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INDIGENIZATION:

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

EVIDENCES FROM AUTOMOTIVE

INDUSTRY AROUND THE WORLD:

VOLUME 2

©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, 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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CHAPTER 9:

CONTRIBUTION OF FOREIGN CARMAKERS INTO INDIAN MARKET



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Part 1: FIRST CONTRIBUTION: AWAKENED INDIAN CUSTOMERS:

An Eagles eye view has awakened and alerted Indian customers:

Indian customers were kept under pressure of only two car manufacturers. So, they had no say in the market prior to many world companies especially the car companies entered the Indian market.

That is why; the customer word has developed a thorough meaning now a day.

Customer means:

- 1. Internal Customers of the companies i.e. employees and shareholders and those involved in the company's everyday affair where as;**
- 2. External Customers mean the consumers who are using the products of that organisation.**

In 1980's PAL and HM lost its big share to MUL. After 1994, with the effect of globalisation, MUL lost its big share to companies like Hyundai, Fiat, and Daewoo. After 1998, these all companies lost their share to Tata Engineering. But still Indian consumers feel that there is a huge share that (Multi National Companies) MNC has captured in the Indian car market.

The competition probed by the MNC car manufacturers was too high. Indian grand-old carmakers like PAL and HM could not face it with there monotonous activities. **It was indication that the manufacturer-dominated market started becoming customer-oriented market.**



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Because of this, in 1998, PAL had to close few of its units in Pune, Mumbai,
and Thane industrial sector.



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companies:

Exposure to the Strategies adopted by the world's giant car companies and other MNC:

After the MNC entered the market India think tank tried to go thoroughly through the success story of these MNC. Thus, exposure to these strategies also reveals that there is lack of sincerity in Indians while implementing the planning.

From the following aspects consumers started feeling that MNC exploit the Indian Resources well to the core. Though they did not know thoroughly, why? Later on, studies revealed that many of the MNC adopt following strategies to capture not only Indian market but also other markets in the world.

Strategies Adopted by MNC:

First Phase: Market Research and R & D at every level:

The MNC are mainly based in USA, Japan, Korea and West Europe. They carry out pre-launch market research.

The research includes-

- ❖ Macro Economic survey of the country,
- ❖ Micro Economic conditions of the competitors,
- ❖ One of the MNC study revealed the consumer expectations and their buying behaviours in market where MNC that is trying make its





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presence felt. Following points make it clear about the preparations

MNC carry out while studying personalities of that market. They study:

- Habits of majority of consumers,
 - Buying behaviour of most of the consumer in that period of time,
 - Is the kind of car consumer demanding is been marketed?
 - What is the approach of life of most of the consumers?
 - What is the consumer attitude in particular buying behaviour?
 - In broader perspective how many kinds of consumers the market has?
 - Then how to tackle many kinds of personalities and persuaded to buy our car?
-
- ❖ Faults in the competitors,
 - ❖ Media support and Advertising systems of the existing competitors,
 - ❖ The services and the Dealers network of the indigenous organizations and the other MNC competitors,
 - ❖ Collaborations to be made if any,
 - ❖ Survey of Technical know-how and the educated human resources or skilled workers availability,
 - ❖ They check the resources to carry on the business successfully including man, material, machinery, money, and mentality to buy their product.





❖ They do presale survey of the existing product and the post sale feed

back as well. So, that there product may be launched successfully. In

this category MNC takes the broader perspective of the market. They

try to know the intermediate market needs as well, look at the table.

Table: 9.1. Shows Intermediate Market Buyer's Needs in the small car market:

Organizational Needs	Personal Needs
1. Delivery reliability	1. Personal security
2. Quality in relation to price	2. Recognised status
3. Post sale installation and assistance.	3. Acceptance of other organisational members.
4. Variety of product offerings	4. Achievements on the job.
5. Efficiency of purchased items	----

Interpretation of the graph:

R & D at every possible level is carried out which affects the small car market.

❖ Government norms are also taken care.

❖ MNC carry out survey of buying behaviour of the consumers in that country. It has been observed that the studies include following factors.

Table: 9.2: Factors affecting buying behaviour of small car consumers in that country:





Cultural	Social	Personal	Psychological
Culture of that country	Reference group	Age and life cycle stage	Motivation
Sub cultures	Family	Occupation	Perception
Social Stratification	Roles and Status	Economic Circumstances	Beliefs and Attitudes
--	--	Life style	Learning
--	--	Personality self concept	--

Interpretation table:

Customer satisfaction means the level of a person's felt state resulting from comparing a product's perceived performance in relation to the person's expectations.

MNC before entering into the market know in details the total psychology of the customer in the country they are going to do business, right from the personal to the social level. This study of consumer behaviours helps them target their customer in a better fashion.

Second Phase: Planning and healthy budget:

To go further we must know that these MNC have yearly turnover of more than Gross National Product (GNP) of many countries. In The Hindu, 8th May 2000, GNP of India has been given to be USD 427 Billion.

Now let us see the turn over of these MNC car making organizations:





- General Motors (GM) of the USA has yearly turn over of USD 135 Billion.*[1]
- Ford Motors of USA has yearly turn over of USD 130 Billion.*[2]
- Toyota corporation Japan has yearly turn over of USD 98 Billion,*[3]
- Mitsubishi Japan has yearly turn over of USD 95 Billion,*[4]
- Mercedes Benz of Germany has yearly turn over of \$80 Billion.*[5]

Considering this vast experience and the amount of profits these organizations can shake the economy and car market of any country.

Similarly, these MNC spend almost five percent of their annual budget on the advertising of pre-launch and on post launch campaign as well.

Many MNC like GM, Ford, Pepsi, Coca-Cola, etc. sponsor many of the major events in the country where they work or launch their product specifying clearly the advantages of their product over others, may it be even false claim, but to capture market they adopt new and innovative methods. It has been observed that these MNC rule the economy of many countries as well, or otherwise that countries' economy loses its shape and size. E.g. Economy of Mexico buckled under pressure of MNC in 1996 and for the same reason Economy of Argentina crumpled in the year 2001.

Thus, MNC make their presence felt every time in every field, small car business is one among them.

1. There are companies who make the things happen.
2. There are companies who watch what is happening?
3. There are companies who wonder what has happened.



**Third Phase: Attracting internal and external customers:**

- To, capture the market the MNC adopt any of the managerial activities and any of the tricks adopted earlier or the new one suiting to that present situation.
- The carmakers like Mercedes, Ford, GM, etc. have very high remunerations and perquisite packages for their employees. It can lure any talented mind.
- Target oriented achievement award is but a common phenomenon in MNC in the event of any big expansion of their previous base. Any individual achieving it is always been presented with hefty sum and other advantages to that employee as well.
- These were only the dream perquisites for the employees and the technicians in India earlier.
- To retain good internal customers these MNC go at any stretch. Many MNC has offered the shares up to 1% stake to as many as 20 odd good technicians in the computer organizations. Many offer a house with all five star facilities including swimming pool and the luxurious cars with petrol. Many offer Medical reimbursements, book allowance, newspaper allowance, laptop computer allowance, etc. The surprising fact is many Indian employees got lured with these facilities and left their earlier government employed job as they compared the sum earned to the amount paid at MNC in a year in their whole life. Such is the glamour, money and attraction MNC put in the job offered for their companies.





➤ When we study these MNC in details we find that they have one or more common organisational objective among the following:

- a. Maintenance of industrial leadership,
- b. Services to customer,
- c. Growth,
- d. Long run profit increase,
- e. Favourable public image
- f. Diversification of corporate activity,
- g. Employee welfare and satisfaction,
- h. Securing a balance between Government, domestic and foreign business,
- i. Enlargement of size of market,
- j. Developing new technology to benefit customers, etc.

Fourth Phase: retaining customers:

This forms the very important step. It is the step in which the multinational carmakers like GM and Ford from USA and Toyota and Mitsubishi from Japan give their customers new model of the car every six months.

- MNC carmakers bring out a totally new version of a car or an advanced version of that car in the market.
- The old version of car is given special concessions to upgrade the newer facilities.





- Many a times new version of car has very attractive features and customers are given special discount to sell the old version and to replace it with new car model.
- Thus resale value concept is aptly utilised.
- These multinational carmakers are spending huge amount of their annual budget, on the Research and Development (R&D) i.e. GM spend almost 7% of their annual budget, Ford spends 3%, Honda 5%, Mitsubishi 3%, Mercedes 7%, and so on.
- The workers are given incentives and awards for the development in any sector of the car manufacturing, sell, process.
- Infact look at the marketing objectives of all these MNC they have at least one among the following marketing objectives for which they strive the most:
 - a. Establishing new customers,
 - b. Develop new product with high quality of customer satisfaction,
 - c. Develop new kinds of services,
 - d. Decrease the cost of services to customers,
 - e. Increase the public awareness of the company activities,
 - f. Increase the awareness and availability of product,
 - g. Servicing and retaining old customers,
 - h. Welfare of hardworking marketing department,
 - i. Establishment of an image for the firm, division or product.
 - j. Move from consumer satisfaction to consumer delight, etc.





- Whereas, in India HM and PAL are running their 1940's model. The R&D spending are almost negligible since last half a century.

Now these companies have also realised these facts and are upgrading themselves up to this standard set by these MNC carmakers.

Fifth Phase: trying for total Customer satisfaction:

- These are the days of customer care. Customer is a king. The carmakers like Hyundai, GM, Ford, Mitsubishi, Toyota, Daewoo give value for the customer money at every step. Infact they try for the Total Customer Satisfaction (TCS). The Mercedes people actually sell delight to their customers. To, elaborate this, it is necessary to look at the services given by these organisations. The services given for the Preventive Maintenances include periodical servicing of the car, periodical check up and replacement of the parts.
- The services given for the Breakdown Maintenances are phenomenal. These organisations give twenty-four hours services to these emergency needs; which includes accidental services as well.
- Every time customers are given home delivery option.
- The timely deliveries of the serviced cars make customers feel they are really the bosses.
- Financial help is also given for buying and yearly maintenances.
- Thus, in this phase every giant MNC follow the kind of model, which is predicted below. They target customers and fulfil their needs till that





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customer gets the satisfaction or even MNC try for total customer
satisfaction even customer delight as in case of Mercedes and Rolls Rice.



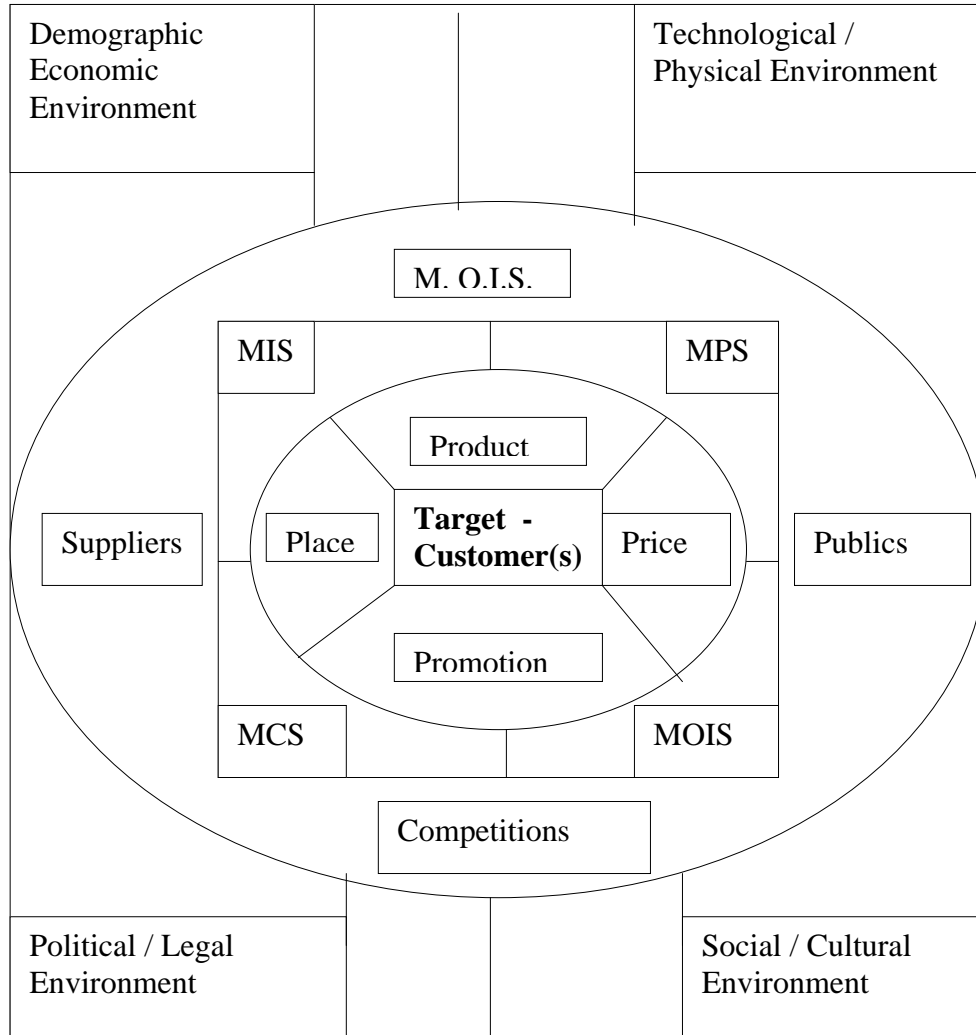
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Look at the diagram what exactly MNC adopt while targeting the customers.

Diagram 9.1: A TYPICAL MNC MODEL OF TARGETTING CUSTOMERS





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Diagram 9.1: Description: Please read, MIS = Management Information system, MPS = Marketing Planning System, MOIS= Marketing Organisation and Implementation System, MCS = Marketing Control System.

Diagram Interpretation:

Look at the importance given to customers by the General Motors Inc. USA. As shown in diagram customer is the centre of focus and customer satisfaction is the prime target of the organisations. All the four P's Product, Price, Place, and Promotion that is the marketing mix is targeted towards this only. Organisations adopt an interrelated MIS, MCS, MPS, and MOIS, to arrive at better marketing mix. The MNC adapt and adopt all these at micro as well as macro level of its strategy of working. Hence they are successful in international market.

- The Resale activities are also done by MNC for their own cars.
- Replace old car with the new version option by the MNC really make them invincible in the market anywhere in the world.
- Customers get what they expect at every level of their life associated with their car.
- Many middle class professionals like Chartered Accountants, Doctors, Engineers, Pharmacists, Professors, Shop owners, are given three years contract of free servicing.
- Thus, Multinational Companies have realised the following importance of customer satisfaction over a period of time and their business since their inception:



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- a. Faithful customers lead to higher profit margin,
- b. Satisfied customer result in contended employees,
- c. Retaining customer is cheaper than acquiring them,
- d. Product may change but customer will remain for longer time,
- e. Only a satisfied customer will stay with the company,
- f. In modern days, providing services to customer is more important than selling products.

Part 3: THIRD CONTRIBUTION: GIVING CUSTOMER APPEALING TECHNOLOGIES:

From the history of Indian car market it is clear that till Maruti-Suzuki enter the Indian market two Indian players the Premier Auto Limited (PAL) manufacturing FIAT models and Hindustan Motors (HM) manufacturing Ambassador dominated it. The hegemonies of two companies were so much that there was a waiting list of more than one lac to buy these cars that too with their monotonous models.

During PAL, HM dominated market look at the sales figures, service industries and technology provided for the customers.

Table: 9.3: Sales of cars in India till Maruti-Suzuki created its mark in the Indian market: Reference: Auto India September 1997.

SN	Year	Yearly Sales of cars in India
1	1971	38304
2	1975	23075
3	1980	30538





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4	1983	45090
5	1984	64013
6	1985	102456 Maruti created its mark in the market.

Description of the Table:

Till 1983, Sales of cars was in the range of 40000 however once MUL showed the technologies and the services to the Indian customers it literally captured the market.

Table: 9.4: Look at the same figures after Maruti-Suzuki took the market by storm: Reference: Auto India Magazine September 1997.

SN	Year	Sales figure of the cars in Indian market	Maruti's Share (%)
1	1984	64013	29.1%
2	1985	102456 Maruti created its mark in the market.	46.8%
3	1990	176821	61.6%
4	1995	329879	73.7%

Description of the Table:

In 1985, customers got the services and the technologies they wanted since last few years. Hence, they literally jumped over the Maruti cars; hence the growth in the car sells was phenomenal. The cars sells increased by more



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than 50% in only one year from 1984 to 1985 when Maruti made its mark

in the Indian car market. Later on MUL set a firm grip over the market, which can be observed in the later years.

Table: 9.5: Look at the present monthly figures of sales, services, and technologies provided market: Reference: Overdrive February 2002.

SN	Month and Year	Monthly Sales figure	Services provided by the car companies
1	December 2000	41,986	Everything from finances to the at home delivery and at home services.
2	December 2001	42740	

Table: 9.6: Market Share of the cars MNC versus the Indian companies:

Reference: Overdrive February 2002.

SN	Car Company	MNC/ Indian	Month	Year	Sales	Approximate Turnover of that month
1	Fiat India	Collaboration	December	2002	2623	Rs. 105 Crores
2	Ford India	Collaboration	December	2002	1174	Rs. 94 Crores
3	General	Collaboration	December	2002	510	Rs. 51





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	Motors					Crores
4	Hindustan Motors	Indian	December	2002	1150	Rs. 90 Crores
5	Honda Motors	Collaborations	December	2002	879	Rs. 126 Crores
6	Hyundai Motors India Ltd.	Collaborations	December	2002	7139	Rs. 286 Crores
7	Maruti Udyog	Collaboration	December	2002	23994	Rs. 960 Crores
8	Daimler- Chrysler	MNC	December	2002	86	Rs. 26 Crores
9	Tata	Indian	December	2002	5185	Rs. 207 Crores

Description of the Table:

Thus out of Rs. 1800 Crores monthly sales of the cars due to collaborations the Indian companies have actual share of Rs. 800 Crores. It means maximum share is going out of India. This is all due to India lacks the indigenous technology. Also adding woes are MNC manufacture world-class high technologies cars and also provide five star services in the luxury cars segment to their customers. Hence, Luxury car segment is totally been taken away by the MNC carmakers like GM, Ford, Daimler-Chrysler,



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Hyundai, Toyota, Honda, etc. Many more MNC are coming to add burden on India.

