and OHSAS 1800-came into practise in all the big companies, which is very important to compete in the market.

Part 3: Present performance survey of cars on Indian roads:

Now a day, the companies' motto is not to sell the car but to sell the satisfaction. Thus, the customer's delight and satisfaction are main concern of the companies. The following companies are manufacturing the small cars, which are widely used on the Indian roads, as shown in Table 1.

TABLE 2.1: Market Share of Cars in India as on 1st March 2002. [1]:

Reference- Overdrive Magazine.





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S N	Organisation /Abbreviation	Collaborati on	Model 1/ Year of launch/ Present Price Rupees In Lac	Model 2 Year of launch/ Price Rupees In Lac	Model 3/ Year of launch/ Price Rupees In Lac	Model 4/ Year of launch/ Price Rupees In Lac	Market Share in yr. 2000: No. of cars sold	Market Share in Yr. 2001: No. of cars sold
1	Hindustan Motors/ HM*[2]	Mitsubishi/ Eicher, etc.	Ambassador/ 1957/ 4. 53	Contessa/ 1988/ 5. 31	Lancer / 1998/ 8. 71		27792	23031
2	Premier Auto limited/ PAL-Fiat *[3]	Fiat	Uno/ 1994/ 4. 00	Sienna / 2000/ 7. 87	Weekend/ 2001/ 7. 90	Palio/ 2001/ 5. 13	21000	7200
3	Maruti Udyog Ltd./ MUL	Suzuki	Omni/ 1984/ 2. 56	Maruti 800/ 1988/ .3. 5	Maruti -Zen/ 1994/ 4. 50	Estee m/ 1995/ .5. 92		



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	*[4]		Baleno	Alto/		Versa	363200	349770
			/	2000/	Wagon	/		
			1999/	4. 00	R/	2001/		
			7. 65		2001/	14. 00		
					4. 90			
4	Hyundai India Ltd. *[5]	Hyundai	Santro	Accent	Sonata		84004	72780
			/	/	/			
			1998/	2000/	2002/			
			4. 24	7. 25	16. 00			
5	Daewoo *[6]	Daewoo	Ciello/	Matiz/	Nexia/		54034	24747
			1994/	1999/	2001/			
			6. 00	4. 33	6. 87			
6	Tata Engineering *[7]	Hitachi , etc.	Indica	Sedan			63089	49876
			/	/				
			1998/	2002/				
			3. 34	.6. 50				
7	Mercedes Benz *[8]	Mercedes	E	S	MB	C	3609	4801
			class/	class/	class	180/		
			1998/	2000/	Van /	2001/		
			33.00	52. 76	2001/	22. 80		
					15. 00			



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8	Escort India Ltd. *[9]	Ford	Ikon/ 1998/ 7. 75				17868	12484
9	Kirloskar / Toyota *[10]	Toyota	Corolla / 2001/ 14. 00	Camry / 2001/ 22.00	Daihat su- Sirion/ 2002/ Rs.12. 0			2200
10	General Motors/ GM *[11]	GM	Opel Asrta/ 1994/ 10. 88	Opel Corsa/ 1999/ 7. 50			3057	8703
11	Honda Motors *[12]	Honda	Accord / 1988/ 15. 00	Siel/ 2000/ 7. 85	City/ 2001/ .9. 88		12012	13212
				Total Sales	638000, in the year 2001.	590000, in the year 2000		

Interpretation of table:



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Note 1: Number in the bracket '[1, 2, etc.]' denotes the reference listed at the end of thesis, ex. Economic Times dated 17th March 2002, and Monthly Magazine Autocar-India, January 2002.

Note 2: There are even subclasses in this table which are not included in it. Like car with Air-Conditioned version, diesel version, petrol version, luxurious electronics fitted version, etc.

From Table 1, it can be observed that there are in all eleven major organisations in India, in a competitive car market. It can be observed from above data that out of these companies, only MUL have introduced eight different models within the span of 18 years (1984 to 2002). In contrast to this, PAL has introduced only four models within the span of 52 years (1960's to 2002) and HM has introduced only three models within the span of 60 years (1953 to 2002).

In the following Figure and Graph the short forms used are: HM= Hindusthan Motors, PAL= Premier Auto Limited, MUL= Maruti Udyog Limited, HMIL= Hindusthan Motors India Limited, DMIL= Daewoo Motors India Limited, Tata= Tata Motors, Merc= Mercedes, FIL= Ford India Limited, KT= Kirloskar Toyota, GM= General Motors India Limited, Honda= Honda Motors India Limited.

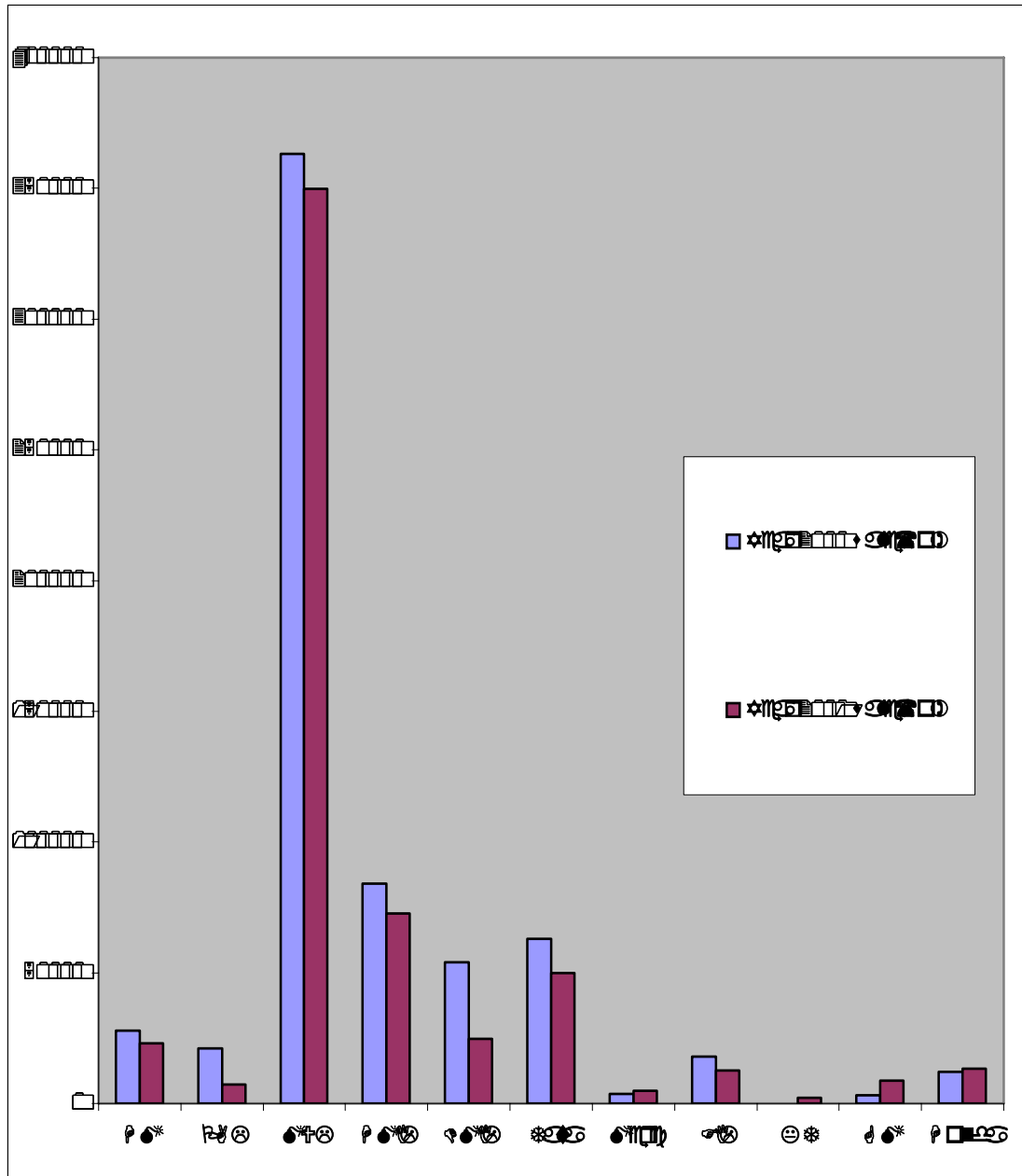




Table 2.2 and Graph Associated with it:

Market Share of each car companies in India:

Company Name	HM	PAL	MUL	HMIL	DMIL	Tata	Merc	FIL	K T	GM	Honda
Year 2000 sale(No)	27792	21000	363200	84004	54034	63089	3609	17868	0	3057	12012
Year 2001 sale(No)	23031	7200	349770	72780	24747	49875	4801	12484	2200	8703	13212
% sell in 2001	4.05%	1.27%	61.49%	12.79%	4.35%	8.77%	0.84%	2.19%	0.39%	1.53%	2.23%





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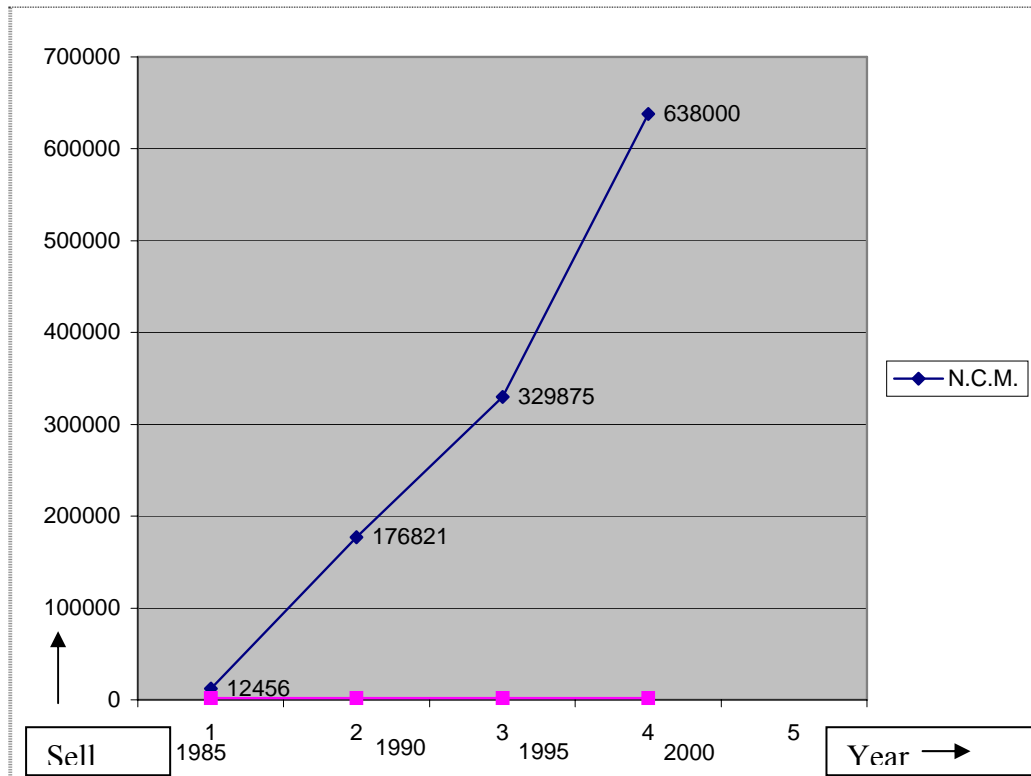
**Interpretation of the Table and the Graph:**

It can be clearly seen from the Table 2, that MUL is having 61.49% highest share in the market. This is because of the continuous improvement and market surveys to check the requirements of the consumers and do the necessary modifications as per their needs, which is very essential in today's competitive market. Still, many more car manufacturers are interested in introducing their cars in the Indian market.

Part 4: Growth of the cars sells in India:

From Table 3, it can be observed from above data that selling of cars in India has risen from 1985 (102456 units) to 2000 (638000 units). This is represented in the Figure 2 below: (*Reference: Monthly Magazine-Auto India-August 1997*)

Table and Graph: 2.3: Growth of car sells in India:



Interpretation of the graph:

Thus, the trend is increasing. Since 1985, the demand and supply of the small cars is increasing with extreme curve. This shows that there is a future scope for the cars in the growing market. So, it is very much essential now a day to concentrate on the needs of the customer and develop the cars accordingly.

In, 1985 it was only in the range of one hundred thousand. But now it has become six times of that and in the 2010 A. D. Sales will touch one million mark is what has been predicted by SIAM.

Actually the growth is parabolic showing tremendous increase in the cars demand. Avenues to earn money have increased due to industrialisation of many sectors in India.





Middle class is estimated to touch almost 600 million in the year 2006 A. D.
out of them one million can afford to by a car by that time.

Part 5: Manufacturing Details of the Indian cars:

Now let us see how many cars were manufactured in India since 1950 till the 2000.

The trend clears the pathway for the indigenisation of small cars with respect to customer behaviours. The phenomenal growth in the car industry and customer demands is seen in the table below.

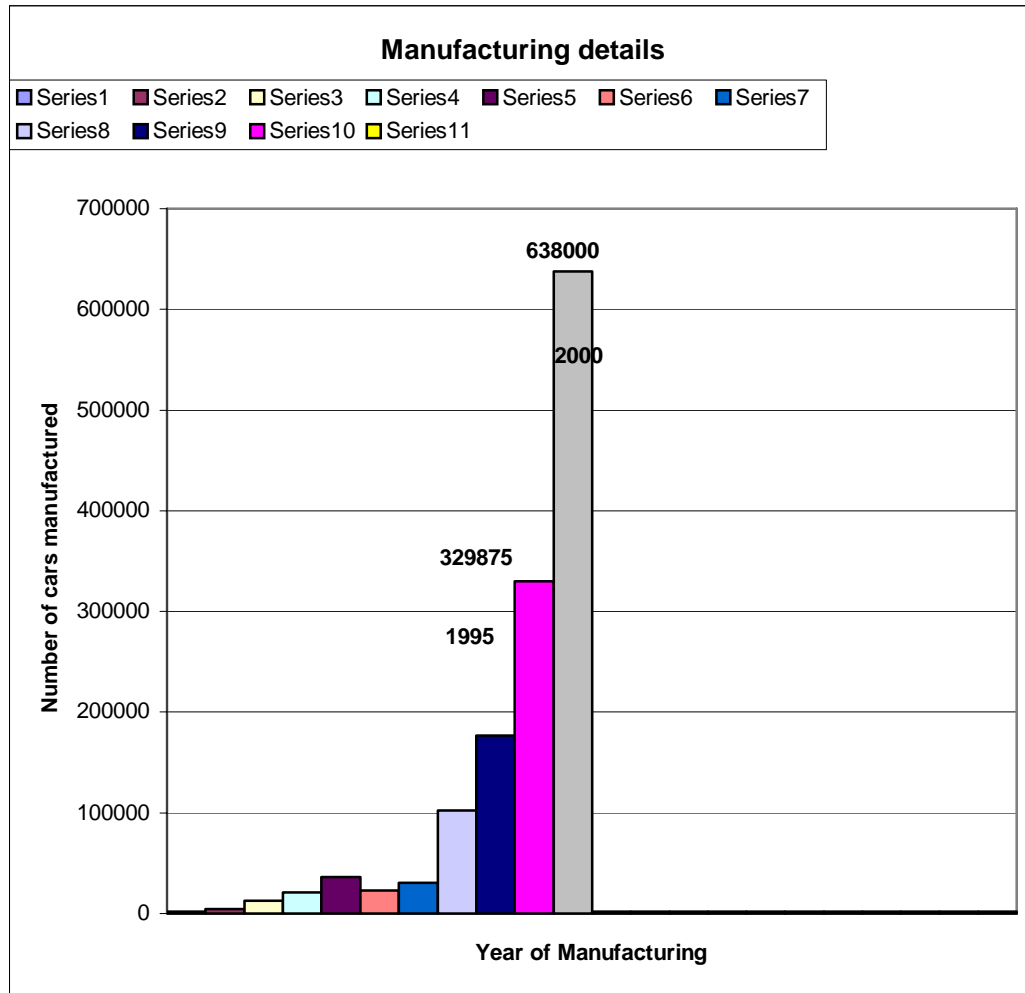
Table and Graph: 2.4:

Manufacturing details of cars in India since 1950 to 2000.





Car mfg	1800	4500	13000	21000	36000	23075	30538	102456	176821	329875	638000
Year	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000
Series	1	2	3	4	5	6	7	8	9	10	11



Interpretation of the Graph:

1. There is steady rise in the car supply than its demand, till the year 1985, can be seen.





2. With increase in production in the Maruti Udyog, 1985 saw first above one hundred thousand (One Lac) per year productions, and matching sells figures.
3. With almost all the major car MNC in the world entered into the Indian car market in 1993, car manufacturing touched the two hundred thousand (Two Lac) production figures a year due to extreme competition.
4. With implementation of Fifth pay commission and increase in salaries of the executives, and as a demand for status symbol satisfaction, car manufacturers touched Three Hundred thousand figures a year.
5. In 1996, it touched four lacs and in 2000 the cars manufacturing figures touched the over six lacs mark.

Maruti with its excellent servicing centre network, Mercedes with complete delight, Ford with world class cars, Daewoo with the best technical car, Hyundai with complete peace of mind car and services, Tata engineering with Tata Brand and Quality services has also tried to relinquished the demand of Customer Satisfaction.

Present Indian Scenario on the manufacturing car technologies and expectations of the customers:

Eighty percent of the Confederation of Indian Industries (CII) listed manufacturing units in India is some way or other related to the Automobile Sector by this way or other. Many of these companies are also busy in





manufacturing other products as well due to mastering technology of manufacturing and technologies spin off.

Hence, the review of manufacturing sector in India is but also the review of most of the car manufacturing companies as well.

What are needs at the present are Leadership, Vision, and Execution of this car indigenisation programme. Thus, leveraging the resurgence in Indian manufacturing sector needs a strategy for turn around management. To enhance R & D, Quality, and Productivity of the Industry needs a concentrated effort.

Manufacturing sector contributes 26% of the Gross Domestic Product (GDP) of the country and is improving steadily due to global and domestic needs. India is the largest manufacturer of motorcycles in the world and low cost steel.

CII, Sofres Mode Survey, SIAM survey shows that Consumer spending on automobile related products is also increasing day by day due to time factor and life styles. CII also claims that by 2007 there will be huge rise in the manufacturing sector and hence the indigenisation of car and other technologies will play a crucial role.

There will be lots of opportunities in the manufacturing sector. It is predicted that there will be huge manufacturing opportunities for the companies from 2007 Indian 40% Indian household will have washing machines, 77% middle class will have refrigerators, 95% will have pressure





cooker, 51% will have two wheelers. (The Hitvada- 28th November 2003, Friday). Thus, from all these nuclear family households the aspiring candidates for the four wheelers would be almost one-fourth of them mostly young or the middle aged persons. Thus, there is complete overlook needed over the manufacturing sector in India especially in the car sector due to its sheer effects on the economy.

Thus, there is a need of utilisation of the resources available in the country. Even manufacturers and R & D centres from abroad from car and information technology field are shifting to India.

Most importantly Indians have started this exercise on the paper but its progress is not even faster than the snails walking speed.

Many vehicle giants can tap the opportunities in the car sector and put the competition up to the root level of the country. Information technologies human resources and knowledge collected from the Web can boost the pace of the happenings in the proper direction.

To avoid total aliens in the field of new technologies Indians must start and are starting of course the collaborative efforts. Thus, most beneficial companies would be the Original Equipment Manufacturer (OEM) of the car industries.

Even few Indian companies like Sundaram Fasteners, Bharat Forge, busy in the car component manufacturing are trying to move from excellence by exception to exception by rule.





This will start making few of the giant Indian companies to Indian Multinational Companies i.e. Indian MNC.

However few differences in the Indian market and the other European, developed Asian and American market still exists due to which Indian brands and the companies will have to suffer for few more years so as to get on the branding like GM, Ford, Toyota, LG, Mitsubishi, etc. As presently to match turnover of these companies there is no Indian company that could stand in these companies list due to their sheer turnovers, brand loyalties of the customers and their patented advanced car and technologies and other supporting technologies.

SOME DIFFERENCES IN THE DEVELOPED NATIONS' CAR MARKET AND INDIAN CAR MARKET:

It is an independent survey:

It is the difference between the US, European Union and Japanese conditions for developing and driving a small car (LMV) on their roads with their Indian counterpart. The MNC do not develop their cars according to these conditions and bring the cars in the Indian market. Where as the indigenously built cars will have the distinct advantage of perceiving the car for the Indian conditions only.

Table: 2.5: Showing the difference in Indian car market versus advanced countries car market:

SN	Factors	Conditions in USA,	Difference in Indian
----	---------	--------------------	----------------------





	considered for Design & Development	Japan, Australia, And other advanced countries.	Europe, Conditions
1	Temperature in degrees Celsius	-20 to +25 degrees Celsius	Range in India -20 to +50 degrees Celsius
2	Weather	Normally pleasant	Hot and dry weather not suiting these machines
3	Climatic condition	Cold to pleasant	Hot And Temperate
4	Humidity	More humid climate	Relatively dry climatic conditions.
5	Rains	No monsoon rains	Four months compulsory monsoon rains
6	Snow	Compulsory in winter	95% population do not exposed to snow
7	Road Conditions	Far Better than Indian	All terrain sinusoidal bumpy roads everywhere
8	Load carrying	Compact as easy	They take lot of





	tendency of people while going on tour	availability and access	things as luggage as availability is restrictive than luxurious needs
9	Psychology of driving	Different cars for different purpose ex. For household purpose, for week end, for utility purpose, for office, etc.	For all purpose the same is used, of course, if its typical middle class Indian family.
10	Life of the vehicle decided	Maximum 8 years	Once bought it is supposed to be for the life time
11	Car owners Average Age Range	14 years to 65 years	25 years to 60 years of Age
12	RTO Norms for maintenance of vehicles	Very Strict for even wipers, mud guards, etc.	RTO norms are not so strict, many old vehicle even today don't have turning lights and mud guards etc.
13	Driving and	Very Strict and different	Average





	Rules	ex. Right hand drive, lanes on TOL roads, etc.	
14	Junk yards/ Scrap yards	Compulsory scrapping unless taken special permission to do so once prescribed life of car is over	No such rule even if RTO prescribes life of the vehicle to be almost fifteen odd years, but nobody throws away their vehicle.
15	Servicing and Maintenance	Yearly contracts are there and consumers follow these norms to avoid any mishap.	No such strict contracts except in the warranty period, people do not follow these norms strictly.
16	Research and Development	Every month new version of car is there and upgraded rules to support and encourage the technological advances.	Absolutely no R&D in few of the plants in India. No encouragement and this there are people still driving 50 years old models in the





			form of Ambassador and PAL vehicles.
17	Quality Standards	GM, Ford, Toyota, Mitsubishi, Suzuki, Renault, Rolls Royce like companies have standards better than ISO & QS.	Indian Countries could reach these ISO and QS standards in 1990's. Many can reach the standards as comparable to these companies soon.
18	Technology	A huge gap has been developed between Technologically advanced and developed countries to the other countries.	May be India is left behind these countries but the 'All kinds of Experts' and skilled workers, Technocrats and Beurocrats and Executives will take India to this height within coming few years.





19	Service Equipments	Equipments used are very advanced and technology in them is the latest one.	MNC are bringing all these to India for faster working and thus Indian will develop these technologies very soon.
20	Spare parts	Heavy penalties for duplicate parts	Spurious parts are too many and government norms are not so strict.
21	Cost of Vehicle	Approximately, it is equal to of one-month salary even if taken as minimum wages act as a base.	No such criteria.
22	Yearly maintenances cost	Bearable though costly in Indian terms but US, Japanese can afford it, as it has become their habit, they have access for earning capabilities.	Even Lower middle class customers can't afford the maintenances cost of the cars.





23	World-wide Turnover of the companies' products and services	GM- \$550 Billion, Ford- \$500 Billion, Toyota- \$450 Billion, etc. even more than GDP many developing countries.	All companies together in India forms the Turnover not more than \$50 to \$100 Billion Dollars.
24	Psychology for progressive Technology	Extremely high in all these countries and money to invest is also more than desired so immediate implementations many a times.	It is high in India but big shot businesspersons not ready to invest in unproven field of R & D work.
25	Transportation norms	Extremely strict rules and regulation.	Indian RTO are still in the process of developing the Traffic sense among every citizen.

PRESENT WORLDWIDE CAR TECHNOLOGIES AND THEIR MARKET:

After Ford-T few more popular models like, Volkswagen-beetle, Maruti-Suzuki-Zen, Maruti-Suzuki-800, Wagon-R, Alto, Fiat-Uno, Mercedes ML-55-





AMG, Rover 25, Clio, Fiat, Fiat Eco-basic, Tata-Indica, BMW Straight-line, Hyundai-Santro, Daewoo-Matiz, Toyota-Corolla, etc.

- i. Suzuki's Wagon-R is more popular in Japan,
- ii. Mercedes-Benz ML-55-AMG is more popular in Europe,
- iii. Volkswagen-beetle is the most sold car in this section,
- iv. Maruti-Suzuki-Zen manufactured with Japanese collaboration in India is sold in more than 36 countries in the world,
- v. Renault has run the first fully battery charged car in the world,
- vi. Eco-Basic is the first Hybrid (Battery-Petrol) commercial small car in the world,
- vii. Nitro is the first liquefied Nitrogen driven small car in the world.
- viii. India's, Tata-Indica is the highly potential and first Indian made small car using various assemblies and individual part from various Indian companies and MNC.
- ix. Where as, Sumo utility vehicle was the first vehicle fully designed in India by Telco.
- x. Clio is the first and the only car in this section, which is driven by women only.
- xi. Hydro the small car is driven on the Hydrogen fuel. Scientists are looking for better version and a wider acceptance of Hydrogen driven cars. Hydrogen is the most abundant fuel/ element in the universe and available in plenty on the earth.





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- xii. Volkswagen-Beetle is running on the road with its very new look.
- xiii. Almost every year car manufacturer like GM, Ford, and Toyota, etc. come out with a new version of a car every after six months, such is the competition.
- xiv. Honda is conducting Car race in Australia every summer. The specialty of this race is but all the cars are designed and developed by the Honda and are Solar Battery charged vehicles.
- xv. According to JD Power survey, Korea's Hyundai- Santro is the best-sold car in India in the year 2001.
- xvi. Many of the cars imported in India are in the CKD complete knocked down conditions in India. This include premium cars like Mercedes- Benz, Ford- Mondeo, Honda- City, Honda- Accord, Mitsubishi- Lancer, Hyundai- Santro, Toyota- Qualis, Ford-Icon, etc.
- xvii. India's Reva, the battery driven car is one among the smallest in size in the car world.



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**Part 6: What are the latest and maximum customers' demands?:**

Few experts like Dr. M. B. Nagarkar, who is the car owner, feels that in the field of software India is leading only due to its brainpower. On the other hand in the automobile field only twenty percent of software field's brainpower in R & D is required hence in coming years if India starts this project India is going to win the car race i.e. India can become the global leader on this front. Another reason is many developed countries have the money to spent now but lack the human resources with high skills and qualifications and the brain power as much the India have. Hence, this kind of project is very much viable project. (*Reference: Dr. M.B. Nagarkar, In his Editorial- Ek Nava Itihas- i.e. One New History, Marathi Magazine: Swaroopyog-Pune, January-February 2004, 2004 Year's 10th Volume*).

Next in his address Dr. M.B. Nagarkar categorically states that by the end of 2006 A.D. India along with the its all the South Asian neighbours will be having the free trade zone. Thus, if the project in this thesis like Rupees One Lakh Car gets into reality India won't have to look for the market around the world. These all developing countries will get the 'modern car' at its cheapest cost. These are the maximum customers' demands. Many two-wheeler owners, which are in millions in India, and in and around the South Asia, and south East Asia, have this common demand. Hence, researcher categorically feels that this thesis may be the solution over these demands and which can help Indian market forces and the nation as a whole.





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CHAPTER 3:

WORLDWIDE HISTORY OF FEW CAR COMPANIES FROM THE TECHNOLOGY DEVELOPMENT POINT OF VIEW



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253

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CONTENTS OF CHAPTER 3:

Sr. No.	Topic	Page No.
3.1	History of Mercedes Cars from technologies development point of view	266
3.2	History of General Motors from technology development point of view	277
3.3	Recent History of Bayerische Motoren Werke (BMW) from 1979 to 2000, from technology development point of view	292
3.4	What is lesson to India?	304



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The history of few organisations can be put here to know how the technology got developed in the car industry all around the world. Instead of taking history of all the cars here most promising histories among the car developers is given here.

3.1: History of Mercedes Cars from technologies development point of view:

To know the history of the car first of all one must go through the history of few car organisations, which have a solid impact on the world car market. The starting will definitely from the Mercedes, followed by the other such giants. The name Mercedes is today synonymous with great and innovative cars. The history of cars and the history of Mercedes are linked whole markedly with each other. The self-explanatory table is given below:

Table: 3.1: History of Mercedes Cars from the Technology development point of view:

SN	Year	Important Event	The Car Technology introduced or developed
1	1871	Mr. Karl Benz (27) and August Ritter formed his first company in Mannheim.	-----
2	1879	Karl and August separated.	-----





3	1880	Karl Benz formed the company of his own.	He developed <i>first two-stroke engine</i>
4	1885	Gottlieb Daimler designed and developed first motorcycle.	He fitted <i>four-stroke single cylinder engine in the two-wheeler.</i>
5	1886	Daimler ordered the four-wheeler carriage from Wimpff and Sohn.	First car got developed as automatically as he fitted into it the 1.1 bhp engine. But was not patented.
6	1886	Daimler developed <i>first official motorcar</i> . The imperial office in Berlin in Germany granted Karl Benz patent number 37435 for the world's first motorcar.	Its <i>0.7 bhp engine was fitted on the rear of the three-wheeler carriage.</i>
7	1893	Benz developed car for the masses.	The <i>Benz-Velo was the first cheap, mass product car</i> in the world.
8	1895	First Truck and Buses launched. Benz Patent Motor Bus travelled	<i>Benz and Daimler designed the Bus.</i>





		Siegen to Deutz.	
9	1895	Daimler and Designed by Maybach invented the world's first motorised truck. The first one was delivered to the British Motor Syndicate.	<i>The world's first truck was equipped with a four-bhp engine as well as a belt drive with two speeds forward and one reverse. A revolutionary idea.</i>
10	1896	Karl Benz developed the first delivery car. It was supplied to the Paris department store "Bon Marche" .	<i>The delivery car was developed on the chassis of Victoria Car model.</i>
11	1898	How the cars got name of Mercedes? Emil Jellinek, who bought and sold Daimler product, took part in the Nice-Magagnon-Nice rally under pseudonym Mercedes, his daughter's name. He	<i>Daimler ran their car in the rally and won. He ran the same car, which masses drove in the rally. Thus first rally car was born.</i>





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		won the race for Daimler.	
12	1902	<i>Mercedes name was patented.</i> Mercedes means Grace in Spanish.	The name given to car, which masses, used to drive on roads.
13	1903	The Benz launched the new Parsifal car.	It was the first car with <i>vertical two-cylinder engine</i> . It also was the first Benz with modern <i>propeller shaft</i> .
14	1909	Gottlieb Daimler's sons advised him to use a trademark of star in their cars.	The Daimler's <i>logo</i> , trademark the Star was born. Its three-pointed star indicates something. One point each indicates the Sky, the water, and the Land. The meaning was that there are three branches of motorisation.
15	1919	After world War the Second, peacetime production started. Drawing on the	<i>Supercharging</i> meaning providing more air in the air-fuel mixture was used for the first time in the cars.