Anyhow, MNC dominated car market has forced Indian companies to think and implement the R & D culture. MNC give most importance to customers. However, Indian companies earlier tried to dominate market only with monotonous product.

Ford, General Motors, Toyota like companies prior to launching carry out an extensive Market Research. Various surveys are collected. Customers' needs are very much taken into care. They try to provide those things which customer demand.

FOURTH CONTRIBUTION: PRESENT OUTLOOK OF THE INDIAN CONSUMERS:

1. Though the share acquired by the MNC carmakers is huge still Mr. Ratan Tata the CEO of the Tata Engineering and Mr. Keshub Mahindra the CEO of the Mahindra and Mahindra predicts that it is but a temporary phase. In long run it will be a totally different scenario.
2. Many of the Suzuki cars owners feel that Japanese cars cost less. But, the costs of spare parts are high compared to the cost of Indian indigenously made cars and spare parts as well. For example, Headlight of the Maruti-Suzuki cars are sold at whopping Rs.300/= where as the Tata-Indica headlight bulb cost only Rs.40/= a huge cost difference.
3. With every six months new version of the cars are added by the MNC carmakers. So their customers who are mainly middle class are made to feel that every after three year his car is outdated. No customers want this





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inferiority complex as every commodity bought at such a huge sum in

India is supposed to be a lifetime acquirement in the house.

4. Even after the costs are reduced every now and then and excise duty is reduced still all the MNC made cars cost more by 40% higher than the cost of the Indian made cars. E.g. Tata-Indica costs Rs.313500/= where as Daewoo costs Rs.414000/=.

5. MNC carmakers invest huge amount in the Robotics, Automation, and Computerisation while developing the cars and Manufacturing. Thus, the most conscious consumer in India has realised that it is but a total exploitation of all the Indian resources. Thus the all-important customers feel that they will also get exploited in the long run.

FIFTH CONTRIBUTION: DEMAND OF CUSTOMERS FOR TOTALLY INDIGENOUS CARS:

1. In a huge survey carried out recently the MNC car buyers have decided to shift to the Indigenously made cars provided the indigenous carmakers give the same kind of services to these customers. Especially mentioning the Indian indigenous companies are trying hard to achieve this competition level and so customers have started the shift to these cars manufactured by the Indian companies.
2. Behaviour of Consumer shows that in this car market consumer is but the king, the boss even some calls it as the god. Loss of one customer is but the loss of many more in the explosion of the Information age.

The day is not away in the Indian car market, when the consumer will dictate the terms about how the car should be, which engine it must





have, which colour his car must be painted, which gear box his car must have, which steering system car must have, which shape the car must be given, etc. Whatever the services rich Rolls Rice owners are getting may be in future the common car owners will also get. It will be a big revolution in the car market.

3. Car consumers in India have started speaking about siphoning of money out of India by the MNC carmakers.

4. Few consumers feel that buying a MNC foreign made car is but buying a dependency on that country. As every now and then consumer has to look for the product from that hub country.

a. In a broader perspective Indigenisation of each and every part of the product gives the Indigenous Technocrat, Management personnel, Services personnel of the cars will make the Indian consumer get their value for the money and satisfaction at lower price.

a. This means the job prospects for the Indian jobseekers will increase. All the resources will revolve in India only. If exported it will bring all-important foreign currency to India.

b. Keshub Mahindra and Rahul Bajaj feel that within the span of two decades few of the Indian Indigenous carmakers will become huge multinational organisations.

c. The technology developed by Indians supposed to be the cheapest in the world. E.g. Car made by Tata Engineering is the cheapest in its class, Satellites developed by DRDO are the cheapest in the world,





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Super Computer developed buy the CDAC is the cheapest in the

world, and so on.

5. Few consumers who are engineers, doctors, lawyers, architects, chartered accountants though less in number feel that the robotic technologies, the computer and information technologies also be slowly and steadily indigenised. It got the boost when Italy, which is totally dependent on the foreign source of electricity, went into total darkness on 26th September 2003 there will be whole black out on the technology sector in India as well. Similarly if Indians do not manufacture the cars indigenously its professionals and the movers and shakers of the country will become totally dependent on the foreign source and will lose their say in the country.

6. One survey revealed that all the Indian consumers are expecting totally Indian made car to dominate the Indian car market. Customers are also expecting the services at much cheaper rate than the Japanese, Korean, and American MNCC charge for the same activity. As customers feel that to satisfy consumer expectations, the MNCC charge hefty sum of money, which Indian middle class and majority car owners cannot afford after some time limit.





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CHAPTER 10:

BRINGING INDIGENOUS CAR TECHNOLOGIES UP TO PRESENT WORLD NORMS AND QUALITY STANDARDS



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10.1: NORMS AND STANDARDS:

The true civilised and cultured citizens of any country are those persons who take their every action within the framework of the human limitations. Since aeons humans in the every corner of the world are trying to decide the limitations of the use of every opportunity, every human values, every moment, and every resource. These limitations decide the fate of the technologies. These limitations save the mother earth from the environmental and other hazards. That is why in every country the quality standards were decided. In Japan i.e. JIS the Japanese International Standards. In India is BIS i.e. board of Indian Standards or simply IS i.e. Indian Standards. While on the world level it is ISO i.e. International Standard Organisation.

Most important thing is to achieve this level in any country great efforts are needed. Similarly to achieve Quality, at the ISO level, a great number of activities are to be performed, right from the market survey to final despatch and trial at customer place to total customer satisfaction. Various departments perform these activities. Requirement of exercising control on existing product and situation is one aspect for which co-ordination of all concerned is necessary. If a change is desired separate teams or committees may bring it about. However, in both cases proper set-up of organisations and obtaining co-ordinations amongst all is must. It thus becomes necessary to install set up for quality system and obtain co-ordination among them. Quality system can be different for nature and scope of work



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E-BOOK- ISBN: 978-93-5235-441-2. COPYRIGHT TO AUTHOR- DR. ASHISH MANOHAR URKUDE in the organisation like manufacturing product, manufacturing and testing, only testing etc. ISO 9000, ISO 14000 and OHSAS 18000 series which are a set of standards accepted internationally can help enterprises select their own quality standards plan and have transactions globally placed. It has been experienced that after obtaining these level enterprises have had beaming customer with satisfaction with boost in employee moral, higher profit and lower manufacturing cost with reduced input energies.

Table 10.1: Standards used to bring organisation on the world level:

SN	ISO Standard	Description
1	ISO 9000 series	It mainly deals with the designs, organisational structure, planning activities, responsibilities, practices, procedures, resource system and maintenances of the plant and working system of the company. These activities are primarily done for developing, implementing, achieving, reviewing, and maintaining the company to compete in the world market. In its earlier version , ISO 9000 and ISO 9004 give guidance to all organisations for quality management purpose in an enterprise. ISO 9001, ISO 9002 and ISO 9003 were used for external quality assurance purpose in pre-contractual, contractual and post-contractual situations. Hence, these quality management systems can be Installed, Operated and





		<p>Evaluated as well. However, since ISO 9000-2000, all the norms are combined. Thus, Model for the Quality Assurance in Design and Development, Production, Installation and Servicing and Model for Quality Assurance in Production and Installation and Model for Quality Assurance in Final Inspection and Test and Quality Management and Quality Systems Guidelines for internal Quality Management purpose are combined to form one ISO-9000-2000. Thus, company gets ISO-9000-2000 only if it satisfies all the mentioned standards.</p>
2	ISO 14000 series	It mainly deals with the Environmental Management System (EMS).
		ISO 14001: It gives EMS specifications and guidance for use.
		ISO 14004: It gives general guidelines on principles, system and supporting techniques.
		ISO 14010: It gives general principles and guidelines to Environmental Auditing.
		ISO 14011: It gives specific guidelines for environmental auditing, Audit procedures, and auditing of EMS.
		ISO 14012: It gives guidelines to environmental





		auditing and qualification criteria.
3	OHSAS 18000 series	OHSAS stands for the Occupational Health Hazard and Safety Management System. It is done to improve safety and improving productivity of the organisation, which treat their workers as the greatest asset.

Description of the Table:

Since, 1994 many Indian companies acquired the ISO norms certifications and have been successfully maintaining it. Thus, showing the international competence among them.

From the table it clear that ISO 9000-2000 ensures that the organisation, its plants, its system, its resources, its procedures of working are tuned to near perfection so as to achieve maximum quality product and/or services.

Next comes the ISO 14000 series and OHSAS 18000 series. Day by day environmental conditions on the mother earth is under going rough patches as far as ecological balance is concerned. Environmental conditions are deteriorating while every passing year. However few corporate are sensible and responsible as well. They have already started working on these norms. Infact these corporate triggered the development of the EMS and the OHSAS norms. Few among them are Yamaha, Honda, Ford, GM, and Toyota. They are investing millions in these projects. They are wishing to excel in the environmental and safety performances. Though few are already certified with the ISO 14000 certifications. Still these organisations always try to be





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above these norms so that another stricter norms in future can be developed.

Few organisations have started to integrate both ISO 14001 and ISO 18001 so as to have one operational standard for both the important systems.

Looking at the genuine effort by few companies, even Ministry of Environment in India and few other nations ministries and even WTO Trade Agreement are also considering the strict environmental stipulations.

The EMS under the ISO 14001 has yielded multiple benefits to Yamaha, Honda, Toyota, GM and Ford in their plants in their own countries. It improved the operational efficiency, better utilisation of material and resources, reduced cost and wastage, improved staff moral. It also enhanced the corporate image

Considering all these benefits the originations engaged in the indigenisation of the car EMS and OHSAS should be given due importance right from the word go. It sll be moulded into the employees and the employers right from the start. Thus, the companies involved in the indigenisation would remain at the highest world standard from the start. While those involved in this act since long will improve their standards to this level as quick and steadily as they can. Infact every person related to this act of indigenisation of the car should realise that they are also customers of that car. Hence, EMS and OHSAS assumes all the more significance for them and their company.

Certification Process for these ISO and OHSAS:





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Generally all the above-mentioned standards have someway or other

following procedure.

Table 10.2: Tentative Time Table for obtaining ISO and OHSAS:

SN	Process	Maximum Time Allotted
1	Preparation Process	Up to 24 Months
2	Application	3 to 5 Months
3	Quality Document Review and Assessment	1.5 to 2 Months
4	Assessment Report and Failure and Corrective Actions	4 to 6 Months
5	Reassessment and Certification	0.5 to 1 Month

Special Note: In India Board of Indian Standards (BIS) offers the Audit Services, apart from other organisations.

Why OHSAS and EMS like Standards be applied to indigenisation of car technologies and manufacturing organisations?

The main reasons to implement EMS and OHSAS in India are:

1. To reduce the monetary loss. As there is an estimated loss of 4% of GDP in India due to industrial accidents and disease.
2. To reduce the human loss. As, every 5 minutes a death takes place at the work place at the work in India.



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3. To start this kind of thinking ability right from the very basics of the work like designing of the cars till the end like emitting environmental friendly exhaust. Once such mind frame is developed future generations get automatically benefited.
4. *To built company image in minds of customers.*
5. *To bring positive competition among the companies to attain these standards, which are beneficial to human kind and the mother earth.*
6. To bring mutual sustainability between the environment and the organisations.

10.2: EXAMPLES FROM COMPANIES WORKING IN INDIA:

Not necessarily these companies are involved in indigenisation of cars still as they are working in India their examples are quoted here as inspirations to others. (Reference- India Today- February 24, 2003- pp- 48)

EXAMPLES FROM TWO WHEELERS:

1. Yamaha Motors: One of the first companies in India to implement these norms is Yamaha Motors India Ltd. Technology used by Yamaha is not indigenous. The OHSAS-18001 in place at Yamaha Motors is for the well being of the employees for the company considers them the greatest asset. Implementations of *ISO-14001 and OHSAS-18001 together helped Yamaha Motors* in reducing costs, reducing staff absence, increased productivity, improved insurance liability rating and a *positive response from the customers*. For Yamaha, implementation of these systems ensures mutual





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sustainability between the environment and the company. After these implantations Yamaha have it's advertisement placed as –‘ Go Green Go Safe Yamaha Way’.

2. Hero Honda: It manufactures two wheelers in India. Hero Honda stressed more on emission norms. Hence, they brought significant changes in the design of the engine and its components manufacturing technologies.

However or this purpose instead of going indigenously Hero group went to Briggs and Stratton company of USA. They tied up. Now they have come out with environmental friendly new design of the engine. The engine gives better fuel economy, reliability, low initial cost, and compliance, with strict emission norms on the Indian roads.

On the manufacturing front Hero Honda people are using latest high-pressure die casting technology instead of gravity casting the conventional old technology. Now, Hero-Honda advertises it as – ‘Burn Lean, Emit Clean is Hero Global Design’s Mantra’.

Thus, Hero Honda modified their design of the engine and manufacturing procedure from the inspiration of ISO-14001 and for the Pollution Under Control (PUC) certification for their two-wheeler on the Indian roads. However they did it by importing technology from USA.

Same thing is possible in the cars as well. However the proceedings should be indigenous. Why cannot Indian engineers design the same engines after several exposures in India itself? They can and they will.

EXAMPLE FROM FOUR WHEELERS:



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1. Ashok Leyland: Infact it is the first company in India that is truly engaged in several environmental friendly activities. As it manufactures 60 models of truck, as it carries 70 million passengers of the Indian roads which is more than the railways, as it manufactures more than 80% of the Indian buses, as it is manufacturing military vehicles; with true responsibility Ashok Leyland has brought pioneering changes in the design, development and manufacturing in the bus and truck industry. It is one of the first companies in India to manufacture CNG buses, which are eco friendly. Now all its trucks, buses and other vehicles are fitted with state-of-the-art pollution control devices. In their plants also Ashok Leyland has fitted effluent treatment plants to recycle and reuse the water up to 1.7 million litres. Now, it has introduced Hybrid Electric buses in Delhi. Apart from this, every customer is given 'Green book' that provides information on the vehicle maintenances. The company is engaged in Driver Training for environmental driving and maintaining the vehicle. The Centre is located at Namakkal, which was established in 1995. Due to all these efforts after wining ISO 14001, Ashok Leyland was awarded the Golden Peacock Environmental Award 2002 of the world environmental foundation for its Bhandara Unit, near Nagpur.

Thus, Ashok Leyland is busy with building eco-friendly technologies and is awarded for that as well. It is engaged in imparting the knowledge to use their product to its customers who drive their vehicle. Thus it is engaged in





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awareness drive as well as in bringing expert eco-friendly drivers on the road.

This has built its corporate image and the loyalty of the customers.

2. The Maruti-Suzuki: It looks like, in collaborations with the Suzuki Japan, Maruti is trying for OHSAS-18001. Already Suzuki has more than fifty percent stake. At Maruti, adequate measures have been taken to ensure that the operators at the manufacturing facility do not get exposed to a noise level beyond the regulatory limit of 90 decibels dB (A) for eight hours especially in areas like press shop and compressor house. Solid waste having sales value are sold off to recyclers while solid hazardous waste having no sales value are incinerated. A special drive for segregating the waste paper at source, collecting and sending them for recycling has made it possible. The components having source around the world or from any corner of India are brought into recyclable bins to reduce packaging waste. To recharge aquifers, measures have taken to harvest the rainwater through soak pits, recharging shafts and water lagoons. In terms of energy conservations, energy consumed by every Maruti vehicle manufactured has been significantly reduced. It uses natural daylight for shop illuminations, energy efficient welding guns, optimisation of compressed air generation and usage, optimisation of steam pressure, optimisation of efficiency in shop floor air cooling, and compact designing and introduction of cata-burn system for better consumption of gas in oven. Suzuki has brought a state of the art effluent treatment plant and sewage treatment plants in the Maruti factories. In this instead of discharging water treated in these plants, it is



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E-BOOK- ISBN: 978-93-5235-441-2. COPYRIGHT TO AUTHOR- DR. ASHISH MANOHAR URKUDE further treated to make if of process quality for reuse in manufacturing. The

sludge generated is used as manure for the horticulture. Other initiatives for water conservation include recovery and reuse of overflow of water from cooling towers, robots, etc., and introduction of ultra filtration modules in plant shops, modification of toilet flushing system, to lever type and electronics eye type, and optimising flow rate of potable water as per requirements.

10.3: EXAMPLE FROM FOREIGN MNC:

There are many companies who are on the path of the above mentioned environmental path of these Volvo is one among them having most appealing aspects in this regard.

1. JOURNEY OF VOLVO'S ENVIRONMENTAL FIRSTS PROGRAMME

Volvo's GM claims, "Volvo's care for the environment is a logical extension of Volvo's care for people. We continually explore ways to lessen our impact on the environment. We've established rating systems and control tools that help us assess the environmental impact of our design and production decisions. And we diligently train employees to put sensitivity toward the environment in everything we do".

Volvo Environmental Milestones:

- 1972 – First automaker to declare environmental commitment at the





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United Nations Conference on the Environment

- 1976 – Volvo unveils first 3-way catalytic converter to eliminate 95% of harmful emissions
- 1983 – Volvo introduces an environmental policy
- 1987 – Volvo introduces chemical purification system at Torslanda
- 1989 – Volvo introduces environmental audits at production sites
- 1989 – Volvo facilitates recycling segregation by marking plastic parts
- 1989 – Volvo is first to reduce solvents in corrosion protection materials
- 1990 – All new Volvos are asbestos-free
- 1991 – Volvo opens an effective waterborne paint system at the Torslanda paint shop
- 1992 – Volvo introduces Environmental Concept Car
- 1993 – Volvo introduces R134A retrofit kit and receives Ozone Protection Award from the EPA
- 1996 – Volvo introduces test fleet of Bi-Fuel (methane and gasoline) cars in the USA
- 1997 – Volvo introduces environmental training program for employees at Volvo Cars of North America
- 1998 – Volvo introduces the world's first third party certified Environmental Product Declaration
- 1999 – Volvo first automaker to have vast majority of (model year 2000) Cars to be LEVs (Low Emission Vehicles)
- 1999 – Volvo introduces ozone conversion radiator, PremAir®





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- 1999 – Volvo adds used parts to an exchange program
 - 2000 – Volvo Cars of North America Headquarters is certified according to the international environmental standard ISO 14001.
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CHAPTER 11:

TECHNOLOGIES SPIN OFF: INFLUENCE AND CONTRIBUTION OF CAR TECHNOLOGIES TO THE OTHER TECHNOLOGICAL FIELDS



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11.1: What is Technology Spin-Off?

Once Michael Faraday was giving practical of his new invention- the armature of the generator that could generate electricity once its magnets when rotated. One of the critic asked him, “Michael what is the use of these unnecessary inventions?”

Faraday stopped for a moment. Then he suddenly went near a lady holding her child on the chair. Brought that child over the dais. Then he looked at that critic and said, “ Sir, this new invention is like this child. As its mother grooms him so will be the future of the child. Similarly you may think about this new invention”.

It was thought to be a fitting reply to all the critics.

Later on the same armature though in bigger size than the invented is generating millions of Megawatt of electricity in hundreds of Electricity Generation Plants around the world.

Now a day, the same technology is used in the dynamometer of the cars and the bikes, the household generators, in the toys.

Thus, proving the point of the inventor Mr. Michael Faraday.

It also proves that every technology has multiple uses. These **unintended applications of any newly invented technologies are known as the Technological Spin-Off.**

All the new technologies of present generation have multiple uses take example of the microprocessors it is used in Computers, Electronic





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Machines, Mechanical Machines, Military Systems, Medical Equipments,

and even in the toys and few more advanced technologies.

11.2: The typical case where Founder is Car industry and Spin-Off elsewhere:

Technology Spin-Off not only gives creative joy to the scientists and the inventors and the developers but also can trigger the socio-techno-economic development of any country.

It was the Car where lot of the newly invented technologies were basically thought of and implemented first and then only in other fields. Few of them are given below:

Table: 11.1: Car Technologies and Spin-Off:

SN	Car Technologies	Its Spin-Off application
1	Assembly line method for the car manufacturing operations	This method is now day used even in the TV, Computer, and other manufacturing industries.
2	Integration of the electronic technologies and the mechanical assemblies that glows lights, blow horns, applies electro-mechanical clutch or	The same technique is used in the Railway system Brakes, or in the Elevators, or in the Industrial Lifts, etc.





	brakes, etc.	
3	Battery Charger through continuous moving car dynamometer and its charger meter.	The same technique is used in few medical equipments, naval systems, aeroplanes systems, and in toys and agricultural equipments.
4	Multicoated painting on the sheet of the car to make it all weather proof	The same technologies are been used in the washing machines and other machineries. Few say it is derived from the aeroplanes while few claim these have cars at the origin.
5	Turning lights	General Motors brought it for the passenger and pedestrians' safety in USA and it became the hallmark in every other vehicle in the years to come.
6	Headlights	Brought by GM in USA and again implanted in several other vehicles.
7	Wiring harness i.e. the distinct coloured wire used for the distinct purposes	Every colour is mean for its unique purpose. Like black is meant of the earth, red for the live wire etc. This made the development of the several electrical equipments easier for the next generation.





8	Air field tyres	This reduced the road resistance and the air resistance to the cars. It was then used in other vehicles and even in the lifts like equipments.
9	Tubeless tyres	It was developed for the heavy-duty cars used on the racing tracks. Later on it was used in the military vehicles and in other vehicles too.
10	Burglar Alarm for touch of an alien person	It prevented the car theft. Hence it is now used in every commodity to avoid the theft.
11	Aerodynamic back view mirrors and other equipments fitted on the car	Aerodynamic shape given to the back view mirror reduces the air resistance of the car by at least 1%. This becomes huge in the bigger vehicles.
12	Radiator to cool the car engine	It has literally changed the designs of various machines. Now a day cooling systems are used in various machines.
13	Air-conditioning in the moving car to add comfort level for the customers/ passengers	It improves the customer satisfaction level in the luxury cars. Now a day this a.c. is used in all the other vehicles.
14	Even the Robotic	It was the BMW, which first stressed





	Technologies used to manufacture and assemble more than 30000 car parts was revolution around the globe	more on these technologies. Later on every other manufacturer started the same trend in their plant. Now a days this technology not only finds place in electronic industry but also in pharmaceutical, medical equipment manufacturing, metallurgical and other industries.
15	Windshield Wipers	It was first used in the cars. Now they are used in every moving vehicle or even on the spectacles.
16	Custom built cars was the idea implemented by Rolls Royce and BMW first.	This idea took world by storm. Every kind of machinery developed found these kinds of customers. Thus, also increased the use of the IT in the Car field.
17	Extreme use of IT to satisfy customers needs	Car industry is worth one trillion dollars in the world. The customers having different tastes and requirements are hard to satisfy. Hence all the new gadgets, including CD player, Music systems, LCD screen video conferencing technologies, GPS





		controlled auto pilot option, Maintenances schedule, Breakdown Maintenances, Every thing is planned using the IT. Looking at the success, other industries also are trying to reach the customer satisfaction level of their customer suing the IT.
--	--	---

Hence, there are number of such applications which find the base in the car technologies around the world and then they are been spin off in other fields such as in:

- Medical Professions,
- Education Profession,
- Law and order,
- Parliamentary affairs,
- Defence Sector,
- Banking sector,
- Arts and the list is unending.

11.3: The typical cases in which founder is not the car industry and spin-off brought technologies in the car industry:

Table 11.2:

SN	Technologies founder industry	Its Spin-Off application in the Car industry
----	-------------------------------	--





1	Seatbelts in the aeroplane for safety.	Seatbelts in the car for safety.
2	Control Panels of cruise controls	Dashboards and control panels in the cars
3	Autopilot aeroplane	Autopilot cars
4	Global Positioning System (GPS) used in the Aeroplanes in the sky and the Ships in the sea.	GPS is now day used n the cars as well.
5	Computerised fuel injection system (FIP) in the fighter aeroplanes.	FIP in the luxury cars controlled by the microprocessors.
6	Ergonomics concept of the fighter aeroplanes to save space and to get maximum efficiency with minimum efforts.	Ergonomics in the cars have the same aim of efficiency and to give more comfort to the driver and the passengers.
7	Joystick controlled aeroplanes.	Joystick controlled cars.
8	Electro-mechanical braking systems in the aeroplanes and in the ships.	A car from Renault finds this application to reduce the efforts of the driver and to achieve precision in the braking.





9	Remote controlled car used in the toys.	Remote controlled cars have become facts.
10	Tubeless tyres used in the military trucks.	Tubeless tyres are now a day used in the cars.
11	Aluminium body for the aeroplane for the lighter weight and fuel efficiency and speed.	Aluminium body of the engine, of the car, has become the reality.
12	Navigation system and traffic management to avoid accidents of the ships in the seas and oceans and to avoid accidents of the aeroplanes in the skies.	Navigation system for the cars in the crowded traffics of the cities has become the necessity. Infact the traffic management has become the critical job in many cities.
13	Aerofoil shape wings of the aeroplane.	Aerofoil shaped bonnets has been successfully designed.
14	Amphibian Vehicles used by the naval authorities to run on the road as well as on the water like the Hovercraft.	Recently a new car is developed which can run on the roads and then with special modification it can run at faster speeds on the waters as well.

11.4: Demand of customers for the spin off:





One of the few examples of the technologies that had the demand, as an idea from the customer/ customers' side can be the technologies used in the Formula One (F1) race into the general customers needs. In this case customers demanded that the speed, braking technologies and the aerodynamic shape to the car must be implemented in their luxury cars as well. Immediately Ford, BMW, Mercedes-Benz, Toyota, Honda, GM, Renault brought those technologies from exclusive purpose for exclusive people to the general customers as well. The luxury cars have been fitted with disc brakes on all the wheels; the cooling system of the formula one racing is developed for the luxury cars, the aerodynamic shape and high speed engine is fitted in the ultramodern cars.

11.5: How did the technologies spin-off started?

Once Mr. Henry Ford said, "Car is the best creation of the human being". Thus, saying he modified the manufacturing concept in the plants by bringing in series of technologies. It was the first time adopted in the industry then it was followed in the other industries.

It was the Ford's Model T, the machine meant for the masses than the classes, which was the most popular among even the higher middle class people. Thus slowly it was conceived that Ford's Model T car was meant for the common man. Remember, it was developed in an era when car was meant for the only high-class/ exclusive class people. It happened only due





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to the mass production system of assembly line method used in Henry ford's
factory. This started the age of Spin-Off.

Later on this method was used in Radio manufacturing plants, telephone
manufacturing plants, etc. The thought behind it was that if it was
applicable in one field then some way or other it will be applicable in other
field too.

The devoted scientists developed these technologies in every field. Vigorous
R & D efforts in the competitive market have brought unlimited technologies
and their spin-off of and from the cars. Ultimately it is helping the humanity
in the longer run.

11.6: The Car Engine: One of the most prominent example of technological Spin-Off:

Remember the prime mover of the car is its engine. Engine has more than
ten thousand part in it right from the screw to the piston.

Thus, car engine is composed of ten thousand basic components and hence
stands at the middle ware of the technologies.

The Car Engine also forms the major Spin-Off technologies for the following
cases:

- a. The Engine of the car also forms the basis of the power generation from
the Generators, which manufacture the alternating current of Electricity
that is used in every household devices and devices of the industrial houses,
- b. The Dynamos for the direct current,





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- c. The Compressor for the air conditionings and cold storage devices,
 - d. Hydraulic devices used in power lifting or braking,
 - e. Pneumatic devices used for the lifting, elevating and braking,
 - f. The Elevator Technology also based on few techniques used in the Automobile Engines,
 - g. X Ray machines use this technology,
 - h. All the Electricity manufacturing Power plants, Atomic Reactors, and all Vehicles,
 - i. Medical Devices like artificial hearts and Anaesthesia Doctors use the kind of devices, which use this technique,
 - j. The technique in the Gas Cylinder, Mixer Grinder, and such all-household devices also use some or the other similar kind of technique or kinematics as used in the Automobile Engines,
 - k. Part time Generators and Dynamos used in the houses, machineries and the big industries,
 - l. The pollution control measure taken for the exhaust fumes from the Automobile Engine also forms the basic of Environmental Technologies used in varied fields of the Industries such as Powerhouses, etc.
 - m. Amalgamation of the Electronic and Mechanical Devices technologies in the car has become the base for the industrial development, of which computer and information technologies are the epitome of today's age.
- So there is no end to this listing.



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11.7: What does it proves?

Experts around the world except that there are following kinds of technologies present in the world:



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Table 11.3: Types of Technologies:

SN	Type of Technologies	Explanation
1	Zero Technologies	It includes the screw, the nut, the plates, and the rods manufacturing technologies.
2	Basic Technologies	The small assemblies manufacturing technologies like the fan and the electric motors.
3	Middleware Technologies	The small cars, the mechanical washing machines, the mechanical printing machine manufacturing technologies.
4	Higher-End Technologies.	The Super Computer, The missiles, The atom bombs, the Luxury cars equipped with latest gadgets, the fighter planes, the passenger planes and the space age technology manufacturing technologies.

From the table it is proved that once India masters manufacturing the cars it will have mastered the Zero technologies and the Middleware Technologies. It will generate huge revenues and the jobs and the social stability in India. As even the small screw if manufactured for the export point of view it will set up the million-dollar industry thus benefiting at least twenty odd people of India.





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Similarly, Zero based, basic, and High-end technologies can make India a technologically advanced country in the world. The skilled and unskilled workforce will get the jobs in millions. As the number of cars if increased will also increase the multiple jobs for its multi-thousand parts, for the servicing for the garages for the repair and for the R & D in the car industry. It shows that India will become self-reliant on the Socio-Techno-Economic front if this project is implemented sincerely.



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CHAPTER 12:

LEGAL ISSUE

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When the Engineers and Management experts study the Legal side of the

Cars they come across following things.

Most important aspect of this Legal side is India must prepare itself for the next generations of the technologies from the Law side as well. For this purpose two important research papers were published. One in the All India Reporter Journal a Premier Law Journal, other in the Seminar AUTOTECH 2004, conducted in the Institution of Engineers (India). The highlighting aspect being even the Senior Advocates of the Rank of Supreme Court agreed on both these Legal Issues and even the very Senior Engineers in India also agreed on the same issue. The Legal issues are:

Part 1: Amendments required in the Motor Vehicle Act-1988 as amended by the Motor Vehicle (Amendment) Act, 1994.

Part 2: Critical Analysis of Law Education for Laws for Technologies in India

PART 1: FURTHER AMENDMENTS REQUIRED IN M.V.A. -1988 AS AMENDED BY THE MOTOR VEHICLE (AMENDMENT) ACT, 1994.

For this Project, from the Automobile Engineering and Management point of view, researcher studied the 'Motor Vehicle Act (M.V.A.)- 1988, as amended by the M.V.A., 1994'.

According to researcher following amendments are necessary in the 'M.V.A.- 1988 as amended by the M.V. (Amended) Act, 1994'.



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These are independent findings of the researcher. These amendments

certainly can make the M.V.A. foolproof from the Legal, Engineering and Management point of views.

**Suggestion in M.V.A.- 1988 as amended by The Motor Vehicle
(Amendment) Act, 1994. –**

**Bare Act – Chapter 7- Construction, Equipment and Maintenance of
Vehicle.**

Suggestion First:

Section 110, which deal with power of central government to make rules.

Sub section- 1 – Clause (c) – brakes, steering gear,

Lacunae- The use of words “steering gear”,

Suggestion: Instead of Steering Gear we must use the words “Steering System”.

Reason- 1. In the Automobile Engineering, Steering Gear is a very small part of the whole steering system. Steering System consists of almost a couple of dozen parts bigger than steering gear. These are steering column, steering wheel, and bigger gears like rack and pinion. It also consists of ball bearings; power assisting system, collapsible steering system, track rod, etc. Therefore, if you use ‘Steering System’, which can be the apt wordings, then M.V.A. can become more full proof from the technical point of view, as well.

Reason -2. In many recent technologies you won’t even find these complicated gears system, as they are electro magnetically driven. So, again





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'Steering System' becomes the perfect wordings. Steering System means

guiding the vehicle in specified direction according to the conscious will of the driver.

In much advanced technological case, this direction is already feed in the computerised system that controls the vehicle. Hence the system acts as 'automatic pilot' or 'automated driver', in a pilot less Aeroplane, i. e. Autopilot Aeroplane. Similar is the case with the Auto Pilot Car. In both of these cases also "Steering System" will be the foolproof wordings.

Therefore substitute the word- "Steering System" in place of Steering Gear.

Second Suggestion:

Section 110, Sub section- 1- Clause (f) – Speed Governors.

Lacunae: Use of the words, 'Speed Governors'.

Suggestion: Instead of Speed Governors we must use 'Speed Controlling and the Fuel Injector System'.

Reason: For, 'Speed Governor' is again a smaller part of very big fuel control system and the speed controlling system. This Governor is that small part of the system which by its centrifugal action controls the proper fuel injection in the I.C. Engine to control combustion and hence power and the speed of the Engine.

This system comprises big parts like Cam shaft, Rocker arm, Tapping mechanism, Fuel Injectors, Springs, etc.





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So, again the apt wordings will be ‘Speed Controlling and Fuel Injection

System’ or ‘Speed controlling and Fuel Atomising Governor System’.

Remember, there is no such thing in Automobile, which can be called as speed governor. As technically this is a simultaneous cohesive action performed as per the will of the driver. Driver controls the speed of the vehicle actually by proper control of Accelerator pedal, Brake pedal and Clutch pedal. Thus Human Driver Governs the Speed. Because of these controls, Speed Controlling and Fuel Injection System acts in unison and controls the vehicle speed and the fuel injection inside the vehicle, to run the vehicle at its proper speed and with proper power as per the need which driver thinks to be fit in those conditions.

Therefore, substitute the word Speed Controlling and Fuel Injector Governing System instead of Speed Governors.

Third Suggestion: During his research, the researcher has visited several hospitals and found very horrible cases. Specially, the Private Nursing Homes are not ready to give the Medical Help to the victims who are injured in accident. Sometimes the accident took place in between two cities/villages where there is no possibility of Government Hospital and therefore even though the Doctors were available they were reluctant to treat the said victims because the doctors do not want to get harassed by the Police authority or R.T.O. authority and hence in such cases even if the initial injury was minor the person loses their lives because of not getting





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timely help and therefore some protection is necessary to these doctors also

and therefore following amendment is necessary.

There must be humanitarian provision in case of accident of fatal injuries.

There should be a provision in M.V.A. 1988, if a person is dying in the accident.