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		experience gained with the aero engines in the war Daimler decided to use Supercharging in the cars too.	
16	1921	Daimler Motoren Gesellschaft presented two new Luxury cars at the Berlin Motor Show.	<i>First Luxury cars of the post world war era.</i>
17	1923	Benz brought the car having Drop-Shape.	The car was unusual in basic layout and can be regarded as the <i>first mid-engines racing car in the world.</i>
18	1924	The Merger. After winning a combined 269 races, Daimler Motoren Gesellschaft and Benz and company coordinated their production activities and two years later merged into Mercedes-	-----



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		Benz.	
19	1926	Daimler-Benz created the legendary “K Type” super-charged model.	The “K-Type” supercharged car had top speed of 145 miles per hour (<i>mph</i>), making it the <i>fastest car in the world</i> .
20	1929	“Stuttgart” a new medium sized car was introduced.	Stuttgart had six-cylinder un-supercharged engine with 38 bhp.
21	1934	A new racing formula led Daimler-Benz to develop a completely new car known as W 25.	It had over weight than its earlier versions. Still it won many races.
22	1936	The dream cars of 30’s were developed.	The cars that were the most popular were, K 500 and K 540.
23	1945	The war stalled the factory. Unterturkheim plant was bombed in the war. Still production started after some time in 1945 itself.	First mass production of <i>trailers for the cars and the bicycles</i> . Thus, car industries also <i>modified</i> the bicycle technologies.
24	1946	Car manufacturing started at the	It manufactured special pick up vans.



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		Sindelfingen plant.	
25	1949	First post war new development in the car sector.	Diesel version of the Mercedes 170 launched. In many countries the diesel was to carry less taxes and hence was cheaper than the petrol. So it became the affordable cars for the executives.
26	1954	Mercedes 300SL one among the best seller was manufactured.	It had 215 bhp three litre six-cylinder engine gave car top speed of 250 kph. By this time speed on good roads became thrill for the car owners. It demanded good road conditions, which were either fulfilled by the rich countries or their government started realising the importance of the good road conditions.
27	1955	A new roadster manufactured.	Roadster 190 SL was 'popular' version of 300 SL. 190 had low power and was lighter as well,





			hence was called the popular car among the Mercedes range.
28	1958	Daimler-Benz launches the SE series of cars.	SE were advanced version of SL. More and more executives started using the cars as a necessity than the luxury.
29	1961	Due to higher speeds in the car seatbelts were introduced in the Mercedes-Benz cars.	Introduction of seatbelts was revolutionary measure of the modern cars. It brought the revolution in the safety technologies in the cars.
30	1977	The W 123 T-models were a new departure in the Mercedes model range.	“T” stands for Tourism and transport. Thus, the cars were made so good to carry passengers as well as goods safely to the destination. It brought the concept of good suspension system for comfort in the cars and less damage in the goods while being transported.
31	1979	The new version of the	S class had more advanced





		Mercedes S was launched.	features in it than its earlier versions.
32	1993	Mercedes-Benz became the first manufacturer to fit diesel engine in the car.	The Diesel engine had four valves, which indeed was a revolutionary concept.
33	1997	The company rolled out new cars and registered it highest growth due to its world-class cars and its product range.	The company rolled out new A-Class car. It posted a revolutionary concept in the cars. It posted highest sales ever by the company.
34	1998	On May 6, 1998 Daimler-Benz AG and Chrysler corporation merged to form a new company, Daimler-Chrysler AG.	It stressed more on future cars and R & D. Daimler-Chrysler built many new concept cars. It includes Solar cell driven cars. Fuel Cell driven cars. Battery operated cars, etc.
35	2001	Daimler-Chrysler AG decides to enter into Indian car market.	Even in the sinusoidal and bumpy Indian road conditions the car sellers claim and prove that even the coin placed on the top of the roof of the car remains





			as it is after long drive. Such is the comfort and safety standards of the Mercedes cars. On few good roads it was a proven fact.
--	--	--	---

Few Special Notes on the Table above:

a. Mercedes never remained dependent on the others for the technologies.

b. Mercedes makers carried out their own R & D.

c. Mercedes were the pioneers in many car technologies like:

- The private car itself is the concept of Mercedes carmaker Daimler.
- Diesel engine for the cars with four valves,
- Seat belts and safety features,
- Very good suspension system for the goods carrier and the passenger cars as well,
- Mercedes were the first to launch the Buses and the Trucks.
- Antiskid braking system,
- Air Bags,
- Electronic Stability program,
- Active Suspension,
- Ceramic Brakes,
- Car with the 'Safety body',





➤ Mercedes car makers are one among the first few car companies in the world to carry out independent R & D on the following technologies having very promising future:

- Hydrogen fuel driven cars,
- Fuel Cell driven cars,
- Solar Cell driven cars,
- The sky cars,
- On water cars, etc.

d. Mercedes offers the other servicing features as well:

- 24 hours emergency services,
- 24 hour Break Down Services,
- Services on call from Email, Mobile and Telephone,
- 'At Home' Services, etc.

e. During Second World War Daimler-Benz engines were literally used in German Trucks, Tanks, Fighter and Civil aviation Aircrafts, Speciality Bombers. Hence the allies destroyed the factories. Still with German efficiency everything was rebuilt. 1980's Mercedes makers became the largest automaker in the Germany.

f. In 1980's Daimler-Benz acquired other companies like AEG, Dornier. Thus, it diversified into high technology products like aircrafts, radio equipments, etc.





g. Due to all these positive activities Mercedes has become the extravagant “Brand Name” in the world. No doubt that nearly *6.5 million car customers still own the 9.5 million Mercedes-Benz cars* (Excluding Daimler-Chrysler cars with which Mercedes collaborated in the year 1998).

3.2: Table 3.2: History of General Motors from technology development

point of view:

SN	Year	The Car Technology developed by GM	Highlights of the technology or the important breakthrough for the company and/ or by the company.
1	1908	General Motors Technical Centre (GMTC) was formed.	<p>a. GMTC became the home for the researchers, engineers and designers.</p> <p>b. GMTC was the largest industrial R & D centre in the world.</p> <p>c. GMTC was located on a 330-acre site. It had building, labs, gatehouses, laboratories, offices and shops lined along the three sides of a 22-acre lake.</p> <p>d. GMTC’s mechanics, machinists, stylists, not only developed new products but also developed the new methods to manufacture them.</p>





			<p>e. Thus, they improved the existing techniques, methods, products and techniques. Though all the GM divisions had their individual in-house research facilities still GMTC handled high percentage of the R & D projects.</p> <p>f. GMTC sued to handle the even the projects which were beyond the capacity of the individuals.</p> <p>g. GMTC even handled successfully the highly uneconomical projects.</p> <p>h. Infact it was GM who introduced largest number of innovative technologies in the car sector since its formation.</p>
2	1908	Electric headlamp for the cars	First electric headlamp was introduced in the car.
3	1910	Closed body of the car	The first closed body car was introduced in the market.
4	1911	Electric Self Starter	Mr. Charles F. Kettering invented self-starter in the GMTC.





5	1912	First all steel body in the car	The closed steel body was regarded as the safety epitomised and was a very new concept in the car technologies.
6	1926	Shatter-resistant safety glass	The safety glass which could not be shattered was a unique phenomenon
7	1927	Car designed by the stylists	GM launched the LaSalle, the first car completely designed by an automobile stylist. It was the first time in the history of the cars that designer got such an importance.
8	1933	First individual front-wheel suspension	GM introduced the first individual front-wheel suspension called 'Knee-Action'. Till that date suspension was not even thought of. Thus, began the comfort driving. Earlier every driver went through the series of ups and downs while driving the car, but this breakthrough brought the shock absorbing techniques into the cars, hence started the real comfort driving and seating in the cars.





9	1933	Built-in-trunk	GM developed the built-in-trunk, means the space for the passengers and separate space for luggage a revolutionary idea by itself.
10	1934	GM conducted Roll over test	GM tested cars for the first time for the roll over test. It means for the tilting of the car its angle of tilt was calculated and to avoid it special suspensions were built. Again a revolutionary breakthrough.
11	1934	GM conducted Barrier-Impact test	Barrier means the unavoidable hurdle to the car while moving on the road. It can be a bumpy tomb or even sudden appearance of the wall while moving on the fast track. It decided the breaking point of the front bonnet, and the force that can destroy the car. This helped the engineers to develop strong and sturdy cars with proper suspension and the measures to avoid severe injuries to the driver and the passengers.
12	1935	Carry-All	The company introduced the suburban





		model of the car	model of the called the 'carry-all' big size car. It was a huge success in the rural area as well as in the sub-urban towns and sub-urban markets as well.
13	1938	Column Mounted Gear Shift mechanism	GM achieved another breakthrough in 1938 when it introduced the column mounted gearshift mechanism in their cars.
14	1939	Rear-Directional signals	GM literally gave new direction to the rules and regulations for the safe driving on the American broad roads in 1939. IT introduced a revolutionary concept of rear-directional signal lights (Turning Lights or Blinkers) in their every car. It became the standard components on the every GM vehicle including every car.
15	1940	Fast Buick cars	In 1940, GM planned the focussed approach to develop the fast moving cars with all the possible safety features on it. Buick was made the front-runner for these kinds of cars.
16	1941	Buick	Buick fastback Coupe (two seater car)





		fastback coupe car was introduced	had 'sedanet' fastback styling and an innovative 'airfoil' fender design. OF these the Sedan concept was the new concept car at that time. Whereas the 'airfoil' meaning the car which moves smoothly in the air resistance. These were the revolutionary concepts for the future fast moving aerodynamic cars, which run on the fast track lane, or in the competitions.
17	1945	Curved Glass shields	GM introduced the curved glass shields to increase the driver vision and reduce glare.
18	1946	Automatic transmission.	One of the major breakthroughs of all time happened when GM introduced the Torque-Converter-Type Automatic Transmission in the US cars for the first time. With this mechanism driver don't have to change gears though they are present in the cars for variable forces required while driven in the variable convolutes, and ups and downs of the





			roads.
19	1951	GM introduced Power Steering	GM made a powerful but hypersensitive power steering, which was, introduced in their cars in first half of the 1950's. This reduced the efforts of the driver and the fatigues in the longer drives or even in the crowded city drives where driver finds it difficult to constantly change the direction of the steering wheel.
20	1952	Automatic Windshield Wipers	This again was the revolutionary concept. These windshield wipers could wipe of the rain water, snow, dust, fog, vapours equally well to give the clear vision in the bad whether conditions. It made the driving simple in extreme whether conditions.
21	1951 to 1955	GM called the transportation officers for safety tests	During all the 1950's GM called the inspectors for the regional transportation offices to check and clear the cars and other vehicle on their own grounds. The tests were conducted at the GM Proving Grounds.





22	1960	GM introduce four distinct cars in each division	From 1930s to the 1950s, GM had been offering five basic models viz. Chevrolet, Pontiac, Oldsmobile, Buick and Cadillac. In 1960 GM planned to start offering four separate sizes in each car division except Cadillac where it offered tow models only.
23	1961	Energy Absorbing Steering Column	This was a revolutionary concept in and for the steering wheels in the car and for the every vehicle. This kind of steering column used the special mechanism by which the every bump is not at all transmitted to the driver and hence to the passengers as well. It reduced the driver fatigue and driving became the most loved job or even the pass time in USA.
24	1962	V6 engines in the cars	V6 engine was supposed to be the powerful engine. It was the six-cylinder engine with V shaped placed compact design. Hence it found the place in the passenger cars made by the GM. It





			became the most popular engine in the USA car history.
25	1963	Front-Wheel-Drive	Un till this time cars had the rear wheel i.e. back wheel drive option only. The engine was mounted in the front and the propeller shaft used to propel the car. Hence again a revolutionary concept.
26	1964	Side guard door beam	This was the safety feature. It introduced the idea that car drives and the drivers are safe in the GM cars. The parallel beams on the side of the cars for safety saved many in the accidents.
27	1969	Guidance and navigation system for moon landing	In 1969 Neil Armstrong and Edwin Aldrin landed on the moon. The GM provided them the navigation system. Later on this idea was to be implemented in the cars as well.
28	1974	Air Bags	GM became the first car maker to introduce the safety for the drivers, the air bags. This bag used to come out of the steering wheel once the severe impact occurred on the cars. It saved the





			lives of many drivers in sever accidents as the cushion provided by the airbags could take the severest jolt and save the face and the front organs of the driver.
29	1975	Small Luxury Cars	In 1975 GM set the trend for the 'small luxury car' during the oil crisis, with the introduction of Cadillac Seville.
30	1975	Pollution control device the Catalytic Converter	One more thing to happen in 1975 was that GM started talking about the pollution control. Hence, with pollution control as its focus, GM became the first player in the car industry to install catalytic converters on its entire car and other vehicles in all its US made cars. This revolutionary pollution control technology, developed by the GM at short notice, benefited the car and the auto industry worldwide.
31	1975 to 1988	GM brought technologies that change the face of the	Since 1975 GM started introducing various small but important concepts in the car technologies. The catalytic converter that could cost less, the





		car industry	suspension systems of affordable prices, and introduced cars in every segment with all the advanced features developed around the world. Thus, it consolidated itself as the worlds largest car company.
32	1989	Dummies used in crash tests	In 1989, GM developed the crash test dummy for safety tests. Using simulated crashes that damaged the dummies, GM studied and measured the impact of forces exerted during the collisions.
33	1990	Hybrid Car HX-3	A hybrid car means the car running on the two distinct kinds of fuels. GM developed it in 1989 and put it into the market in 1990. GM developed Hybrid car HX-3, a near pollution free car powered by gasoline-electricity, i.e. car running on the petrol and the battery. A revolution by itself. The concept took the world by storm, the car appeared in every news flash and in every newspaper around the world. Special rules and regulations were developed for the cars





			and vehicles around the world. Indians infact modified their Motor Vehicle Act in 1994 after seeing this breakthrough only.
34	1991	Antilock-braking system	It was developed in 1989, but was introduced in the year 1991 in the cars by the name ABS-V1. It was an economical antilock braking system. This system avoid the misbalancing force on the car while braking in every kind of situation including bad whether conditions like rainy season and water layer on the roads, snowy roads, or even on the fast track lane. This braking system applies the braking pressure equally and simultaneously on all the wheels by avoiding the stoppage of the revolution of the wheels and hence avoiding the skidding.
35	1993	Opel Corsa was developed in 36 months	In 1993, GM Europe demonstrated its ability to develop a new product in a relatively short period of time through





		with minimum workforce	the model, Opel Corsa. Analysts praised Corsa for its design, efficient packaging and well-executed details. The Corsa was developed in just 36 months. It had 30% fewer parts than its forerunner, because suppliers were instructed to deliver pre-assembled modules. The new Corsa also incorporated design changes that made it easier to assemble thereby improving both quality and productivity. With hooks being replaced by nuts and bolts fasteners, the labour requirements came down by two-third.
36	1997	First Electric Car delivered	In 1997, GM delivered the first electric car, GM EV1.
37	1998	First Hybrid car with petrol and Battery was delivered	In 1998, the hybrid car developed was actually delivered to the customer. It had Petrol and the Battery power. It took eight odd years to commercialise the technology and to deliver the car that was developed in 1989.
38	1998	Aluminium	EV1 the electric cars and the other cars





		was profusely used in the cars	were using the light metal aluminium to reduce the fuel consumption and the pollution as well. However there were bottlenecks of safety standards and higher costs hence a special division was made to develop the metallurgical feature in the car body. Hence, Montreal based Alcan was invited to develop these features in the cars and formed a 10billion dollar deal.
39	1999	First Hybrid car with Diesel and Battery was delivered	This car was even cleaner than the petrol and battery operated cars. It was delivered to the customers and got a good response. Thus, it was conceived by the carmakers that customers wanted the cars that are least pollutant as well as which consume less money on the power.
40	1999	GM signed the pact with Toyota for manufacturing	Under increasing pressure from the customers and the federal government composed of the car customers, GM had to think seriously





		Hybrid cars	about developing cheaper hybrid and non-conventional energy source driven cars. So to build such kinds of cars GM signed the pact with Toyota for the special power trains required for the electric and hybrid cars and other vehicles.
41	1999	GM introduced cars with infrared sensors	In 1999, GM's Cadillac division announced to launch Evoq Roadster Car. Evoq was tow seater rear-wheel drive and targeted for young generation. It had unique feature of Night Vision System, which was developed with the Raytheon partnership. The system used the infrared sensors to detect objects beyond the range of the headlights.
42	2000	GM introduce fuel cell driven concept car	Fuel Cell is the technology that generates the electricity without using the mechanical energy. Infact the electrons are generated due to the chemical reaction in the fuel cell technology, which draws the electrons





			from the Hydrogen atom. This, electricity drives the car.
43	2003	GM introduced Hydrogen fuel driven vehicle	In 2003 GM introduced the car that can be driven on the Hydrogen fuel. Hydrogen is the most abundant fuel in the universe. Hence the concept car is very important from the future. Hydrogen is also abundant on the earth as water is the combination of the Hydrogen and Oxygen. This car has the zero pollution.

Special Note on the Self-explanatory table: Every now and then carmakers like GM, who likes to see their customers satisfied with well-built good long lasting relationship always been trying to do this using advanced technologies for comfort, safety and time saving options. Thus, even customer satisfaction criteria can force the carmakers to develop new technologies in the cars.

3.3: Table 3.3: Recent History of Bayerische Motoren Werke (BMW) from 1979 to 2000, from technology development point of view:

SN	Highlights of the Car Technologies introduced by the Bayerische Motoren Werke (BMW) from 1979 to 2000.
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1	<p>Earlier from 1923 to 1979, due to inadequate facilities BMW initially restricted itself to small but efficient cars and two wheelers. As the demand of the cars increased, BMW ventured into the production of six-cylinder engines for advanced cars and other vehicles. Gradually the company expanded and began to use new methods to extend its product line. Then slowly BMW introduced the Building-block Concept of Car development to incorporate production flexibility and facilitate the manufacture of a family of cars and automobiles with interchangeable parts and common body design.</p>
2	<p>With the evolution of small and robust electronics controls in 1979, which could be integrated directly into the mechanical components, BMW was able to do away with use of many plugs and socket connections. This way BMW innovated the integration of electronics into its following few products:</p> <ol style="list-style-type: none">First it introduced these technologies into simple functions like indicator lights.Then BMW brought microprocessors to control a variety of chassis, suspension and body-shell functions.





	<p>c. The BMW introduced 'Mechatronics', a stepper motor with integrated sensor and control, operated the air-jets of the car air conditioners.</p> <p>d. 'Rain Sensors' the wiper control regulated the wiper depending on the amount of rainfall.</p> <p>e. In 732i BMW introduced the first series produced cars to incorporate digital engine electronics.</p> <p>f. In the BMW 7 series cars BMW used more than 100 electronics control units.</p> <p>g. To reduce the cabling 'New Bus System' was used to improve the reliability of the electronic control system.</p> <p>Because of all these activities and since new technologies used a combination of the most varied scientific and technical disciplines, the company opened its own electronics laboratory in 1989. The hardware and the software were tested in the laboratory under varied conditions to ensure the reliability.</p>
3	<p>In 1984, BMW M3 was introduced in the market, which was fitted with a transmission derived directly from the racing cars technologies. <i>This car was developed in the newly built plant, which cost BMW \$600 million, at</i></p>





	<i>Regensburg that had the necessary technologies to integrate modern electronics systems and gadgets into the advanced luxury BMW cars.</i>
4	<p>In mid 1980s BMW invested lot on the designing front as well. On the Design front BMW follows the unique and an elaborate process in selecting design. Recently following steps decided the fate of the design:</p> <p><i>1st step: Design proposals are invited:</i> BMW solicited up to four ‘designs proposals’ from outside and judge them against its in-house stylists.</p> <p><i>2nd step: The in house designers evaluate The Design:</i> Rather than test the designs in product clinics or focus groups, the company ‘evaluated them by itself’.</p> <p><i>3rd step: All the Components are tested on simulation technologies:</i> Over the time, computer ‘simulation technology’ increasingly replaced the lengthy and costly testing process for the ‘components’.</p> <p><i>4th step: The whole car undergoes the Crash Tests from various angles:</i> Earlier Final result was decided by the fewer prototypes. These were required during car development and production planning. However this final test also been computerised. This ‘Crash test simulation’</p>





	for the 'Whole Car' resulted in considerable time and cost savings.
5	<p>In 1991, with the pressure from the company due to increasing public awareness about environment and low emissions standard norms laid down by the European Economic Community (EEC) led BMW to develop catalytic system to satisfy the customers demands for pollution controls. Following developments were developed for this purpose:</p> <ul style="list-style-type: none">a. To comply with various EEC norms BMW developed the Digital Motor Electronic System, which electronically controlled the Air: Fuel (A: F) mixture.b. <i>BMW also invented the Lambda Probe</i>, which monitored the Oxygen content of the exhaust and <i>altered the Air: Fuel mixture</i> depending on the quality of the intake air and engine load. This invention infact reduced the need for scarce unleaded petrol.
6	<p>In 1992, BMW invested \$660 million on R & D to make its cars greener, more efficient and safer. Infact for this purpose BMW opened its new R & D centre at Mile. This centre along with the BMW Technik GmbH mainly</p>





	concentrated on alterative but mostly futuristic solutions in the field of car technologies.
7	<p>In 1992, BMW constructed the modem development centre at Munich. This centre was mainly developed to leverage on technological advances in electronics for improved car performance and its driver comfort. Some of its innovations included:</p> <ul style="list-style-type: none">a. Anti-Lock-Braking system (ABS),b. Traction System (TS), <p><i>Special Note:</i> Antilock braking system and traction system assisted drivers while applying brakes and accelerating.</p> <ul style="list-style-type: none">c. Driver Information System (DIS),d. Service indicators based on driving habits.e. “Servotronics” which aided steering and cruise control helped in maintaining constant speed.f. “Adaptive Automotive Transmission” even took account of the driver’s usual choice of gears.g. “Park Distance Control” helped driver to park the car between two cars.
8	<p>In 1993, BMW ran into significant quality problems.</p> <p>Hence, Mr. Bernd Pischetrieder reacted, “ There is a very subjective element in it, because we are obviously aiming</p>





	<p>for much more discerning (astute, and shrewd) customers and therefore they will complain about items for which the owners of other car aren't complaining".</p> <p>Later on, Federich Hanau, Senior Vice President, Corporate Affairs explained, "The prime focus of BMWs' long range, \$400 million per year, investment plan is not necessarily to increase capacity, it is to enhance product quality and specialisation through R & D in Production Technology".</p> <p>Throughout 1990s BMW continued to emphasise engineering improvements through these R & D efforts. In which company also took the step to bring the product design engineers and factory engineers under single roof to facilitate more efficient generation and implementation of the ideas</p>
9	<p>Throughout 1990s BMWs' effort to improve safety standards continued. Driving Safety was increased by electronically controlled ASC+T (Automatically Stability Control + Traction), available in new 5 series and 7 series models, which particularly proved good along the curves. ASC+T improved traction on the surfaces such as snow.</p>
10	<p>Few more highlights of 1990's for BMW's technologies in</p>





the car and the car manufacturing technologies development:

- a. BMW attempted to synchronise construction of new car production facilities and the introduction of new technologies with the development of models in order to ensure the best possible capacity utilisation.
- b. BMW introduced a system of 'linked production plants' in Germany, which paved the way for flexible deployment of personnel within the company.
- c. The body shell facilities at the Munich plant were equipped with a new generation of low-maintenances, high-speeds, highly efficient Robots.
- d. New paint shops were built at the cost of \$15 million for water based finishing coats.
- e. The entire assembly of the cars system in the plant was renovated, reengineered from the ergonomics point of view to get maximum efficiency at the less time and less cost, even over the Robotic operations.
- f. In 1991, in Japan, BMW's independent distribution helped the company greatly as it had increased its





sales outlets up to 125. Similarly in USA BMW had 375 outlets out of them 125 were selling exclusively BMW cars and other vehicles.

g. At its Regensburg plant BMW launched comprehensive program to enlarge the 'body shell' facilities similar to the Munich plant. *These body shell facilities used the flexible robotics.* BMW shifted its most popular Z3 the two seater roadster to this plant. In 1996, per day exactly 250 units of Z3 could be manufactured in this plant. Z3- BMW captured one-third of the world market in its segment. South Carolina plant of BMW produced four and six cylinder engines. It even manufactured the left and right drive BMW-Z3 roadster and later coupes. It manufactured 122131 Z3-Roadster due to the high demand worldwide.

h. BMW invested more in the engine manufacturing when its 400,000 petrol and diesel engines manufactured in Steyr plant were sold on customer demand very quickly.

i. BMW conducted thorough R & D on its production process. This enabled the company to develop one





of the most *efficient logistics systems in Europe*.

- j. The company has also introduced the company wide information system linking all the departments including development, design, production planning, and production.
- k. BMW introduced Computer Integrated Manufacturing through use of CAD / CAM systems, which generated significant time and cost savings.
- l. The Landshut plant, which produced plastic and light cast metal parts and mechanical components, received the ISO Quality certification ISO 9001, in 1996. The plant tied up with a supplier in 1996 to develop a method of sintering, using Laser technologies. This enabled production of prototypes for the cast parts more quickly and economically. A new production technique was developed by the plant increased the precision of casting processes and significantly reduced the need for subsequent treatments of cast car parts.
- m. In 1996, BMW announced the plans to establish a new supply centre for its car production facilities out side Germany. The centre was expected to





supply parts and systems to BMW's production facilities in USA, South Africa, and South America. Across North America, BMW had established a network of about 100 supplier plants, purchasing about \$1 Billion in goods and services.

- n. In 1996, BMW implemented its own version of JIT the Just In Time production system where by suppliers delivered the components to the company only as and when needed. This reduced the stock level and costs. The customised JIT helped each BMW plant for advanced on-line data transmission systems for calling up components and materials linked the plants with inventory centre.
- o. In 1996 in the James Bond movie "Golden Eye" BMW-Z3 Roadster was shown as the innovative marvel. A significant achievement by itself, as it happened even before the car was launched.
- p. In 1997, BMW introduced environmental friendly paint shop technology in all BMW car plants in Germany and USA.
- q. In 1997, in the case of chassis production, BMW attempted to weld together Aluminium and Steel. As





a result, mixed structures, which considerably reduced weight, began to be used in almost all the BMW cars.

r. In 1997 again, the Rover Group introduced the comprehensive programs to improve its supplier's base. Together with BMW's purchasing division, the Rover Group continued to examine the possibilities of using the same parts and components for all the similar group and segments of cars and the other vehicles to achieve economies of scale and to cut costs.

s. BMW also developed the Dealer Operating System (DOS), which clearly defined how the BMW dealer should operate. (i.e. BMW way of Doing Business). The extensive manuals were provided for each functional and resources details for the dealerships. The team of BMW employees and the dealers undertook the task of development of DOS. It was advanced version of the "Integrated BMW Network Development Concept" in mid 1980's. Hence customers began to find a marked improvement in their shopping experience when they visited BMW





dealers. Only difference between the 1980's concept for the incentive to the dealers. It was not only depended on the *volume of the sales but also took into account customer satisfaction and market penetration achieved* by the dealer while calculating the bonuses. The BMW advised their dealers to seek out more affluent customers. The dealers were also advised to provide cars for test-drive to offices too.

- t. *The test drives and other customer care approach proved to be great success for BMW in 1997. BMW and Mercedes-Benz both completed neck to neck in the USA with BMW registering sales of 122,500 vehicles as against Mercedes' 122,417. Anyhow the luxury car markets for the BMW were The Great Britain, Germany and the USA. Deliveries of new BMW cars to customers worldwide increased by 5%.*
- u. Later on, despite applications of the highly advanced technologies, in 1998, BMW continued with craft production. The company's new plant at *Regensburg plant was designed to facilitate high degree of customisation. BMW undertook production only when order was received.* The customer could





choose from a large list of different mechanical features and fittings. It was revolutionary concept in BMW and for the car world having such huge capacity like that of the BMW. Hence, Carl Peter Foster, a BMW engineering General Manager admitted, “ We’ll never be the low cost producer anyway, so we have to work in the areas where individuality pays off, such as in styling and technical features”.

- v. Recently, BMW tied up with Hero Motors in India to tap Far East market. BMW justified the choice on the ground that Hero group is well-managed company in India and are leaders in the two-wheeler market around the world. The company has already sold more than 200 cars in India since 2000, since this announcement.

3.4: What is Lesson to India? :

Thus History of the cars from technological development point of view is an inspiration to the Indian citizens. Unless you jump in the water you cannot swim. Similarly, Indians have started their attempt to indigenise the cars since the inception of the Tata-Indica after the premier Padmini and





Ambassador. However, the Flexible Robotic Technologies in the BMW, Mercedes, GM, and Ford plants give quality production of more than few million luxury cars per year must be the aim of the indigenous car manufacturer like Tata Motors for the coming decade.

As, cheaper technologies for more number of cars means more demand from the customers and more customers means more suggestions and more suggestions from the car users means more will be the development of the car technologies.

As the history is inspiring so also must be the vision for the future- the forecast of the car business.





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CHAPTER 4:

WORLDWIDE HISTORY OF THE CAR TECHNOLOGIES AND CUSTOMERS' RESPONSE TO THEM



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296

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CONTENTS OF CHAPTER 4:

Topic No.	Topic	Page No.
4.1	Most prominent case 1- Ford Motors	308
4.2	Most prominent case 2- Mercedes Cars	315



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*In this chapter we shall focus on the most prominent cases in the world car market. **Otherwise millions of cars turnover and One Trillion Dollar world car industry is beyond the scope of every book and the thesis.***

This focused approach will be useful to the Indian car indigenisation efforts. We take Ford Motors and the Mercedes-Benz Cars for our studies and will learn the metamorphosis of the proceedings of the car technologies. This will help us in concentrating on the major points and hence Indians will be able to achieve the target of car indigenisation according to the customer needs will be achieved at faster rate.

From the previous chapter it is clear that it was Mr. Henry Ford that brought the cars for the common men. Hence Ford is discussed first and later on the Mercedes the signature of the luxury cars in the world.

4.1: MOST PROMINENT CASE 1: FORD MOTORS:

Technologies in the Ford Motor Cars and customers' Response to them:

In fact Ford Motor cars manufactured by the legendary Mr. Henry Ford are still supposed to be highly responsible for the revolution in the Car History. The devotion with which he achieved is supposed to be the model for the every generation for the car manufacturers.

History of car technological development and huge or very low response to them, Ford Company has experienced both of these ups and downs in its 100 years history.