Proposed amendment is as under:

Notwithstanding anything contained in this Act or in any other law for the time being in force it should be lawful for any person to give medical help to the victim in the accident without following any procedure in this Act and in other law.

Fourth Suggestion: During his research researcher has visited several factories and found that there are distinctions in cars in their organisations. But there are no distinguishing features made in M.V.A. 1988 for the small cars, middle cars, luxurious cars, etc. and all cars are brought under only one category and that is Light Motor Vehicle (LMV), i.e. Vehicles up to 7500 Kilogram Weight. So, **the proposed amendment is,**

L.M.V. should be further divided into small car segment, middle car segment, luxurious car segment, etc.

Fifth Suggestion: As a Management student researcher has one more suggestion, it is related to transparency of prices and profit the companies make. So the required amendment is:

Notwithstanding anything contained in any other law it shall be the duty of the manufacturer and the seller to give the Material Cost



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Incurred for manufacturing the vehicle and Taxes on it and other

incidental charges to the consumer and to public and the seller shall display all these things on the board.

Special Note: This Research paper was published in AIR Journal in August 2002, issue, on page numbers 227 to 229 in Journal Section. When the authorities of the rank of Supreme Court Level Advocates Accepted the Paper.

PART 2:

CRITICAL ANALYSIS OF LAW EDUCATION FOR LAWS FOR TECHNOLOGIES IN INDIA

Critical Analysis of Law Education for Laws for Technologies in India **The Paper Published in the National Seminar AUTOTECH 2004.**

Engineering has become very vast subject. There are several branches in Engineering, like Aeronautical Engineering, Automobile Engineering, Civil engineering, Electronics Engineering, Electrical Engineering, Mechanical Engineering, Textile engineering, and so on.

There are combinations of two branches in engineering as well. The combination of are Mechanical engineering and Electronics Engineering has become Mechatronics Engineering. Means over the period of every fifteen



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years the branches in Engineering are getting diversified and thus ever-new

branch is developed.

More over, the education of specialisation starts at the time of degree level only. Though at the level of first year of Bachelor of Engineering all the subjects are almost common to every branch; the next three years are focussing more on the specialised branch of the Engineering education.

When, Indian citizen looks at the judiciary side he finds that law has also diversified into many areas like Company Act, Labour Law, Law of Income Tax, Law in Sales Tax, Indian Copy Right Act, Motor Vehicle Act, etc. Most importantly, in every these fields there are thousands of cases generated or developed every year.

One more aspect is the rate of Research and Development in engineering has developed ever-new technologies. The development is so fast that every moment new technology is developed. However the generation of law for the same technology is not so fast. We do not mean ever amendment in the Law so that there will be no Law left. However we mean Generation of Law for the different technologies. At present it is not been done. May be it is not important for the Lawyers but when Engineers find new technologies in the Medical, Pharmaceutical, and other fields they realise the havoc which can occur if law is not developed.

In practise the engineer who is specialised in the Automobiles fixes the vehicle well. He deals only with the vehicles. Similarly, Electronics Engineer fixes the Electronics equipments like Television, Calculators, etc. It means





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the specialists always fix the fault in the machinery as per case in Engineering.

However people find that the same Lawyer who is fighting for the civil or criminal case is fighting for these cases too. They have studied the same subjects in Law throughout their five years of curriculum. The specialists are present only in the Metropolitan areas like Mumbai, Chennai, Kolkata and Delhi.

Thus, it needs the seating of at least couple of thousand specialists in Engineering and couple of thousand specialists in the Law seat together, without any other interference, and decide this matter as early as possible, so that the Law in India becomes as advanced as it is in USA or in the UK.

The questions on this background are very well discussed with well-known lawyer of Nagpur, Advocate Satish Ranganathrao Deshpande.

The education with regard to Law is controlled by the BAR council of India. The Bar council of India is Autonomous body which give Sanad (Licence to Practice Law) to individual. The eligibility to practice is decided by the BAR council of India and State. Both State government and Central Government enact the relating to Lawyers Medical practitioners because it is in concurrent list of the Seventh Schedule of the Constitution of India. The Parliament of India enacted Advocate's Act and BAR council of India. The power to regulate the entry in the profession is controlled by these two enactments. The BAR council of India had repeatedly framed the rules for giving a Licence to the person to become an Advocate. The BAR council of





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India framed one of the rule that there should be apprenticeship for a year

to enrol as an Advocate the Supreme Court set aside the said rule. Previously the BAR council of India framed the rule that there should be an examination for getting the Sanad but the Parliament amended the said Act. Thus, all the efforts made by the BAR council of India to upgrade the standards of Lawyers are diminished by either the Parliament or the Apex Court. The apex court while setting aside the said rule directed the Parliament of India to amend the BAR Council Act. But, the Parliament did not amend the said provision. The Section 30 of the Advocate's Act, which authorises the Advocate to Practice, is not brought into force by the Parliament and the Central government for the best reason known to them. All the efforts made by the BAR council are not accepted up till now by the Parliament. All India BAR council, gave a 'Call off strike' all over India, but Apex court held that the Lawyer should not go for strike. Thus, the pathetic condition in which the BAR council of India is working that because of the pressure by the Labour Ministry section 30 of Advocate Act is not brought into force.

The Indian Judiciary had previously adopted Anglo-Saxon system. The said system has origin in the U.K. (England). The Indian government has always a wrong notion that any system should not be adopted in its entirety and therefore we have also not adopted the total Anglo Saxon system. In England the procedure is that there are solicitors and arguing council. Except Metropolitan cities i.e. Mumbai, Delhi, Kolkata, and Chennai this





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system is not found in other courts. Therefore there is a huge delay in disposal of cases. There again a wrong which is always done in the H.C. that the cause lists are published a day before or in the case of hearing party on Saturday or Sunday. Thus, the clients residing in the remote places does not know, when their cases are listed for hearing and when they should instruct their council. Thus, Clients are put to huge losses. Because of the fact that the clients cannot give the instructions the cases need to be adjourned.

After the lapse of time the civil procedure code is now amended and we have shifted to the American pattern of Judiciary. But the Act has not given the power, as it did not accept the total American system as it has accepted some of the provisions. There is a huge arrears in the various courts because of number of reasons and one of the reason is that the proportion of judges and the cases are very disturbing proportions. At most of the time, the Judge even cannot read the order sheet written by the reader or steno. Thus, the Judge cannot do any Administrative work. If at all the arrears are to be curtailed the Judiciary, Legislature, Executive will have to adopt complete we are taking from the any foreign (American or England) system and not by piece meal. Because of all these demerits and because the BAR council of India cannot do everything in the said matter the Lawyer are not properly trained and therefore here is no specialisation in Law nor any post graduate degree gives any special training so that the Lawyer could be





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E-BOOK- ISBN: 978-93-5235-441-2. COPYRIGHT TO AUTHOR- DR. ASHISH MANOHAR URKUDE specialised one. Therefore the cumulative effect of all these things is that

there is no specialisation in India.

Judiciary system in India:

a. In India there is no power to court to investigate into the fact like American court and there after decide the case but the court has to decide the case on the basis of evidence of the both the parties only. There is no independent case investigation like in USA.

b. In USA the law is generated every five years and not major amendments are done. It decides the legal and the illegal side of the technology, and also in the other fields like the drugs in pharmaceutical industry when it is generated. While it is not the case in India.

c. Not only every Lawyer but also every Engineer, Doctor and other professionals have to renew their respective Licence after every five years. This keeps the knowledge of the lawyer and other professionals up to date. While, it is not the case in India.

Future generations belong to those nations who hold the knowledge and technological storehouse and who can implement these tools positively for building the societies. Hence, all these suggestions to the Indian systems.

Special Note:

3. The same Advocate committee of the Advocates of the All India Reporter Journal who accepted above MVA-1988, amendment paper has accepted this research paper as well on 10/ 07/ 2003 with Ref. CD/983/ 2003, Article No. 245/ 2003. The



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Authors received the letter from AIR send by Deputy Manager

(Communication Department). It is under process of publication.

4. Part of this research paper is published in the AUTOTECH 2004- the Seminar conducted in 2004 by the Institution of Engineers (India), Nagpur Local Centre by the same Authors.

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CHAPTER 13:

DISADVANTAGES OF NOT INDIGENISING THE CAR TECHNOLOGIES: WAKE UP CALL FOR INDIA



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Part 2	Strategies Adopted by Multinational car companies	580





As mentioned earlier almost all the Multinational giant car companies have multi-million turnovers. Few among them like Toyota, GM, and Ford have multi billion turnovers. The phase in which Indian car technologies is passing through in the field of Car industry, is the phase these companies have already experienced some where in earlier times. That is why these companies have ready-made solutions over many of the problems stored in their data base. Otherwise, the expertises in every field, in these companies bring out solutions and work force with the mighty budgets implement it with full might. Thus, it becomes an unstoppable force for the countries like India.

PART 1: PAST, PRESENT AND FUTURE OF CAR INDUSTRY – A STRATEGIC ANALYSIS:

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 car in India will require due attention to the following factors:

1. Remember, Multi National Companies (MNC) especially carmakers like General Motors, Ford, Toyota, Mitsubishi, have individual yearly turn over





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nearly one third of the total of all the Indian companies yearly turn over. In

the national sense, in 2003, according (Ratan Tata, Cover story, 24th February 2003, pp-32) Gross National Product (GNP) of India in USD was \$458 Billion (almost Rs. 2060667 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, in their peak performance, Japanese MNC Toyota has yearly turn over of more than \$132 Billions, Japanese Mitsubishi has yearly turn over of more than \$140 Billion, similar 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)

2. 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.

3. 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 (Motor India Journal, May, 1996.)

4. MNC 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.



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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.

5.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.

6.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.

7. In the Daily Tarun India, 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 as well as medium scale industries in India, China, Pakistan, South Korea, Indonesia, and other Asian and Latin American countries.

8.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 other companies and their supporting machinery.

9. 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 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)

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

11. 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.

12. 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,





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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.

13. 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 USD 50 million. It has grown to 70% of new car market in 2003. Now it has become almost five lac cars per year. This comes out to be Rs. 1000 Crores and USD 2.2 Billion (Rs. 45 = 1 USD)
(Ref. 27th July 2003- Tarun India- Nagpur)

14. 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 series of editorial in June 2002, has stated that, the Daewoo has succumbed to the battle with mighty Ford MNC from USA.

15. Look at the advertisement of Toyota-Qualis:



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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:

- a. Fast spreading information about company through Internet, TV Ad, Newspaper, Pamphlets, etc.
- b. 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





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force that consumers have at least a look at it or may even have

a test drive.

c. Some special feature about the product is highlighted in its specifications,

d. Consumers or even future customers are requested to get free literature which Indian companies can not afford,

e. 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.

f. 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.

g. MNC are manufacturing many individual part, assemblies, sub assemblies, with perpetual increase in productivity with consistent quality improvement using TQC, TPM, Kaizen, JIT,





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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.

h. To satisfy customers MNC keep their productivity growth always higher.

i. 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.

16. 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.

1. When other technical fields also peeped we shall find that similar situation is there as well. Lack of R & D and independent technological development in these fields has a bad effect on Indian Economy. In the following table this is given in details. The source of the table is respective Web sites and a Review in the India Today Magazine, Frontline Magazine, and few News Paper Reviews during





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India- Pakistan Kargil War. Main Calculations based on the article

Vision for 2020- Dr. A.P.J. Abdul Kalam, Ratan Tata-Cover story-India
today-February 24, 2003.

Table 13.1:

**Losses India is suffering due to not taking faster leads in the
Indigenisation efforts:**

Reference: Respective Departmental Yearly Analysis, Their Journals, Magazines, Various Dailies and Aaj Tak Cable Network Channel's Health Aaj Tak Program, Star News Channel's few programs and defence analysis for their technologies.

SN	Field and Machinery Used/ purpose	Approximate total prices in Rs. Crores
A	Medical field	
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





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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



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	Air Craft Carrier, Ship building yards,	
6	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
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



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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



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	Machinery for manufacturing other hygiene	
10	products	50
H	Sports Goods	0
1	Machineries for English Willow Cricket Bats	20
2	Golf goods machineries	5
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



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	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 Air crafts like AWACS, Refuelling, etc.	
	e. Air borne Missile Systems	50
	f. Spareparts parts and supporting	500





	equipments, etc.	
4	Other	1000
	<i>Total Losses India Suffered till today in Rupees Crores</i>	195986
	<i>Rate of U. S. Dollar in Rupees</i>	47
	<i>Losses in Billion U. S. Dollar (\$)</i>	41.00

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

18. Remember, in the yearly review of Auto Car- Monthly Magazine- December-2001, it has been claimed by the Volkswagens that the Volkswagen-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 car industry and its indigenous manufacturing?

19. 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





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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 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.





COMPANIES:

In this main focus will be on the strategies of the MNC that are making huge profit worldwide. Many among might know that it was a proverb in early part of second half of this century that what ever is good for General Motors is good for the USA. One million GM cars, which were sold in the market, show the sheer domination. What were the things that made GM, Ford so successful? This is what is very important from every company or from Indian perspective as well.

PART 2: STRATEGIES ADOPTED BY MNC CAR MAKERS:

This is taken as the future challenge as nobody is here in India for charity. MNC means organised business and organised profit making companies.

First Phase: Market Research and R & D at every level:

The MNC are mainly based in USA, Japan, Korea and West Europe. They carry out pre-launch market research.

The research includes-

- ❖ Macro Economic survey of the country,
- ❖ Micro Economic conditions of the competitors,
- ❖ One of the MNC study revealed the consumer expectations and their buying behaviours in market where MNC that is trying make its presence felt. Following points make it clear about the preparations





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MNC carry out while studying personalities of that market. They

study:

- Habits of majority of consumers,
 - Buying behaviour of most of the consumer in that period of time,
 - Is the kind of car consumer demanding is been marketed?
 - What is the approach of life of most of the consumers?
 - What is the consumer attitude in particular buying behaviour?
 - In broader perspective how many kinds of consumers the market has?
 - Then how to tackle many kinds of personalities and persuaded to buy our car?
-
- ❖ Faults in the competitors,
 - ❖ Media support and Advertising systems of the existing competitors,
 - ❖ The services and the Dealers network of the indigenous organizations and the other MNC competitors,
 - ❖ Collaborations to be made if any,
 - ❖ Survey of Technical know-how and the educated human resources or skilled workers availability,
 - ❖ They check the resources to carry on the business successfully including man, material, machinery, money, and mentality to buy their product.





- ❖ They do presale survey of the existing product and the post sale feed back as well. So, that there product may be launched successfully. In this category MNC takes the broader perspective of the market. They try to know the intermediate market needs as well, look at the table.

Table 13.2.**Shows Intermediate Market Buyer's Needs in the car market:**

Organizational Needs	Personal Needs
1. Delivery reliability	1. Personal security
2. Quality in relation to price	2. Recognised status
3. Post sale installation and assistance.	3. Acceptance of other organisational members.
4. Variety of product offerings	4. Achievements on the job.
5. Efficiency of purchased items	----

Interpretation:

R & D at every possible level is carried out which affects the car market.

- ❖ Government norms are also taken care.
- ❖ MNC carry out survey of buying behaviour of the consumers in that country. It has been observed that the studies include following factors in the table:

Table 13.3:



Factors affecting buying behaviour of car consumers in that country:

Cultural	Social	Personal	Psychological
Culture of that country	Reference group	Age and life cycle stage	Motivation
Sub cultures	Family	Occupation	Perception
Social Stratification	Roles and Status	Economic Circumstances	Beliefs and Attitudes
--	--	Life style	Learning
--	--	Personality self concept	--

Interpretation table: Customer satisfaction means the level of a person's felt state resulting from comparing a product's perceived performance in relation to the person's expectations.

MNC before entering into the market know in details the total psychology of the customer in the country they are going do business, right from the personal to the social level. This study of consumer behaviours helps them target their customer in a better fashion.

Second Phase: Planning and healthy budget:

To go further we must know that these MNC have yearly turnover of more than Gross National Product (GNP) of many countries. In The Hindu, 8th May 2000, GNP of India has been given to be USD 427 Billion. During same time the turn over of top MNC car making organizations was as below:

- General Motors (GM) of the USA has yearly turn over of USD 135 Billion.





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- 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.

Considering this vast experience and the amount of profits these organizations can shake the economy and car market of any country.

Similarly, these MNC spend almost five percent of their annual budget on the advertising of pre-launch and on post launch campaign as well.

Many MNC like GM, Ford, Pepsi, Coca-Cola, etc. sponsor many of the major events in the country where they work or launch their product specifying clearly the advantages of their product over others, may it be even false claim, but to capture market they adopt new and innovative methods. It has been observed that these MNC rule the economy of many countries as well, or otherwise that countries' economy loses its shape and size. E.g. Economy of Mexico buckled under pressure of MNC in 1996 and for the same reason Economy of Argentina crumpled in the year 2001.

Thus, MNC make their presence felt every time in every field, car business is one among them.

1. There are companies who make the things happen.
2. There are companies who watch what is happening?
3. There are companies who wonder what has happened.

Third Phase: Attracting internal and external customers:



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- To, capture the market the MNC adopt any of the managerial activities and any of the tricks adopted earlier or the new one suiting to that present situation.
- The carmakers like Mercedes, Ford, GM, etc. have very high remunerations and perquisite packages for their employees. It can lure any talented mind.
- Target oriented achievement award is but a common phenomenon in MNC in the event of any big expansion of their previous base. Any individual achieving it is always been presented with hefty sum and other advantages to that employee as well.
- These were only the dream perquisites for the employees and the technicians in India earlier.
- To retain good internal customers these MNC go at any stretch. Many MNC has offered the shares up to 1% stake to as many as 20 odd good technicians in the computer organizations. Many offer a house with all five star facilities including swimming pool and the luxurious cars with petrol. Many offer Medical reimbursements, book allowance, newspaper allowance, laptop computer allowance, etc. The surprising fact is many Indian employees got lured with these facilities and left their earlier government employed job as they compared the sum earned to the amount paid at MNC in a year in their whole life. Such is the glamour, money and attraction MNC put in the job offered for their companies.