Table 4.1: Ford Motor Company Technologies and Customer Response to these technologies:

SN	Ford Model	Year	Technological Features	Customer Response to these technologies
1	Model A	1903	Simple technologies	Good. It made the car very popular transportation vehicle among reach class of customers.
2	Ford Luxury cars	1905	Expensive technological features	Worst response. Little response from the customers.
3	Model T	1908	Durability and easy reparability, price of car affordable to average man	A very good response. It was the lowest priced car during those days. Record 15 million cars sold in 19 years. It made the car most popular vehicle.
4	Conceptualised	1946	V-8 engine is	Customers literally





	the Ford T with V-8 engine car		been regarded as the epitome of power since its conception only.	waited for this car to come out.
5	Model T -V-8 Engine	1949	New styling, upgraded V-8 engine, new frame, new kinds of brake system, new kind of upgraded version of suspension system.	Got a good response. Car was conceived in 1946 and was introduced in record three years time with all these new features.
6	Corporate look car	1952	It has the stylish look for the executive customers.	The customer response was huge and Ford recaptured the second place in the car market replacing the Chrysler. Few called it "Ford's first GM-ized car" The car was successful.





7	Thunder Bird or T- Bird personal car	1955	America's first 'personal car' in which two- passengers could seat.	Because of this car Ford maintained its second position in the market, due to good customer response.
8	T-Bird Luxury cars	1958	Four-passenger luxury car with good suspension technology. Supported by luxury seats with aesthetics and best controls from ergonomics point of view.	This was the first car, which created new segment for the Ford in the luxury personal car market.
9	Falcon	1958- 62	Smaller, simple, compact, less showy car.	It was the most demanded car from America in the European car market. In spite of huge competition it created demand for the





				Ford. Customers liked this car very much.
10	Mustang	1964	New styling, low priced, four-passenger sports car. The mustang used the components of the existing Falcon line, there by reducing the start up costs.	It was the revolutionary car for the Ford after model T. It drew 100,000 orders within first 100 days. Customers liked it very much and its sale stood at 418,812. The man behind it was Lee Iacocca rapidly shot fame and became world known luminary and became president of the Ford.
11	Taurus	1980	It was developed in four years time, two years less than its earlier versions from any company. It brought the	The more disciplined approach, change in attitude of the internal customers of the Ford, brought external customers towards Ford. It was one the most successful cars that year





			concept of TQM, Research in every department with cross-functional point of view. It proved that workers education helps the organisation in longer run as brings customer satisfaction at every step of car getting manufacture till it satisfies the customers' need.	and coming years as well.
12	New Mustang	1994	A completely new Mustang developed within the span of 35	The highly cost effective car, which was developed at only \$700 million. It was researched,





			months with allotted budget as certain components of old Mustang which customers liked very much were like engine, transmission, and parts of chassis were kept as it is. Decisions were taken within minutes.	developed and put before the customers, within the shortest time in the history of the car, got a huge response. Infact it was car, which was the dream of many customers at that time. It was declared the Motor Trend Car of the year 1994. It is the first car in the 1990's, which received the advanced order even in the stiff competitive market for 53000 cars. A record by its entire means.
13	Focus	1998	Ford focus had excellent design and safety features besides offering plenty of	It was relatively low priced for its looks and makes. It received the European Car of the year award in 1998.





			<p>space and greater fuel efficiency. It was the first of its kind, developed using the lean processes of Ford 2000 program which has reduced the car development time from 36 to 24 months due to less number of platforms.</p>	
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4.2. MOST PROMINENT CASE 2: MERCEDES CARS:

Infact, the first motorcar was patented on the name of Mr. Daimler, the makers of Mercedes cars. Hence the history of car technologies and customer response to them is closely associated. As Ford-motors brought the revolution in USA similarly Mercedes brought revolution in the





European car market. Mercedes also have gone through cycles of ups and downs. Hence this case is given below.

Technologies in the Mercedes Cars and Customers' response to them:

Part 1: Historical review of customers' response to Mercedes car technologies:

- a. In 1882, near Stuttgart, Mr. Gottlieb Daimler, one of the pioneers of the automobile industries formed the Daimler Motor Company (DMC). In 1890, one Emil Jellineck agreed to buy 36 racing cars from DMC with the understanding that they would be named after his daughter, Mercedes. When the car won the race in 1901 DMC registered the Mercedes Trademark, as customers naturally got attracted towards the car that had technologies to win the race.
- b. Meanwhile Carl Benz had established the Benz & co. in Mannheim in 1883. In 1899 this firm became the world's number one car company due to customers' positive response.
- c. Even when both of these firms were manufacturing the most expensive cars in the world both the firms enjoyed the phenomenal growth, as customers like the idea of privately owned cars, in 1901. It continued till First World War.
- d. Due to First World War hyperinflation, fluctuating demand and political instability threw these companies into crisis situation. To combat this situation successfully fierce competing Benz and DMC merged in 1926,





to form Daimler-Benz AG (Daimler). It helped the newly formed *company* to grow rapidly due to customers' reliability to their technology. However, 1926 the company suffered the loss of 18 million Reich Mark (RM) in trying to built the customer response to built the trust in their technologies and to make solid foundation for the future.

- e. After growth in the customer base and the customers' trust in the new technologies, in 1927 the company made the profit of 4.75 million Reich Mark when it sold the 10129 cars.
- f. Customers were provided the car technologies, which they wanted at that time of development hence the profit grew six folds in 1928 and 1929 to RM 26.85 million and 27.76 million.
- g. However, in the year of great depression in 1930 Daimler incurred the loss of 8.55 million due to less buying capacity of the consumers. The depressions continued till 1931 and the company again suffered the loss of RM 13.4 million due to worldwide continuation of the depression phenomenon.
- h. Still the company continued its *R & D* in the recovery phase of the economies and in 1938 it increased the production and sales up to 42000 cars per year. The new technology, which attracted the customers, was innovation in diesel power. Success in the car racing technologies by the same company also brought required boost from the customers to the company.





- i. The company suffered the huge loss when it got totally destroyed, in 1945, in the Second World War. Still Daimler had the internal customers (Employees and associates of the company), which made Daimler to recover quickly. *After the war again the customers all around the world started the demand of the car that existed in the pre-war bullish scenario. Hence the company again recovered its sales to almost 42000 cars per year in 1950. It proved that Car and its Technologies, and manufacturing technologies are inseparable from the customers' point of view and customers' response to one of these factors is also response to all other factors.*
- j. From 1950, the company literally captured most the car market in the world due to its *quality car technologies*. In 1956 company touched the mark of one lac infact it sold 104,000 cars.
- k. Daimler gradually built up the reputation for it technologies and quality in a highly specialised line of passenger cars and it sold 300000 units in 1969.
- l. The Mercedes cars due to its quality technologies grew in popularity as a status symbol for the affluent class. By, 1970 Mercedes sales expanded worldwide. The oil crisis seemed to have spared the Daimler carmakers because its customers were wealthy. Thus, trust of customers gathered the momentum required even in the oil crisis. It was this well built array of internal and external customers that was already been developed to





tackle every kind of crisis. To be precise R & D in every field proved to be beneficial to the Daimler in long run.

m. Then in one significant move from 1977, Daimler started transforming it into an “integrated technology” company. Daimler acquired Euclid of USA, which manufactured the heavy equipments. Then Daimler acquired Freightliner in 1981, Fabrica de Autotransportes Mexicana (FASMA) Mexico, in 1985. Then in 1986, it diversified itself in to manufacturing of aerospace industry, electronics and software industries. Integration was unsuccessful attempt. Daimler performance deteriorated due to competition posed by the extra high quality and innovative models from the Japanese carmakers. *Customers appeal to innovative and quality Japanese cars was phenomenal. Hence, the Sales declined to 515000 in 1993 from an all time high 591000 in 1986.* Still Daimler reported marginal profits in 1993 and 1994. The policy of integrated approach show its extreme face in 1995 when Daimler suffered the loss of Four Billion USD.

n. In 1995, under the leadership of Mr. J. Schrempp, Daimler returned to its car business by divesting the unprofitable businesses. Daimler sold off Electronics, Software and Aerospace businesses. This reduced the employees from total 220000 from all the businesses to only car organisation employees to 140000 in December 1995. *After this Reengineering Process Schrempp set about revitalising the culture and*





promoted what he called “value driven management”. In this process each of the 23 Daimler businesses had to earn at least 12% return on the capital employed i.e. ROCE. It worked. During 1997 first half Daimler showed revenues of Doesch Mark- DM 124 Billion, with 9% net profit. Thus, it proved that any older or new management technique could be called successful technique only if it succeeds in the car industries in some way or other. Internal and External customers of the Daimler also realised it very soon.

- o. In one of the biggest surprise move in the world of business, on May 6, 1998 Daimler and Chrysler announced their signing of their merger agreement. In July European Commission (EC) and Federal Trade Commission (FTC) approved the merger. Hence, on August 6, 1998, it was announced that Daimler-Chrysler (DCX) shares would trade as “global stock” rather than as American Depository Receipt (ADR). *It was very good news for the internal customers of both the companies. As Daimler had a fear that its high valued Mercedes cars were not affordable to the Asian and South American Market. Whereas, Chrysler had a fear of losing market to the Volkswagen and Toyota, both of which were bigger than Chrysler and were busy in building premium luxury cars such as Lexus and Audi that would hold a considerable cost advantage. Thus, the decision of Merger by Schrempp of Daimler and Eaton of Chrysler was supposed to be the best move for the future of the fast changing car*





technologies and even better for the highly dynamic car industry as a whole. Mr. Schrempp said, "By combining and utilising each other's strength, we will have a pre-eminent strategic position in the global market place for the benefit of our customers". Thus ultimately future customers were held responsible for this merger. Later on the optimism of Mr. Schrempp was justified well due to the fact that DCX had total revenue of USD 153 Billion in 1998. The combined unit sales were 4 million cars and trucks. Chrysler made moderately priced cars and light trucks; Daimler made Mercedes Luxury cars and heavy trucks. Chrysler was strong in North America due to its reliable customer base and weak in Europe due to its incompetence in the competitive market. Daimler just had the reverse case due to its established superiority in the European market. Thus, Chrysler's strengths lay in product development; while Daimler's engineering and technological capabilities were well established. According to some estimates, the merger was likely to create synergies of nearly USD 1.5 Billion, in 1999, and around USD 3 billion in 2000. Internal and external customers also responded well as they were taken into confidence. Otherwise merging two giant industrial houses was not an easy task. Both companies had total 428000 employees and manufacturing facilities at more than 34 countries and adding stuff was the sales in more than 200 countries. Nevertheless, the merged entity seemed to be off to a good start. Hence,





more than 99% of Daimler shareholders switched over to the DCX shares by October 23, 1998. *Thus, customers from Asia and South America showed their strength of buying. That is why, the giant car organisations buckled under the customers' demand of cheaper cars having high-class technologies. It was supposed to be happening due to the growing customer awareness in the world car market.*

Part 2: Table 4.2: Recent responses to Mercedes (Daimler-Chrysler) technologies with respect to car Sales by product line:

(Ref: Autocar December 2003)

SN	Product Line	Year always 31 st Dec.	Sales figures in units
1	S-Class	1996	52200
		1997	47800
		1998	42700
2	SL	1996	16400
		1997	15100
		1998	15600
3	E-Class	1996	291500
		1997	277000
		1998	259400
4	C-Class	1996	280300
		1997	348700
		1998	384400
5	A-class	1997	6700
		1998	136100
6	M-class	1997	16300





		1998	63700
7	G-class	1996	4600
		1997	3500
		1998	3800
8	Smart	1998	17100

Special Note:

1. Technological Features of each of these cars and Price Tags (TFPT),
2. Analysis of Customers Response to these Technologies (CRT).

Taking every car and knowing every detail of them would be a highly impossible task hence only E-class and the SL class are taken in details. The Technical as well as the customers' response to those technologies are explained in details.

Part 3:**Customers response to technologies in the E-220 class Mercedes:****Petrol:**

Technical Specifications of E 220 Merc: The inside story: (Reference- Mercedes E-220 Pamphlet)

1.Engine: Petrol variant,

- Type: Four Cylinder, in-line, longitudinal location,
- Displacement: 2199 (cc) cubic centimetre,
- Bore X Stroke Ratio (mm) in millimetres: 89.9 X 86.6,
- Number of cylinders: Four,
- Maximum Power: 143 bhp @ 5400 revolutions per minute (rpm)





- Maximum torque: 20 kg meter @ 4000 revolutions per minute (rpm),
 - Compression Ratio: 8.5: 1,
2. Transmission: Manual, Rear-wheel drive, Number of gears: Five,
 3. Dimensions: Length- 4750 mm, Width- 1740 mm, Ground clearance- 186 mm, Wheel base- 2800 mm,
 4. Weight: 1460 Kg,
 5. Maximum speed: 210 Kilometres per hour,
 6. Fuel Efficiency: 9 Kilometres/ Litre,
 7. Present Price: Rs. 22,50,436/= Ex-Showroom (approximately).

Technical specifications of E 220 Merc: The Aesthetics point of view:

Aesthetics side of the car technologies deals with the better looks, high comfort and safety provision to the customers seating inside the car.

1. The car's body shape is typically Merc and it looks and feels like it has been carved out of single block of steel.
2. The build quality of E 220 has no parallel, is true.
3. The paint job, the perfect shut-line and panel gaps are outstanding.
4. Every rivet every bolt and every corner spells Quality.

Technical Specifications: Ergonomics point of view:

Ergonomics is the science of proximity of the technology used in the car to suit the customer seating inside the car and also the driver from comfort, time and motion studies, manageability and safety point of view. Behind the





wheels also the Mercedes Experience continues. The ergonomic are superb, with everything deliberately, thoughtfully and impeccably executed.

1.The front seats, which offer a range of adjustments, are firm while the rear seats provide enough comfort to cosset corporate Czars who will rarely get behind the wheel themselves.

2.Mercedes E 220, with 143 bhp engine is the most powerful car and fastest and the safest.

3.Merc E 220 has the brilliant chassis.

Safety Features in Mercedes E 220:

The safety equipments technology makes the E 220 the right car to survive any untoward incidences.

1.Merc E 220 has the best suspension system. It is said that even if keep a coin on the roof of this Merc on any road it will remain at its spot when you return back to your home. Thus, this highly sophisticates suspension system maintain a benign composure over every road surface and provide failsafe handling.

2. A driver has emergency air bag to deal with the accident. As this air bag comes out of the steering wheel within the span of few milliseconds and saves the front portion of the driver in case of accident. Infact it is this Merc, which has brought this safety revolution in India. Other small carmakers always follow the leaders like the Merc. Merc has proved that it is the true mover and shakers in the world car market.





3.The car is fitted with the ABS brakes to avoid the skidding or to avoid imperfect braking. This again was the new technology in India. Looking at this ABS, many Indian indigenous companies like Sundaram-Clayton, of Chennai, are on the verge of developing this technology indigenously in India.

4.Another safety feature is pre-tensioning seatbelts.

Standard Equipments in Mercedes E 220:

1. Electronic Power Steering,
2. Central Locking System,
3. Electric Glass movers,
4. Burglar Alarms,
5. The air conditioner has separate temperature controls for the left and right vents.
6. The world class Music system,
7. LCD display screen on the dashboard, which displays every thing driver, wants on the screen.

The customer response to these E 220 Mercedes Technical specifications: The sales figure (Worldwide)

The E-220 is the mid-size Mercedes (Merc) in the Mercedes range of cars. Since 1996, this car has sold more than 2.6 million units world wide i.e. 26,00,000 lac units (cars) were sold world wide. It is a status symbol in





many countries including India. Many rich and famous people bought these cars. Obviously Mercedes is the symbol of luxury cars in the world.

Part 4:

Customers' response to SL class Mercedes: Particular case SL 500:

(Reference: Autocar, Car Bike, Mercedes Pamphlets- 2003)

Customers' response to SL class Mercedes: Particular case SL 500:

Though this car is presently meant for the Rich and Famous people still this car shows the future car technologies, which need to be made as affordable as the maximum Indian middle class people can buy. It puts the challenge and a specified direction to the Indian R & D for indigenising the car technologies.

Its Cost: £50,000/= In Indian currency its cost is approximately

Rs. 37,50,000/= (Ex-Factory Price).

Its users: Rich and Famous personalities, Wealthy and Middle aged millionaires, and such other people.

Its highlighting advanced technologies: The original SL series started from 1950s and it had the options of mechanical convertibles supplied with removable hardtops to justify their exalted prices. The new SL series has following technologies:

- a. The new SL 500 is coupe,
- b. It has engine having 302 bhp V8 engine with five-speed automatic transmission. These are exemplary smooth in there operation as it takes 0





to 100 kmph within 6.5 seconds (a touch quicker than before) with maximum speed of 250 kmph.

c. It has convertible in equal measures; these conversions are done through simple switches given in the middle of the seats.

d. SL 500 has a masterpiece of engineering in the form of rooftop. It takes simply 16 seconds to lift it up, separate into four pieces, and fold into the trunk. The cleverest part of it is how the glass rear window flips over to nestle under the roof takes up much less space and leaves enough space for the luggage up to a big suitcase.

e. If you need more room, Mercedes will direct you to bigger, more expensive but quite similar looking CL-Coupe. The CL was the first car to have ABC- Active Body Control- a semi-active suspension system that provides very accurate wheel and body control using electronically directed hydraulic plungers. The new SL also has ABC. It also has Antilock Braking System (ABS), Traction Control and Stability Systems, combined for the first time with SBC Sensotronic Electro-Hydraulic Brake Control.

f. Brake-by-wire may be the next big thing in SL Car technologies. Unlike every other car available, when you press the SL's brake pedal you don't pump hydraulic fluid to operate the brakes. Instead, the pedal is an electrical switch and the computer interprets how quickly you want to stop by measuring the speed movement of the pedal, the attitude of the car, and various other parameters. The pedal however is arranged in the





conventional manner so as to make driver feel he is seating in the conventional normal car.

g. In the Sensotronic System, brake application system remains hydraulic, the computer directing distribution of the fluid from a reservoir maintained at a constant pressure. It has a distinct advantage of passing the fluid pressure equally to the entire wheels front or the rear one or the left or the right one. This application of equal forces avoids the excessive tire wears. It acts as if the pressure of the braking system is applied on the mid-corner of the fluid lines. The brake pad and the brake shoe adjustment in different whether conditions get automatically adjusted. It means that in a clear sky whether or the moisture prone atmosphere, or the foggy winds, or the icy cold or the desert conditions these technologies are microprocessor controlled and hence are self-adjustable.

h. The safety system uses the Sensotronic system same as the fly-by-wire aircraft. In case the electrical system fails the hydraulic and mechanical system takes charge of the whole system.

i. The throttle gets adjusted according to the whether conditions and to optimise the Air: Fuel mixture for maximum efficiency at relatively lower fuel consumptions. Which is of the range of 17% less fuel required than its predecessors.





j. The electronic steering system has the Rack and Pinion gears with ultra sensitive speed sensors to give proper cruising to the car. Steering System is also lighter.

k. The multifarious control system helps the driver to achieve optimum traction, braking, and tire grip. It doesn't seem quite right to use this car for blasting speeds across the mountain passes. But just as it combines the qualities of a coupe and a convertible, the new SL is both luxury cruiser and a fast and accomplished driving machine. Thus, it has made the definition of speedy sports car irrelevant.

1. *From the history of the SL series, one thing we have seen Constant and that is every new version of the car whose initials stood for sport and*

light was ever brimming with technology. So it is also even held true for the new generation R-230 series SL 500. The Mercedes Benz Engineers and stylists have done their job excellently well, clothing a large car with only 1770 Kg kerb weight to handle nimbly and delightfully while giving it the means to travel all day long for days at a stretch in sheer comfort and pace that many other cars would be found wanting.

Lacunae: 1. In Mercedes SLK: The cheaper version of the SL series is the Mercedes SLK which has retractable hardtop. It has one simple lacuna, when SLK roof disappears into the trunk there is no room left for luggage.





2. In Mercedes SL 500: It is criticised for this car that its efficiency comes at the expense of excitement, and there is no space for the children.

Customers' Responses: *SL has the constant sells every year since its inception in the market. Almost fifteen thousand cars are sold every year a very good response by all means to this high class, ultra modern luxury car.*

Part 5:

Lessons to the Indian car R & D: Few Indian customers are also demanding the technologies in SL 500 or E 220; which are yet to be developed indigenously in India; hence it can be the short-term goal of next ten years for the indigenous Indian car industry. The reason behind this is the most promising technologies are introduced in the costlier cars first later on these technologies get filtered down to the more regular everyday cars for the masses. Hence, the aims of the R & D can get decided in India from these high class car technologies and customers demands for them in India.





CHAPTER 5:

INDIAN CAR HISTORY FROM INDIGENISATION POINT OF VIEW





CONTENTS OF CHAPTER 5:

Topic No.	Topic	Page No.
5.1	Indian Car History in Tabular form from indigenisation point of view	332 to 351





5.1: Indian Car History from indigenisation point of view:

Indian car history moves in parallel with the Indian Socio-Techno-Economic developments. It is closely linked with the Government policies as well. It has seen many ups and downs.

The car in the early era of the independent India was supposed to be the 'luxury' product. As Government wanted to limit the petroleum consumption and wanted to save foreign exchange it laid severe regulatory policies. It includes the restrictions on capacity, foreign exchange allocations, restrictions on foreign allocation, price control, price control, heavy taxes and tariffs. One more reason behind this was government thought it would make people to save more. This savings would mean greater resources for investment. Further more government of India tried to develop public transport like Railways and Bus system for the masses than the classes.

However, some experts believe that it unfolds the sad story of missed opportunities. Whilst Japan and later Korea, used the car and auto industry as the engine of growth. Some how for four decades we Indians believed that private cars were a no-go and that Indians did not need so many cars. It made the business class look gloomy. Whilst Indian's Industry and state were mostly at loggerheads, Japan's car industry with full backing of its government went on to become the biggest in the world. However, when we see the history of the world car market we find that in 1950 Indians manufactured or assembled more cars than Japan. These critics believe





that only handful of manufactures were allowed to manufacture the cars which enjoyed the sellers market. That is why these manufacturers enjoyed the full protection from the government irrespective of their little efforts for modernisation and developing new technologies of world standards. So, the aim of indigenous car industry got a hampered. Even collaborations were terminated. Still, all the restrictions, which were intended for the total indigenisation of automobile sector, could not bring self-reliance. Only Tata could succeed a bit. However, Tata Motors (Telco, Tata Engineering) is also at least ten years behind the world car giants. Anyhow, Indian economy is strong enough to proceed further on total indigenisation track.

TABLE: 5.1: Indian Car History-Technologies-Price-Sales figures-customer appeal and petrol prices:

Important Note: Other important events that have direct effect on the car sells, technologies and customer behaviour are also mentioned in this table.

SN	Year A.D.	Landmark events of this year	Car Launched / Approximate Price in Rs.	Technologies used- Imported or Indian?	Customer Response Sells	Petrol/ Diesel Prices In Rs/ Litre
1	1942	Hindustan Motors Established	-----	-----	-----	Not Available (N.A.)
2	1944	Mr. Walchand	----	-----	-----	N.A.





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		Hirachand established Premier Automobile Ltd. (PAL)				
3	1945	Mr. Kailash Chandra and Mr. Jagadishchan dra established Mahindra and Mahindra (M & M)	-----	-----	-----	N.A.
4	1947	PAL started assembling few cars and trucks in Kurla plant	-----	-----	-----	N.A.
5	1947	M & M assembled Willy jeeps in completely knocked down	-----	Imported from Willy Overland Export Corporation,	N.A.	N.A.



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		form (CKD)		USA.		
6	1948	Ashok Motors Established	-----	-----	-----	N.A.
7	1948	Standard Motor Products of India established	-----	-----	-----	N.A.
8	1949	a. HM motors begins manufacturin g of Hindustan 10. b. Also on this year M & M launched their Willy jeeps.	Hindustan 10/ Rs. 7000/=	Few parts were imported few were Indian made.	Sell of all the cars from 1949 to 1950 was 9267.	N.A.





9	1950	PAL launched first car under collaboration with FIAT.	FIAT 500 / Rs. 7000/=	Maximum parts were imported few were Indian made and assembling was done in India.		N.A.
10	1952	Tariff commission established	-----	-----	-----	---
11	1953	Tariff commission plans industry structure	-----	-----	-----	----
12	1954	HM Launches new car	HM Land master/ Rs. 10000/=	Technology from Nuffield of UK to manufacture Morris 10.	N.A.	N.A.
13	1954	Fiat Millicento Launched	N.A.	Technology from Chrysler	N.A.	N.A.





14	1954	Telco enters Automobile industry	TMB 312 Truck/ Price N.A.	Mercedes	N.A.	N.A.
15	1955	a. Standard Motor Product of India Ltd. (STAMPRO) launches its car. b. Ashok Motors changes to Ashok Leyland and manufactures Leyland Vehicles. c. M & M converted to public limited company and sell 2267 jeeps.	Standard 8/ Price N.A.	Ashok Leyland used Austin Technologies an imported one.	From 1951 to 1955 passenger cars sold were 23, 057.	Petrol Price Rs. 0.58 Paise per Liter. Diesel Price Rs. 0.31 Paise per Liter.





16	1957	<p>a. HM Launches its most famous ubiquitous car.</p> <p>b. HM starts manufacturing Trucks</p>	<p>a. Ambassador MkI with overhead valves/</p> <p>Price Rs. 17000/=</p> <p>b. Bedford Trucks/ Price N.A.</p>	a. Morris of UK	-----	N.A.
17	1958	Bajaj Tempo Ltd. incorporated.	N.A.	N.A.	N.A.	<p>Petrol Rs. 0.66/ L</p> <p>and Diesel Rs. 0.36/ L</p>





18	1960	Standard Launches a car	Standard Herald	N.A.	From 1956 to 1960 in India 64,746 cars were sold which includes all the types of cars.	N.A.
19	1963	HM launches its new car	Ambassador MkII	NA	NA	Petrol Rs.0.6 8 Diesel Rs. 0.54
20	1964	a. PAL launches it new car b. Telco comes out with truck	a. FIAT 1100D, price not available. b. Telco 1210 series	FIAT	NA	NA





21	1965	M & M introduced trucks.	FC 150 trucks	Willy of USA	From 1960 to 1965 108716 car of all the types and make were sold in India.	Petrol Rs. 0.81 Paise and Diesel Rs. 0.67 Paise
22	1966	FIAT rolls out 50000 th car.	FIAT 1100D which is Padmini of 1990's	FIAT	NA	NA
23	1969	a. Car Price control case in Supreme court b. Telco comes under Tata Brand name.	-----	-----	-----	NA
24	1970	Standard launches the car	Standard Gazel	Engine from Vanguard	From 1966 to 1970 car sells was 168627	NA





25	1972	PAL ends collaborations with FIAT. PAL sold cars under Premier brand name	-----	-----	-----	Petrol Rs. 1.52, Diesel Rs. 0.83.
26	1975	HM launches new car	Ambassador MkIII/ NA	NA	From 1971 to 1975 approximately 160000 cars of different makes were sold.	NA
27	1978	HM launches its Diesel version of car	Ambassador Diesel	NA	NA	NA
28	1980	M & M collaborates with Peugeot for engines	Used in Jeeps	NA	NA	NA





29	1981	Maruti Udyog Limited was established.	-----	Collaboration with SUZUKI of Japan.	-----	Petrol Rs. 5.56 and Diesel Rs. 2.61
30	1982	a. Sipani dolphin was launched. b. Bajaj Tempo brings out OM616 Engines.	-----	a. Reliant Kitten b. Bajaj Collaborates with Mercedes	-----	-----
31	1983	MUL comes out with its first car.	Maruti 800-SS80 launched/ Price Rs.48000/=	Technology from Suzuki Japan.	19000 cars were sold on first year itself	NA
32	1984	MUL comes out with Van category of cars.	Maruti Omni was launched.	Suzuki of Japan	Total Maruti car sells goes up to 29100 cars.	NA





33	1984	HM comes out with new car.	HM contessa was launched.	Fitted with ambassador engine.	-----	NA
34	1985	Indian Government announces broadband policies	-----	-----	-----	Petrol Rs. 7.34 and Diesel Rs. 3.52
35	1985	MUL launched new vehicle	Gypsy Launched	Suzuki, Japan	NA	
36	1985	M & M launches new product	MM 540	NA	NA	
37	1985	Standard launches new luxury car	Standard 2000	Vanguard	NA	
38	1985	PAL launches new car	Premier 118 NE	-----	1981 to 1985 almost 280000 cars were sold.	Same As Above





39	1986	MUL launched new product and its 100000 th car.	Maruti 800 (S308)	Suzuki of Japan	Good	NA
40	1986	Tata come out with new product	Tata 407 was introduced	Few parts from Mercedes and few parts Tata made.	Good	NA
41	1986	HM collaborates with ISUZU	ISUZU provides engines for the Contessa	ISUZU, Japan	Good	NA
42	1986	FIRST INDIAN AUTO EXPO Exhibition	-----	-----	Very good	---
43	1986	Indian Auto-First Indian car magazine was launched	-----	-----	-----	-----





44	1987	Bajaj Tempo Traveller launched	-----	Mercedes	Good	NA
45	1988	Tata comes out with new vehicle	Tatamobile			Petrol Rs. 9.14 and Diesel Rs. 3.63
46	1990	Telco comes out with One Millionth Truck	Truck / Price not available	Mercedes	Very good	Petrol Rs. 13.72 and Diesel Rs. 5.62
47	1990	MUL comes out with the new car model	Maruti 1000	Suzuki	1986 to 1990 almost 650000 cars were sold	As above
48	1991	Telco launches new vehicle	Tata Sierra	NA	-----	NA





49	1992	Telco launches new vehicle	Tata Estate	NA	-----	NA
50	1992	Bajaj launches new vehicle	Bajaj Tempo Trax	Mercedes Engine	Good	Petrol Rs. 17.91, Diesel Rs. 6.88
51	1993	a. Auto India magazine launched. b. Auto industry de- licensed. c. Second Auto Expo exhibition.	-----	-----	-----	---
52	1993	MUL comes out with new product	Maruti ZEN	Suzuki	Good	NA





53	1994	a. Tata launches new vehicle. b. Sipani launches new vehicle.	a. Tata Sumo hits road b. Rover Montego	a. Fully indigenous b. NA	a. Good b. NA	Petrol Rs. 19.26 Diesel Rs. 7.84
54	1994	MUL launches new car and brings out One Millionth vehicle	Maruti Esteem	Suzuki	Good	Same as above
55	1995	Mercedes enters Indian market	Mercedes E- Class	Mercedes- Benz	Good	NA
56	1995	Peugeot- HM launches new car	Peugeot 309	Peugeot	NA	NA





57	1995	Daewoo launches car	Daewoo Cielo	Daewoo	From 1991 to 1995 all kinds and all company made almost 800000 cars were sold	NA
58	1996	a. Third Auto Expo Exhibition b. Maruti Gypsy King launched	--	-----	-----	Petrol Rs. 24.03 Diesel Rs. 9
59	1996	FIAT launches new car	Fiat UNO	FIAT	Good	Same as above
60	1996	General Motors (GM) launches new car	Opel Astra	GM of USA	Good	
61	1996	Ford India launches a new car	Ford Escorts	Ford of USA	Good	





62	1996	HM launches new car	Peugeot 309 diesel	Peugeot	NA	
63	1997	Tata comes out with new SUV	Tata Sierra Turbo	Fully indigenous	Good	
64	1998	1980's Maruti 800, the epitome of Maruti Suzuki is almost 95% indigenised which have only basic features of indigenisation	Maruti 800 Old version/ Rs.3 lacs.	Mainly Japanese Technology is tried to be reproduced. Many vendors of Maruti were trained for producing each part.	Very good as they had little choice.	Petrol Rs. 32 and Diesel Rs.16.

Description of the Table:

1.First and foremost point that comes to mind of the critics is that Indians have missed the bus of riding on the fast track of car technological development. The goal at that time for independent India was self-sufficiency and considerations of cost, quality, and efficiency got the second place. The regulatory authority was very strict form the chart it is certainly clear. Dependence on foreign technology was banned. Manufacturers were automatically forced to indigenise the cars. Some how this made import





substitution order of the day. However, this attempt at self-reliance failed miserably. Though we learnt to indigenise, the models we are bringing out are outdated designs of the west. Above that we in India continue to make car models with marginal improvement.

2. The failure of the system lay in the industry's isolation from technology and exports. Although the Japanese, and later Korean, car industries were also highly protected in their formative years, they never shut the doors on the technology front. They relentlessly tapped the best talent pools in the world to absorb the know-how of car design and manufacture. Exports pushed for international competitiveness and also provided the volumes to make large investment justifiable. In contrast, Indian companies have never been able to invest large sums in R & D thanks to the then the modest volumes of the domestic market.

3. Now, with floodgates of liberalisation opened to MNC carmakers that have come in droves, can any Indian carmaker compete on the same terms? At best, India can hope to become low-cost manufacturing base for these multinationals.

4. One of the few good things that have happened in the Indian car history is the indigenisation of the Maruti 800, the 1980's version of the Suzuki and the importance of service station network MUL has built in India. It has revolutionised the car industrial set up in the Indian subcontinent. In the hegemonies of the Ambassador and the Premier Padmini only few used to





buy the Car being some kind of need, however the MUL has literally increased the need of the Indian customers for the cars.

5. Adding the stuff in the technologies was the Information Technology revolution. It has improved the service sector, which has seen the phenomenal growth of almost 18% per annum since the introduction of the Maruti Technologies in India.

6. With the increasing demands of the Maruti 800 cars Suzuki had to indigenise its technologies in India as otherwise it was a difficult task for the Suzuki Japan to bring the huge quantity of the spares and the services to follow. Thus, customer demands has forced Suzuki to indigenise the car in India which ahs the highest demand. Now though older technology but as the reliable one Customer in India buy it and feel they are buying a car that is almost 98% indigenised.

7. Demand for the Tata-Indica proves that Indian customers are demanding the car that suites the Indian psyche is demanding the car that suites Indian condition and made in India. Only thing required is the total indigenisation of the car technologies. Otherwise customers demand the kind of services in which the Tata Motors had to replace the suspension system in the earliest version of the Tata-Indica, it incurred the services of Rs. 120 Crores to Tata. Each suspension made in India had to be improved to the world standards and that too to suite the bumpy roads in India.





8. One more aspect in the table is that though the petrol and diesel prices are rising still the demand of the cars is increasing thanks to the hectic schedule of the urban customers.

9. The indigenisation of the cars will be forced by the customers in the future otherwise lack of customer will be attracted towards the foreign made cheaper cars and Indians will be doing simply the secondary jobs and not of creation and achievements.

10. The table is quite self explanatory, however one thing is clear Indians have realised that the technologies used in the cars is been slowly and steadily getting assimilated by the Indians and car has become the part of the Indian culture, whether rich people or the middle class people. Remember, Indian civilisation and culture accepts only good things and throws away bad things.

Thus, the more the demand in India the more will be indigenisation. That is why the customers in the premium cars sector are also demanding the indigenisation; as the piquant problem and short of spares in Skoda-Octavia, Ford-Mondeo and Mercedes-Benz spares has become the talk of the nation. This, indigenisation efforts will not only improve the car industry but also the supporting industries as well.





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CHAPTER 6:

HISTORY OF CUSTOMER BEHAVIOUR IN INDIA IN RESPONSE TO CAR TECHNOLOGIES



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345

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CONTENTS CHAPTER 6:

Topic No.	Topic	Page No.
6.1	A complete review of cars manufactured and sold in India since 1948	354
6.2	Case Study 1: Phenomenal growth of Maruti-Suzuki Cars share in the Indian car market: 1983 to 1996.	360
6.3	Case Study 2: A specific car: Maruti 800 from 1983 to 1997. Historical Preview of Indigenisation of “Maruti 800” technologies from customer’s point of view.	364 To 370



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346

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In this chapter we take the sales of cars for particular model and show that because of technologies favouring better Ergonomics and Aesthetics customers responded well. Some times customer demanded and the technology evolved. Which parameters customers demanded the most and how did technocrats and businessmen responded to it?

6.1: Table: 6.1:

A complete review of cars manufactured and sold in India since 1948:

SN	Year	Number of cars sold	Options of cars for customers	Technology used	Petrol Rs/ Litre	Diesel Rs/ Litre	Special Remark over Options
1	1948 to 50	9267	2	Assembling foreign cars	NA	NA	HM and PAL
2	1951 to 55	23057	5	Assembling foreign cars	NA	NA	HM, PAL and Standard Motor product of India ltd. (SP) had 5 distinct car types
3	1956 to 60	64746	7	Assembling foreign cars	0.58	0.31	HM, PAL, SP
4	1961 to 65	108716	8	Assembling foreign cars	0.68	0.54	HM, PAL, SP
5	1966 to 70	168627	9	Assembling of few foreign	0.81	0.67	HM, PAL, SP





				part and few Indian made parts in few cars.			
6	1971	38304	9	Same as above	NA	NA	HM, PAL, SP
7	1972	38828	9	Same as above	NA	NA	HM, PAL, SP
8	1973	39937	7	Same as above	1.52	0.83	Fiat ends collaborations with PAL
9	1974	36008	7		NA	NA	HM, PAL, SP
10	1975	23075	8		NA	NA	HM, PAL, SP
11	1976	31610	8		NA	NA	HM, PAL, SP
12	1977	38019	8		NA	NA	HM, PAL, SP
13	1978	34366	9	Same as above	NA	NA	Ambassador Diesel launched
14	1979	29235	9	Same as above	NA	NA	HM, PAL, SP
15	1980	30538	9	Same as above	NA	NA	HM, PAL, SP
16	1981	42106	9	Same as above	5.56	2.61	MUL established
17	1982	42674	10	Same as above	NA	NA	Reliant Kitten launched by Sipani dolphin
18	1983	45090	11	Same as above	NA	NA	Maruti 800 (SS80)





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							launched
19	1984	64013	12	Same as above	NA	NA	Maruti Omni launched
20	1985	102456	14	Same as above	7.34	3.52	Standard 2000 and Premier 118 NE launched
21	1986	116004	15	Foreign	NA	NA	Maruti 800 (S308) launched
22	1987	148495	15		NA	NA	HM, PAL, SM, MUL
23	1988	159941	15	Same as above	9.14	3.63	HM, PAL, SM, MUL
24	1989	177190	15	Same as above			HM, PAL, SM, MUL
25	1990	176821	16	Same as above	13.72	5.62	Maruti 1000 launched
26	1991	178930	16	Same as above	NA	NA	HM, PAL, SM, MUL
27	1992	153867	17	Same as above	17.91	6.88	Tata Estate car launched
28	1993	199571	18	Same as above			Maruti ZEN launched
29	1994	237280	20	Same as above	19.26	7.84	Maruti Esteem and



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							Sipani Rover Montego Launched
30	1995	329879	23	Same as above	NA	NA	Mercedes E, Peugeot 309, Daewoo Cielo launched
31	1996	396456	27	Same as above	24.03	9.00	Fiat Uno, Opel Astra, Ford Escort, Peugeot 309 Diesel launched
32	2000	633000	150	Mostly foreign, either in CKD form cars is assembled or are imported or are assembled here. Few car companies started manufacturing few parts in India.	NA	NA	Almost every company has various options for a.c., non-a.c. small car middle segment car and luxury cars with various features and versions.





33	2001	650000	160	Same as above	32.00	16.00	Same as above
34	2002	640000	170	Same as above	35.00	22.00	Same as above
35	2003	700000	180	Same as above	36.00	24.00	Same as above
36	2010	Prediction of car sells to be 1000000.	200	SIAM has predicted	40.00	30	All above features plus there will be more indigenous cars and its users.

Highlights and Description of the table:

1. There is a sudden drop in the sales and manufacturing figure in the table in the year 1971. It is due to the fact that on that year we have put the production and sales figure separately.
2. Till 1983 figures were steadily fluctuating near the 40000 mark. Though demands were high still the supply were limited. Though demand was for varied car products still the customers got only two kinds of cars.
3. Since, 1983 when the first Maruti 800 was launched it changed the car scenario in India.





4. 1983 to 84 production and sells figure increased by almost 40%. It shows that the potentially trapped market got exploded and customers responded it well.

5.1984 to 1985 productions and sells figure increased by almost 66%.

6.1985 to 86 almost 10% rise is there, as customers started demanding up gradation in the product.

7.In 1986 to 87customers responded well hence there was a rise in figures of sells and production to almost 22% than the previous year.

8. 1988 to 1991 there was steady sell and production.

9.1992 saw drop in sells due to Gulf Crisis, blockage of Oil surfing to various countries. It was also due to Iraq versus Kuwait plus USA and friendly force war. More than half of the petroleum around the world is trapped in this region. War in this region saw extreme down fall in sales figure of the cars all-round the world. Which directly affected the petrol sell and the drop in the cars sell.

10.1992 to 1993 when Gulf war ended there was sudden rise in car sells by almost 25%. Most important thing is Maruti also show the up-gradation in their product and added more variants in the Maruti 800 itself.

11.1993 to 1994, Indians got almost multiple car companies option to buy the car. So there was 20% growth in the market. From every corner of the world car companies started selling cars in India, due to full force liberalisation. Car finance started showing its results.





12. 1994 to 1995, there is a 25% growth the reason being same as above.

13. There is 20% growth again from 1995 to 1996 due to implementation of fifth pay commission and due to good economy.

14. 1996 to 2000, the car industry in India is growing steadily by 20% every year. In 2000, it touched the figure of six lac cars.

15. Since 2000 till 2002, the sell and production of cars touched six and half lac mark and going steadily.

16. In 2003, Car finance, recovery of economy in few sectors, export of cars, has made it possible to touch the car production and sells figure touch 700000 mark.

17. Society of Indian Association of Manufacturing (SIAM) has predicted that there will be almost One million cars sold in the Indian market. IT is obviously due to its affordability of cars due to Finance schemes and increase in the Middle class people in India.

6.2: Case Study 1:

Table 6.1: Phenomenal growth of Maruti-Suzuki Cars shares in the Indian car market: 1983 to 1996:

The table given below shows how Maruti's growth is but the other side of customer satisfaction for product and services through indigenising car technologies to give customers value for their money as per their expectations.

SN	Year	Total Car Sales in	All car segment	Maruti's % share in





		India	Maruti sales	the Indian market
1	1982-83	45090	852	1.9%
2	1983-84	64013	18628	29.1%
3	1984-85	102456	47950	46.8%
4	1985-86	116004	71459	61.6%
5	1986-87	148495	88652	59.7%
6	1987-88	159941	94365	59%
7	1988-89	177190	106491	60.1%
8	1989-90	176821	108922	61.6%
9	1990-91	178920	117551	65.7%
10	1991-92	153867	110323	71.7%
11	1992-93	199571	140498	70.4%
12	1993-94	237280	174875	73.7%
13	1994-95	329879	252687	76.6%
14	1995-96	396456	315579	79.6%

Highlights and Description of the table:

1. On the very first year, in 1982-83 Maruti 800 was launched. All the 852 cars those were launched sold like a hot cake. Besides the advertising, the 'ear-to-ear marketing' spread so fast that next year Maruti captured more than 29% car market in India. It was the severe jolt posed to the Padmini and the Ambassador car manufactures.





Customers started calling this car as the “people’s car” due to its price tag of affordable Rs. 50,000/=.

2. *After its third year of launch customers started saying they would buy the car which almost half of the Indian car owners buy every year as by that time Maruti captured almost 47% car market in India.*
3. In 1986, Maruti made its market base firm. It sold almost 60% of the Indian cars. Soon, customers realised that it a long lasting organisation. Hence, many got attracted towards the Maruti cars. When they knew that it was meticulous planning of MUL chairman Mr. V. Krishnamurthy. His objective of making sure that the car and its technologies from Suzuki must be absorbed in totality and not by a piece meal. Hence he also imbibed the work culture from the Japanese. Mr. R. C. Bhargava, who took the reign of Maruti, was also instrumental in turning a Public Sector company a profitable one, a relatively rare feat at that time. He made the efforts of his predecessors fruitful by making the Maruti Jewel of the Public Sectors in India, an enviable success from Indian perspective.
4. Dazzled by the potential of India’s One Billion population, car companies around the world planned rosy picture by putting ambitious capacities in their countries. It seems from the so many analyses that 1994 onwards a stiff competition among many world car giants that came to India posed a serious threat before the Maruti.





However, management of Maruti remained unruffled. They underestimated Maruti's stranglehold of the bottom end of the market, and were unable to compete with it on price and sheer value for money. This forced most of the entrants into the premium end of the market, the so-called mid-sized luxury cars segment. In this segment also prices ranged from five to eight lac rupees, affordable by only handful, there were predictably few takers for these cars. Peugeot, Daewoo, Ford, GM and the Mercedes-Benz are now saddled with excess capacities. Thus, Maruti Udyog Limited (MUL), disproved all the forecast in all the car segments. Infact it showed the continuous growth, it shared almost 70% car market in India in till 1997 and still hold almost 50% share of the car market. This is the result of policies of MUL of the combination of good value product, long-term commitment from the manufacturer, and value for money given to customer through quality product, services for his total satisfaction.

5. As mentioned in earlier chapter, MUL made it possible due to indigenising few of the car technologies and giving manufacturing rights to only those vendors who give quality products. One factor is MUL is giving transparency in their over all business. MUL has the widest range of authorised car service stations in India ranging from Kashmir region to the Kanyakumari. Indians are happy with those





technologies by which they get more number of jobs, more customer satisfaction, more value for money and more reliability for future this is what Suzuki realised and hence are more successful in India than anywhere else in the world. Suzuki also wants its made up market to be intact for its long lasting business, hence they are striving hard to stay in the Indian market.

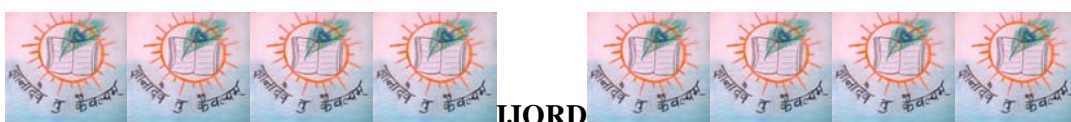
Conclusion of the case study 1: Thus, this case study proves that customers can force the companies to buckle under their pressure otherwise the Peugeot like companies are even get thrown off from the Indian subcontinent. Suzuki has rightly thrown away almost 60% of its business to the vendors for indigenising the car technologies and also for the before and after sales services and maintenances aspect for their cars, otherwise the result they knew in advanced. This resulted in growing deep roots in the Indian market.

Thus, finally it proves that more the company indigenise the car and its technologies the more its roots get deeply rooted in the socio-techno-economics of that country hence more customer oriented that company becomes. It helps in better performance of that company in the market of that country.

6.3: Case Study 2:

A specific car: Maruti 800 from 1983 to 1997.

Table 6.3: Historical Preview of Indigenisation of “Maruti 800” technologies from customer’s point of view:





It can be put into following self-explanatory table:

SN	Year	Indigenisation %	Customers Responses
1	1984	Less than 10%	A throw away price of almost Rs. 50000/= Maruti 800 was instant success. It gave the car market a complete face-lift. The traditional Padminis and the Ambassador were swept aside by the customers in wave of Maruti mania. Though, this year more than 850 Maruti 800 cars were sold. However, this new tiny car captured the heart of the customers. Maruti-Suzuki understood one fact that to reduce prices of production it must indigenise more Maruti 800 parts.
2	1985	27.5%	More than 20000 cars were sold. As customers were getting cheaper cars. Thus, capturing more than 50% car market in India.
3	1986	36.82% of more than 30000 car parts were	Maruti got the first revamp in its design and interiors. Customers liked the car technologies and the interior designs as





		indigenised.	well. The sales figure touched 33000.
4	1987	55.13% car parts were indigenised.	The price tag remained competitive and it captured more than 60% share in the Indian car market. Sales figure touched 50000 units.
5	1988	79.46% car parts of Maruti 800 were indigenised.	64,581 cars were sold and demand was of more than one lac cars for the Maruti 800. Many people had to buy other products like Maruti-Omni due to built in Brand image.
6	1989	86.23% Maruti 800 parts were indigenised.	By this time the indigenous vendors and ancillary units of Maruti learned to modify the car parts. They gave face-lift to the plastic/ fibre interiors of the cars. It appealed the customers. The sales figure touched 67,547 units.
7	1990	90.58% car parts were indigenised	73,410 were the sales figure. Still it was almost 50% of the car market. Thus, in this decade Maruti 800 became the phenomenon in the minds of the small car customers and the potential customers. The more the indigenisation





			the more customers understood to have cheaper and more advanced parts every year.
8	1991	93.83	Sales figure of 74,149 showed that the maturity had reached in the Maruti 800 car market. Every other car company in the world started realising success of Maruti. More the indigenisation reached the more the customers got attracted as they started feeling that the car is being manufactured in India. More number of people got job in the Maruti Vendors. The Quality and other norms were liked out in the market. Thus, customers realised Maruti is the quality car.
9	1992	94% car parts were indigenised.	Though there was Gulf Crisis and sour in the prices of Petroleum products still Maruti maintained its sales figures of 76, 766. Many higher middle class customers realised that Maruti 800 is blended with low cost ownership, ease





			of driving, reliability, and widest range of network for services. It made the Maruti the winning car, even in the crisis situation.
10	1993	94.95% parts of the 1983 first conceived Maruti 800 model were indigenised.	Sales figure touched 79,433 due to impact of the gulf crisis. Still Maruti 800 remained the most reliable product in the Indian car market.
11	1994	95% Maruti 800 first version car parts were totally indigenised.	Sales figure touched 100000 marks per year. It was the record in the Indian car market. Thus, it had established itself as the benchmark for the entry-level car in any market. It became the best choice car for the first time buyer. As customers realised the transparency in the technologies due to its results. Thus, increasing local content (indigenisation of technology) and volume has resulted in the cheaper cost of Maruti 800 that resulted in the astronomical success in the world car





			history.
12	1995	95% stagnation was reached in the indigenisation of technologies of the car.	Sales figure of 117056 showed that the Maruti 800 is the car rest all are just old four wheelers. Its share in the market was nearly 40% as by that time many models from the Maruti itself were launched.
13	1996	95% Probably Suzuki did not wanted to lose its supremacy in core technologies was soon realised.	Slowly different versions of the Maruti 800 were classified. Thus Maruti 800 deluxe, with ac, without ac, etc. Still Maruti 800 was the market leader. It touched the sales figure of 150000 again the record in the Indian car market. Thus, the struggling car part industry in India got a big uplift due high content of indigenised contents in the Maruti 800. Many mastered this field of industry. Infact Suzuki outsourced this version of car to Maruti plant in India as it faced the continuous downward trend in Japan in the small car market.





14	1997	95.1% Maruti 800 parts were indigenised.	Sales touch 1,89,852 units, out of almost 4,00,000 car sales in India. Thus, Maruti 800 became the most reliable car in the Indian market. It is due to its cheaper cost, ease of driving, customer appeal to the ergonomics and aesthetics of the car. Also, boosting is the most reliable and widest range of network of services in India. Adding stuff was the technologies indigenisation, job generations and percolation of the knowledge to the Indians. That is how Maruti 800 has established its firm feet in the Indian car market. The highlighting factor was customer satisfaction was tried first time in this sector by keeping aside the manufacturers dominated market as it was in the Ambassadors and the Padmini era. Soon lot of companies realised this factor and tried to enter the Indian car market. Thus, Maruti
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			became the lighthouse for the giant car market and supporting industries in India by proving first time that the customer is the king in the car market.
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Conclusion of case study 2:

Though many of the Maruti 800 car components are been indigenised still it is been understood fact that the indigenised parts are no longer been used in the advanced technological savvy and featured countries around the world. Hence, as the Ambassador is the 1950's model, similarly if the car technologies with which car are manufactured is not indigenised then again after 50 years Indians will be chasing some other company for the technologies. No company is here for charity including Suzuki; hence what awakened customers are expecting is that Indians will try their whole might to indigenise the car technologies for the future self-reliance.





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CHAPTER 7:

CAR MARKET HAS BECOME BUYERS MARKET DUE TO SHEER CUSTOMER DOMINANCE: A CASE STUDY OF SMALL CAR MARKET IN INDIA



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365

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CONTENTS OF CHAPTER 7

Topic No.	Topic	Page No.
7.1	The Car Market Segmentation	373
7.2	New Cars to be launched in India due to customers' demand	374
7.3	World Car Market Share in the A, B and C segment from 1998 to 2002	376



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After opening the floodgates of Indian Economy in 1994, Indian car market started flooding with the small cars from the various worldwide companies. Every manufacturer around the world started thinking about the Indian car market as the second biggest car market in the world. Hence in 1998 new compact cars like Hyundai's Santro, Daewoo Matiz, Tata's Indica, and Fiat's Uno diesel were introduced in the market. Unlike the Premier Padmini and the Ambassador car where it was sellers who were dictating the terms and conditions these cars changed the market face. Earlier, Maruti entered into the small car market in the year 1984, hence, lot of customers started buying these cars other than Premier Padmini and the Ambassador for their innovative looks and services they provided. Hence, even Maruti who were pioneer in giving very good services to the customers for their cars in India also started facing the competition. In other words, by seeing the Maruti's foundation in the small car segment had made new players straight into mid-segment. Interestingly, Maruti persisted with its strategy of intensification and kept on expanding production and market. It is also kept enlarging its competitive advantages. Even the first time car buyer is choosing technologies over the price as the most important parameter, while picking up the car.

7.1: The Car Market Segmentation:

We are restricting our case study only for the A, B and C class car market segments due to sheer volumes, i.e. 80% of total Indian car sells as they are





sold in India. They are divided into such categories according to their price as below:

Table: 7.1: A, B and C segments in India in the year 2003:

SN	Segment	Price Tag in Rupees	Cars in this segment
1	A	Under Rs. 3 Lakhs.	Maruti 800, Maruti Alto, Maruti Omni.
2	B	Under Rs 4 to Rs. 5 Lakhs.	Daewoo Matiz, Hyundai Santro, Tata Indica, Maruti Zen, Wagon R.
3	C	Up to Rs. 7 Lakhs.	Maruti Esteem, Ford Ikon, Hyundai Accent, Opel Astra, Mitsubishi Lancer, Honda City.

7.2: New Cars to be launched in India due to customers' demand:

Due to volume of sell in these segments many new entrants are there in the Indian car market.

Table: 7.2: New Car arrivals 2003 to 2005 in the Indian Car Market:

(Reference: Motorindia-October-2003)

SN	Model	Launching date	Expected Price
1	Daewoo Matiz	2005	Rs. 3-4 Lakhs
2	Hyundai Getz	June 2003	Rs. 4-5 Lakhs
3	Maruti Ignis	2003	Rs. 4-5 Lakhs





4	Honda Fit	December 2003	Rs. 5-6 Lakhs
5	Ford Fusion	2004 January	Rs. 5-6 Lakhs
6	Hyundai Elantra	2004 May	Rs. 5-6 Lakhs

As mentioned earlier after the Liberalisation of the Indian economy since 1994, many major car sellers around the world have been around in India to sell small cars and the big cars as well. However, the cars costing less than Rs. 4 Lakhs capture more than the three quarter of the Indian car market. From 2003 to 2005 there are more than five cars, which are getting launched within the span of 14 months in the Indian car market. Prices are between Rs. 4 to Rs 6 Lakhs.

One most important thing is new car segments are getting created day by day.

With the entry of Fiat Palio new car segment called the B+ segment is created having cost between Rs. 5to 6 Lakhs. Similarly with the advent of adding air conditioners, power windows, power steering, central locking system, high voltage air conditioners, etc. ever new segment is created few of them are given below:

Table: 7.3: Modified A, B and C car segments in India after 2003:

SN	Segment	Price Tag in Rupees	Cars in this segment
1	A	Under Rs. 3	Maruti 800, Maruti Alto, Maruti





		Lakhs.	Omni.
2	A+	Rs. 3 to Rs. 4 Lakhs	Maruti Alto ELX and GLX, New Daewoo Matiz.
3	B	Rs 4 to Rs. 5 Lakhs.	Daewoo Matiz, Hyundai Santro, Hyundai Getz, Tata Indica, Maruti Zen, Maruti Wagon R, Maruti Ignis.
4	B+	Rs. 5 to Rs. 6 Lakhs	Tata Indigo Diesel and Petrol. Honda fit and Ford Fusion, Toyota Vitz.
5	C	Rs. 6 to Rs. 7 Lakhs.	Maruti Esteem, Ford Ikon, Hyundai Accent, Opel Astra, Mitsubishi Lancer, Honda City.
6	C+	Rs. 7 to Rs 10 Lakhs	Ford Ikon NXT, Hyundai Accent GLX, almost all these cars with GLX versions.

Thus, Honda Siel has begun to work on the small car called the fit, which is Asian version of a popular model called Jazz in Japan. Honda also has the plan to launch 660 cubic centimetres (cc) car sometime in the year 2005. However since it is leader in the premium car segment it is not willing to launch it immediately.

7.3: World Car Market Share in the A, B and C segment from 1998 to 2002:





Many large and rich car manufacturers in the world are investing in the developing market rather than investing more in their business in their existing car market. This was the major reason that in the segment A, B and C world of cars could observe the significant rise in the sells. In the table given below are the percentages of the sells in these categories.

Table: 7.4: Worldwide market share in the A, B and C Car segment in the from 1998 to 2002:

SN	Year	Segment A	Segment B	Segment C
1	1998	53.81%	32.80%	13.39%
2	1999	40.80%	48.83%	10.37%
3	2000	28.65%	55.83%	15.52%
4	2001	29.86%	53%	16.54%
5	2002	24.69%	57%	16.48%

The rise in the B segment demand due to up gradation of the A segment customers is rising significantly in the world. Similarly the C segment is also showing rise in the percentage share in the total cars sold around the world.

One of the surprising things in the car market is that only 0.1% of its market is shared by the D car segment in the year 2001 and only 0.07% in





the year 2002, having price tag more than almost Rs. 8 Lakhs which includes Hyundai-Sonata, Mercedes-Benz E class and other cars.

That is why it is observed that many players will be putting their cars in India in the A, B and C car segments in coming decade. Infact in the year 2006 car market around the world is going to rise by 46% from base year as 2003.

India is also expecting to touch one million cars turnover since 2007.

Why it has happened?

First and for-most point is the customer focus, which has changed the car market worldwide since the model T in 1908 by the Ford Company and in India by Maruti 800 in the year 1984.

Earlier car manufacturers used to dominate the market. However due to following reasons the car market has become customer centric and customer demand has become so important that even their rejection can close the companies or a part of the company over night as happened with GM in 1992 in USA and with PAL in India in 1996.

The reasons are:

1. Advertising has become most important factor of car selling and customer awareness has increased significantly.





2. Every Customer in every segment wants the cheaper technologies existing in the higher car segments. Even A, B, C car segment customers expect the same facilities as the D segment car customers get.

3. With the full automation using digital technologies and robotic technologies and semi automation due to robotics and CAD-CAM-CAE in the car factories the production rate the productivity and quality of the cars has increased many folds. In Ford, GM, Toyota infact car manufacturing is far more than actual demand in the market. Hence, Automobile Production has grown faster than the sales. (Indian Journal of Marketing November, 2003 pp-16). Hence, the prices are coming down due to various productive measures taken by the car organisations and their vendors and dealers.

4. The Information Technologies have brought the world closer. The market is made aware about every technology every servicing maintenance facilities and every financial and technical detail. In this market if one car player do not offer one service other will offer it and will take away the customer. Many car companies are giving the King customer the cheaper services at 24 hours.

5. Customer demand everything at doorstep and car players give it.

6. Even customer demand improvements in the technologies and car companies those give get benefited others lose the market share.

7. Customer demand transparency in the business and the car companies give it.





8. Even market dynamics has proved that companies are planning long-term benefits. Take example of Tata Motors, they have plan of manufacturing car at the selling rate of Rs. 1 Lakh i.e. which is called as the One Lakh Car project. This car would capture the premium two wheeler segment customers.

Thus it proves our case study. That is, sheer customer dominance is the reason of car sells improvements at the services front and ever-new development in the technologies and even generation in the jobs in various professions related to the car business. It is happening not only in India but also it is a worldwide phenomenon due to Liberalisation, Privatisation and Globalisations (LPG) policies all the government adopting worldwide as they are not been able to maintain their giant work forces and giant projects in the competitive world.

Chapter 8:

CRITICAL ANALYSIS OF THE PRESENT CAR MARKET IN INDIA: PERFORMANCE OF DOMESTIC CAR COMPANIES, THE MULTINATIONAL





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CAR COMPANIES AND THE FATE OF THE JOINT VENTURES.



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375

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CONTENTS OF CHAPTER 8:

Topic No.	Topic	Page No.
Part 1	Customers' response to present car market	382
Part 2	Customer Motive 1: Present car Technologies, Customer Motive 2: Present Car pre sales and after sales Services, and Factors related	383 to 447
Part 3	Expert's Views	448
Part 4	Preparing for the future trends according to the demands of the customers	455
Part 5	Case Study: Knowing fate of the joint ventures in India from Maruti-Suzuki Case.	485 to 497



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376

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We are considering some highlighting points, especially in the small car market in India. In some cases other cars are taken into care elsewhere the extensive research on the small cars is given below.

Most importantly, the customers who drive these cars in India are very alert, conscious and hence is this detail survey and critical analysis from various aspects related to indigenisation of the car technologies.

PART 1: CUSTOMERS' RESPONSE TO PRESENT CAR MARKET:

Customer is the prime target and is the most important link of the in all these activities. His 'yes' can make the turn over of One Million Rupees or even One Billion Rupees in the market and his 'no' can be equally devastating to the market what so ever the reason may be.

So, it becomes important to know his buying motives, needs, and his behaviour studies in the market.

Let us see the buying behaviour first. Mr. Sherlekar, Mr. Prasad and Mr.