➤ When we study these MNC in details we find that they have one or more

common organisational objective among the following:

- k. Maintenance of industrial leadership,
- l. Services to customer,
- m. Growth,
- n. Long run profit increase,
- o. Favourable public image
- p. Diversification of corporate activity,
- q. Employee welfare and satisfaction,
- r. Securing a balance between Government, domestic and foreign business,
- s. Enlargement of size of market,
- t. Developing new technology to benefit customers, etc.

Fourth Phase: retaining customers:

This forms the very important step. It is the step in which the multinational carmakers like GM and Ford from USA and Toyota and Mitsubishi from Japan give their customers new model of the car every six months.

- MNC carmakers bring out a totally new version of a car or an advanced version of that car in the market.
- The old version of car is given special concessions to upgrade the newer facilities.





- Many a times new version of car has very attractive features and customers are given special discount to sell the old version and to replace it with new car model.
- Thus resale value concept is aptly utilised.
- These multinational carmakers are spending huge amount of their annual budget, on the Research and Development (R&D) i.e. GM spend almost 7% of their annual budget, Ford spends 3%, Honda 5%, Mitsubishi 3%, Mercedes 7%, and so on.
- The workers are given incentives and awards for the development in any sector of the car manufacturing, sell, process.
- Infact look at the marketing objectives of all these MNC they have at least one among the following marketing objectives for which they strive the most:
 - k. Establishing new customers,
 - l. Develop new product with high quality of customer satisfaction,
 - m. Develop new kinds of services,
 - n. Decrease the cost of services to customers,
 - o. Increase the public awareness of the company activities,
 - p. Increase the awareness and availability of product,
 - q. Servicing and retaining old customers,
 - r. Welfare of hardworking marketing department,
 - s. Establishment of an image for the firm, division or product.
 - t. Move from consumer satisfaction to consumer delight, etc.





- Whereas, in India HM and PAL are running their 1940's model. The

R&D spending are almost negligible since last half a century.

Now these companies have also realised these facts and are upgrading themselves up to this standard set by these MNC carmakers.

Fifth Phase: trying for total Customer satisfaction:

- These are the days of customer care. Customer is a king. The carmakers like Hyundai, GM, Ford, Mitsubishi, and Toyota give value for the customer money at every step. Infact they try for the Total Customer Satisfaction (TCS). The Mercedes people actually sell delight to their customers. To, elaborate this, it is necessary to look at the services given by these organisations. The services given for the Preventive Maintenances include periodical servicing of the car, periodical check up and replacement of the parts.
- The services given for the Breakdown Maintenances are phenomenal. These organisations give twenty-four hours services to these emergency needs; which includes accidental services as well.
- Every time customers are given home delivery option.
- The timely deliveries of the serviced cars make customers feel they are really the bosses.
- Financial help is also given for buying and yearly maintenances.





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- o Thus, in this phase every giant MNC follow the kind of model, which is predicted below. They target customers and try customer satisfaction. Few even give customer delights as in case of Mercedes-Benz and Rolls Rice.



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Diagram 13.1: Factors considered for customer satisfaction by giant

car companies:

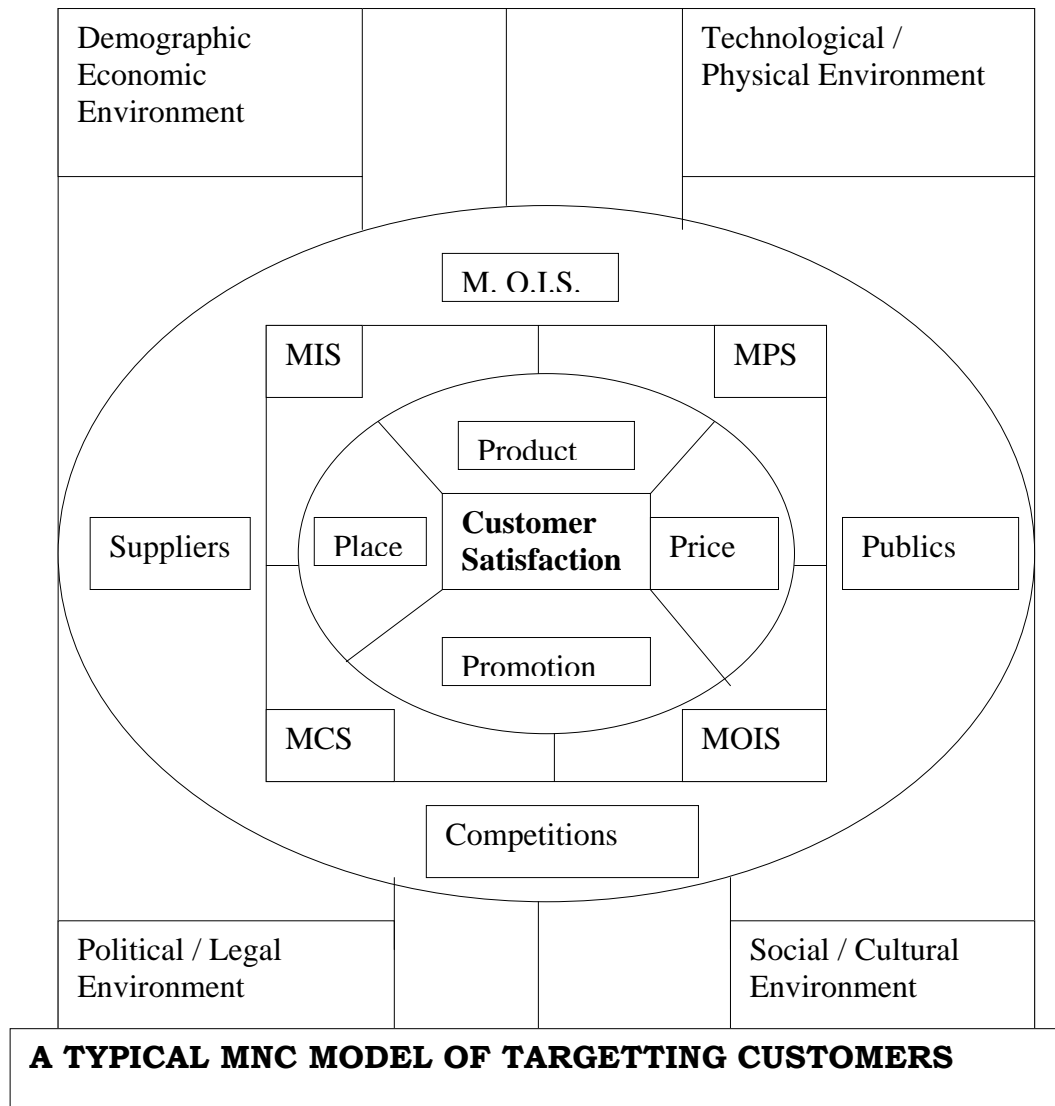




Diagram 13.1: Description: Please read, MIS = Management Information system, MPS = Marketing Planning System, MOIS= Marketing Organisation and Implementation System, MCS = Marketing Control System.

Diagram Interpretation:

Look at the importance given to customers by the General Motors Inc. USA. As shown in diagram customer is the centre of focus and customer satisfaction is the prime target of the organisations. All the four P's Product, Price, Place, and Promotion that is the marketing mix is targeted towards this only. Organisations adopt an interrelated MIS, MCS, MPS, and MOIS, to arrive at better marketing mix. The MNC adapt and adopt all these at micro as well as macro level of its strategy of working. Hence they are successful in international market.

- The Resale activities are also done by MNC for their own cars.
- Replace old car with the new version option by the MNC really make them invincible in the market anywhere in the world.
- Customers get what they expect at every level of their life associated with their car.
- Many middle class professionals like Chartered Accountants, Doctors, Engineers, Pharmacists, Professors, Shop owners, are given three years contract of free servicing.
- Thus, Multinational Companies have realised the following importance of customer satisfaction over a period of time and their business since their inception:





- g. Faithful customers lead to higher profit margin,
- h. Satisfied customer result in contented employees,
- i. Retaining customer is cheaper than acquiring them,
- j. Product may change but customer will remain for longer time,
- k. Only a satisfied customer will stay with the company,

In modern days, providing services to customer is more important than selling products.

Wake up call for India:

Indians must give high priority to customer satisfaction through the indigenous technologies. Otherwise the sales figure is staggering and the strategies adopted by the result-oriented approach of the MNC are also vicious. Thus, it can be a wake up call for all the Indian citizens as if India misses this bus and India will become totally dependent on the foreign high tech companies in future.





CHAPTER 14:

PROBLEMS AND LIMITATIONS IN THE PRESENT INDIAN SYSTEM



**CONTENTS OF CHAPTER 14:**

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14.1	Problems in the present Indian System	594
14.2	Limitations of the present Indian system	596 to 597





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The very first sentence would be there is no perfect system in the world.

However, whatsoever the system may be the personnel in that country can make it as much perfect as possible. It can be done only through amalgamation of theoretical research in the technology and the commerce with the best possible practical in the same fields.

14.1. Problems in the present Indian System:

- a. Less importance given to independent thinking and creativity,
- b. Indians give least importance to R & D,
- c. Only few (Like Mr. Anand Mahindra) give full force freedom to develop new technology in their factory to the scientists.
- d. Less spending capacity of the consumers.
- e. Commodity like Car once bought becomes life long asset for the consumers unlike the average Americans who change their car after every three years.
- f. Unless proved Indians do not accept any new product thus discouraging any kind of the R & D in the car market.
- g. The Law in India changes at very slow pace. Thus many a times it takes lot of time to bring newly developed technology or product on the road or in the market.
- h. Indian people are interested in permanent kind of job with pension and gratuity after the whole job span of thirty odd years. MNC carmakers and even other companies do not offer these kinds of job and hence can pose problem in future.





- i. Every MNC entering into India brings its supporting conglomerates of companies from their own nation to India. These all companies 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 own country which will boost their profit in longer run, e.g. Pepsi, Coke, Mercedes, Opel, Chevrolet, GE, Proctor and Gamble, Rolls-Rice, etc.
- j. The sheer aim of all the global car giants are to earn huge profit. The competition among these companies develops a huge competition in the host countries. Slowly they capture every business associated with their business. Then with might of money these big car companies and other giant MNC along with their conglomerates just clean sweep the nation in every business they enter.
- k. There is problem of Political will in India. As this forms the most important aspect. Every technocrat and businessman has to make this a big issue before it gets a rolling stone.
- l. Indians are less aware about the technologies. Unless all the Institutions come together it becomes a highly impossible task to make every citizen aware about the technologies developed in the country.
- m. There is one more problem. The Problem of developing giant technological Set-Up and the infrastructure to live up to the levels of the new R & D ventures.





- n. There is a problem of bringing every kind of expertise together. As much of Indian experts are presently working with the developed countries they won't leave their job or the project in hand. There are many reasons behind this. Getting fewer facilities, less payment, work cultures of independence to work with are few among these problems.
- o. The problem of continued non-value added activities in the organisation are many. Few are as a part of formality few are happening as part of habit. Some activities are happening due to chronic problems in the psyche of the workforce. Few are happening due to chronic problems in the upper management levels.
- p. There are many organisations in India, which do not offer better employment reward schemes. They move on the path of 'Boss is always right' and take advantages of poor workforce, which otherwise can become big asset to the organisation.
- q. There is a problem of customer dealings in India as well. Both internal customers and the external customers are not treated well in many organisations in India.

14. 2. Limitations of the present Indian system:

No system and process in the world is perfect everybody try for this perfection but in the extreme competition and due to huge customer number there are bound to remain few limitations to Indian system which





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must be broad minded accepted and then only few things should be planned.

- a. The prices of the cars in India cannot be brought to the level of the American level i.e. Lowest Price of the car in USA is equal to the Lowest Monthly Payment of any lowest paid employee in that country. In India many earn less than Rs. 300/= i.e. USD 7 (Seven Dollars only) per month.
- b. If the project is started earlier then its ok. Otherwise to develop every part of the car which can be recycled will become almost impossible.
- c. As the project is almost new, to develop customised car for each customer will be impossible task for the big companies.
- d. Unless planned in advanced India will not be able to develop auto pilot cars, air cars, fully solar cell cars, indigenously in India. At present India is limiting to the cars running on the road. The technologies used are old. Still they have many modifications to make up to the latest norms.
- e. Suddenly, to jump from nowhere to somewhere in the range of ISO 9000-2000, QS-9000, OHSAS-18001 becomes a challenging task. So, new organisations cannot be expected to raise at this much height.
- f. It is a challenging task to mould people to go through the task via R & D, Prototype high quality product, maintaining Quality standards, remaining on that level, bringing total quality control in practice, making every move countable, Kaizen in the system. Indians have





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moved on the simple task. They were in the secluded atmosphere.

However, now that world has become the market place it is a challenging task to raise the whole system to such a high level. So, going step by step is the limitation.



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CHAPTER 15:

POSSIBLE SOLUTIONS OVER FEW RECURRING CAR INDIGENISATION PROBLEMS





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	<p>Given by the experts in various fields in the car industry:</p> <p>It is in the form of Question/ Problem and Answer/ Solution format</p>	
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Solution 15

Specific Organisation Level Efforts

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India is a country with vast amount of availability of lot of Resources:

- i. Human Resources,
- ii. Material Resources,
- iii. Monetary Resources.

Then why could not Indians make a car as advanced as latest Mercedes E-class or BMW 7 series or Ferrari GT-40 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.



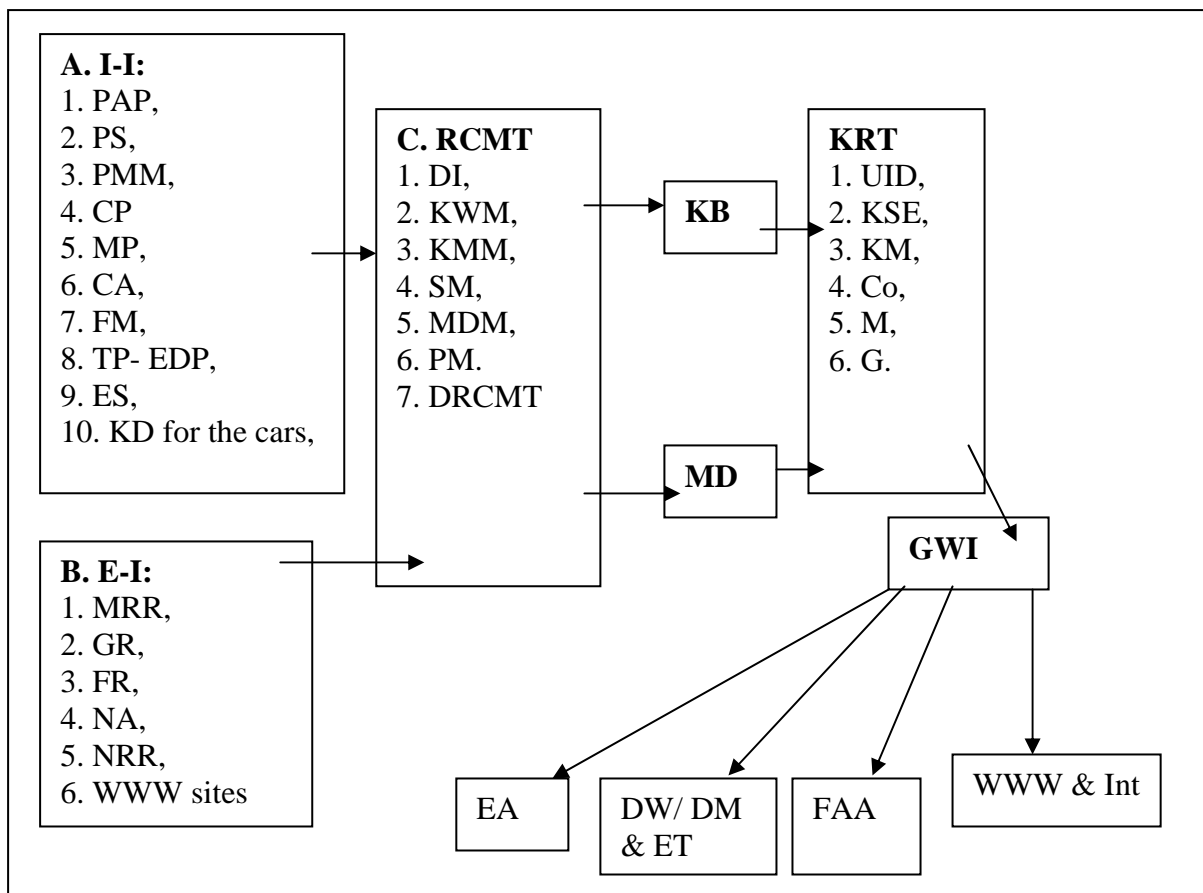


SOLUTION 1: Implementing KMS to this project:

Part 1: Instead of remaining only traders who assemble and/ or sell the product and earn profit Indians must think positively towards R & D and especially towards Knowledge Management System (KMS) for the total indigenisation of the car sector in India. Following is the best possible KMS for this purpose.

Diagram 15.1:

Knowledge Management System for indigenisation of car technologies:



**Details about the words used in the Diagram and their description:**

A. Internal Information (I-I): It refers to the internal information of the organisation that will deal the total indigenisation efforts. It may have collaborations of number of giant organisations, MSI, SSI, or ancillary units and vendors of existing indigenous organisations who can help in building the car indigenously in India.