Victor define buying behaviour of the customer as, "*All psychological, social and physical behaviour of potential customers as they become aware, of evaluate, purchase, consume, and tell others about the products and services.*" It involves:

- a. Individual process
- b. Group process,
- c. Post purchase evaluation and satisfaction level,





- d. It include communication, purchasing, and consumption behaviour,
- e. Social Environment,
- f. It includes both consumer and industrial buying behaviour.

Now, Buying motives are defined as those influences or considerations which provide the impulse to buy, induce action or determine choice in the purchase of goods or services. These include Product motives and Patronage motives like emotional and rational motives. We shall go factor wise.

We will go by technology motive first.

Part 2: Customer Motive 1: Present car Technologies:

Let us see the present car market in India and compare the four most sold cars in India.

Let us start with most visible part of the car the technology. *Remember it is estimated by Indian Car Industry that if GDP is more than 6% India will have turn over of 1 million cars per year from 2007.*

Table: 8.1: Showing technical specifications of the three most sold cars in India:

DIMENSIONS	HYUNDAI-SANTRO	TATA-INDICA	MARUTI-ZEN
Length in mm	3495	3660	3495





Width in mm	1495	1625	1495
Height in mm	1590	1485	1405
Wheelbase in mm	2380	2400	2335
Ground Clearance- mm	172	170	165
Kerb Weight- Kg	780	850	752
Front Track- mm	1250	1295	1260
Rear Track- mm	1210	1256	1240
Front Seat	Bucket type	Bucket type	Bucket type
Rear Seat	Moulded type	Bench seat	Bench seat
Capacity	5 persons	5 persons	5 persons
ATTRIBUTE	HYUNDAI-SANTRO	TATA-INDICA	MARUTI-ZEN
Type of engine	Inline 12 Valve SOHC with MPFI system	Water-cooled conventional carburetted engine.	Aluminium engine with SOHC water-cooled.
No. of cylinders	4 in line	4 in line	4 in line





Cylinder Capacity	999 Cubic cm	1405 Cubic cm	999 Cubic cm
Maximum Output	55 bhp @ 5500 rpm	60 ps @ 5000 rpm	50 bhp @ 6500 rpm
Maximum Torque	1.4 Kg m @ 2500 rpm	10 s n m @ 2500 rpm	7.2 kg m @ 4500 rpm
Idle rpm	900 +/- 100	800 +/- 100	800 +/- 100
Ignition timing	BTDC 5° +/- 2° at 900 rpm	Not available	100 +/- 10 @ 800 rpm
Compression Ratio (Air: Fuel)	8.7: 1	9: 1	8.8: 1
Fuel Delivery	Fuel Injector	Carburettor	Carburettor
Valve Gear	3 valves per cylinder	2 valves per cylinder	2 valves per cylinder
Firing Order	1-3-4-2	1-3-4-2	1-3-4-2
Clutch type	Single friction plate, Diaphragm type	Diaphragm type	Diaphragm type
Clutch operation	Mechanical Type	Mechanical Type	Mechanical Type





method			
Transmission type	Synchromesh mechanism with two overdrive	Diaphragm type	Diaphragm type
Transmission Operation	Manual Operated	Manual Operated	Manual Operated
Number of Gears	5 Forward and 1 Reverse	5 Forward and 1 Reverse	5 Forward and 1 Reverse
Front Suspension	McPherson strut with stabilizer bar, offset coil spring, hydraulic dampers.	Independent wishbone type with McPherson strut, and Anti-roll bar	McPherson strut
Rear Suspension	Torsion Beam Axle, 3 link coil springs, hydraulic	Independent, semi- trailing arm with coil spring	3-linked axle with isolated trailing arms, coil springs and





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	dampers	mounted on hydraulic shock absorbers	gas filled shock absorbers.
Type	Rack and Pinion	Rack and Pinion	Rack and Pinion
Operation Method	Power Assisted Steering System	Manual Operation	Manual Operation
Turning Radius	4.5 meter	4.9 meter	4.9 meter
Safety Provision	Collapsible Steering column	Collapsible Steering column	Collapsible steering column
Type	Vacuum Assisted Booster type	Dual Circuit, diagonally split, vacuum assisted with PCR valves	Booster assisted dual circuit
Front Brakes	Floating type with ventilated disc brakes	Disc brakes	Disc brakes



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Rear Brakes	Self adjusting leading and trailing drum brake	Drum brake	Drum brake
Parking Brake	Mechanical brake acting on rear wheel	Mechanical brake acting on rear wheel	Mechanical brake acting on rear wheel
Rear Bumper	Rigid Bumper	Rigid bumper	Rigid Bumper
Safety Norms	Santro has passed front impact test at 60 kmph.	The Indica confirms to current European Safety norms for frontal impact.	Not available.
Mileage	16 to 17 kmpl	15 kmpl	13 kmpl
Maximum Speed	130 kmph	140 kmph	120 kmph
Fuel Tank Capacity	35 Litres	37 Litres	35 Litres
Tyre Type	Radial	Radial	Radial



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Tyre size	155 / 70 R-13	155 / 70 R-13	145 /70 R- 13
Cost of Cars	Starting with Rs.3.05 Lacs	Starting with Rs. 2.54 Lacs	Starting with Rs.2.97 Lacs

Description Note: The long forms of the all the table contents are given below.

SOHC = Single Over-Head Cam, MPFI = Multi Point Fuel Injection,
 mm = Millimetres, Kg = Kilogram, m = Meter, bhp = Brake Horse
 Power, rpm = Revolution Per Minute, kgm = Kilogram meter, ps =
 Pascal Second, Snm = Seconds Newton Meters, cc = Cubic Centimetres,
 BTDC = Bottom / Top Dead Centre, Kmpl = kilometre per litre.

Interpretation of the Table:

1. This is the Technical comparison of Hyundai- Santro, Daewoo-Matiz, Tata-Indica, and Maruti-Zen. All the dimensions are specified below the table with dimensions description.
2. There is not a single car in this segment in India, which gives customer a kind of delight, which Mercedes or Rolls rice is giving so there is an ample scope for targeting the indigenisation.
3. Not a single car in this segment gives most comfortable ride to the customers. Every customer demands from an Indian developed car that he must feel the same freshness as at a time he rides the car should be felt at the time he gets out of the car. So also proves the requirement of indigenously developed car technologies.



**Customer Motive 2: PRESENT CAR PRE SALES AND AFTER SALES SERVICES AND****FACTORS RELATED TO IT:**

Next part is the services the companies providing to the customers. In this all the companies are at par with each other in some segments while Maruti-Suzuki and Tata Engineering have the edge over other as they have the most number of service stations in India.

Tata engineering has brought the first vehicle in India though not totally indigenous but which is perceived for the Indian conditions and for the Indian consumers. It has seen the most phenomenal growth in India.

Following are the results taken from the J.D. Power Survey, the most trusted source for the car market analysis in the world.

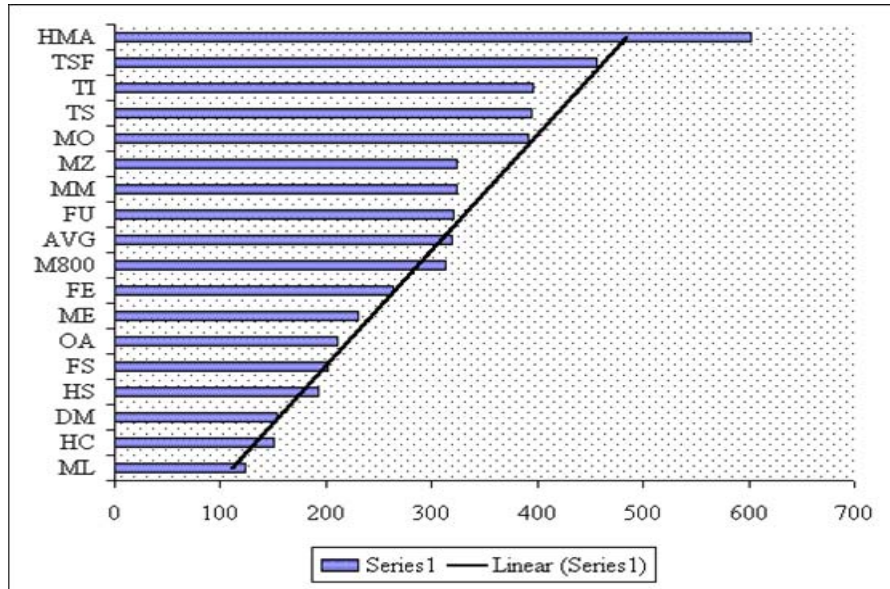
Factor 1: Problems faced by Customers in each kind of car in India:**Table: 8.2: Customer Response to specifications - J.D. Power Survey Dec. 2003.**

Self descriptive Survey of 100 vehicle for each car in each segment		
Name of the car and Organization	Short Form	Problems / customer / Vehicle/ Year
HM / Mitsubishi Lancer	ML	124
Honda City	HC	151
Daewoo Matiz	DM	153
Hyundai Santro	HS	193
Fiat Siena	FS	202
Opel Astra	OA	210
Maruti Esteem	ME	230
Ford Escort	FE	264
Maruti 800	M800	313
Industry Average in India	AVG	319
Fiat Uno	FU	320
Mahindra & Mahindra Armada	MMA	323
Maruti Zen	MZ	324





Maruti Omni	MO	391
Tata Sumo	TS	395
Tata Indica	TI	396
Tata Safari	TSF	456
HM Ambassador	HMA	602



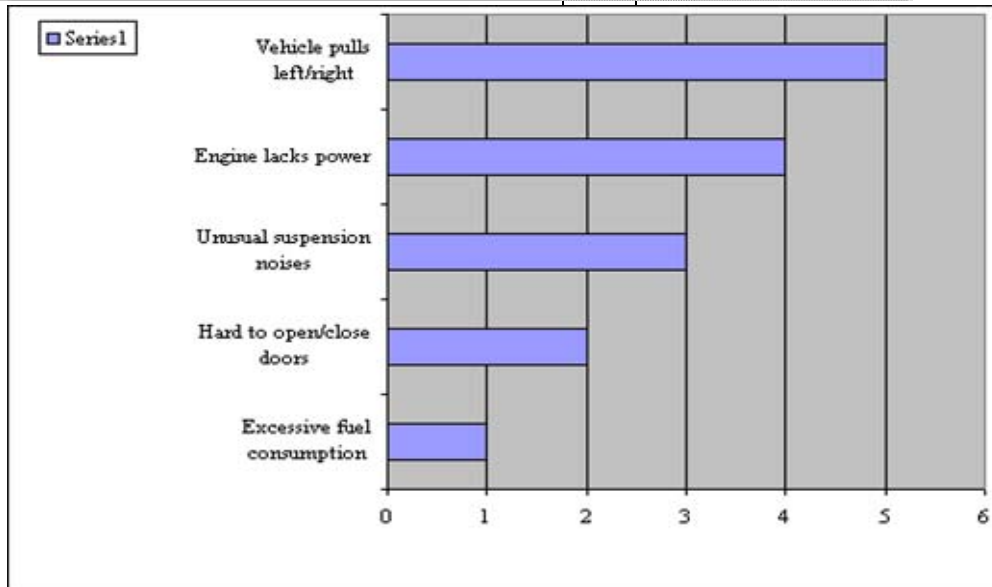
Factor 2: Table: 8.3: Top 5 Problems Reported in India with respect to Cars: J. D. Power survey, December 2003.

SN	Problems in simplified form	Rank
A	See Graph: Series 1: Small Cars	
1	Excessive fuel consumption	1
2	Noisy brakes- squeak/squall/groan/grind	2
3	Hard to open/close doors	3
4	Manual Gearshift hard to operate	4
5	Gaps/Poor fit of vehicle exterior	5
B	Mid-Size Cars	
1	Excessive fuel consumption	1
2	Hard to open/close doors	2
3	Unusual suspension noises	3
4	Engine lacks power	4
5	Vehicle pulls left/right	5
C	Multi Utility Vehicle	
1	Excessive fuel consumption	1
2	Unusual suspension noises	2
3	Brakes are noisy: squeak /squall /groan	3





/grind	
4Hard to open/close door	4
5Water leak problem	5



Interpretation of both Graphs and tables: As vehicles are mainly designed and develop for the European, American, Japanese and Korean conditions they lack in above performances in India. Special Indian indigenous Research and Development is required for this purpose in India. Hence customers buy that car which poses less threat in future.

Factor 3: Fuel Consumption: Table: 8.4: Survey of Cars in the Indian market for fuel consumption: Reference: First Hand Report from consumers: J.D. Power, Dec. 2003.

On Fuel Consumption of cars		
SN	Name of the car	Fuel consumption (KMPL)
1	Opel Astra	9
2	Tata Safari	9
3	Honda City	10
4	M & M Armada	10
5	Tata Sumo	10
6	Fiat Siena	11
7	Ambassador (HM)	11
8	Mitsubishi Lancer (HM)	11





9	Maruti Esteem	11
10	Ford Escort	12
11	** Daewoo Matiz	13
12	** Fiat Uno	13
13	** Hyundai Santro	13
14	Maruti Omni	13
15	** Maruti Zen	13
16	Industry Average	13
17	** Tata Indica	14
18	** Maruti 800	15

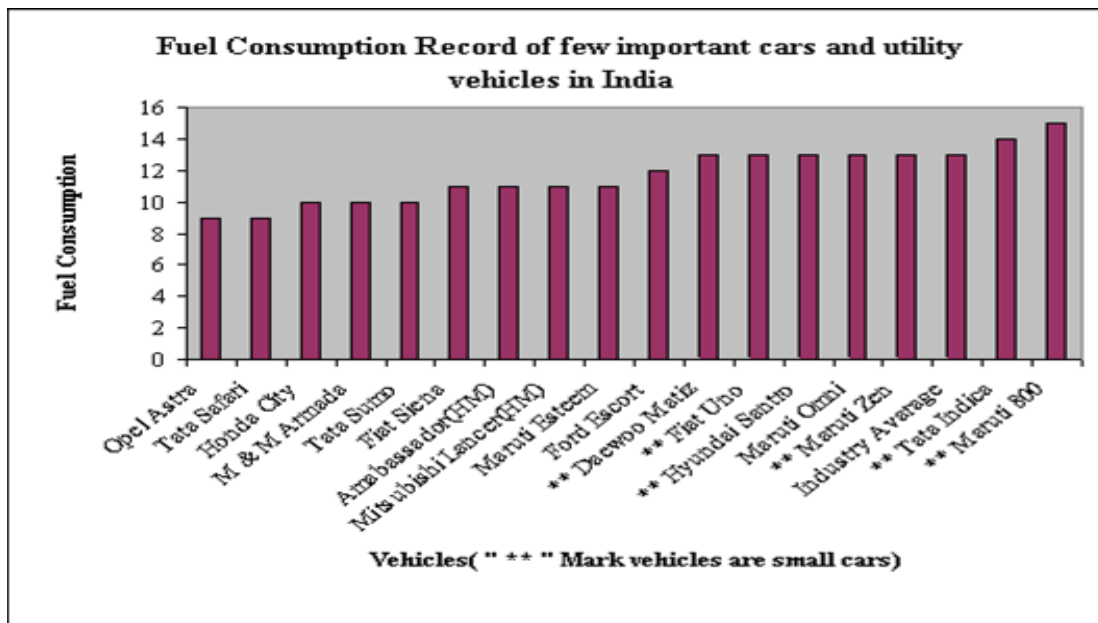


Table and Graph interpretation: Tata Motors car also capturing the market along with the Suzuki-Maruti and Hyundai. Three of which are giving the best fuel consumption, while Daewoo-Matiz is in rejuvenation stage after the closure of the Daewoo Company and is taken over by the GM.

Factor 4: Table: 8.5: Showing Indian Customers' Likes and Dislikes in

the small cars: J.D. Power, 2003, Survey combined with independent survey with restricted and exclusive 25 sample each:

SN	Features	Indica	Santro	Zen	M- 800	Amb'sdr	Alto	Wagon R





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Ride /							
1Manoeuvrability	C	A	B	C	E	A	B
2Handling	C	A	B	C	E	A	B
3Braking	C	A	B	C	E	A	B
4Features	C	B	B	B	D	B	A
5Controls	B	A	A	B	C	A	A
6Seats	A	A	B	C	B	B	B
7Sound System	A	A	B	A	C	A	A
8Vehicle Exterior	C	B	A	B	E	B	B
9Vehicle Interior	B	A	A	B	C	A	A
10Transmission	C	B	B	B	B	B	B
11Engine	C	C	D	C	D	C	C
12Fuel Consumption	A	B	A	B	D	B	B
13Cockpit	D	C	C	C	E	C	B
14Instrument Panel	D	C	C	B	E	C	C
15Vehicle Styling	D	B	B	B	E	B	C
16Comfort	C	D	C	B	C	C	C
17Services	A	C	A	A	C	B	A
18Spare Parts	A	D	D	D	A	D	D
19Convenience	B	D	B	B	B	C	B
20Maintenances	B	C	B	B	B	C	C



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21	Resale Value	D	D	C	C	D	D	C
22	Satisfaction Index	C	B	C	C	B	C	C
23	Dealer Network	A	D	D	D	C	D	D
	Service Station							
24	Network	A	D	A	A	C	A	A
	Selling/ buying							
25	Experience	C	B	B	B	C	B	B
	Explanation at							
26	delivery	C	B	B	B	C	B	B
27	Price Evaluation	C	A	B	B	C	C	C
28	Loan Facility	B	B	B	B	C	B	B
29	Delivery Timing	B	C	B	B	C	B	B
	Sales Person							
30	knowledge	C	C	B	B	C	B	B
	Post-Delivery							
31	Contacts	C	A	C	A	D	C	C
32	Customer Care Cell	B	B	B	A	D	C	C
33	Given Test Drive?	A	A	A	A	A	A	A
34	Looks	B	B	B	B	B	A	B
35	Overall Technology	C	B	B	B	C	B	A
	Continuous							
36	Improvement	A	B	B	B	E	B	B



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Resource							
37Management	A	B	B	A	C	B	B
38Indian Makes	A	E	D	D	A	E	E
39Technology Transfer	A	E	D	D	A	E	E
40Interest other than profit	A	E	C	C	A	E	E

Interpretation of the table:

A= Excellent, **B=**Very Good, **C=** Good, **D=**Average, **E=** Dislike.

1.Over the period of five odd years Tata-Indica is the only brand, which has improved its products, procedures as per the Tata reputations.

2.Tata is the only company that has shown indigenisation of technologies in India other than Maruti that has indigenised few of its car parts. These have improved its customer's base as inner customers have percolated the knowledge about the technology to the outer customers even up to the roadside garage in and around the country.

3.The cutthroat competition has improved the pre-sales services and after-sales services of every car company. It includes indigenous companies like Tata Motors and the foreign companies as well.

4. However, MNC like Suzuki, Daimler-Chrysler, GM, and Ford take every precaution to keep their interest in the market alive. They do not transfer the technologies they have. Infact, even Suzuki has increased its stake in the Maruti by improving its shares to more than 50%. At this front Tata





Motors is developing lot of technologies in India as it has wider range of R & D centres in India. In Pune they have a complete division devoted to the Cars and their R & D where as in Tata Nagar they have the Trucks and the Bus R & D units. Beside that the suggestions from the dealers and service stations around the India brings lot of improvements in their products. At this front indigenous companies have started performing well.

5. Though over all technology and customer care cell are not at par with the likes of Mercedes like luxury car makers still Tata Motors have improved their performance in all respects due sheer competence of the class of engineers and managers they recruit. Tata prefer quality personnel in every field, hence the result. Tata do care about their internal and external customers hence slowly they are, infact every organisation in India has started releasing importance of the customer is really the boss. In car business you just cannot cheat the most professional, most learned, most awakened customers; if you cheat once it pulls the legs of your other at least ten customers.

Besides business India's local companies are showing interest in development of society by sponsoring hospitals in needy areas, planting trees, schools for education, and sports. This also has direct impact on the customers in this business.

Factor 5: Table 8.6: Survey for Customers Appeal from cars they own:

Reference: JD Power Survey, 2001:



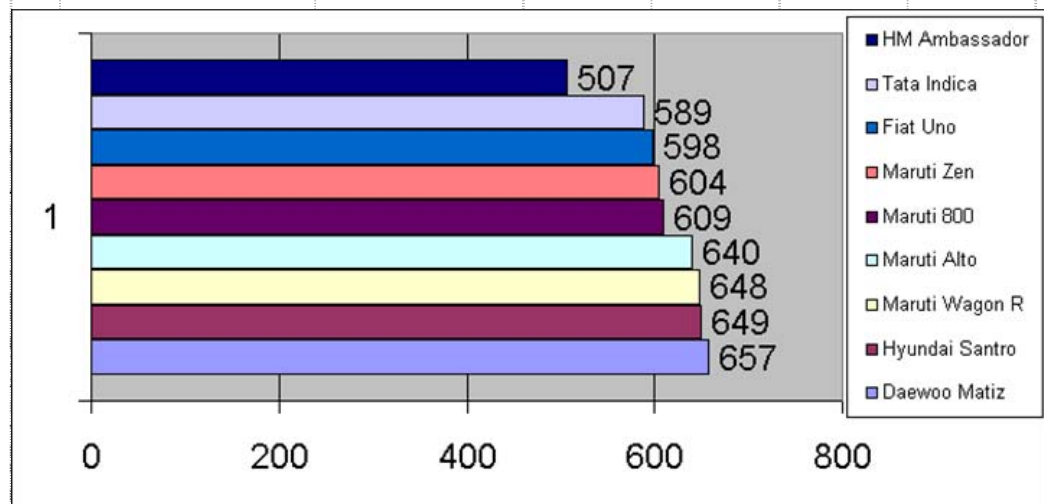
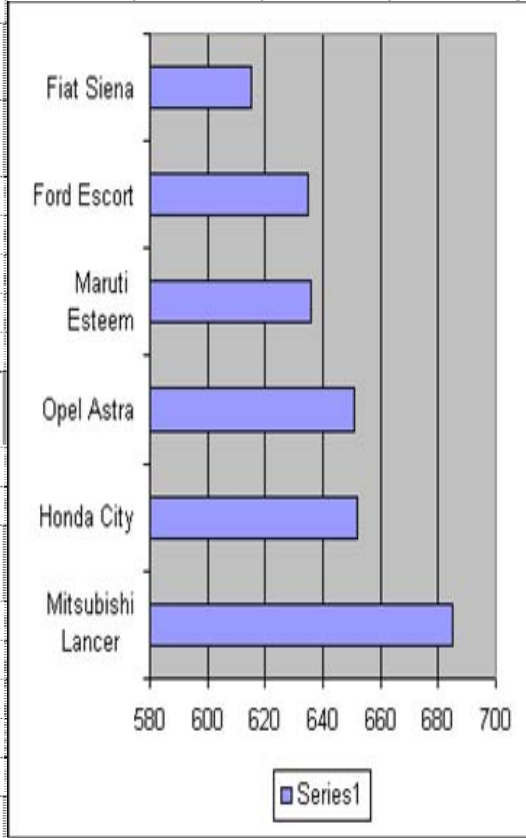


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Name of the car And Organization	Customer APEAL Rating / 1000
Midsize Car SN Segment	
1 Mitsubishi Lancer	685
2 Honda City	652
3 Opel Astra	651
4 Maruti Esteem	636
5 Ford Escort	635
6 Fiat Siena	615
Small Car SN Segment	
1 Daewoo Matiz	657
2 Hyundai Santro	649
3 Maruti Wagon R	648
4 Maruti Alto	640
5 Maruti 800	609
6 Maruti Zen	604
7 Fiat Uno	598
8 Tata Indica	589
9 HM Ambassador	507



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Interpretation of Graph and table: This is the Survey conducted by J.D.Power displayed in 'Autocar' Magazine December; 2001. Ratings are conducted at par with 1000 marks scale.

This clearly indicates that India must carry out extensive research and develop their indigenous midsize car as early as possible in India, even better than the Tata-Sedan; without putting any foreign made car part in it. Otherwise the foreign carmakers will keep their customers' base intact and to make a dent in that market Indians will have to struggle a lot in future. Anyhow already more Rs. 250 Crores mid-car segment is already been lost to these foreign carmakers.

Factor 6: Table: 8.7: View of Technocrat customers:

Indigenous R & D needed on the following intricate technologies of the car to satisfy customers from indigenous cars:

Factors of cars on which Research and Development is needed in India				
SN	Where R & D Is needed	Technologies on which R & D is needed	Who are Doing it?	Research findings why R & D is needed on these in India: Reasons / Comments / Remarks
A	Body of the car	Shock Absorber	MUL, Tata	Indian climatic & road conditions cut short the life of this foreign MNC made part
		Streamline body	Telco, MNC	Air and Rain Resistance is almost unavoidable in Indian





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			climate.
	Safety Measures	MNC, Tata	To Pass all dash tests in accidents is must in Euro Standards.
	Coats in Painting	MNC	Corrosion resistance paints and coatings needed in the competition.
	Night vision lights	MNC, Tata	All terrain roads in India and lack of night lamps and road signal.
	Doors and Door locks	MNC	These form the Most problematic part in Indian cars.
	Wind Shield Wipers	MNC	Improper wiping is done at present in varying climatic conditions.
	Back lights & Brake lights	MNC	Fusing these lights is a common phenomenon in India, research needed
	Panel & reading meters	MNC	On Panel / Dash Board most of the car's data must be visible.
	Emergency Needs	MNC	Air Bag, Message sending, Safety measures
B Transmission	Automatic Transmission	MNC	Changing Gears very often.



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		Alloys used	MNC	Breaking of Gears, Propeller shafts, etc.
		Lubricating Oils	MNC	Present oils must be brought to the international standards.
		Wheels	MNC	Improvement is needed on balancing front.
		Tyres	MNC	Quality of the material and standard needed
		Tubes	MNC	In this much improvement is needed
		Locking Nuts & Bolts	MNC	Age old nuts and bolts are still used
		Clutch	MNC	50 years old design is still used in India
		Constant Variable Tr.	MNC	No car in India yet running on CV Transmission
		Steering System	MNC, Tata	Needs Improvement in the Indian context.
C	Gear Boxes	First and Second Gear	MNC	Much improvement is needed in Indian cars
		Top Gear	MNC	Due to road conditions and other factors
		Overdrive	MNC, Tata, MM	Saves Lot of efforts and fuel consumption





	Synchromesh Rings	MNC	Indians are yet to make good quality rings
	Gear Shifting Mechanism	MNC, Tata, MM	Second biggest problem in India
	Automatic Gear Shifts	GM, Ford	Gear Shifting can be avoided in Gear boxes if this is used
	Gear box lubrication	BP.	Improvement is needed in India as temperature range is -50 to +50 as against the European and cold Asian and American countries.
	GB Servicing a year	GM, Ford	In India it is yet to make a start at maintenance front.
	Alloys used in Gears	GM, Ford	Metallurgical Improvements need of the hour.
D Engine	Cylinder Wear & Tear	GM, Ford, etc.	Whole mechanism differ with conditions so needed research.
	Piston	GM, Ford, etc.	Combustion Chamber is the Power Chamber hence it requires more extensive research.
	Piston Rings	GM, Ford, etc.	Pollution due to unburnt gas leaks.
	Tappet Valves	GM, Ford,	Most problematic in Diesel





		etc.	Engines.
	Rocker Arm	GM, Ford, etc.	Frequent problems have been there due to this part.
	Cam Shafts	GM, Ford, etc.	Metallurgical, Mechanism needs improvements
	Crank	GM, Ford, etc.	Improvement is needed in Indian Contest to develop more powerful engine in India.
	Crank, Cam Mechanism	GM, Ford, etc.	Improvement is needed in Indian Contest
	Fuel Injecting Mechanism	GM, Ford, etc.	Perfect Combination is yet to be found. Infact all the Fuel Injection system have been imported from various companies like Bosch from Germany till date. Now also Tata Indica finds Hitachi system made in Japan.
	Combustion Timing	GM, Ford, etc.	MNC vehicles misfires in Indian Contests
	Catalytic Converter	GM, Ford, etc.	Heavy Pollution through exhaust gases can be avoided
E Fuels and	Petrol	GM, Ford, etc.	Unleaded Petrol misfires, detonates





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Alternative Fuels	Diesel	GM, Ford, etc.	Diesel forms the major automobile fuel in India
and Alternative	CNG	ARAI, etc.	200 Tonnes of CNG produced at Bombay high everyday
Car Segment	LPG, Gobar Gas, etc.	ARAI, etc.	It is feasible to run car on these fuels.
	Hydrogen as a fuel	GM	Most abundant fuel and least pollutant. So need of the day
	Solar Car	GM, Honda,	Petroleum is getting extinct but Sun will last longer.
	Battery Car	Renault, Audi, etc.	Research on long lasting Batteries is need of the day.
	Air Car, Water Car	Honda tried	Future needs of the car are Air borne and water borne as well.
	Some other fuel	JFKL	Liquid Nitrogen as fuel in the car.
	Auto pilot-GPS car	GM	Computer guides the car takes help of Satellites for position.
	Fuel Consumption	GM, ISUZU, etc.	Many organizations are trying to get maximum average from cars.
	Alternative Materials	Isuzu, etc.	China-clay piston, Fibre glass body, etc.



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**Interpretation of the Table:**

This is an independent survey. Thus are these are independent findings as an Automobile Engineer. These are the areas to be developed well, to get exceptional results in the Indian conditions and the circumstances and the psychology of the Indian customers. If given due importance India can lead the R & D sector as well. This will bring the whole car sector into Indian focus. It will boost the R & D in other technologies too. Bench marking will increase a healthy competition in the India market.

Next table will clear why R & D is needed from the Indian all whether and all terrain condition point of view.

Factor 7: Table: 8.8: External Customers Expectation from the Internal Customers:

Independent Survey of External Customers' Actual Expectations from the Internal Customers (Employees in the organisations and their internal associate to reach the external customers) in the car market:

Survey of 100 External Customers for Expectations			P.G.
SN	Factor	Services Expectations	
1	From The Manufacturer	1. Timely Manufacturing and Supply of the Car to get timely delivery.	C
		2. Listen to the Dealer Response from customers or take it in regulation.	B
		3. Dealer is a bridge between Manufacturer A	A





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		& the real boss is Customer. Aware?	
		4. Dealer is whole and sole for the king customer in that region so keep updated record.	A
		5. Increase in R & D implementation in every sector to compete in the market.	B
		6. Remember millions of lives depend on the giant car factory of yours.	C
	From Service Authorised 2 Centres	1. Quality service if needed like '24 hours service- call and we are there to help you'.	C
		2. Avoid using substandard spare parts in the cars.	C
		3. Make a yearly plan for regular customers.	C
		4. Engine tuning and less pollution car must be given the top priority.	C
		5. Maintaining good rapport with the customers as of often contacts.	B
	3 Vendors	1. Must use standard metallurgical/substance material.	B



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		2. Must let reach the finished product Just in time the schedule of manufacturer.	B
		3. Let R & D be the continuous processes for vendors the main plants have.	B
		4. Be competitive at world standard as both rely on reputation of each other.	B
4	Ancillary Units	1. Give the Assembly of parts to the main plant at pre-planned time.	B
		2. They must have R & D and they should follow the world standard.	B
		3. Let the main plant have the say after dealers' suggestion.	B
		4. They must have their own R & D and Quality norms in the competitive world.	B
5	National Government	1. Transportation be made more swiftly and with least cost	C
		2. Let imported car be made impossible to enter in the market	C
		3. VAT, Excise duty, Custom Duty be made as low as possible.	C
		4. Encourage the positive and ethical	B



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		business environment.	
		5. Fuel prices must be kept under control to avoid any further price rise.	B
From other Small Car 6 Consumers		1. Servicing be made directly from the dealers and authorised service stations only.	B
		2. Buying genuine parts only from the dealers.	B
		3. Complaint if any must be made to dealers or directly to the manufacturer.	C
		4. Regular Servicing keeps the car up to date and avoids breakdown failures.	C
		5. Before selling first contact dealers for any scheme and then go to the used car market.	C
From Transport 7 Agency		1. Time schedule is must to be followed.	B
		2. Communication must be maintained properly while transportation	A
		3. Minimum excuses for timely delivery of vehicles.	B



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	From		
	Unauthorised		
8	Service Centres	1. Use Genuine parts only.	C
		2. Maintain Quality Service as comparable to the authorised centres.	B
		3. Avoid comparisons with Indian and MNC Money managements.	C
		4. Maintain good rapport with the dealers.	C
		5. Engine tuning and pollution less car must be given top priority.	C
	From Spareparts	1. Avoid for the first time and last time selling fake spare parts.	C
9	Dealers	2. Nothing spreads faster than the quality service as the dealers do.	C
		3. Complaint immediately about anything to manufacturer & main dealer.	C
	From Local	1. Sales Tax, Octroi, and Taxes are made affordable.	C
10	Government	2. Small cars and Two wheelers always form the backbone of employments.	A
11	From the Petrol	1. Using unadulterated petrol must be an	B





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	Pump owners	ideal of working.	
		2. Quality Lubricating oil must be added.	B
		3. Quality GB oil must be sold; greases used also must be genuine.	B
		4. Increase awareness about environmental aspects.	A
12	From Garages	1. Be sincere enough to keep good relationship with the Manufacturers, etc.	A
		2. Avoid spurious parts once and for all times.	B
	From Advertisers and		
13	Newspapers	1. Dealers sell thousands of vehicles so once in while something may happen	B
		Which is highlighted very often in the newspapers and advertisements- Aware?	
		2. Both Advertisers and Newspapers must avoid this phenomenon.	B
	From Insurance		
14	Companies	1. Pay the timely dues to the customers, after making the entire enquiry from all.	C
		2. Surveyor, Police, Doctors, RTO must have better communications between	A



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		them.	
15	From RTO, DTO	1.Dealer and Regional Transport Authorities like RTO or DTO if work together Car delivery becomes easy.	A
		2. Along with the License, First Aid, RTO Rules, Police Rules must be made compulsory prerequisites.	C
		3. Expecting Compact License like credit card but more descriptive using latest techniques.	C
		4. Lot of awareness drive must be made in public for small car and two wheelers.	A

Present Grades in the above table (P.G.): A= Very Good, B=Good, C= Needed Improvement.

Interpretation of the Table:

Customers will be attracted to that car services which provide or make provision for all these factors in totality. Customers are going to buy and maintain the cars only if all these conditions are satisfied otherwise the small car market would get saturated from the middle class Indians in less than a decade. It is possible only if maximum car parts and services are indigenised in India. Otherwise lot of world car giants have entered into Indian market with the thought that lot of their cars and Indian vendors





would make car parts. If it does not happen, then conscious Indian customers would throw away these companies as happened with the Peugeot cars. Many car companies have a tie up with the petrol company for genuine petrol and such alliances increases the life of the cars. Many such provisions will be made in future but prior to that Indians must make a dent in these fields.

Factor 8: Table: 8.9: Indian Car Designers expectations:

Independent Survey of Indigenous Designers' Expectations on how the small car design should be form the Indian conditions and customers expectations. Here only two major comparison are take as al the countries and all the organisations cannot be taken together, even it not possible to bring all of them in this tiny venture.

Comparative studies of requirements of the Small Cars technologies in USA and in India			
S N	Factors must be taken into care	US needs	India needs
1	Design with more Factor of Safety (FOS) as tougher conditions of road and weather conditions than US.	FOS is less due to good road conditions	FOS is more mainly due to bad road conditions
2	Temperature Range form -20	Lesser high	Mostly higher





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	to 50 Degrees Celsius	temperature	temperature
3	Uneven Road Conditions	A rare occasion	Most frequent happening
4	Metallurgical strong parts of the car are needed	Normal	Stronger than normal
5	Extreme Climatic conditions variations	No	Yes
6	Extreme Weather conditions from Himalaya to Rajasthan and from Cherapunji to Dwaraka.	No	Yes
7	People prefer rough and tough all terrain vehicle	These are different segment vehicles	All factors put in one car is preferred in India.
8	Looks are important but life time durability is also more important	No such criteria	For 90% important factor
9	Service Stations must be within each ten km. Range	No such criteria	Has to consider
10	People prefer branded vehicle	Yes	Yes



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			As fuel is
		Fuel is	Costly to make
		relatively	car reach to
		Cheaper still	the middle
	Whether mileage i.e. fuel	it is a factor	class it
	consumption per kilometre is	to some	important
11	very important factor or not.	extent.	factor in India.
12	Population moving on roads	Less	More
		population	population
13	Requirement is for frequent	Not	Has to be
	change in gears factor	considered	considered
14	Frequent change in Clutch as		
	more wear and tear	Average	Yes
15	Oils are developed mainly for		
	colder conditions by MNC for	Temp. -20 to	Temp. -40 to
	USA conditions.	+30 Celsius	+50 Celsius
16	Engine is mainly designed for		
	Japanese, European, US	Cold	High
	norms	conditions	temperature
17	Servicing Equipments must be	As per the	Yet to reach
	cheaply available	Norms	norms



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18	Road side garage forms the important factor in long drives	Well equipped garages everywhere	Not well equipped garages everywhere
19	Quality Standards of vendors and ancillary units.	Very high precision	No such case
20	Cost of Spare parts forms the important factor.	Average factor	Important factor
21	Once bought Indians make it life long commodity.	No such thing	Case with 90% Indians
22	Research and Development is negligible in India.	R & D- very fast.	R& D negligible
23	Average Americans change their vehicle after three years.	Yes	No such case
24	Norms applicable to every part of the vehicle.	Very strict	Not so strict
25	Yearly maintenance contract concept yet to come in India.	Concept is here	Yet to come
26	Car owners average age range	14 to 65 years	25 to 60 years
27	Expertise for every kind of job	Experts are	All rounder is



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		there	preferred
28	Competitive standards for company and vendors are same.	Yes	Big gap is there.
29	One monthly payment of the US citizen is but the cost of the cheapest car. Otherwise almost five months of lowest possible salary in USA can buy even a midsize car.	Yes	In India cars can never be so cheaper at least in coming two decades or so. So, not so cheaper cars.
30	Life of the car is prescribed to be eight years maximum.	Yes	Minimum 15 years expected
31	Special heater, wipers, GPS system is must in Snow.	Yes must.	Only in Hilly Areas it's must
32	Turbo charger must in mountain region like Himalayas.	Must in all cars	Still not made compulsory in all the cars.
33	Catalytic converter is compulsory.	Compulsory	Less strict norms, hence



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			not yet made compulsory.
34	Strict environmental norms	Yes, they are.	In India government is trying for this.

Interpretation of the Table: As per the experts of all the needs FOS i.e. Factor of Safety forms the most important factor along with the environmental norms. As Indians prefer the most durable commodity these factors are going to decide market in near future. Infact Tata-Indica has already decided that Indians want bigger car with lesser prices with lesser maintenances cost, with higher quality of parts, with high quality services, with higher fuel efficiency and having longer life.

Indian customers are more interested in a car as a life long commodity than changing it every few years, as lot of them cannot afford it. So, developers will have to think of a car with the minimum maintenances and rouged body. Hence, designers are carrying out extensive research on how to make cheaper but durable material for every part of the car along with their other engineer and scientists friends in India.

Another thing is Japanese people sale the car at relatively cheaper cost. Whereas they sale the car parts and services at relatively higher costs. Hence extensive survey is expected on this front.





Then, about latest gadgets that are to be fitted in the cars have to be made in India to make them cheaper hence an indigenisation bug has to bite the domestic electronics industry to make it happen.

Indians are yet to realise that Car industry is the engine of growth in the entire car manufacturing countries. As it is conceived that to every car part at least fifty jobs are associated, it boosts the other associated industries as well. Infact more than 80% industries listed in CII directory and even in the American, Japanese, British, Korean industries are directly or indirectly associated with the car industries.

Environmental aspects for making less pollutant fuel, technology for catalytic converter are few more aspects where extensive research is required. Alternative fuel driven cars and their manufacturing technologies is also the need of the future generation cars. If it happens then only customers scan become loyal to the Indian companies in future.

Factor 9: Table: 8.10 and Graph: Showing Shifting to Higher Vehicle

Syndrom In India:

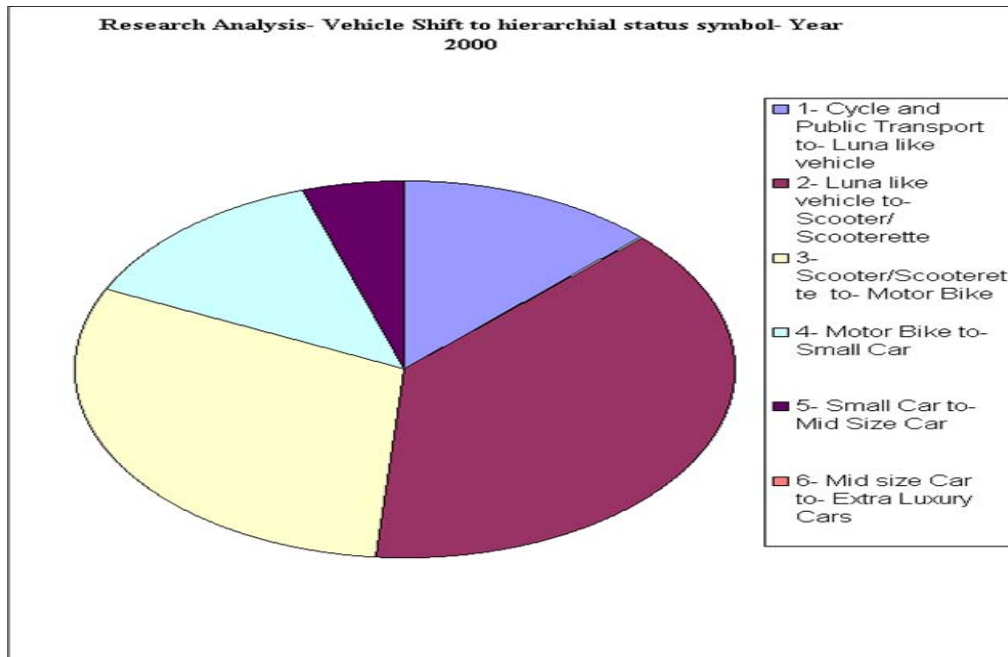
Reference: Graph taken from The Week, Monthly Magazine-Dec- 2001.

Shifting to Higher vehicle syndrome in India- 2000				
Research Analysis				
SN	Earlier mode	Shift to next	%	Vehicles
	Of Transport	In a Hierarchy	Up	Sell-2000
1-	Cycle and Public Transport to-	Luna like vehicle	5	100000
2-	Luna like vehicle to-	Scooter/ Scooterette	15	500000
3-	Scooter/ Scooterette	Motor Bike	12	100000





	to-			
4-	Motor Bike to-	Small Car	5	500000
5-	Small Car to-	Mid Size Car	2	20000
6-	Mid size Car to-	Extra Luxury Cars	0.0005	5000



Interpretation of the Graph and table; Look at the points 4, 5, 6.

- a. Though 6th point is very small i.e. 0.00005% still it is increasing by 5000 in number and in luxury cars segment it is yearly turn over of Rs.250 Crores.
- b. Middle car segment has Rs.140 Crores yearly turn over, and
- c. Small car segment comes out to be Rs. 1500 Crores, for this five lac customers increase in yearly turn over.





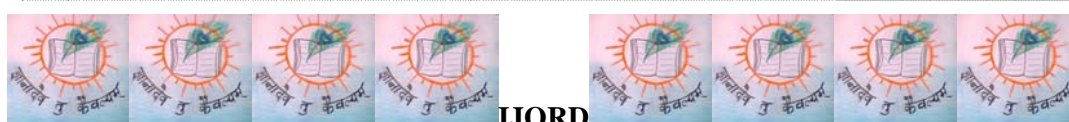
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Factor 10: Table: 8.11: India's well-known Solutions providing R & D

Institutes in Auto sector:

Reference: Confederation of Indian Industries (CII) Directory:

R & D Institutes & Organizations Associated with Automobile Industries in India			
SN	Name of the Institute	R & D Specialization	Address
1	Central Mechanical Engineering Research Institute (CMERI)	R & D Services in the field of Mechanical Engineering	Mahatma Gandhi Road Durgapur
2	Automotive Research Association of India (ARAI)	Automobile Testing and Research Head of India.	Pune
3	Pollution Control Research Of India (PCRI)	Pollution Control Research	Delhi
4	Telco, Tisco and Tata Motors	Steel industry and Automobile R & D	Pune and Tatanagar
5	Mahindra & Mahindra	Automobile R & D	Mumbai
6	Kirloskar Brothers	Mechanical R & D	Kirloskarwadi, M.S.
7	Bajaj Auto Ltd.	Automobile R & D	Pune
8	National Environmental Engineering Research	Auto-Industrial Pollution Control	Nagpur



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Institute (NEERI)		
India Heavy Electrical 9Ltd.	R & D in Mechanical- Electrical	Delhi, Bhopal
10Tisco	R & D in Metallurgy of parts used	Tata Nagar.
11ACC Castings	R & D in Castings of Auto-Parts	Nagpur, etc.
12MRF tyres and tubes	R & D in Auto tyres and tubes	Chennai
13CEATE tyres and tubes	R & D in Auto tyres and tubes	Mumbai
14India Forge Ltd.	R & D in Forging of Auto parts	Pune
15Sundaram Fasteners	R & D in Fasteners	Chennai
16Castrol India Ltd.	R & D in Lubricating Oils	Chennai
17Kinetic- Honda	R & D in Two Wheeler Technology	Pune, Ahemadnagar
18Neptune India Ltd.	R & D in Automotive	Delhi
19Birla Tyres	R & D in Tyres	Delhi
20ACMA	R & D in Automotive Systems	Delhi



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21	CII (Confederation of Indian Industries)	Encourages R & D in this field	Delhi
22	Tata- British Petroleum	R &D in Lubricating oils	Tata Nagar, Pune.
23	Escorts India	R & D in Two Wheeler Technology	Delhi
24	Indian Institute of Technologies	R & D on all specifications	Mumbai, Delhi, etc.
25	Ashok Leyland	R & D in Trucks and Buses	Chennai
26	Maruti Udyog Ltd. (MUL)	R & D in Cars segment	Delhi

Interpretation of table and Special Comment:

To improve the indigenous contents of the Cars and to improve internal and external customers base in the car business Indians can take few following points. This will improve the SSI and MSI bases in India in this business. There will be more job generation; there will be better customer services, which car customers are expecting, and there will be more self-reliance on the technologies front from the Indian perspective. The points are:

1. Government should allow the private R & D Institutes and should recognise their work.





2. Institutes like IIT, Regional Engineering Colleges, BIT, Other Engineering Colleges carry out huge project work every year, but hardly any project gets its actual implementation in practice. So in wildest idea all the Engineering students of Mechanical, Automobiles, Production and allied branches should develop in a span of five years each and every part of a car as a final year project and thus India will be self reliant in the field of every kind of engineering development.

Factor 11: Table: 8.12: Survey of Comparative performance rating of all the small cars in India.

Reference: J.D. Power survey 1998, 1999, 2000, 2001, 2002.

SN	Performance for features	Mar-						
		Indica	Santro	Zen	800	Amb'sdr	Alto	Wagon R
1	Manoeuvrability	D	A	B	C	E	A	B
2	Performance in Rough Handling	A	A	B	C	B	A	B
3	Braking performance	D	A	B	C	E	A	B
4	Tyres performance	C	B	B	B	D	B	A
5	Controls performance	B	A	A	B	C	A	A
6	How seats are	A	A	B	C	B	B	B





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	working							
7	Sound System/ A.C. working	A	A	B	A	C	A	A
8	Damage to Vehicle Exterior	C	B	A	B	E	B	B
9	Damage Vehicle Interior	B	A	A	B	C	A	A
10	Transmission system damage	C	B	B	B	B	B	B
11	Engine performance	C	C	D	C	D	C	C
12	Performance of brakes	A	B	A	B	D	B	B
13	Cockpit looks/ Inside car looks	D	C	C	C	E	C	B
14	Instrument Panel performance	D	C	C	B	E	C	C
15	Effect of Vehicle Styling	C	B	B	B	E	B	C
16	Comfort ability from car	B	D	C	B	C	C	C
17	Service:	A	B	A	A	C	A	A



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	dealer/service station							
18	Spare Parts Damage & Rates	A	D	D	D	A	D	D
19	Convenience shown by car	B	D	B	B	B	C	B
20	Maintenance spending	B	C	B	B	B	C	C
21	Resale Value of the car	D	D	C	C	D	D	C
22	Satisfaction Index of buyer	C	B	C	C	B	C	C
23	Dealer Network for the car	A	D	D	D	C	D	D
24	Service Station Network	A	D	A	A	C	A	A
25	Performance of the Axles	B	B	B	B	C	B	B
26	Performance of the Body	B	B	B	B	C	B	B
27	Price Evaluation till date	C	A	B	B	C	C	C



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28	Monthly instalment dues	B	B	B	B	C	B	B
29	Delivery Timing after servicing	B	C	B	B	C	B	B
30	Gear Shift Performance	C	B	B	B	C	B	B
31	Response to contacts made	C	A	C	A	D	C	C
32	Customer Care Cell	B	B	B	A	D	C	C
33	Regular check ups	A	A	A	A	A	A	A
34	Damage to the Looks	B	B	B	B	B	A	B
35	Overall Technology	B	B	B	B	C	B	A
36	Continuous Improvement	A	B	B	B	E	B	B
37	Utilisation of Space in car	A	A	A	A	A	A	A
38	Satisfying Indian Makes	A	E	D	D	A	E	E
39	Patriotic Feeling	A	E	D	D	A	E	E



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40	Gain of co. other than profit	A	E	C	C	A	E	E
41	Is it better than others?	A	A	A	A	A	A	A
42	Expect any retrofitting	Yes	No	No	No	Yes	No	No
43	Stock Market Position	A	D	A	A	B	A	A
44	Sales Satisfaction Index/100	89	102	10	2	102	91	102
45	Problems per 100 vehicles	396	193	32	4	313	602	320
46	APEAL / 1000 scale	589	649	60	4	609	507	DNA
47	Owners Reported Mileage	14	13	13	15	11	13	13
48	Actual Torque (Kg/100 cc)	7.9	8	8	8	8	7.8	7.9
49	Car Toughness at all fronts	A	C	C	C	A	C	C



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50	Value for money	B	B	B	B	C	B	B
51	Potential from your car?	A	B	B	B	C	B	B
52	Safety feelings in heavy traffic	A	B	B	B	A	B	B
53	Performance of Doors	B	A	A	A	B	B	B
54	Actual Ride Performance	B	B	B	B	B	B	B
55	Performance in Indian condition	B	B	B	B	B	B	B

Interpretation of Table:

A-Excellent, B-Good, C-Not up to the expectations, D-Lot of improvements is required.

1. Alto, Zen, Indica, Maruti-800 are the best performing cars in India.
2. But all the cars have different needs for different category of consumers.
3. These ratings are decided on the actual performance of these cars.

Factor 12: Table: 8.13: Study of Provisions for Resale Value Factor as on 30th March 2003.

Source: Mahalaxmi Motors, Near Passport Office, Nagpur.





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S. N	Make/ Most sold	Year of Manu- facturing	Price- Rupees	Loan Provision	Loan Price %	Tenure of Loan: Months	EMI In Rs.	Interest Rate: Flat Rate and Reducing Rate
1	Maruti 800	2001	205000	141000	69	60	3619	18.5% and 9%
		1999	181000	124000	69	48	3676	18.5% and 9%
		1998	160000	110000	69	36	4005	18.5% and 9%
		1996	121000	83000	69	18	5415	18.5% and 9%
2	Maruti Van	2000	181000	124000	69	60	3185	18.5% and 9%
		1998	155000	106000	69	36	3859	18.5% and 9%
		1997	125000	86000	69	24	4377	18.5% and 9%
3	Esteem	1996	211000	145000	69	18	9286	18.5% and 9%
4	Maruti Zen	2000	261000	180000	69	60	4620	18.5% and 9%



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		1999	271000	186000	69	48	5517	9%	18.5% and
		1997	211000	145000	69	24	7274	9%	18.5% and
		1996	185000	127000	69	18	8135	9%	18.5% and
5	Indica	2000	265000	182000	69	60	4676	9%	18.5% and
		1999	191000	131000	69	48	3883	9%	18.5% and
6	Santro	1999	275000	189000	69	48	5601	9%	18.5% and
	Opel						1146	18.5% and	
7	Astra	1996	260000	179000	69	18	4	9%	

Special Note: EMI = Equal Monthly Instalment.

Interpretation of the table: Around the world the vehicle having the best resale value is supposed to be technically the most fit to buy and drive extensively.

1. Of all the small cars Maruti-Zen, the Opel-Astra, and Hyundai- Santro form the best cars in this category, as they have the best resale values.





2. There are many companies offering flexible financial offers as per the customer needs and so are trying to capture car market at this front as well.

Factor 13: Table: 8.14: Actual Resale value factor after seeing

Condition of three best-selling cars of India after one year:

Reference: Independent Survey which is inspired from the Survey of series of Indian Magazines like Overdrive, Auto India, Indian Auto, Motor India and foreign magazines like World Car Guide, etc.

Table 14: Showing what was checked while buying the second hand car. Customers now a day check literally every factor while buying a car like fuel consumption, maintenances cost, its resale value, its proximity to the services stations, safety aspects, environmental norms and a lot more things. However in this check the researcher has checked the body and technologies reliability of the cars.

SN	Aspect	Checked for	Tata-Indica	Hyundai-Santro	Maruti-Zen
1	Boot Badge	Name	A	A	A
2	Rear End	Damage	A	A	A
3	Wheels	Wear	A	A	A
4	Windows	Damage or fitting	A	A	A





5	Interiors	Worn	A	A	A
6	Door panel	Gaps	A	A	A
7	Paint	Shade or corrosion	A	A	A
8	Windscreen	Damage	A	A	A
9	Suspension	Proper Shock Absorption	A	A	A
10	Engine	Condition of every major parts	A	A	A
11	Lamps and Electrical system	Cracks in glass and intensity of light with proper wirings	A	A	A



**Interpretation of Table:**

Every aspect looked for class of every small car for its Resale value after observed in almost twenty-five cars of each category after **one year**: Please read grades as *A= Good condition*, and *B=Needed some improvement* in the quality by the manufacturer and while indigenisation must taken care while the time of inception only. As many customers can afford second hand cars. The condition applied here is no accident or dash by foreign body, and maintained well throughout the year without any major replacements.

1. After checking this only thing remained was paper work i.e. checking for the legal documents, insurance policy, taxation book, Registration book, etc.
2. Most important aspect is taking a test drive, which indicated, that Mitsubishi Lancer, Opal Astra, Mercedes have there own class and the Santro, Indica are yet to reach that level. After one year they show sign of one-year-old car.
3. The car with best resale value was Maruti Zen, then Santro, and then lastly the latest among them the Tata-Indica.
4. So while customers are demanding cars at par with above Daewoo-Matiz and comparable to Mercedes, the indigenisation according to customers needs have ample scope. It will definitely reap reach dividends in future.



**Factor 14: Table: 8.15: Survey of Few Job Generating Business**

Dependant on the Cars thus showing its importance: (An independent innovative survey):

There are very few customers who have considered this factor but as they are either rich and influential or very famous Technocrat/ Businessmen/ Economists/ Professors/ Doctors/Chartered Accountants/ or highly influential in the Indian context. The survey is self-explanatory and it put in the table:

Few Businesses Dependant on the Cars					
SN	Name of the Productive Businesses	Dependency grades on cars			Type of dependency
		A	B	C	
1	Authorised service station for cars		X		Small car service station
2	Denting and Painting Works			X	Other vehicles also need this
3	Car Leather Works and Sofa Works	X			Other vehicles also need this
4	Car Audio system			X	Some people don't fit it
5	Car Air Conditioning			X	Some people don't fit it





				Other vehicles also
6	Car Tyres and Tubes	X		need this
7	Car Lubricating Oil	X		Other vehicles also need this
8	Car Servicing Centre	X		Other vehicles also need this
9	Used Car Sells	X		Other vehicles also need this
10	Indian Car Dealers	X		Other vehicles also need this
11	Car Spare Parts Shop	X		Other vehicles also need this
12	Setting up car manufacturing unit	X		Other vehicles also need this
13	Ancillary Units to Main Unit	X		Other vehicles also need this
14	Car Vendors to Main Plant	X		Other vehicles also need this
15	Petrol Pump and Pollution Control Unit	X		Other vehicles also need this
16	Puncture Unit- Vulcanising Centre	X		Other vehicles also need this





17	Car Advertising	X		Other vehicles also need this
18	Car Market Research Centre	X		Other vehicles also need this
19	Customer Care Centre for Cars	X		Other vehicles also need this
20	Car Engine Repairing and Tuning	X		Other vehicles also need this
21	Car Engineering Costing and Surveyor	X		Other vehicles also need this
22	Car Tyre Retreading Unit	X		Other vehicles also need this
23	Racing Cars and Go-cart Manufacturing Unit	X		Other vehicles also need this
24	Forging Units for Car parts	X		Other vehicles also need this
25	Casting Units for Car parts	X		Other vehicles also need this
26	Road Side Garage	X		Other vehicles also need this
27	Travelling Agency	X		Other vehicles also need this





28	Auto Rickshaw Dealer	X		Other vehicles also need this
29	Various Car Driver, Auto rickshaw Driver, etc.	X		Other vehicles also need this
30	Automobile Consultant	X		Other vehicles also need this
31	Spareparts sales Agent	X		Other vehicles also need this
32	Driving School	X		Other vehicles also need this
33	Car Licensing Agency	X		Other vehicles also need this
34	Car Insurance Agency	X		Other vehicles also need this
35	Car Electrical Spares	X		Other vehicles also need this
36	Car Electrical Parts Repairing	X		Other vehicles also need this
37	Car Body Makers as per customer's wish	X		Other vehicles also need this
38	Foreign Car Dealers	X		Other vehicles also need this





39	Foreign Cars Servicing Centre	X		Other vehicles also need this
40	Foreign cars Spareparts Centre	X		Other vehicles also need this
41	Car Communication Centre	X		Other vehicles also need this
42	Car Export Import Agency	X		Other vehicles also need this
43	Car Parts Manufacturer and Supplier	X		Other vehicles also need this
44	Automobile Accessories	X		Other vehicles also need this
45	Efficiency Improving Accessories Agency	X		Other vehicles also need this
46	Car Security Parts Developers	X		Other vehicles also need this
47	Car Security Parts Dealers	X		Other vehicles also need this
48	Alternative Fuel Unit Developers Agency	X		Other vehicles also need this
49	Authorised Alternative Fuel Pump Station	X		Other vehicles also need this





50	Authorised R & D Centre For Cars	X	Other vehicles also need this
51	Running Magazines on cars	X	Other vehicles also need this
52	E-Commerce Transactions in the Cars	X	Other vehicles also need this
53	Transaction Agency in the Stock Market	X	Other vehicles also need this
54	Conducting Automobile Programmes on TV, etc.	X	Other vehicles also need this

Interpretation of table:

1. Volkswagen-Beetle, almost four million, is the most sold car in the world. If you take an average of price per car to be \$2000, it comes out to be \$8 Billion (USD). Thus small car market can shake the economy of any country. Such is the power of this product.
2. Almost 60% of the list of manufacturing industry in the Confederation of Indian Industry (CII) is related to Automobile Industry. Business Class of India takes this point into importance. Thus boosting the car market.
3. Thus, generation of the employments is the highest in the world within small car sector. As each of above mentioned business generate huge employment potential. It is estimated that a car is made of 30000 parts.





And each part of small generates 200 individual employments. This becomes $30000 \times 100 = 3000000$ i.e. 3 million people are working directly or indirectly with the car market in India. In addition to it different companies have their specialised technicians, which gets added to it and becomes a solely important industry.

4. It is believed that Battery, Dynamometer, Generator, Bulbs, Glass, Steel Plates, Paints, Rubber, Nylon, Robotics, Electrical Equipments, Electronic Gadgets, Lathe and other kinds of machinery used for car development forms the basis of all the technologies in the world. Thus if we develop this small car indigenously from these indigenously developed basic parts and the technologies, then it can make India one of the most technologically advanced country in the world.