- 1.Policies and Procedures:
- 2.Product Specialisations
- 3.Project Management Methodologies,
- 4.Client Proposals,
- 5.Marketing Plans,
- 6.Competitors Analysis,
- 7.Financial Models,
- 8.Training Plans (EDP),
- 9.Engineering Schematics,
10. Knowledge Directories for the cars,

B. External Information:

- 1.Marketing Research Reports,
- 2.Government Regulations,
- 3.Financial Reports,
- 4.New Articles,
- 5.New Research Reports,
6. World



**C. Repository Creations and Management Tools:**

1. Document Import,
2. Key word Management,
3. Knowledge Map Management,
4. Security Management,
5. Metadata Dictionary Management,
6. Performance Management.
7. Developing Reliable Customised Management Techniques

D. Knowledge Bank,**E. Metadata,****F. Knowledge Retrieval Tools:**

1. User Interface Designs,
2. Keyword Search Engines,
3. Knowledge Maps,
4. Collaborations,
5. Messaging,
6. Gateway.

G. Gateway Interface

1. Enterprise Applications,
2. Data Warehouse/ Data Mining and Extraction Tools,
3. Forms Automation Applications,
4. World Wide Web and the Internet.





Part 2: Why KMS is must in indigenising the total car sector?

1. Since aeons and especially today in the competitive world, knowledge has become the pre-eminent economic resource. Infact it has become more important than the infrastructure, raw material, and some times even money in the organisations. Indians must gather every kind of details in the automobile sector. It will be useful in developing those technologies indigenously in India.
2. Technological Spin off will help Indians in every kind of details in other allied technologies.
3. After analysing the success story of GM, Ford, Toyota, Mitsubishi, Hyundai some conclusions can be drawn. Why did few organisations including few Indian failed and why these organisations succeeded? Why do some organisations prosper and grow while others struggle? There are a variety of interrelated factors that determine the answer to such a complex question, and these factors differ for organisations in the different places and at different times. Indians also must develop the same kind of systems applicable to specific purpose in specific organisation. Especially mentioning would be GM, Ford, and Toyota who created their own knowledge bank for their business and technology. Later the knowledge was disseminated to those members of the organisations who needed it at the most.





4. Infact Toyota, GM and Ford coordinated the processes when their dealers network increased to huge numbers using knowledge based system. The time and distance remained no barrier even before the advent of the Internet. It helped, decentralisation of the decision-making powers. It also has developed the flatter organisational structures with less direct supervision, and levels of management, and shorter time for developing the new product and bringing theme into the market.

5. In few of the problems organisations rediscovered the answers either inside the organisation or outside the organisation, which were immediately communicated then after consensus the solutions were implemented. Knowingly or unknowingly KMS was the base.

6. When Pharmaceutical Industries in India like Dr.Reddy's, Ranbaxy is seen we may conclude that it is the emergence of knowledge-intensive products and services increases the amount of information exchange within and between the organisations. Similarly in the super competitive car market Honda, GM, Ford and Toyota are bringing ever-new version of the product due to customer demand. Another reason for this knowledge intensive products and services is the depletion of the petroleum level in the earth surface and the environmental imbalance.

7. When we observe the history of the car technology we see that the mechanical components used in the cars are been day bay day getting replaced by the electronic components, microprocessors, and the software.





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This is developing what can be called as the Information Technologies

Knowledge Based Management System.

8. GM, Ford, Toyota, Honda, have already started development of KMS. These organisations are using the CAD, CAM, and Artificial Intelligence to codify knowledge for the car technologies.

9. Going through the Web Sites of global giants it can be conformed that knowledge and future technologies forms the basis for attracting more number of customers. Hence many car companies have developed the rich database for the future. They have very good product, processes and services knowledge placed on Internet. Also on the intranet, similar Enterprise Information Portals (EIP) is placed to get exact information. Whether internal customer (employees those are associated with the organisation) or the external customers (product customers who own the cars). There are keyword search engines, browser interface, in the intranet same as they are in the Internet. Only thing differs in the giant organisations is the customised look at every problem from their perspective and knowledge bank.

10. There are innumerable technologies that are developing in the car sector. For example, hydrogen fuel driven car, auto pilot cars, Liquid Crystal Diode (LCD) display board screens, Global Positioning System (GPS) fitted cars, etc.

Part 3: Indigenous software for the KMS:



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Naturally all the data will be stored on the huge computer. There will be well

defined and well designed indigenous software in the interconnected organisations that are involved in indigenising the car sector.

Indians are world leaders in the software development. For indigenising the car sector the knowledge management technologies can solve many of their problems. Mainly it will have all the words and the Indian linguistic words, which can communicate what any person wants to communicate in any official Indian language. Thus, indigenising cars involve this additional feature as well. This software involves the following highlights:

a. Intranet: WWW standard Intranet to simplify the tasks of storing and distributing a wide range of materials required for indigenising the car sector, stored in the different file formats.

b. Web authoring tools: The HTML editors, graphic design tools, proprietary animations packages, and streaming video/ audio tools, for creating the extremely rich variety of text for indigenising the car technologies with interactive multimedia content.

c. Document or Content Management System: The document contains the names of the 30000 distinct parts of every kind of car. Hence, tools which create and develop new versions of the software, store them with ever-new knowledge can be used here. The tools that can retrieve the complex data, the tools that can handle the additional file formats and provide the file format can often provide knowledge maps to categorise the stored material.

Indians are infact master in this kind of software development. Especially





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mentioning would be software developed by the Infosys, TCS, and Wipro for

various banking organisations, and for the ancillary units of the Ford, GM, and for other global giants.

d. Search Engines: Developed for the Library sciences this technology forms the basis of searching the knowledge by letter to letter, by keyword, or by technology wise, from simple level to the difficult level.

e. Office Suites: Similar to the MS-Office having distinct independent MS-Word, MS-Excel, MS-Power Point, MS-Front Page, MS-Access, MS-Outlook Express, Indian software giants can develop indigenously the software for this indigenisation of cars purpose.

f. Updating software: As KMS requires constant updating of the knowledgeable material the special purpose software would be developed. It may update documents preserved in multiple formats, both synchronously and asynchronously. If possible the advanced version of software would be able to do the job of upgrade the storing, retrieving of data as well as modifying and retrieving the data. Thus, the software can become the basis for the indigenising efforts of the car technologies.

g. Enterprises information portals (EIP): This software will manage the knowledge bank. Its access can be made via familiar browser interface. EIP products may have a broad range of useful features, including search engines, knowledge mapping, personalised data, standing queries, affinity group filtering, and simple collaboration tools.





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h. Knowledge Mapping: It will be done through Taxonomy of hierarchical

multi-dimensions views of the data, documents that too having different categories. The taxonomies of vendors, ancillary units, different departments would find the pale in this Knowledge Bank. Also Taxonomy for the technical details will also have the place so that each and every part of indigenously built cars will be seen in distinct categories. Infact there would be standard templates to deal this knowledge mapping and enterprise information portals (EIP).

i. Knowledge Directories: As the user searches the knowledge map the search engine should identify the experts for each topic in addition to collection of the stored material. Each knowledge branch of taxonomy of the indigenously built car would have an expert to deal with.

j. Gateway to enterprise applications and other computing resources: Construction of truly comprehensive KMS requires that users have access to all the organisations information and computing resources. Portal forms the single interface for employees that perform its job providing information required for the job. E.g. The Cost Accountant needs the help of Financial Analysts as well. Hence there will be structured information in the knowledge bank. To extract this information data ware house and data mining extraction technologies can be used and our Indian software giants have got expertise in this field.





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k. *Metadata*: To build successful KMS requires the metadata, user historical

access profiles, affinity groups, user security profiles, and document restrictions.

l. *Taxonomy*: It is the hierarchy of the topics on the car indigenisation efforts. The example/ sample of the Hierarchy is given below:

Hierarchy A. Engine Design in the typical petrol engine:

- a. Engine block design,
- b. Piston Design,
- c. Gasket Design,
- d. Crankshaft Design,
- e. Valves System Design,
- f. Camshaft Design,
- g. Rocker arm design,
- h. Tappet Valve design,
- i. Nuts Design for different places of different sizes,
- j. Bolts design for the different purposes,
- k. Engine Head Design,
- l. Flywheel design,
- m. Piston Ring design of different sizes and different purposes, etc.

Hierarchy B: Piston Ring Design:

- a. Compressive Piston ring,
- b. Oil Piston Ring

Hierarchy C: Metallurgical aspects,





Hierarchy D: Designing specifications for the tolerances, the engine

capacity in Cubic Centimetre, etc.

Hierarchy E: Technology used,

Hierarchy F: The car in which it will be used,

Thus this hierarchy may grow further. As each of this aspect grows to the extent where engineers and scientists and the developers feel that it is ok.

Part 4: Success of KMS:

As far as Indian software industry and the pharmaceutical industry is concerned KMS is the success story. Hence, it depends on the scientists and the administration side as well. In nutshell KMS success depends on the following major factors:

- * Tools to monitor performance,
- * Vigilantly Tracking utilisation pattern and the system,
- * Processing capacity of KMS by the computer and the staff,
- * Inputting every suggestion successfully to upgrade the capability of the KMS,
- * Providing every individual the information he/she requires,
- * The organisations' knowledge taxonomy and the topics,
- * Using KMS successfully for the pin pointing the problem,
- * Finding solution over the problem again using KMS,
- * Implementing the solution over the problem again using KMS to its utmost perfection.





In all, what engineers and the entrepreneurs in India were lacking were open technical knowledge and the funds. KMS can bring the knowledge; it also can guide them for the funds. KMS can guide them for the technology, the Research and Development, the procedures of the manufacturing, the marketing aspects, and the financial aspects as well. Only thing needed is moving harmoniously on the path of indigenisation as same as the Korean Hyundai Engineers moved on till they indigenised the car, and the heavy industries like the shipbuilding.

SOLUTION 2: Departmental Expertise Or Experts Dealing Expertise:

KMS can become useful if and only if there are distinct departments and expertise dealing with every kind of problem. Remember in all the giant car companies to solve any problem they have a distinct cell on the type of the problem. The respective experts solve them. As it has observed that KMS is the best way to deal with these kinds of problems. KMS is also the best way to get proper long lasting solution without any other side effects. So, problems can be distinguished broadly into following categories for the best possible solutions.

1. *R & D and Technological Problem:* Indian companies in the technological sector give least importance to the R & D. Where as R & D department can be solve every problem distinctively in the following ways:

- a. R & D in Machineries and Maintenances dealt by the experts in the mechanical, electrical or as per applications engineers and technicians.





b.R & D in the product development can be well dealt by the experts in

the product development from the engineering point of view, customers' point of view, marketing and engineering costing point of view.

c.R & D in the process development can be dealt with experts in the plant designs, process designs, materials management, Total Productive Maintenances (TPM), Total Quality Maintenances (TQM), Just In Time (JIT), Kaizen and others who can make the process nearly perfect for the manufacturing. Which takes minimum time, minimum cost, minimum efforts of the men and machine.

d.R & D in the Robotics and the advanced technologies: Perhaps this is the major concern India has to deal very soon. There should be independent cell in India to deal with this problem. Nowhere in Indian companies you will find the Robotics made totally in India. Take example of the machineries in the Maruti Plant, Fiat Plant, Hyundai Plant, Ford Plant or even in the Pharmaceutical companies, you won't find the Robotics totally made in India. That is why Suzuki in its original plant in assembles a car within 53 seconds using robotics.

2. *Engineering Problem*: It is the problem arising due to some faults in machines, some faults in the process, some environmental problems, some wastage problems, some work in process problem (WIP). Some problems arising due to extra consumption of oil, electricity, water,





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etc. The experts in these fields can deal these with strong hand so as

to avoid any major accident.

3. *Financial and Costing Problem:* Almost every day there is a increase in number of the Finance experts, Chartered Accountant and Cost Accountant Experts in India who are well groomed in their field. Automobile field must take benefit from them. During development time of General Motors used to keep extra staff by providing smaller tasks these men were managed well. Once distinctive solution from every expert was got in GM grew like never before as every expert though that it was his contribution when they were duly rewarded for their job.
4. *Human Resource Development Problem:* In India Employee Development Program is mainly done for the exposure to the environment of the working environment of the company. Some times training is given by sending person to Parent Company mostly placed in the developed nation. Why cannot the same facilities be put in their Indian counterpart? Productivity based HRD can be the best possible solution.
5. *Marketing Problem:* With the ever-growing market due to growing population who can maintain the cars marketing has become a very important aspect. Main problem for the Indian SSI and MSI is of marketing. They cannot afford to big budget for advertising as the multibillion MNC can do. The best solution would be manufacturing





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world class quality product and producing it before the client. If the

product passes all the tests nobody on the earth can stop its progress.

6. *Production Management Problem:* Many companies in India fail to perform due to lack of due attention to the Production Management. If the plant is faulty as in Yash Engineering Local firm. In this case the plant design is faulty. Every product while manufacturing has to pass through zigzag mode that to against the norms of the manufacturing processes till its final version comes out of the factory. There are many firms like this they do not utilise their men and machineries up to full potentials. Consulting the experts can solve this problem. However, in India again there is no importance given to the expert consultation to any problem. Employers feel that their existing employees should solve the problem.

7. *Services and its Supporting Technological Problem:* Service sector is the only sector, which is growing 8% every year in India. If Indian companies can give the services as good as the Bayerische Motoren Werke (BMW), the Mercedes kind then hardly these MNC will find any place in the Indian car market. Once Indian companies develop the indigenous cars in India, one day these multinational will have to walk back. For the service industry main problem in India is not a proper or sufficient men to service ratio is there. Employers must know that for better contacts latest, gadgets technologies and more number of men at services should be there. Take example of local car





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service station. Mr. Viranchi has kept two extra mechanics in his

Service station specially meant for these emergency situations. If there is no emergency at that moment these people work in the service station. However, when there is emergency these people run there well equipped. This has helped Mr. Viranchi to increase his business by ten folds since 1992.

8. *Intra Organisational and Inter Organisational Problems:* In the Environmental Technologies Inc. the experts in these fields deal the job of Sales Tax, Income Tax, and Governmental Policies. This has reduced the burden of the Administration and the Finance people. Thus, again it proves that experts in their fields can solve the problems in the organisations very well. However, all rounder kind of personality is becoming a bygone era. This is what about the Intra Organisational dealings. Similarly, there are case dealing with competitions, dealing with patents, dealing with inter organisational problems. Here also expertise can solve the problems otherwise the organisation can lose its own existence in the competitive market.

9. Other Problems that have common linkages to one or many departments other than coordination and organisational. Infact there is a engineering costing expert present at the time the crash test is carried out in the lab to minimise the damages done to the car and hence ultimately to the consumer and the company. Thus, even for the simple problem better coordination is done in the big companies.





Whenever the monthly critical analysis is done all the positive and negative sides are thoroughly considered. Then always a consensus is reached for the future action with due consideration from all the experts.

SOLUTION 3:

The TQM Approach in the existing indigenous car component manufacturing SSI:

Perhaps the highest number of internal and external customers are directly or indirectly associated with the SSI, MSI and Professionals. Hence, if all the existing Indian firms, which are in the range of SSI or MSI, must be utilised for the indigenisation of car technologies is concerned the management of quality is a key issue. The recent thrust on the customer satisfaction, understanding and broad application of quality concept and contribution through participation of all employees of an organisation has given rise to another new concept TQM i.e. Total Quality Management.

TQM integrates / unites separate ideas and techniques into a strong methodology and has real meaning to companies who really want to improve their efficiency.

As various departments are involved in any quality production work, and finally a customer is to be satisfied, therefore some discrepancies between needs, stated requirements and specifications are possible but that is why proper communication and problem solving skills are required. However,





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existing band of employees; in the market research department, designing department, planning department, purchasing department, production department, quality department, quality department, marketing department, feedback department; many a times have it in them, only thing required is the methodical modern approach towards solving it. Here comes TQM, which places emphasis on:

- a. Training in problem diagnosis and solution,
- b. Comprehensive and Very Effective Communication amongst all concerned is the basic requirement.
- c. Developing all necessary and that too appropriate procedures.
- d. Positive attitude of all concerned so that customers get a quality product.

This TQM approach ahs become very necessary in the firms, which will be used for the indigenisation of the car products. Another aspect of the TQM in these firms is gone are the days when customer used to come to doorstep of a manufacturer or a supplier. Now the customer ahs to be approached many a time with facilities and conveniences to attract him for buying a product. It is TQM, which can help Indian firms to coordinate all the activities to have a beaming customer with satisfaction, but en-route it also makes employees confident earns higher income for the enterprise through lowering costs of products, procedures and the services.

Example of the Indian firm, which has achieved this level:





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Sunderam Fasteners a company owned by the T. V. Sunderam near Chennai. It was the first company in India to manufacture fasteners for the Ford Company of USA for their ultramodern cars. Infact they achieved this using TQM amalgamated with the Yoga practises. This company has become a pioneering example for others. If Sunderam can do 30000 more who can manufacture the every car parts indigenously also can do.

SOLUTION 4:

KNOWLEDGE BASED TQM for the Indian firms already having ISO, which are involved in vehicle sector and which can be used in total indigenisation of the cars in India for customer delight:

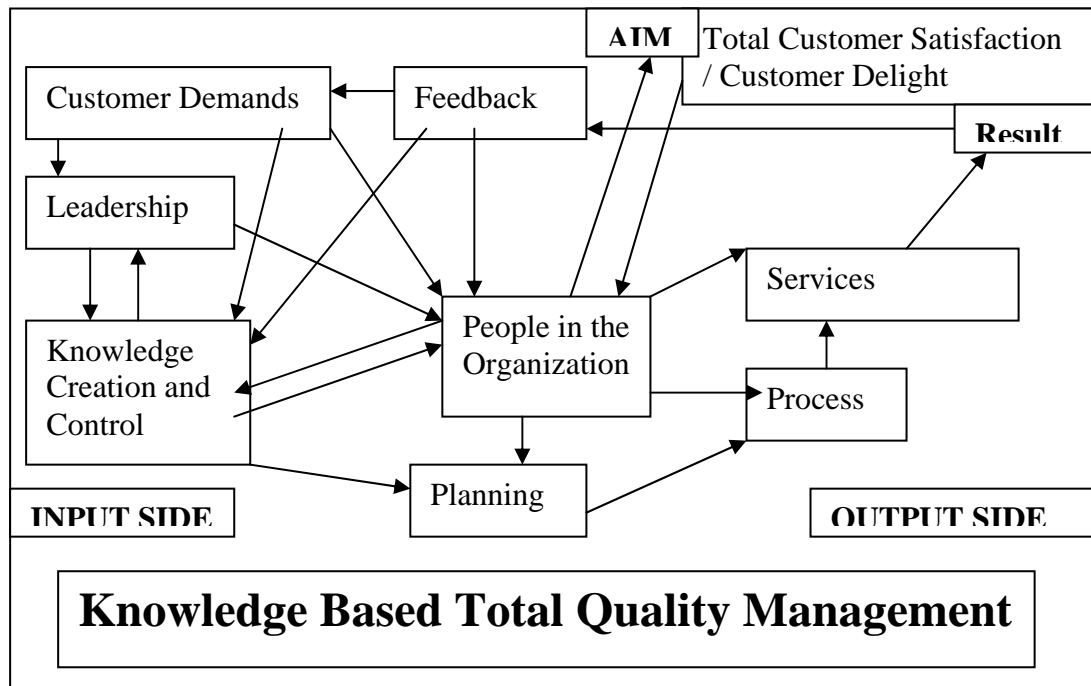
If at all the existing Indian firms which already has ISO Certification be utilised properly for the indigenisation of car is concerned Knowledge Based Total Quality Management (TQM) is one of the solutions that can bring phenomenal change into Indian car indigenisation efforts. The transformation can literally change the whole system based on the knowledge as the prime importance in the organisations. This can put these ISO firms on the top of the world in near future as the internal customers (people) and external customers are the engines to drive this KTQM.

At present Manufacturing, Extractive and construction and Services are keeping the techno-socio-economics vibrating in India. KTQM can literally bring more growth at all these fronts by bringing up-gradation in this entire sector. Especially mentioning will be car sector as 80% of the industries





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**DIAGRAM 15.2: KTQM APPLICABLE TO ORGNISATIONS INVOLVED IN
INDIGENISATION OF CAR IN INDIA**

Diagram Description:

From the diagram it is clear that Knowledge and People are given equal importance in the organisation.

AIM = RESULT = Total customer Satisfaction or Customer Delight.

Customer Demands means knowing intricacies in the requirements of the customers.

Leadership categorically means the leaders who are motivating this whole indigenisation venture.





Planning involves every kind of planning for short-term focus and for the long-term focus and the intricate focuses in the organisations. It needs huge backing of knowledge required for Planning.

Processes involve the every kind of processes right from production to the service and feedback.

Result categorically means satisfaction of internal and external customers for work culture, processes involved and overall proceedings.

Services for total customer satisfaction means offering the services at so much extent that the customers feels he is delighted or totally satisfied.

Knowledge Creation and Control involves four distinct activities based on above KTQM model:

First activity: Solving problems of internal and external customer of the organisation in the current phase.

Second activity: Integration of the knowledge of the internal customers (employees) across various functions and projects.

Third activity: R & D innovations, creativity, and experimentations to build the future product, future processes and other future activities for customer delight.

Fourth activity: Integration of external information flow as a feedback then taking measures to control the faults and attain perfection in the activities to attain one aim and that is customer delight.





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Input side involves knowledge of customer demands, planning, feedback,

knowledge, services for total customer satisfaction, people and leadership skills.

Output side involves processes, result as total customer satisfaction or customer delight, feedback, knowledge, and people.

Thus, feedback, knowledge and people find a place on both input as well as the output sides.

How to built a KTQM organisation?

The basic fundamental of KTQM is that every individual has his say in the organisation. His view is either generated in the brainstorming or in the brain calming session. In the indigenisation of car technologies efforts, every individual's intuitive power, interpretation skills are utilised for the betterment of the organisations involved in this activity and the country as well, which is not happening at present in India.

Table: 15.1: Showing how to build a KTQM:

SN	Level	Process	Inputs/ Outcomes
1	Individual	Intuiting	Experiences, Images, Metaphors/Similes/ Description.
2	Group	Interpreting	Language, Cognitive map, Conversation/ Dialogue.





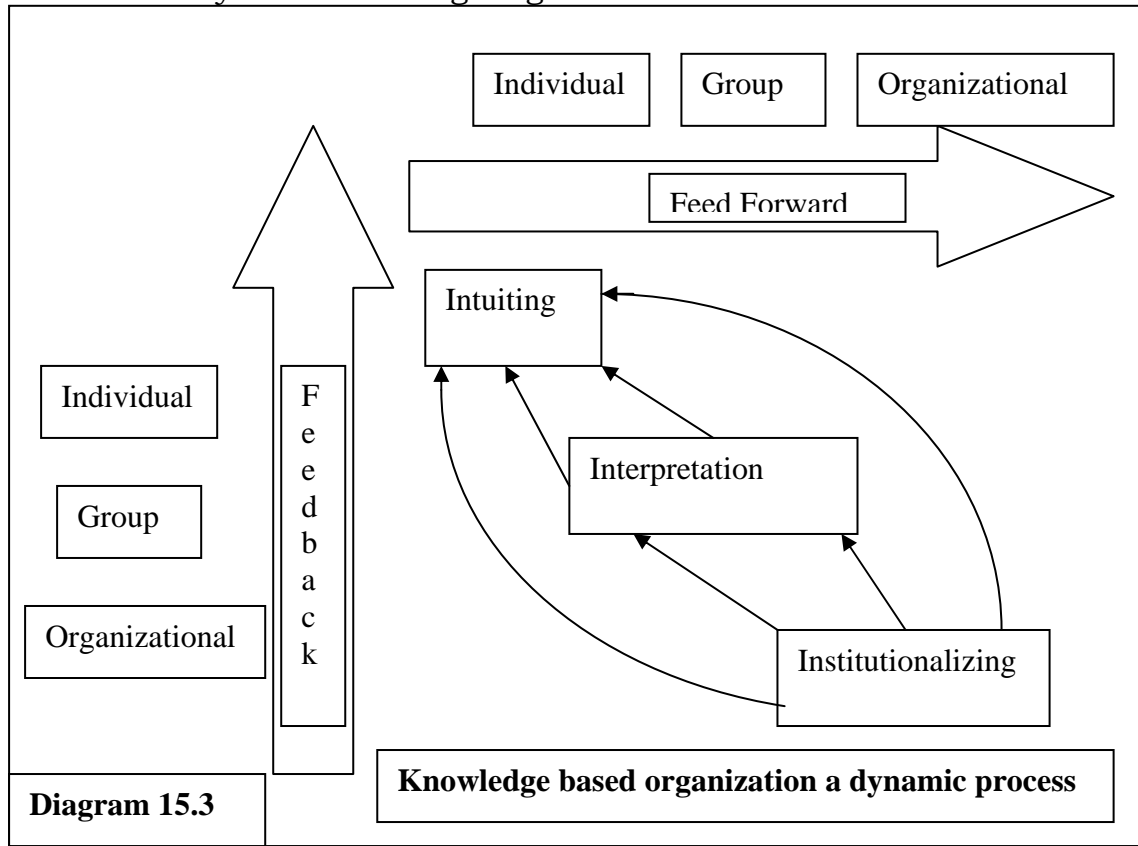
		Integrating	Shared Understanding, Mutual Adjustment, Interactive Systems.
3	Organisation	Institutionalising	Routine, Diagnostic Systems, Rules and Procedures.

Description of the Table:

While every individual has his own intuitive power, in the KTQM, it is given free hand. Through every individual's experience and creative nature, he comes out with the solution over every problem. Even he can create or imagine a problem in future on which solution is thought off in advanced.

In-group some hidden talent comes out from every human being through proper encouragement and through proper interaction and shared understanding. The organisation is made up of individuals as well as the group. These entities make a very good schedule for the problem solving and attaining the aim of the organisation.





Description of the Diagram:

As stated earlier the diagram gives the efforts made by individual, group and the organisation is collected and noted in the knowledge bank of the organisation. It is used for the betterment of the individual, group and the organisation to build the indigenous technologies of the car in India. It is a dynamic and continuous process because of the following reasons.

Knowledge is becoming a driving force in the competitive world. Increasingly, after Vedic Age, again knowledge is becoming critically important asset. All the organisations that are succeeding in today's world have one common thing in them they are knowledge based organisation.





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Knowledge about the skills, knowledge about doing a particular task and

knowledge about the skill development is getting vital importance day by day. In the world of the fast versioning and obsolescence of the product and processes, organisational efforts for the learning and implementing are also becoming very important. If it is not conceived immediately then Indians can face a trouble in near future, starting from there present no.

Example from India:

Ambassador car manufacturer Hindustan Motors of India gave the least importance to the changes in the world market. They lost the battle. The HM could manage the further growth only when they collaborated with the Mitsubishi like world-class organisations. Imported knowledge about the new technologies and then imparted it to the Indian customers through their products and services.

Example from USA:

In USA present figures shows that knowledge is becoming Techno-socio-Economic driver especially in the area where knowledge-based ideas are converted to the manufacturing. These ideas lead to advanced technologies, which manufactures the products converting thoughts into reality. Look at the table how knowledge is important in increasing the Gross National Product of (GNP) of USA.



**Table: 15.2:****Knowledge based industries in USA as a Socio-Techno-Economic Driver:**

SN	Sector where knowledge is given the most importance	% GNP Contribution
1	Manufacturing (M)	21
2	Extraction and Construction (E C)	13
3	Services (S)	66

Description of the Table:

In USA it is supposed that knowledge is the driving force in the Manufacturing (M), Extraction and Construction (E C), and Services (S). It provides employments, quality life, standard living and so on.

The reason being if no new knowledge generated no advanced technologies would be developed no advanced knowledge is developed no further growth will be achieved. No further growth no further dreams of using technology to go to Mars or to distant Galaxies. Thus Americans feel that knowledge is the basic driver of their economy and they are proud of it.

From the Table it is clear that Manufacturing and Extraction and Services result in creation of primary, real and tangible wealth. Thus, in USA using Advanced Technology 62% of direct wealth is created by creative activity. It is about two third of the countries wealth.

It was KMS and TQM that brought the changes in USA in the reduction of cost and improving wealth. Hence, this KTQM is being developed. In KTQM, KMS





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and the TQM are combined from the total Indian perspective. This KTQM is equally applicable to Manufacturing, Extractive, Construction and Services sector in India in their distinctive forms. Every organisation in India thus has to put efforts in this direction. Thus, KTQM can bring the indigenisation of car sector at its peak in the Techno-Socio-Economic contribution of India. Also, if accepted with broad-minded approach KTQM can become an umbrella solution for the Indian firms in near future.

SOLUTION 5:

Modifications in the Existing Higher Education System:

Here only professional courses like MBA, B.E., B. Tech., ME, and M.Tech., Ph.D. kinds of courses are considered. As taking into view the over al education system is beyond scope of this thesis.

Education system is the backbone of any country. Look at USA, Japan, Germany, Sweden, Canada like countries they are making progress simply due to their education system is result oriented and is moulded according the need of the hour.

It is a need of the hour that education and earning must go parallel. Theory and practical should be result oriented. Hence, all the engineering and management courses must be so well planed that by the time student comes out of college he is independent enough to launch his own business or take some work independently allotted him while his job in the factory or services organisation.



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There are number other suggestions and solutions put in the upgrading

skills chapter and in this chapter elsewhere.

SOLUTION 6:

Improving Reliability of Present Car Services for converting potential customers into actual long time customers:

It is well explained in the table below. Few activities are chosen and displayed over here. The format chosen for this is like this. The activity its lacunae, its improvement procedure and its implications are given in the table. As far as possible, sequential operations and solutions are given here. Once it is well developed it will be beneficial at the time of selling totally indigenous cars.

Table: 15.3: Improvement needed in the customer acquisition, customer services and customers' needs fulfilments to convert them into long time asset as actual customers:

SN	Activity	Snag in the customer dealing	Improvement needed/ solution	Implication
1	Giving detailed information to the customer.	Many times customer is given obsolete information.	Frequent training and orientation program for the staff to make their knowledge up to date about the product to	A long-term contract with the manufacturer is needed to get this up to





			interact with potential customers.	date information.
2	Customer visits the show room after collecting information with respect to the car he wishes to buy.	The customer is not at all satisfied with the treatment he get at the showroom, dealer or at service station once a while. Hence, he avoids visiting showroom.	The dealer, showroom staff, or service station men make telephonic or actual inquiry by taking official appointment. Then understand the problem of the customer. Know why they did not visit the showroom to purchase the car. Presents/ Sends few pamphlets/ brochures, models/ variants, Finance schemes brochure, or email the catalogues, or advertise on the	It needs a very good training and development. Even an in-house customer redresses cell can solve these problems.





			media about the latest models and about the services.	
3	A showroom man makes arrangement of for the display of the vehicle.	The vehicle requested by the customer is not available.	At least one variant for each model is kept ready for the display for the customers. It improves reliability of at least seeing the vehicle. Customer may buy it some time later but he gets satisfied that he has seen the car he wants to buy.	Dealer must keep in mind that the maintenances and inventory of this showroom car is his responsibility.
4	The showroom host only welcomes the host and do not note what are his	One person can either welcome the host or can take the notes. The introduction of	Two showroom hosts must be deployed at the reception in the showroom. One to welcome the customer and other for taking notes of	The dealer must recruit additional staff. In India less staff more work is a trend since





	requirements.	redundancy in hosts eliminates the possibility of customer not being welcomed.	details of his wants for the product. Thus, customer feels that he is an important person (King) and most likely visit to buy the car.	aeons. The training and development to this staff, better engagement of customer by this staff improves the customer acquisition.
5	Sales executive display car features, benefits, colours, etc.	Relying only on sales executive for selling the cars.	Even the showroom hosts must be so trained that they can motivate the customer in buying the car, while they tell and show the details of the car.	Dealer must keep a reward solely on result. The sales executive who brings the customer to showroom and the person who converts the





				potential customer into actual customer must be rewarded for their motivation.
6	Hosting a test drive.	Not able to conduct it due to malfunctioning of car or not availability of car.	Maintaining enough number of cars for show and test drive. Maintenances schedule of these cars is also important factor.	The test drive squad and their maintenances schedule should be streamlined for the results.
7	Customer feedback of the test drive of the customer must be	At present it is not much happening in India. As they take it granted that is the part	The details of each customer feed back must be noted. The feedback must be compaired with Test drive feedback of	This imporves the product in future thus benefititng the manufacturer





	noted.	of mechanic's work or driver work or somebody else's work.	other customers. The missed out points about the car must be noted. The collected feedback should be analysed and the analysis must be send to the manufacturers and to the higher authority of the dealers and showroom.	as well the sellers and dealers and the service and maintenances men. For this purpose necessary hardware, software and Information technology network must be provided and well maintained.
8	Dealer deposits payment at local branch on weekly basis.	This is harmful for the dealers in long run. As dealer is not providing	This very activity can be removed from the business process by starting the extension branch of the concerned bank	Dealer saves time by opening the branch of bank near his show room





		<p>faster services.</p> <p>As delay in depositing and money transfer may snatch away the high-class customer in future.</p>	<p>at the showroom premises.</p>	<p>and thus removes the non-value adding activity like weekly deposits of payments.</p>
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SOLUTION 7:

List of solutions over the India's other genuine recurring problems:

Given by the experts in various fields in the car industry:

It is in the form of Question/ Problem and Answer/ Solution format:

A questionnaire was produced the research scholar before the experts in the Management, Commerce, Engineering, Technology, Businessmen from India and abroad. The expertise includes lot scientists from the IIT, NIT, the consultants, the management experts, the Chartered Accountants, the cost accountants, the businessmen who are in the automobile field since last few decades of the like Mr. Rahul Bajaj of Bajaj Auto Ltd. And Mr. Ratan Tata of Tata Motors.

Following is the extract of the best questions and the answers:

(Please Read “% of People’ means Percentage of people agreed to this solution.)