Factor 15: Table: 8.16: Survey result of Comparative Maintenances cost of the small cars in India:

(Reference: Autocar 2003 to 2004, Overdrive 2003 to 2004, Car and bike 2003 to 2004 and other magazines and independent survey):

SN	NAME OF THE CAR	PREVENTIVE	YEARLY	BREAKDOWN	FULLY EQUIPED CAR	
		MAINTAINANCE	COST	MAINTAINANCE		
		(Rs)			Rs.	
1	Maruti Zen/800	General Servicing	3000	Engine	150000	25000





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		Body of the car	5000	Gear Box	55000	Music System	25000
		Special Servicing	4000	Tyres & Tubes	15000	Power Steering	18000
		Required Repairing	3000	Fuel Injectors	2500	Work Assisting	40000
		Miscellanies	2000	Lights & Glasses	2000	Accessories	30000
		TOTAL	17000	TOTAL	224500	TOTAL	138000
2	Tata Indica	General Servicing	2100	Engine	135000	AC	25000
		Body of the car	3000	Gear Box	40000	Music System	25000
		Special Servicing	2000	Tyres & Tubes	15000	Power Steering	18000
		Required Repairing	2000	Fuel Injectors	1000	Work Assisting	40000
		Miscellanies	2000	Lights & Glasses	2000	Accessories	30000
		TOTAL	11100	TOTAL	193000	TOTAL	138000
3	Daewoo-Matiz	General Servicing	3000	Engine	165000	AC	25000



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		Body of the car	8000	Gear Box	60000	Music System	25000
		Special Servicing	4000	Tyres & Tubes	15000	Power Steering	18000
		Required Repairing	3000	Fuel Injectors	1500	Work Assisting	40000
		Miscellanies	2000	Lights & Glasses	2000	Accessories	30000
		TOTAL	20000	TOTAL	243500	TOTAL	138000
4	Hyundai-Santro	General Servicing	3000	Engine	155000	AC	25000
		Body of the car	7000	Gear Box	60000	Music System	25000
		Special Servicing	4000	Tyres & Tubes	15000	Power Steering	18000
		Required Repairing	3000	Fuel Injectors	1200	Work Assisting	40000
		Miscellanies	2000	Lights & Glasses	2000	Accessories	30000
		TOTAL	19000	TOTAL	233200	TOTAL	138000
5	Maruti Van/Omni	General Servicing	2100	Engine	150000	AC	25000



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		Body of the car	2000	Gear Box	55000	Music System	25000
		Special Servicing	2000	Tyres & Tubes	15000	Power Steering	18000
		Required Repairing	3000	Fuel Injectors	1000	Work Assisting	40000
		Miscellanies	2000	Lights & Glasses	2000	Accessories	30000
		TOTAL	11100	TOTAL	223000	TOTAL	138000
6	Ambassador -HM	General Servicing	2100	Engine	140000	AC	25000
		Body of the car	1000	Gear Box	45000	Music System	25000
		Special Servicing	1000	Tyres & Tubes	15000	Power Steering	18000
		Required Repairing	3000	Fuel Injectors	1200	Work Assisting	40000
		Miscellanies	2000	Lights & Glasses	2000	Accessories	30000
		TOTAL	9100	TOTAL	203200	TOTAL	138000
7	Maruti Alto	General Servicing	2100	Engine	150000	AC	25000



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		Body of the car	2000	Gear Box	55000	Music System	25000
		Special Servicing	2000	Tyres & Tubes	15000	Power Steering	18000
		Required Repairing	3000	Fuel Injectors	1000	Work Assisting	40000
		Miscellanies	2000	Lights & Glasses	2000	Accessories	30000
		TOTAL	11100	TOTAL	223000	TOTAL	138000
8	Maruti Wagon R	General Servicing	3000	Engine	155000	AC	25000
		Body of the car	7500	Gear Box	60000	Music System	25000
		Special Servicing	4000	Tyres & Tubes	15000	Power Steering	18000
		Required Repairing	3000	Fuel Injectors	1200	Work Assisting	40000
		Miscellanies	2500	Lights & Glasses	2000	Accessories	30000
		TOTAL	20000	TOTAL	233200	TOTAL	138000
8	Fiat Palio	General Servicing	5000	Engine	200000	AC	25000



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		Body of the				Music	
	Latest Car	car	8000	Gear Box	65000	System	25000
		Special		Tyres &		Power	
		Servicing	4000	Tubes	15000	Steering	18000
		Required		Fuel		Work	
		Repairing	8000	Injectors	1200	Assisting	40000
				Lights &		Accessori	
		Miscellanies	5000	Glasses	2000	es	30000
		TOTAL	30000	TOTAL	283200	TOTAL	138000

Interpretation of table: Manufacturing of Tata-Indica in India is coasting less in terms of Rupees than in any other cars in India. Thus slowly Tata-Indica has started taking grip in the market even if trusted brand of cars like Daewoo, Hyundai, Ford, Suzuki, etc. around the world are competing in India with it. Thus in coming future people will be preferring not to get exploited and pay higher prices for the product which ultimately lead them to pay higher prices on the spare parts and services too. As of naturally no custom duties and any kind of such taxes will not have to be burdened by Indian indigenous customers.

Thus, indigenisation of small car technology can give amazing results to India.

Table: 8.17: Customer expectations from various car business organisations in India:





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Customer's Expectations	
SN	from What customers expect?
1	Financial Institutions
	Easy and 0% interest
2	Loan facility from manufacturer
	Easy loan at 0% interest
3	Manufacturer
	Quality product at cheaper cost
4	Dealer
	Timely delivery
5	Service Centre
	Give delightful services
6	Advertisers and Media
	Give true knowledge
7	Technology Developers
	Consumer friendly technology
8	Monthly awareness drive
	From concerned authority
9	Latest development report from manufacturer
	Especially at home services
10	Prices of the spare parts
	Should be less than Japanese cars
11	Genuine spare parts at the Authorised service centre
	Reliable and timely services
12	Nearer Access of the Emergency services
	In cities more service stations required
13	Up gradation of parts/ units
	Manufacturer must take



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	facility if case arises	care of this
14	Government	Put lesser taxes and encourage R & D
15	MNC made small cars	Quality product at cheaper cost
16	Indian made small cars	Quality product, cheaper cost, employment
17	Indian made spare parts	International Quality with high class results
18	About the complaint raised for services	Service stations should take care of it.
19	About the complaint raised for manufacturer	Should take immediate action
20	Resale or Exchange facility	Manufacturer must enter in to this service
21	Second hand small car market	Reliable services for reliable cars
22	Taxes and duties on Indian cars and spare parts	Should be less comp paired to MNC cars
23	Taxes and duties on foreign cars and spare parts	Should be levied more taxes
24	About Traffic manners	Educate people every now



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		and then
About	Telephonic/Email/FAX/Mobile	Must be a frequent
25/Pager messages		phenomenon
About 24 hours Emergency	26services	Every car dealer or service station must have
About at home 24 hours	27services	Every car dealer or service station must have
MNC made spare parts for the	28MNC cars	Must provide customer at cheaper Indian prices
International Quality	29Equipments for car technicians	Technicians must be provided these equipments
Engineer customers'	30expectations	R & D must be encouraged
Doctors, Lawyers, CA	31customers' expectations	Developing Solar energy cars for Office goers
Dealers, Employees customers'	32expectations	Once year Comprehensive services like Eureka Forbes
Roadside mechanics'	33expectations	Keep alive his part of job as well
Traffic Management system	34must be to the mark.	To get better driving and safety.



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Interpretation of the table: When contacted every customer realised that MNC cars provide: The Costly services, and the Costly spare parts but relatively lesser-priced cars and if above measures are taken indigenous car can capture the market.

Factor 17: Table: 8.18: Survey of ‘What Highlighting points Customer looks for when he buys the car?’

An Independent Survey, and a survey of Overdrive/ Auto Car/ J.D. Power.

SN	Which Factor is Important for you?	High Priority
1	Price of the car	High Priority
2	Mode of Payment	High Priority
3	Schemes if any	High Priority
4	Maintenances Cost	High Priority
5	Cost of Spareparts	High Priority
6	Loan/ Finance facility	High Priority
7	Comfort	High Priority
8	Warranty	High Priority
9	Seating Capacity	High Priority
10	Resale Value	High Priority
11	Manoeuvrability/ Easy driving	High Priority
12	Safety	High Priority
13	Average or Fuel consumption per kilometre.	High Priority





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14	Make: Indian made /Foreign made	High Priority
15	Near Home Garage / Service Station Availability	High Priority
16	Technology	High Priority
17	Quality	High Priority
18	Other Services	High Priority
19	Overall Looks of the car	High Priority
20	Good customer care cell	High Priority
21	Durability of the body	High Priority
22	Will you like a car manufactured with your suggestions?	High Priority
23	Shape	High Priority
24	Style	High Priority
25	Metallic Paints	High Priority
26	Sporty looks	High Priority
27	Contribution to Indian Industry	High Priority
28	Employment given to Indian citizens	High Priority
29	Motive of the company	High Priority
30	Market Condition of the company	High Priority
31	Stock market position of the company	High Priority
32	History of the working of the company	High Priority
33	Did you require any special fittings as a top	High Priority



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priority?	
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Interpretation of the table: The best suggestions from the surveyed customers:

1. Make more and more people aware about the advantages of indigenisation of small cars before it becomes too late.
2. Few small-scale industries (SSI) should cooperate and manufacture engine of the car by adopting technique of manufacturing each every part one by one within stipulated time frame. Then concentrate on other parts of the car.
3. Indians must enter into the small car market with a broader outlook like Hyundai did in Korea, General Motors and Ford motors did in U.S.A., Toyota and Mitsubishi and Suzuki did in Japan.
4. Like-minded Centre for Advance Computing (CDAC) carried on Research in Computer Technology and manufactured the Super Computer Indigenously in India; similarly like-minded car technologist should do it for India.

Highlighting Point: This table clearly indicates that there is a growing concern about the exploitation Indians are facing due to invasion of MNC cars in India. So anyhow Indians are no longer be over adopting dependent strategies on foreign technologies. Small car will be the stepping-stone in this context.





From all the above tables it is clear that new generation customers in Indian are an awakened lot. They have lot of expectations from:

- a. The manufactures,*
- b. The dealers,*
- c. The service stations,*
- d. The indigenous car and technologies,*
- e. The foreign car makers should more indigenise there more an more car parts so that few customers get exposure to technologies and get a job associated with them,*
- f. The environment supportive technologies and cars,*
- g. Even top brass of the technocrats, bureaucrats, educationists, scientists want lot of technologies to be indigenised in India. As most of the technologies developed abroad had a significant contribution from the Indian scientists working there. Now Indian Scientists and engineers want to prove their mettle in their own country.*

PART 3: EXPERTS' VIEWS:

The experts' views are taken in this regard from the various angles and factors.

Factor 1:

Negative side of Indigenous Indian manufacturers:





1. Indian car industry is flooded with the obsolete technologies and grossly underpowered cars that are forced on them by the dishonest carmakers both Indian as well as the MNC carmakers.

2. Indian car manufacturers are not providing environmental friendly cars. Also the whole automobile industry is full of dishonest people in the business except few. The findings which proves this fact are:

- Engine Design and technologies used decades old hence are not up to norms.
- Fuel sold is very often adulterated,
- After Mercedes cars the less pollution cars. Other cars are using Compressed Natural Gas (CNG) then Petrol and lastly the diesel for less pollution.
- As thought earlier even Joint Venture are no longer remain reliable than the Indian companies.
- Except for the Mercedes no other company is up to the environmental norms. Infact Mercedes has gone beyond the norms. No other company is investing and trying reach even the norm level leave aside going beyond it. Government is not providing incentives are what they claim.
- Also there is poor mass transport infrastructure.
- The shift of people is from Railways to Road transport and now moving towards the personal car or tow wheeler vehicles.
- Overall Transport planning in India is since long very poor.





- Technologies used in various vehicles are extremely of poor quality.
- Mostly the 99% vehicles use still conventional fuel like Petrol and Diesel.
- Government provides very much less to develop alternatives.

Factor 2:

Second Hand Car Market: In the 27th July 2004, edition of Daily Tarun India of Nagpur there was very brief news about second hand car market in India. It has stated that it has increased by 15% since last year.

Obviously as the market slum continues many who could afford the new cars now are buying second hand car till their business grows.

Factor 3:

Expert Customers' view on Indigenisation of small cars with respect to this view:

For this purpose suggestions of very many experts who are master in their field are required.

1. Leading Technocrats and Engineers: They feel that whatever expertise they have acquired during the last five decades will be useful to the Indians in coming future. Many Experts are ready to give their services to the nation on the voluntary basis. Only thing necessary is due recognition to these revered men and arranging the on job training for the senior engineers and the experts in this field to gather at a predestined industrial house with all kinds of facilities.





2. Bureaucrats: Many of them want less taxes and strict industrial policy to favour the companies involved in Indigenisation of car industry at least for a decade till the maturity is reached. They are in favour of Indian state to pursue the policies those offering the counter guarantees for Indian organisation involved in Indigenisation of small cars with respect to customer behaviour. They want this offering the counter guarantee to Indian indigenous companies be implemented for the fast track projects without providing such facilities to the MNC.

3. Others: Due importance to Indian experts must be given as otherwise their expertise is used by other MNC. Emphasis must be given on the cheap technology as in USA a car costs the minimum wage i.e. one monthly pay of any working person. This will boost the car industry in India immensely.

4. Majority of Automobile Experts: They strongly believe that if the project of indigenisation is taken as part by part screw by screw, assembly by assembly then it can give us the desired result in coming five years.

This will even develop the most required small-scale industrial sector in India and will make the Engineers and the related manpower to develop their skill step by step. Even the giant business houses can reap the dividends in near future by becoming MNC from India.





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Table: 8.19: EXPERTS' EXPECTATIONS: Growth in the Car

Industry indicates the nation's Economical and Technological

growth? : Independent Survey Report:

DO YOU AGREE on the following aspects		YES	NO	REMARK
SN	about the CARS?			
1	Car Industry is still the biggest in the world?	YES		
2	India can Design, Develop; Manufacture its own car with its own resources?	YES		
3	US industry thrives on car industry?	YES		
4	India can develop at faster growth rate, if it can produce its 100% own cars?	YES		
5	India can generate most employment through complete set up of own car industries?	YES		
6	US have contributed most in the Research and development of the car industry?	YES	NO	50% Japan
7	Italy has the best designers in the car industry?	YES		
8	Continuous improvement in the Quality has upgraded the car industry?	YES		



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9	Better versioning in the car industry is still possible in the car world?	YES	Price concern
10	Should Various impact tests be made compulsory in India?	YES	
11	Should Strict Quality tests be conducted every year in India for every car segment?	YES	
12	Should the Service industry in car segment be upgraded?	YES	Very much
13	Will you expect a completely computer controlled Autopilot driven car in future?	YES	
14	"Car is the best invention of man"?	YES	
15	Complete set up of car industry forms the basis of higher end space-technologies?	YES	
16	Automobiles form the backbone of Transportation Industry?	YES	
17	Number of small cars shows the Economic growth in middle class people?	YES	
18	Small car is mostly driven by professionals like Doctors, Lawyers, Engineers, etc.	YES	
19	Executives must be provided with car and fare or car and petrol facilities?	YES	



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20	Cars having price more than Rs.5 Lacs, have less chances of growth in India?		NO	
21	Like Japan India can also manufacture Quality cars in India itself?	YES		
22	In coming 20 years India can have at least one Car Giant like GM, Ford, Toyota?	YES		
23	Should Engineering and Management people come together to develop Industries?	YES		
24	Should India develop Cooperative Car Industry for Indigenisation of Cars?	YES		If it's basic need
25	Should Unemployed youth be utilized for the Indigenisation of car Industry?	YES		Engineers
26	Can Public Sector Industries develop the better cars in India?	YES		Like BHEL
27	Price of a car in US is equal to lowest salary of one month in US?	YES		
28	Can the prices of the cars in India be brought to the level the US has?		NO	
29	Should Hyundai, Daewoo and other MNC cars be 100% Indianised?	YES		Must
30	MNC should be allowed to manufacture cars	YES		



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	only if they Transfer the Technology?			
31	Indian cars can capture Chinese and Third World car market?		China	
32	RTO, DTO must be very strict while allotting the Licenses for the cars?	YES	NO	Price
28	Traffic manners, licensing and the car must be directly linked?	YES		
29	Should alternative fuels like Methanol, CNG, LPG, be allowed in the cars?	YES		
30	Should the car industry and other industries be given special privileges?		NO	
31	Should any restriction be brought on importing cars to increase domestic cars sell?	YES		
32	Should the Indian car industry be thoroughly revived?	YES		
33	Should the Indian car and transportations norms be revised?	YES		
34	Should the Indian road conditions and the signals be synchronised?	YES		
35	Should the Indian Traffic Management be	YES		



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revised and Motor vehicle act be revised for the new technology?			
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Interpretation of Table:

The table is quite elaborative and self-explanatory. It covers almost every point related to car industry market and customer and traffic, and the nation's economy.

Here those car experts are been interviewed whom are either in the direct contact with technology or who are driving it since long and who have analysed many of the factors mentioned above.

Experts believe in thorough revision and modification of the car industry and related matter and they believe in India's strength of survival of the weakest and growth of the toughest economy in the world, through this indigenisation of car program.

PART 4:**PREPARING FOR THE FUTURE TRENDS ACCORDING TO THE DEMANDS OF THE CUSTOMERS:****PART 4-SECTION A: Internal customers satisfaction through stress relies using Information Technology and E-commerce enabled services:**

Internal customers will demand Latest Information Technology assisted E-Commerce enabled services to tackle the huge competition from the world market in the field of::





1. Planning system of the organisation,
2. Plant development for the organisation,
3. Product Designing section,
4. Shop floor management system,
5. Manufacturing Processes,
6. Inventory/Logistic Management,
7. Financial control and Management,
8. Costing and Estimations department,
9. Human Resource Management Department,
10. Marketing Management,
11. Sales Automation,
12. Office Automation,
13. Quality Control,
14. Research and Development,
15. Executive Development Programs,
16. Knowledge Management, etc.
17. Every company can get itself fitted with advanced technology like computer and use local but advanced rated software and services.
 - This improves faster services,
 - Faster decision power,
 - Improved Quality,





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- Improved productivity,
- Improved work culture,
- Improved cohesive atmosphere in the organisations involved in indigenisation,
- Customer satisfaction will reach its peak to be even called customer delight,
- The socio-economic condition of the nation will be uplifted certainly.



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**PART 4- SECTION B. External Customers:****TECHNOLOGICAL ADVANCES CUSTOMERS WILL DEMAND IN NEAR FUTURE IN INDIA:**

1. In future vehicles with Global Positioning System will be functioning throughout the world. With this geographical location of the car can be exactly pointed. This technology has started its functioning in North America, Australia, and in Europe.
2. Mainly cars driven on alternative fuels like:
 - a. Solar powered vehicles running on Solar Cells: This car has panels of solar cells or photovoltaic cells in which solar energy is converted into electricity. Rotating the direct current motors' shaft assembled with the axles drives the vehicle.
 - b. Fuel Cells powered cars: The fuel cells combine the Hydrogen and Oxygen to form vapours of water producing enough electricity to drive the car. It contains Proton Exchange Membrane (PEM), and uses bits of plastics and sheets of Graphite to make fuel stack. This steadily increases the power out put of PEM cells. At the same time these cells also drastically reduces the manufacturing expenses by making unnecessary the costly platinum needed in the electrochemical process. All combining forms the Ballard Fuel cell motorcar. The greatest advantage of PEM fuel cell is that it is absolutely clean and pollution free.





- c. Apart from these small cars also been driven on Compressed Natural Gas (CNG), Liquefied Petroleum Gas (LPG), Liquefied Natural Gas (LNG), Ethanol, etc. as these gases are less pollutant and give lesser fuel consumptions customers in India have started using all these fuels and are in huge demands.
- d. 'Eco-basic' from a European version of battery driven car has prompted the research in this field. Indians developed the 'Reva' the battery driven car. Now customers are demanding cars having longer life batteries.
3. In 1990's customers demanded the no gear-shifting car and thus the Japanese and Americans developed the CVT i.e. Constant Variable Transmission. This CVT has two belts and pulleys on faster speeds these belts get adjusted well and thus avoiding the need of gear mechanism. Now Indian customers are also demanding the same kind of technology in their cars due to heavy traffic and crowded roads.
4. In 1975 one customer died at the spot while driving the impala car having stiff steering wheel. Immediately US government made a law to for specifying technical details of the cars. Thus, Scientists developed what is now known as the collapsible steering column. This is very safe and avoids the after accident damage to the human body. Now this technology is a common phenomenon in every modern car of India.





5. In 1998, Firestone Tyre Company suffered a huge loss when it was observed that one particular slot of one million tyres suffered a vulcanising problem and its tread were damaged only after vehicle was driven a few hundred kilometres. Immediately firestone ordered the emergency meeting and called all the vehicle owners who bought that particular lot of tyres. It was a revolutionary step where for the first time a fear of losing customers was dealt at such a fast speed. Really customer is becoming a king. This made the advancement in the vulcanising section of the tyre industry.
6. In its first lot of Tata-Indica, Tata Engineering invested Rs.123 Crores extra on its suspension system. Around ten thousand Tata-Indica owners got a replacement kit of around Rs. Twenty five thousand each, when again one customer made a complaint these kits were fitted free of cost. Never in the history of India customers were treated so honestly as a king. Even Tata-Engineering was also increased its reputation as the best customer serving company. Later on it went on to sell more than one lac vehicles within the span of less than two year. This time new kind of suspension system was fitted which were having torsion bars, anti roll bars, etc. Thus customers indirectly or directly influenced the suspension technology in the Tata-Indica.





7. There are many more technologies in this category which were developed for the comfort and safety of customers and were highly influenced by the customers' demand only:

- a. Fog lamps and Halogen lamps: for better vision in humidity or in fog.
- b. Heaters: To start the car even in colder temperature,
- c. Turbo chargers and superchargers: To get high efficiency from the car and to burn the fuel completely inside the engine,
- d. Rear view mirrors,
- e. Higher speed streamline or hydro-profile cars,
- f. Tubeless tyres to get rid of puncture,
- g. Car with Radio system, Stereo system, Television system, Mobile phoning system, Video conferencing system, etc.
- h. Hybrid Car running on battery as well as conventional gasoline/petrol.
- i. Cars with air-conditioning, defroster, and windshield wipers, extra-wheel, etc.
- j. Cars with instant balloon inflating technology at steering to get in functioning when ever there is impact on the car.
- k. Small car, Medium sized car, Coupe, Estate, Sports car, Luxury car, Weekend cars, etc. kind of cars were developed once customers demanded.





- l. Cars with folding tops,
- m. Cars with G.P.S. and Auto-pilot,
- n. Now a day customers are demanding multi fuel multi functioning cars, and scientist are on the verge of developing them.
- o. Cars with computerised fuel injection system,
- p. Cars with PC,
- q. Ultra light sound insulation,
- r. Frame of the car/ passenger cell function split,
- s. Air conditioning with own power source,
- t. Lightweight data network leader,
- u. Steer-by-wire,
- v. Multiple energy network,
- w. Telematics,
- x. Rear-view observation package,
- y. Carbon disc for the brakes as used in Formula 1-racing cars,
- z. Variable Valve timing,
- aa.Engine without Auxiliary power,
- bb. Integrated Safety System,
- cc.Centre Monitor- (MMI) i.e. as a man, machine, Interface.
- dd. Road recognition light,
- ee.Titanium Spring,





- ff. Head up display,
- gg. Remote controlled driver less featured car with all modern equipments fitted on it,
- hh. Less fatigue prone cars,
- ii. Less pollutant cars fitted with the cheaper version but high efficiency catalytic converter,
- jj. Fuel celled cars,
- kk. Car with more safety feature,
- ll. Car with more advanced features but at less cost,
- mm. Cars so comfortable that while you get out of the car you will feel the same as when you get in,
- nn. Cars will be developed so advanced that they will emit zero pollution,
- oo. Compact car with huge space,
- pp. Car with least spending on the fuel,
- qq. Cars with ultra modern styles,
- rr. Cars with more free and high tech servicing guaranties,
- ss. Car with more modern technological features but with lower cost than its MNC counter part,
- tt. Unbreakable cars with dent detector and recovering from dent technology, etc.





This is an unending process and there is no limit to individual customer's demand. In everyday life customers are expecting the same kind of services, which Rolls Rice car owners get – the royal services. Rolls rice organisation develops cars as per the specifications of the customers. It gives services as per the demand of the customers. We shall know how to provide these kinds of services to the customers in the next topic.

PART 4- SECTION C. Customer Relationship:

MANAGING CUSTOMER RELATIONSHIP OF SMALL CARS THROUGH E-COMMERCE:

Now a day even lower middle class houses have computers and Internet connectivity. As mentioned above every customer is demanding self-respect from the car industry. As customer has very many options whenever he wants to buy a car, the car organisation has no other option than respect the king customer. The reason being if one customer losses faith in your company's product or services, the negative mouth-to-mouth publicity makes that organisation loose some hundred more customers.

Also, to keep up with increasing marketing dynamics many enterprises involved on the indigenisation of small cars must speed up their reactions to changes and cooperate more closely with suppliers and customers.

The indigenisation of small car with respect to customer behaviour will mostly depend on the capability of the people involved in the project to react





quickly and flexibility to the development in the car market in competition and the technology.

Only those enterprises associated with this project will survive the global competition that are able to reengineer their business processes in an efficient and customer oriented way, that built up flat and process oriented organisation structure and concentrate on their core competencies.

In addition, they have to cooperate with partner companies and above all these measures have to be supported through advanced information technology and hence E-Commerce.

That is why customer relationship through E-Commerce using Information Technology has become need of the day.

So, let us see how customer relationship can well be achieved in the small car market through E-Commerce and using Information Technology.

- 1.Small Car customers are demanding more personalised treatments than earlier in the history.
2. This thing is possible only by one method i.e. by using the latest technology and management skills using E-Commerce. If we think carefully electronic commerce can even surpass the traditional small car business by leaps and bounds.
3. The World Wide Web offers new opportunities that traditional small car business can not offer like:
 - a. More business of small cars,





- b. Provision of round the clock services expected from small cars customers,
 - c. Lower operating costs of whole system,
 - d. Easy Maintenances of the small car and the E-Commerce system,
4. E-Commerce market present enormous opportunities due to its sheer pace of operation and extension and growth.
5. Adding Mobile Commerce, i.e. M-Commerce in this can boost the communication system phenomenally.
6. Computer based Mobile commerce and Electronics Commerce can keep record of every customer and his expectations in the computer as and when he communicates with the parent company or to dealer or the service station whenever he is need. Only compulsion is that particular organisation must have these computerised mobile connected, pager connected, telephone connected, computer connected and personally visited services fully operating. Thus the information regarding the following things be well maintained in the following manner:
- a. Customer's general personal Information,
 - b. Customer's pricing expectations,
 - c. Customer's expected technology requirement in the car.
 - d. His expectations about the services.





7. One of the web site [www. Priceonline.com](http://www.Priceonline.com) offers the options to buy the small car. If one form is filled it throws open plethora of exciting options. Thus, developing exciting site for the customers, providing that kind of services has got very much importance now a days.
8. Rolls rice car has production schedule in a manufacturing plant based not on forecast but online data capture and well interpreted business intelligence tools.
9. Customer relationships of small cars have moved from being standard, to being targeted and now being customised. Thus in new era of car market strategies of still asset failed. The strategy excelled are having strong customer database. At this front GM and ford have made a remarkable success.
10. Due to globalisation all the car companies have their bases or at least products placed in all the major countries. This has caused following dramatic changes in the car market and customer relationship:
 - a. Few Transactions to massive transactions.
 - b. Small amounts of content to tons of rich business content.
 - c. No customer data to huge warehouses of customer data,
 - d. Static catalogues online to dynamic personalisation,
 - e. Homegrown revolutionary solutions to packaged flexible solutions with rapid deployment.





11. The challenges of new era:
 - a. *The challenge here is to manage the database of prospective and old customers, and evolve the customised relationship with the customer the company is interested in.*
 - b. *The challenge is to attract new customer for the companies car,*
 - c. *The challenge is to engage customer, and*
 - d. *More importantly retain the customer making them brand loyal to the car made by the organisation.*

Thus business would need to personalise every individual shopping experience based on customers' past and current online behaviour.
12. A sophisticated E-Commerce Solution allows content to be targeted to unique customer profiles and segments making customer relationship management that much easier.
13. The typical survey report or the interview talk with customer gives his likes and dislikes. The data collected and stored in a database enables the organisation to understand what customer preferences exist and to match specific offerings to those preferences. This will automatically lead to increased customer loyalty and help build customer satisfaction. Ex. One company website of Big book Inc, gives customer every details to the customer about what he is interested in.





If a customers want to buy a car it gives options and well-mapped addresses of the companies.

14. Mercedes- Benz, Honda, Toyota, General Motors, Ford Motors, have Analytical Merchandising. This has brought one to one marketing capability to customers E-Commerce site. This has the capability to decipher the needs of the customer shopping on web site so that the customer enjoy a quicker and more rewarding shopping experience inducing him to return to that commerce site time and again. This is the next generation of merchandising which is resulting in:

- Improved customer experience,
- Continued and Sustained brand building,
- Driving customers' interest,
- Increase sales, and more and more other kinds of transactions,
- Increase in visit of the site and request for provision of the information for the product.

15. Further advancement in the small car communications system, E-Commerce Solution will bring following advancement in the market:

- The supply chain management will get improved,
- Customer relationship will be reaching almost pinnacle,
- Mobile computing will be improved,
- Data mining and interpreting will predict the new behaviour pattern of the customer while buying the car,





- Device new skills for customer handling,
- Thus more customers will be attracted towards and will be retained due to these kinds of prompt services.
- In small car market, E-Commerce will be but remain as focused car marketing. It is about marketing to the individual customer to fit his or her unique interest by providing dynamic individualised content.
- Other businesses will also get the boost due to faster services and orders for the commodities. Ex. There are few companies in Japan, which provide global positioning system on the LCD screen of the car showing the full map of the shopping centre and exact location. Many a times it provides other services as well.

PART 4- SECTION- D:

Small Cars Consumers: New Technology and New Market Trends:

1. Changing Marketing Dynamics: Market changes are taking place very rapidly in the today's globalisation and liberalisation era. Small cars are also facing the same fate. Many MNC are already there in the Indian market and trying to capture the market by all the means. So following highlights are been spotted meticulously by the various forces in India.





- a. Standardisation and formation of global market have seen the emergence of increasingly homogeneous demands across the world for many products and services. Small car developed in the US, Italy, Japan is need to be marketed instantly in at the global level or it faces the consequences, of being neglected by the customer for not fulfilling his demand.
- b. The same type of small car with little modification, is demanded all over the world, by the consumers having geographically distinct markets and satisfaction needs. This sort of convergence of need has turned different markets into a large homogenous unit popularly referred as 'Global Market'.
- c. The world has become a common market place in which people no matter where they live have develop a universal desire for the small cars and life styles.
- d. The shortening of cars life in Japan and USA has shown the vision and rightly assessed the potential changes in taste and technologies of the small cars.
- e. Marketing practices are changing very rapidly and some new kinds of way have developed over the period of time.
- f. Information technology and E-Commerce are going to play major role in the world car market with fast pace of the customer capturing techniques.

2. Viewing Market Forces affecting the small car market:

- a. To capture consumers companies try to reach the right customers, it involves following things:





- The Product research,
- Market Research,
- Test marketing advertising,
- Public relations,
- After sales services, etc.

It is not new, but technology invasion has made it so rapid that it makes following impact on the customers:

- Customer oriented marketing activities,
- Customer retention activities,
- Future sales target findings,
- Building company image in the minds of the people.

b. Communication tools such as magazines, newspaper, radio, telephones and postal delivery - to a marketing environment defined by the use of digital communications tools such as data basis email, online services, smart cards, calling cards interactive telephone services system, fax on demand, a host f tools and supporting traditional marketing tools.

Thus, traditional marketing environment is fundamentally linear in nature.

So the fast track results expected in the market are as follows:

- The wise car marketers are asking for the greatest impact of each rupee spent,
- Organisation can send thousands of email at a time, so product services are becoming faster,





- Online bill payment of the small cars and its services offers are very common phenomenon,
- Small car customers feel more relaxed to contact online and get the faster and desired results.
- Small car organisation using the advanced tools can contact customers even if he does not have computer by asking sub vendors.
- This fast track small car marketing is spatial rather than linear, in nature and hence, market research, product development, customer feedback can be done simultaneously.
- It has changed the life style preferences and buying patterns of the small customers, and thus present market is customer cantered rather than the product center.
- Every moment new and creative ways of marketing the small cars are developed around the world,
- Recently, small companies have become more proactive; they are making things happen than wait to happen them.
- In many countries, digital technology is making small car marketing process free up people to deal with customers in a more relaxed and meaningful ways.
- With this technology built up in the company car consumers shop at the speed of the light, they order within few minutes having been





come to know about the price difference and the features and services differences between the two car competitive products.

- GM, Ford, Toyota, Honda, have already started the “On Screen” demonstration of their latest model in the market and have made very good deals. Thus indigenous car market will also make the breakthroughs.

3. Effect of Globalisation and the Liberalisation on the small cars consumers in this scenario:

Globalisation and liberalisation have not remained words in the textbook they have become a reality. They have redefined the way we do the business, and hence require the new dimensions of thinking and new kinds of skills. Information technology enabled services and E-Commerce are the best possible skills the indigenisation program can acquire.

They are not only effective tools in the advanced countries but also can put formidable challenge in the developing countries like India.

As world have become a true global village you can't just ignore this global market conditions otherwise which can be called a biggest mistake. Better it shall be for the business new to adopt as the industry is struggling to navigate the topography of the wired market place.

In 2005 almost one billion consumers will be using mobile phones and Internet. This will enable the speed, compact machines, compact cars; new inventions rule every sphere of the human life.





Service industry will face a cutthroat competition and who so provide quicker services will capture the market. This will also useful in retaining the customers and generate a classical relationship with the indigenous car making company, which would be the global player in the car industry.

Thus the conclusion of the Section D is if the indigenised car makers also develop their vision for the E-commerce and Mobile commerce and Internet marketing or digital marketing, India will have an excellent chance of emerging in next decade as a global leader in the small car industry.

PART 4- SECTION E- VISUALISING SMALL CAR CUSTOMERS' EXPECTATIONS:

Small car consumers usually visualise what they expect to see and what they expect to see is usually based on familiarity on previous experience or on pre-conditioned set of mind. In the marketing context, customers tend to perceive products and product attribute according to their own expectations.

1. Today the point for consideration is that the customer is not likely to be as indulgent as most of the Indian customers have been so far. Customers have umpteen number of small car alternative choices available to them. So, the customer is no longer affording the luxury of costs arising out of under-utilised capital assets. He is demanding since long the proven car quality product by the proven market player.





2. Now a days customers demand the life cycle cost bid evaluation and not only yearly budget. Customers are seeking guarantees for the effectiveness of the company.

3. The increase in sophistication of the advertisement and new marketing trends has enable manufacturers to manipulate any kind of customer.

4. Rising expectations from the product to give the good life to customer has become need of the hour. If car is not up to the standard, it results into the dissatisfaction.

5. Dr. Doug Howardell has claims-

- Customers are revolting.
- They want more for less cost.
- They want it all,
- They want it now,
- If you can't provide what they want somebody else will provide them,
- Customer loyalty is a myth in multipolar market formed in the mist of a distant past.
- They need to be looked closer.
- So we must provide greater customer services.

6. Customer service is ability of an organisation to constantly and consistently give customers what they want for their car and for their personal car needs.





7. Where as the excellent customer service is ability of an organisation to constantly and consistently exceed the need of the customers in the car market.

8. Customer Satisfaction = Customer's Expectations / firm's actual performance.

Thus customers' satisfaction is the derivative of customers' expectations and the fulfilment by the firm.

9. Next step is to know what really customer expect and know the sub steps of these proceedings:

- Know that today's small car customer is always awake and aware,
- All the small car customers want concrete steps to protect their interest,
- A plethora of platitudes and an abundance of assurance will not satisfy him
- For the small car customer the experience of yesterday cannot be the expectations of tomorrow,
- The expectations and the entire scenario are changing rapidly.
- Even the big and top class marketing organisations fail to come closer to the customer satisfaction.
- Even the companies may adopt:
 - * Aggressive marketing,
 - * Large-scale advertising,





- * Well-organised PR activities,
- * Innovative sales promotion exercise,
- * Allowing the Internet Banking option, ATM payment, etc.
- Today's customer is more demanding and expects:
 - * Cars at lower rates than other competitors,
 - * Efficient pre and post purchase services,
- Expectations of small car customers seen rising generally in the direct proportions to the levels of performance. The more one gets the more expectant one becomes,
- Needs can be satisfied because 'need' represents the vacuum-financial, physiological, or psychological that can be fulfilled with provision of the small car availability with all kinds of services.
- Whereas the expectations is seen on the border of imagination, which may be realistic or achievable or even illusory.

Now a days expectations and dreams have become a driving force of any economic activity small car is one among them which can provide the necessary impetus to growth and development.

One customer survey by Overdrive Magazine in the may-2001 and revealed that there are three categories of cars and organisation in the world and India is part of it. In the survey following was the out come:

- a. Car organisation exceed expectation like Mercedes-Benz,





- b. Car organisations like Maruti- Suzuki which meet the expectations,
- c. Car organisation that needs improvement for not meeting the customer expectations, like Premier Padmini.

PART 4- SECTION F: HOW TO MANAGE FOR MEETING CUSTOMER EXPECTATIONS:

Point 1. Know it: Common problems of not meeting customer expectation are:

- a. Ill defined and inaccurate requirements,
- b. Unrealistic requirements,
- c. The small print trick,
- d. Requirements are not owned and not taking responsibility,
- e. Lack of courtesy/ service,
- f. Lack of attention to few customers,
- g. Making to hide few services,
- h. Lack of communications,
- i. Failure to redress grievances promptly.

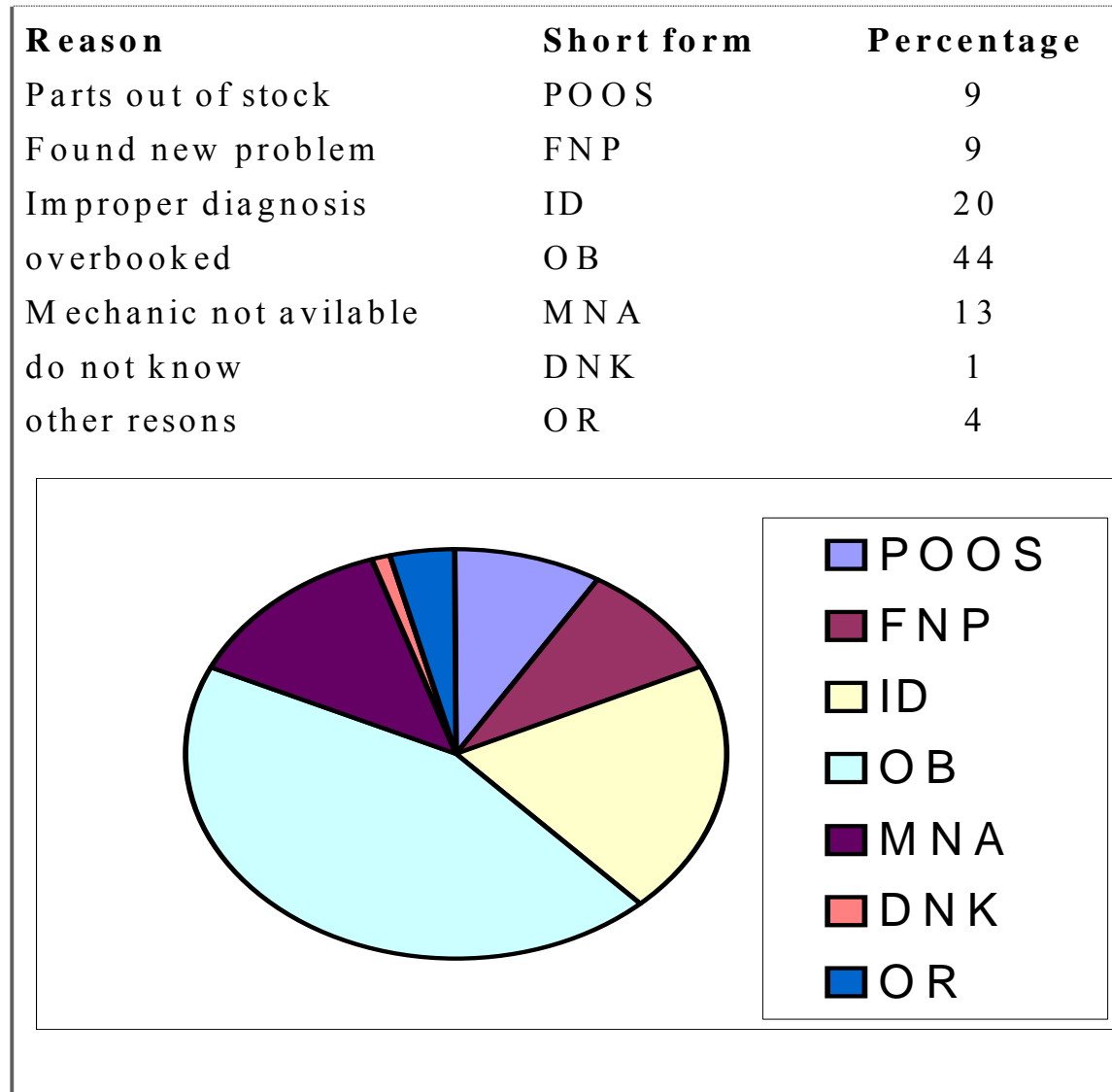
Let us see how Indian car industry is performing. When a survey of most frequent reasons given for delay in servicing small car was carried out the following facts came out.





Table: 8.20: Showing Reasons/ Problems of customer servicing delay:

Reference: Independent survey plus Auto India Magazine and new websites.



**Interpretation of the chart and the graph:**

1. 57% of the time delay in servicing of vehicle takes place due to overbooking and unavailability of the mechanics.
2. 29% of the time is due to improper diagnosis or new problems.

Out of this spare parts out of stocks and unable to find proper problem can be overcome with proper skill up gradation of the mechanics. There is always a scope to upgrade to bridge such a big gap of delay in customer servicing.

Point 2. How to meet customer expectations?

Following are the pragmatic solutions successfully developed by the experts.

In their book- 'Enterprise One To One', Authors- Don Peters and Martina Rogers has stated that in order to compete in a truly customer driven manner an enterprise must integrate its entire range of business functions around satisfying the individual needs of individual customers- not just marketing, customer service and sales, but production logistics, and financial measurements and metrics.

Organisations from dealer to the service station and manufacturer can exceed the customer expectations by focussing improvement efforts in three areas:

- a. Customer friendly, customer-driven, customer oriented process not just mechanisation of services but humanisation kind of services,





b. Every Employee committed to customer services and will show the behavioural changes when required:

- * Adequate training,
- * Leading through training,
- * Avoiding tunnel vision,
- * Proper and timely communication and listening to customer,
- * Understanding priorities,
- * Understanding the constraints and demands of customers,
- * Knowing own responsibility,
- * Proper objective setting supported by time management.

c. Customer Dialogue: It is means by which organisation can know what the small car customer wants and what are his needs. Superlative performance relies upon being self-critical. So one to one correspondence and dialogue must be set up with customers. TQM about challenging requirements, talking, with the customers and agreeing new requirements.

d. Frequent Self-assessment:

Every time organisation goal may be short term and long term must be communicated to all the internal customers i.e. staff members, to grasp real 'mission' set up for:

- * Contact customers and identify them personally,
- * Determine his requirements and expectations,





- * Meet customer requirements,
- * Exceed customer expectations.

Measure the following key issues on the good self-assessment tools:

- * Making sure what customer wants and expect,
- * Being flexible in meeting customer demands,
- * Treating customers like partners rather than adversaries or simply end users,
- * Making it comfortable for customer to do business with your organisation,
- * Having a positive attitude towards customers,
- * Encouraging customers feedback on even trivial matters,
- * Responding positively to customers' problems,
- * Developing a fantastic repeat relationship,
- * Seeking to exceed customer expectations.

e. The reasonable expectations:

Check whether the expectations are reasonable as more than 96% of customers have reasonable expectations like below:

- * That car organisation will attend the customer problems whenever they have one. Customer expects patience, time and attention in that order.
- * That car organisation will take up customer's case with concerned authority or office when need be.





* That organisation will feel for the customer when ever they have the problem. As feeling many a times actually heels the wounds of the problem.

f. Proactive approach:

- Modern techniques and technology can add the vigour in the proactive approach in fulfilling the customer preferences, aspirations, and expectations are the need of the hour.
- People just don't buy things but buy expectations and not needs now days. Good services are customers' beliefs, so know them at earliest.
- It immutable law in business that words are words, expectations are expectations, promises are promises, but only performance is the reality. So let every customer feel that he is very special to the organisation.
- Every service taken:
 - * Should be with a smile,
 - * Accurate and efficient for the first time.
 - * Must have a personal touch,
 - * Goes beyond customer expectations,

It must be optimal taking into account the changing customer taste and preferences and remain one step ahead of the customer by continuously monitoring the environment and acting proactively to exceed customer expectations by rendering consumer services beyond promises.





PART 4- SECTION- G: Inside the customer's expectation fulfilling product the small car using Information Technology and E-Commerce in the Indigenised car:

The crux of this E-Commerce is that India has to enter in to the indigenisation of every kind of technology. Indians have to indigenously manufacture or develop following gadgets and equipments to be fitted in the small cars, someday or other to sustain customer demand:

- 1.Computers having LCD screen to be able to fit in small car,
- 2.Mobile phones which can be operated well from the small car,
- 3.Music system and air conditioning to be fitted in small car,
- 4.Noiseless, ultra safe suspension system like what Mercedes have,
5. Auto pilot car in case of emergency taking the riders to hospital, etc.
- 6.Accident warning gadgets to avoid accident,
- 7.Puncture less tyres system or alternative tyre with puncture fixing system,
- 8.Every company can get itself fitted with advanced technology like computer and use local but advanced rated software and services.
 - o This improves faster services,
 - o Faster decision power,
 - o Improved Quality,





- Improved productivity,
- Improved work culture,
- Improved cohesive atmosphere in the organisations involved in indigenisation,
- Customer satisfaction will reach its peak to be even called customer delight,
- The socio-economic condition of the nation will be uplifted certainly.

9. Every R & D section in India will be connected to each other and if any new discovery or invention occurs in the field of Automobiles will be conveyed through the E-Commerce immediately and thus if at all production is required it can be conveyed to the suitable department.

10. Patent and all the other legal documentation will be taken care.

11. In the event of growing small cars by sheer numbers the Management of Traffic and Regional Transportation Offices will have greater role to play in India. This can become an easier issue if digital technology, information technology and

E-governance and E-commerce is used properly. It is estimated that there will be one million increases in cars every year from the year 2010, in India. So, AIAM has suggested the safety of the drivers, passengers and pedestrians is ensured more effectively if the following kinds of traffic disciplines are observed and enforced:





- Driving and lane discipline,
 - Parking and Stopping Discipline,
 - Signal and Stop line discipline,
 - Speed restrictions,
 - Synchronising signal for particular speed,
 - Safer Overtaking,
 - U-Turn and intersection discipline,
 - Respecting the rules of the road,
 - Using the modern technology any discrepancy, theft, and the accident can be avoided.
12. Corporate governance will use these kinds of E-Commerce Governance system at all the times to avoid any kind of snag.
13. Thus, the complex growth of the modern business and emergence of corporate giants necessitates and require professionals approach in governance to maintain good customer relationships and for the management of the organisation. The changing global corporate scenario also emphasise that good management owes effective organisation culture but to great extent to the mission, vision and pro-active approach of the top management, middle management, the workers for the total customers satisfaction. This complexity can be made simple using Information Technology with modern communication skills used for the E-Commerce.





14. *Prerequisite of this project can be the establishment of service institutions for building consulting companies network and systematic networking of these institutions to realise an overall cooperation marketplace.*

The list is unending. But this task of indigenisation with respect to customer behaviour is certainly achievable, when taken sincerely. When it is supported by fast services provided by Information Technology and E-Commerce and if the human resource who are cultured and civilised for the above task with proper qualifications, knowledge and skills, and having strong will, and who are acting in unison for the pride of their motherland.



**PART 5: CASE STUDY:****KNOWING FATE OF THE JOINT VENTURES IN INDIA FROM SUZUKI-****MARUTI CASE:****Part A: Analysis of Maruti-Suzuki Cars performances after 2000 A.D.:**

Prior to arrival of competition means till 1994-95 Maruti-Suzuki had 70% to 80% market share in the Indian car market. After 1998, the competition in the market intensified with launch of Fiat's Palio and Tata's Indica V2 in 2000-01. Suzuki-Maruti still remains the largest player. Suzuki-Maruti will lose more market to the competitors still will remain the largest player for coming few years, is certain, as the number of cars sold is growing day by day. In 2001-02 number of cars sold were 575369 and Suzuki-Maruti sold 59.1% of it, due to lowering the rates of Alto and 800 up to Rs. 25000. Thus, again Suzuki-Maruti (now we call only MUL for Maruti Udyog Limited) remains the largest player. Now let us see, why?

a. With the increasing competition MUL remains unperturbed. It is due to tow important factors:

- The Car market is highly fragmented,
- Most of the MUL' competitors find it difficult to increase their reach given the relatively low profitability, scale of operations, and distribution channels.

b. Maruti has the largest network of dealers and service stations amongst all the car manufacturers in India. As of 31st March 2003 it





had 178 authorised dealers with 243 scales outlets in 161 cities, 342 dealers workshops and 1545 Maruti Authorised Service Stations (MASS) covering 898 cities, and express service centres on 30 highways across the country. Clearly the company is extremely well positioned in the competitive landscape.

- c. J.D. Power Asia-Pacific Report for four consecutive years from 2000 to 2003 ranked MUL Number 1 in India on its Customer Satisfaction Index (CSI), which assesses customer satisfaction with product quality and dealer services as well.
- d. By far, with the annual capacity for 500,000 Cars MUL is the largest automaker of India.
- e. In April 2003 MUL has manufactured its 4,000,000 vehicle in Indian market.
- f. On Overseas turf, MUL has made many inroads into the global market too. But set off against imports, MUL is a net foreign exchange loser due to joint venture. However in the percentage terms, exports make up 7% of total sales, which is Rs. 610 Crores. In 2003 MUL exported 32,240 cars, up 163% as compared to 12500 in 2002. Alto 1.1 made it possible. In 2003, the cumulative export of MUL in last 16 years stands to 280342 cars. Most demands were from Netherlands where the cumulative exports cross the mark of 50000.





- g. Suzuki has upgraded its stake in MUL from 50% to 54.2% and Suzuki is also taking away credit of developing vendors. Suzuki claims that earlier Premier Auto Limited (PAL) and Hindusthan Motors (HM) used to manufacture only 40000 Cars per year but MUL came with the capacity of 100000 cars. Suzuki also claims that it has also improved the quality and productivity by closely monitoring its vendors.
- h. Infact, components had to be localised, for which MUL with Suzuki assistance, floated over dozen of joint ventures. MUL supported the component manufacturers with right from Financing to giving technical know how. They provided Technology with respect to tools, dies, and drawings and even machinery on lease for them. That is how vendors got developed. However it almost avoided the technology transfer. All this gave a flip to the component industry. Hence lot of companies followed it into India. Now the components manufacturers are fielding enquiries from Original Equipment Manufacturers (OEM) like General Motors (GM) and Ford. Since 1998 these companies are watching the vendors in India. So now that they feel that the Indian vendors are up to there mark GM and Ford have suggested their headquarters that instead of buying from Europe they must buy from India. Quality is same it is cheaper to produce. Even Volvo Truck have also the same plan as it's cheap in India.





- i. However, the vendors' number has not increased infact it has decreased from over 400 to almost 60 to 70. For instance earlier on MUL had 30 to 40 suppliers meant only for the Sheet Metal now by creating subassemblies it has just six hence the cost is reduced. The reason being MUL used to buy the components from every vendor then assemble it at their factory. Now, MUL make one big tier I supplier. It takes from others make a big piece and supplies it to MUL. This has resulted in reduced costs, less people to deal with and smaller inventories as well. Cumulative effect of all these is it ahs reduced working capital, increase in volumes, and highly reduction in costs.
- j. On R & D front also MUL is working very hard. With Suzuki in charge R & D activity at MUL has perked up and outside of Japan in Asia, MUL has become an R & D centre for Suzuki Cars. MUL expects to leapfrog on the scale and have full model change capability by 2006-07 including upgrades of products in term of technology and features. This R & D will play important role in localisation and development of components. The strategy of the MUL is to introduce new models with minimum of 75% localisation level and increase the same to at least 90% within the span of three years of introduction of a new car model. This will directly benefit Indian customers MUL claims, by reducing the costs of the components and accessories. These parts will be





available with MASS, faster and at lower costs, thus improving after sales services.

- k. Suzuki also playing a competitive benchmarking in India in a better fashion. Recognising the need of diversifying its income streams and tapping the potential of car related businesses MUL copies some successful business models from other parts of the world, in building non-manufacturing income. This is inline with international trends, where service income is used to boost the low margins from the core manufacturing activity.
1. MUL is also trying to Build Its Brand Image in the Second Hand Car market. It took MUL tow years. But in October 2001 MUL leveraged its brand name to start a pre-owned car business under the 'True Value' brand. In 2003 it is increased to 34 cities from 11 cities in 2002 involving more than 50 outlets in 2003, which were only 12 in 2002. In 2004 it is going to reach to almost 100 cities and 135 outlets. MUL has an advantage here as out of 40 lacs vehicles it has rolled out it has more than 35 lacs still on the road. Pre-Owned cars, being less expensive, address demand among the two-wheeler owners aspiring to own a car and among existing car-owners to upgrade. The Pre-Owned cars market for MUL in India is estimated to be 1.1 times the size of the market for new cars. Thus, if MUL sales 3 lac cars in a year it sells almost 330,000 cars on the second had front.





- m. MUL has also entered into the Insurance business of the cars, called Maruti Insurance, which was launched in May 2002. Through its two wholly owned subsidiaries, Maruti Insurance Brokers Limited (MIBL) and Maruti Insurance Distribution Services Limited (MIDSL). These two subsidiaries function as corporate agents of two non-life insurance companies. In 2002-2003, Maruti Insurance bagged more than 150000 policies with gross premium more than Rs. 160 Crores approximately.
- n. Maruti Finance is the Auto Finance arm of the MUL. It has provided loans up to Rs. 900 Crores from February 2002 to February 2003.
- o. Maruti has tied up with State Bank of India (SBI) under the brand name SBI Maruti Finance in February 2003.
- p. In corporate lease and fleet management business under the brand name N2N, MUL clinched 14 deals with corporate giants like Reliance, GAIL, NTPC, and Doordarshan.
- q. MUL has placed themselves in the customers' shoes it seams. They are trying to know customers' expectations are. MUL is trying to fulfil those customers' needs. That is why MUL is entering into every kind of Car businesses. MUL is making almost 2% of profit in these non-core activities.
- r. Looking at the P & L account, in the year 2002-03 MUL has Sales at Rs. 9426 as against Rs. 9410 in 2001-02. The Profit After Tax is up





in 2002-03 up to 138% to Rs. 282 Crores from Rs. 118 Crores in 2001-02. Hence, Net Profit stands at Rs. 146 Crores. Also, Suzuki is giving up on Royalty Rs. 78 Crores on Maruti 800, Omni, Gypsy, Esteem and Zen models and discount spares another Rs. 70 Crores. One more thing is Maruti has Rs. 1000 Crores surplus cash and hence has the financial flexibility as well.

- s. When excise duty was cut from 15.7% to 7% Maruti's bread and butter sales jumped by 44% in March 2003.
- t. With the reduction of excise duty car sales are expected to grow by almost 10% every year, as financiers will reduce the interest on the loan as well.
- u. Thus, MUL is the largest passenger car manufacturer in India. In 2002-03 it has 58.6% market share. It is three times larger than the Hyundai, which stands at Second position with 18%.
 - In fact MUL has monopoly in the Segment 'A' in India. That is the Cars, which are priced below Rs. 300,000; MUL has 100% market share.
 - In segment 'B' Cars priced between Rs. 3 lac to Rs. 5 lac MUL has market share of 36.4%. This segment constitutes almost 55.7% of the overall market in India.
 - In segment 'C' Car priced between Rs. 5 lacs to Rs. 10 lacs MUL has captured almost 16.8% of market share in 2003.





- MUL has 10 basic models and 50 variants in the year 2003.
- Three out of top five selling car models are MUL products. In fact, it dominates the Indian small car market by having stake of 100% in Segment A with Maruti 800 and Omni and 36% of Segment B with Maruti Zen, Maruti Alto and Wagon R. *Together segment A and Segment B comprises of 86% of market share of Total Indian Car Market. Segment A being 30% and Segment B being 56%. Of the car market.*

Part B: Why Total Indigenous ventures are needed?

Recently Suzuki has challenged the Tata Motors to manufacture the car below Rs. One Lac mark. Thus, focus of discussion in market circles is car pricing. The height is Suzuki comes to India and challenges Indian company to manufacture the car at the lower rate than them that Tata had earlier promised to give to the customers their value for money. There must be something, which gave Suzuki a confidence to speak. Today it is Suzuki next time it will be some other company, which will do the same thing. Hence let us see why indigenisation of the car sector is needed to avoid such things in future. Let us analyse Suzuki's Indian venture Maruti-Suzuki or the MUL. The highlighting points are:

- a. According to Merchant Bankers, considering the price Suzuki paid for right issue, worth Rs. 164 Crores made in 2002, in addition to the Rs. 1000 Crores is paid to the Indian Government for the controlling





stake, the rights issue works out to close Rs. 194. So *by underwriting this offer, what Suzuki is indicating is that, even if investor wish or even if the investors do not wish to invest; Suzuki as comfortable parents are responding confidence in the company. Thus, with sheer money power of MNC these joint ventures will remain joint ventures and will never be able to indigenise in India.*

- b. By this Suzuki has increase its stake in the Maruti-Suzuki venture up to 54.2% from earlier 50% stake, while now public holds nearly fifteen percent and the Indian Government holds nearly thirty percent in the Maruti-Suzuki venture. However, Suzuki is taking away 54.2% profit share from India is a hefty sum to lose from the Indian perspective. That too a regular source of money is siphoning out of India.
- c. On the Vendors front also till 2003, Suzuki owes the stake of almost 49%, while Citicorp and citi group owes 15% while Indian vendors owes the stake of 36% only. Thus, it is high claim that the Suzuki is developed only Indian vendors. Does it mean that the technology transfer from other countries on the cars front is a distant dream for the Indians? Does it not provokes the indigenisation, if even after twenty years $49\% + 15\% = 64\%$ stake in the vendors is owned by the MNC and only 36% stake is hold by the Indian indigenous vendors?
- d. Another factor is that given the over capacity of global car manufacturers which stands around two million cars in the year





2003, and their declining sales in overseas markets, they are expected to sharpen their focus on India as a second biggest growing market for cars.

- e. To add woes, Maruti-Suzuki cannot be strictly compared to international giants because it will be an Indian subsidiary of a giant Multinational Corporation (MNC) operating in India not really competing with the international ones.
- f. On Overseas turf, MUL has made many inroads into the global market too. But set off against imports, MUL is a net foreign exchange loser, due to joint ventures only.
- g. The Indian domestic car market is growing much faster and in coming 3 to 5 years it will have more than one million cars turnover. However, Suzuki has made its roots so deeply rooted in India that not even the domestic companies like Tata Motors can overcome their present share in the market.
- h. About new entrants, it will take very much time to reach even the breakeven and attain the higher volumes. Till then Maruti-Suzuki and hence Suzuki has a smooth ride in India.

Thus, formidable efforts are needed to give boost to the domestic companies like Tata Motors. Even the Tata Motors should also try to indigenise all the car parts in India from the 'future of the indigenous car of India' point of





view so as to avoid these kinds of dependency and to achieve the self-reliance in the car technologies.

Part C: What is the present worldwide situation in the joint ventures?

For this analysis Japanese and South Korean ventures in the year 1996 to 2002 are especially considered here as their fate has been decided by now.

Table: 8.21: Worldwide situation of Joint ventures:

SN	Country	Company	Joint Ventures/ Alliances
1	Japan	Toyota	Toyota/Daihatsu
2		Nissan	Renault /Nissan
3		Mitsubishi	Daimler-Chrysler / Mitsubishi
4		Mazda	Ford/ Mazda
5		Daihatsu	Toyota / Daihatsu
6		Suzuki	General Motors/ Suzuki
7		Isuzu	General Motors/ Isuzu
8		Subaru	General Motors/ Subaru
9	South Korea	Hyundai	Hyundai/ Kia/ Asia
10		Daewoo	Daewoo/ Ssangyong
11		Kia	Hyundai/ Kia/ Asia
12		Asia	Hyundai/ Kia/ Asia
13		Ssangyong	Daewoo/ Ssangyong
14		Samsung	Renault/ Samsung



**The Results of these Joint Ventures:**

The winds of change are blowing towards Asia. Infact many challenges are there been observed as below to affect many joint ventures in Asia. They are:

- a. Stifled by the domestic market,
- b. The Asian Economic crisis,
- c. Negative currency shift, and
- d. Global consolidation pressures from the original equipment manufacturers (OEM).

All these factors have adversely affected to these alliances in Japanese and South Korean car market. Infact the whole region's vehicle manufacturing landscape has been altered forever due to these entire crises especially in the car sectors nobody could escape through these monumental changes.

While their sphere of influence over selected Japanese joint ventures has grown internationally in North America, Europe and ASEAN still Japanese could not touch the height of sales it had earlier.

In Korea worst thing happened the Daewoo motors along with its joint venture had to see the closures due to cumulative effect of all these.

Few especially mentioning issues for these joint ventures in Japan and Korea would be:

- a. *Consolidation case:* Financial difficulties plagued several manufacturers and forced consolidation to survive. Daihatsu forged





closer ties with Toyota and the 'GM Trio' – Suzuki, Isuzu and Fuji, joined the world's largest automaker to extend into global market.

- b. *Succumbing to new suitors:* Asia Motors, Kia, Mitsubishi and Nissan all succumbed to new suitors.
- c. *Tightening reign case:* Ford had to take tighter control over Mazda's operation to ensure survival.

Thus, Japanese and Korean car makers have been forced to forge closer ties with Western Car makers to either survive or to thrive in the future as the former business model break down under stress of capital requirements and economic scale. Hence proved was several trends will define the structures of the tomorrow's industry in the region.

(Source of the data: CSM's Japanese and Korean LMV production services launched every year in the month of October).

Thus there is higher unpredictability in these joint ventures has been observed worldwide since 1996 to 2002. Many more restructuring are expected in the coming future. Hence it can be concluded that it is better to have indigenous car companies in India with all indigenous self-dependent technologies instead of these kinds of parasitic joint ventures.

Part D: Where Indigenisation of car technologies must be targeted?

- a. Flexible Robotic Technologies because which these MNC can manufacture the varied versions of the cars at faster rate and at lower costs with less labour force and hence lower overheads.





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- b. Metallurgical and non metallurgical Technologies to manufacture the components of the cars,
- c. Manufacturing Technologies for the intricate parts in the cars,
- d. Electro-Mechanical Components over which these MNC are holding major stake,
- e. Manufacturing Maintenances Equipments and technologies,
- f. To target customer delight indigenous car manufacturers must come together and set a high level of Services Standard.

This part is put in details in the other chapters particularly in chapter 24, 25, 26 and 28.

----- Up coming book: Coming Volume 2-----



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