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Table: 15.4:

The Problems and The Solution: Experts' Survey and Opinion Result:

Q.N.	Question/ Problem	Answer/ Solution	% Of people
1	Do you think India can make the whole car indigenously in India?	No. India has already missed the bus of making cars indigenously in India. If we had started in 1970's or 1980's it would have been the best attempt, how so ever the less market at that it may be and howsoever that would be a luxurious attempt it would have been.	49%
2	Why do you say no?	It is not required to reinvent the wheel. When others have made it just try to get technology from them.	45%
3	Does it not mean borrowing technology brings dependence on the foreign companies?	So what? Even GM does not make all the parts in America. Infact it assembles the parts that are made of best quality from any company in the	56%



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		world irrespective of its origin.	
4	Why did you mention the example of GM?	Infact every time India thinks about indigenisation it is in the fear of colonisation it suffered at the hands of British in the last two centuries. They came as the businessmen and capture the whole land. You cannot do indigenisation out of shear fear.	50%
5	If we start indigenisation part-by-part will it be successful venture?	In our opinion no country can become fully independent in any field. It has to take help from others. Similarly even if India attempt part by part indigenisation, the parts thus made may or may not become of the world standard. Either Indian should make parts simply the best in the world or just do not manufacture the parts indigenously. As it will	70%





		be a fatal attempt.	
6	Is indigenisation the best way of import substitution?	Yes. However, in the car industry technology changes very rapidly. So, to versioning problem it needs huge flexible robotic plant set up. Indians cannot afford to it unless they develop their Robotics indigenously in India itself. It needs special cell in every top institute and in every top industry, otherwise slowly these giant multinational can capture the market due to sheer over production and bringing cost of vehicle down. Less than their Indian counterpart.	90%
7	You said in 1960's to 1980's it was the luxurious attempt to manufacture car. Why?	You see, at that time India needed its basic priorities fulfilled first. Food, shelter to many, roads, steel, power, irrigation, education	95%





		institutes, textile industry, saving Indian culture from the western cultural invasion, were given top priority. As at that time, more than 95% Indians could not have even thought of the two wheelers leave aside the car. That is why we said it was the luxury to by the car. It would have been even luxurious attempt if Indians had manufacturing them.	
8	Instead of indigenisation you people agreed on making car parts from the best manufacturer (of that part) in the world. Why?	You see, nobody is perfect in this world. Not even GM, Ford, BMW, Daimler-Chrysler or Toyota people can say that they have all the products that are the best in the world. As they know, if they say so, somebody else will claim that one of their car parts is made in their company. Even	60%





		<p>somebody can claim that ours is the best from this angle. As the best have many angles. Few parts are the best as they are technology efficient. Few parts are technology superior and are called as the best. While few parts have high rate of factor of safety, hence they are the best. There are number of companies around the world already matured in this field. So, we must seek their expertise instead of attempting a fresh venture, is what we want to convey.</p>	
9	Why cannot those companies be of Indian origin?	<p>You see, to reach that quality standards which these matured companies have reached is a saga of these companies. Since last few decades these companies are manufacturing the parts in</p>	95%





		<p>which they have become master. If Indians start is today it may take at least few years to reach maturity. Otherwise there is no problem in manufacturing the parts indigenously.</p>	
10	<p>I'm stressing on indigenisation of cars as we have workforce increasing geometrically in India. They are to be brought into this indigenisation efforts so as to make India self reliant on the techno-socio-economic front.</p>	<p>Yes. We agree with you. How about the finances? How about the infrastructure? How about the expertise? Whenever India plans something it takes few decades to put that idea in to practise. We are very good at idea but very slow in implementing it. No doubt every year at least one-lac engineers, management students, commerce students, are coming out of the factory called the Indian education system. However, only</p>	60%





		indigenisation of the cars is not the only solution. How about the indigenisation of the electronics goods like TV, Computer, and Information Technologies?	
11	Car manufacturing includes manufacturing of electronics goods like few Programmable Logical Circuits (PLC), Liquid Crystal Diode (LCD) screens, Microprocessors that controls the fuel injecting in the computerised fuel injection system in the car, etc. Also, you have to start somewhere that is why indigenisation of car technologies.	Then you are correct. Yes I agree the car becomes more appealing from the customers point of view if it contains all these gadgets. If these gadgets are made in India they will be of lesser cost than their present cost when bought from the foreign companies. Infact our expertise shows that the goods when manufactured either in China or in India cost at least half of the price than their counterparts from the western countries. From this angle you are very correct.	99%





12	One more aspect, every car is made up of more than 30,000 parts. Every car can generate at least 30,000 SSI or MSI kinds of independent units in India. What is your opinion about this?	Yes we agree. Only thing required is these parts must be made of world standards. We fear that only on the quality issue MNC can eat away the market. Customers go on the brand name as well. For example you put a part called oil filter made in Suzuki costing Rs. 500/= and put an oil filter costing Rs. 300/= made in your Indian company, though your part is the best in the world, customers will buy by the Suzuki filter as it a proven brand name.	100%
13	Do you mean our parts are not the best?	Here the best has least importance. May it the best but it is not proven in the market all around the world. Where as the Suzuki parts are proven one. Thus, it is the part of Marketing. It may	80%





		generate 30,000 odd SSI and MSI still to survive in the world competition you need to market them as vigorously as these multibillion companies are doing. On this front it requires huge marketing and advertising expenses which Indian companies at present cannot afford.	
14	Then what can be solution?	Quality product and Practical approach to the Education system in India.	100%
15	You people said about the education system in India is as same as the factory of manufacturing Engineers and Managers. Why?	You see the number of colleges, the passing percentage. At the same time you see their quality of education. If less number of engineers is there they will be of quality. If so many engineers are coming out of Universities having only cramming or solving paper as	100%





		<p>their motto how can they be called the best in the world? They are given least exposure to the factories. They attempt practical as if they are visiting restaurants, how can they be called good engineers?</p>	
16	<p>Do you mean that engineers are more theoretical than the practical? Then, what is the solution?</p>	<p>Yes. We mean it. There must be an attempt like Dynaneshwar Vidyapeeth of Pune, where six months of every year of engineering education is devoted to compulsory practical training in the factory. The exposure to the real world can make every engineer perfect once he comes out of university. He can independently deal with the problems in his hand even he can become entrepreneur. You see the percentage of engineers going for the</p>	100%





		<p>entrepreneurship in India is very less. You said about techno-socio-economic development of India, it might help achieve that. Thus, it requires radical changes in the education system only. Instead manufacturing clerical kinds of engineers and commerce graduates India requires independent and entrepreneurship minded engineers and commerce graduates. Otherwise like Doctors are given one year compulsory internship engineers also require the same dealing. Remember Doctor can save lives of thousands similarly engineering and commerce graduate can also save lives of thousands by making things,</p>	
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		as they should be. If an engineer fails to make a bridge perfectly, it can lead to a tremendous hazard.	
17	You said about the radical changes, in how many places and in how many ways it can be brought in India?	As said earlier Education system must add a practical stuff to it besides its present form. It includes the recruitment of faculties as well. You observe the private engineering and management colleges; the Professors teaching there are far below the standard. How many of them are trying for the PhD? How many of them are publishing research paper? How many of these Professors are having practical and research experience? How many of us know that India's PhD faculty requirement is more than 5000 yearly and	100%





		<p>Indians are not even up to the half way mark of it? Then your visit to so many factories and the colleges might have seen the labs their. How many colleges and the industries have fully equipped laboratories?</p> <p>Remember, to go for indigenisation these basic things are required at the grass root level, which lies in these areas. Education system and the basic industries and the human resources.</p> <p>Another thing is government policies require a sea change. As far as India is concerned, Global liberalisation is a distant attempt. First of all Indians must bring liberalisation in their country first. One window tax system,</p>	
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		<p>one-window sales tax, one window octrai can change the face of the business world. Every businessman has to pass through these many steps till he places his goods into the hands of the customers. Then government policies need a better look. Indigenisation must be given top priority, and indigenisation requires maximum thrust on R & D. So R & D must be given soap. Any company, which brings totally new and marketable product through R&D, must be given some concession in future. Unless that company brings a new patent and proves its potential every year that concession should not be extended. Thus, result</p>	
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		<p>oriented approach is required.</p> <p>Then, Quality standards must be upgraded as per the international levels, laws for the technologies must be upgraded every two to five years, and so long and so forth. Unless these changes are brought our engineers and expertise in other fields cannot get success as compaired or as par to the success for them, happened in USA or UK in last few decades.</p>	
18	<p>Why do you say Indian engineers are more successful in USA or UK like developed countries and not in India? There are only few working there where as in India more than double of</p>	<p>They are given free hand to practice especially on the R & D front. In India R &D is given the least importance. Even if companies have R & D buildings and departments still the job they do is of only nominal. Few do it to get</p>	100%





	<p>them are working and bringing development of the country. Are those migrated engineers loss to nation or gain to nation?</p>	<p>benefits, though very less, from the government. They carry out show of R & D when the government inspectors visit their plant. Later on again that department is on its usual clerical, services or manufacturing job. Here, government norms must be very strict. Otherwise Indians will become follower than the leaders in the world. Slowly, they will lose their identity of creative people and will become slave of western technologies.</p> <p>One more thing migration from the better opportunity is not the loss in longer terms. These people migrated due to better job opportunities, better work culture, better pay packages and better living standards.</p>	
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		<p>However, ultimately their bond with India continues as their relatives staying in India exploit the business opportunities in the western countries. Many Indians got well educated from the foreign institutes. Many brought latest technologies with collaborations with the western companies in India. Many migrated people have brought radical changes in the government policies as India cannot afford to lose Engineers and Doctors over whom government has spend at lest a million rupees on every one of them. Also, many come to India and offer their expertise to Indians. This brings lot of business and job opportunities and</p>	
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		<p>technologies in India. During financial crisis these NRI bought the bonds in 1992 to support Indian foreign exchange crisis. Thus, what was supposed to be the loss became the profitable idea. These people find the Indian culture to be the best to live. Hence, the cordial bond they share with the motherland remains forever. Hence, it is not a loss. If managed well it can become a force to reckon with in future. In every future attempt to deal with any techno-socio-economic problem Government of India can take help of these NRI. These people will definitely and happily offer their big share in that.</p>	
19	Why did you say Indian	Remember it is the only	90%





	<p>culture is the best? What Indian culture has to do with car indigenisation?</p>	<p>Indian culture and civilisation, which advises every person to have best of the things in your life but not at the cost of your future life. Every person must have a car but not at the cost of the future life. For future every person must save enough to live a better life in his old age. It does mean that on the earth there should not be a sustainable development. However, it does mean, that there must not be over production of cars at the same time there should not be over dependence on the foreign source. Every development must be environmental friendly and every attempt in India must be harmonious to the Indian culture having</p>	
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		<p>more than two billion years of background. It is not the thing of total indigenisation it is a matter of every step in building the car must not harm this set pattern of the billion odd years. Once it harmonises with the culture car will be automatically be absorbed in the family system and slowly people who are customers as well, will indigenise it.</p>	
20	<p>Does Indian culture advises us for the sustainable development? How about its application to indigenisation of the cars?</p>	<p>You see our culture says that once you see the product you must be able to reproduce it in your country. The technocrats must be that much expert. Also, there are people who are using the car at there home. They will build it some how in future. Remember in all our past</p>	100%



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		<p>technologies Indians used the biodegradable products. They will attempt the same thing in the cars, space age technologies, and other technologies as well. Indians believe in reliable products rather than ever-new product. They do not believe in buying and selling a car every three years. They save a lot of their money. Indian culture (Agni Puran) advises us to save at least 32% of their earnings. That is why India's GDP is almost Rs. Twenty Lac Cores and Savings is almost One fifth of that. Where as USA is spending Rupees Forty Seven Lac Crores and they have a burden of debt of same size. Thus, every American is harming the world by adding</p>	
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		<p>waste in the world by abandoning the car, televisions, and computers for a very small fault in those products. Where as in Indian culture commodity like the car once bought becomes a part to their family as they treat even car as a living thing. Even some families treat the car as a ‘somebody of our own family’. The commodity becomes life long asset with the family. Indians believe that as the human get suffered from illness motors also can. So they repair it and use it. Except for the few very families, it is the trend in almost all the families in India. Thus, it reduces the waste, it brings fewer hazards to the environment, and it</p>	
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		<p>brings sustainable development as the cars are manufactured only up to the demand level. Another aspect is nowhere and nobody in the universe can use the hazardous material. Here also, Indians mould every technology in such a fashion that it becomes human friendly, civilisation friendly and culture friendly as well apart from the technology being eco-friendly. Infact, the world should learn more from India on this front than advising Indians over this problem. Hence, we all so to whom you call us experts, believe that there will be indigenised technology in every field including the car technologies, that too, in</p>	
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		coming decade.	
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SOLUTION 8:**ISSUES Based recurring problems and solutions over it:**

The world knows that India is the only developing country in the world having developed its own space technology, Super Computer technology, Missile Technology, Atomic technology, and son and so forth. So following issues are of major concerns in developing indigenous cars with respect to customer behaviour:





Table: 15.5: Showing the Issue Based Problems faced by the

indigenisation team in allied fields and possible Solution over it:

Issue No.	Issue based problems and found solution in the indigenisation of technologies	Solution for indigenisation cars
1.	In some fields in India Prototype once developed was not up to the standards and final product was of also of poor quality by the vendor.	Develop the prototype and final product of higher quality by all means.
2.	Domestic suppliers do not keep the delivery schedule up to the mark. There are no smooth operations of repair and maintenances.	Domestic suppliers must realise the dire need of the day.
3.	Repeat order means lot of profit. So vendors have quoted unreasonable prices on this issue. They claimed unreasonable cost escalations, which were unjustifiable.	Vendors must have long-term goals rather than earning on only one contract.
4.	Some suppliers have supplied limited but very high quality parts due to inadequate financial resources,	Adequate number of parts must be supplied just in time by the





		vendors.
5.	MNC manufacture the parts of cars in millions, where as Indians are still in thousands. So vendors cannot afford to manufacture less number of parts.	Small Scale Industry development is the best possible solution.
6.	Engine, Gearbox, Axles require higher precision and higher quality material, according to BIS, QS, ISO, JS standards to develop indigenous products.	Indian industries must gear up for the TQM, TPM, and other Quality norms.
7.	Adequate data and technical specification of the car part to be manufactured must be provided to the manufacturer in time with all the specifications and details. It could not happen earlier.	Adequate Design data, specifications, should reach just in time or prior to first warning.
8.	TQM, TPM, Quality is not taken seriously by the Indian industry, especially the seller vendors.	Indians must become serious while designing and developing small cars.





9.	Service stations in India must realise that customer relationship has the highest priority.	Realise 'customer is the king' for the India.
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Interpretation of the table:

The issue discussed are genuine and solutions suggested are more practical and result oriented in the Table.

SOLUTION 9:**Inspirational Solution in the form of Successful example:****Successful example over the car technology indigenisation and improving sells from USA:****Similar kinds of Problems were faced by the US car industry:**

In 1992, US automobile manufacturers and General Motors (GM) in particular lost its \$23.5 Billion share to Japanese Car manufacturers like Honda, Nissan, and Toyota. Later on, GM had to close 142 units in US. In Detroit itself, GM closed at least dozen of its units.

GM being global market leader till that incidence analysed the situation. An Engineering and Management Research predicted the following problems:

- Repeated poor quality of product to the customers,
- High prices to all the services,
- High pressures dealers from Detroit,





- d. The problems between Management and Labour made their relations very tense,
- e. Japanese car manufacturers were providing Quality product and services that too at very low cost. Therefore, consumers started loving Japanese products.
- f. Besides this, deregulated global competition had offered customers choices in many industries. If customer did not like Lincoln, the customer could choose among Cadillac, Mercedes, BMW, Lexus, and Infiniti. However, thirty years ago the only choice was Cadillac the GM made car.

American Answer to Global competition: Quality Indigenous Cars:

Therefore, the General Motors (GM) Strategic Management crew decided to set up the brand new company and named it Saturn. Saturn was the pilot project to overcome the losses suffered in 1970's and 1980's by the US car market due to invasion of Japanese and German cars.

Saturn's specific mission was to "market vehicles developed and manufactured in United States that are world leaders in quality, cost and customer satisfaction through the integration of people, technology and business systems and to transfer knowledge, technology and experience throughout General Motors."

This was costly, ambitious pilot project and a risky undertaking by GM. GM invested whopping \$5 Billion in Saturn project.





Within two years of its late-1990 start-up, Saturn became an obvious success.

Its cars were ranked third in a 1992 J.D.Power Customer Satisfaction Survey, which was based on:

1. Saturn's nearly impeccable Quality,
2. Low prices. Infact, the prices of other cars in the top five were almost three times higher than Saturn's prices.
3. No-haggle pricing by dealers and
4. Improved Productivity norms.

Specially mentioning here for the first time Productivity Norms were clearly defined and seriously implemented in the Saturn Car project of General Motors in US. This led to a price war between all the competitors. First two years of its inception the Saturn sell dominated the car market and Saturn Cars reached at the third spot in US all time sells chart.

Saturn defined Productivity of the production system is analogous to the efficiency of a machine, just as it is desired to increase the efficiency of a machine; it is also aimed at to raise the productivity within the available resources.

Thus, *Productivity = Quality Production / Quality Resources Employed.*

It will increase if the production increases without adding to the resources employed.

So the following steps were taken to improve Productivity of Quality Products:





- i. Improving basic process by R & D in every field of Resources Management,
- ii. Saturn provided more and improved physical need of producing which required investment in,
 - a. Highly trained technical staff,
 - b. Infrastructure assets, and
 - c. Advances Technology in plants and equipments.
- iii. Saturn simplified and improved the product and reduced the variety as well. It gained great Economic benefits from standardisation and the reduced range of products to a reasonable minimum.
- iv. Saturn improved the methods of operations so that the same Car can be manufactured in lesser time. It used Work Study, Critical Path Method, Total Productive Maintenances, etc.
- v. Lot of suggestion were called from the employees to improve organisation, planning, control, quality of the product and services, so as to reduce the resource waste and to reduce time wasted on such activities.
- vi. As mentioned earlier Saturn increased manpower effectiveness at all the levels – taking from top-level executive to the most recently joined apprentice.

These were the reasons; Saturn's dealers were selling an average of 100 cars each month, more than any other brand sold in the United States.



**Table: 15.6: J.D.Power Customer Satisfaction Ratings for top Five****Automobiles: 1992 Report:**

SN	Automobile Make	Customer Satisfaction Rating
1	Lexus	179
2	Infiniti	167
3	Saturn	160
4	Acura	148
5	Mercedes-Benz	145
6	Industry Average	129
Reference: "Saturn: GM finally Has a Real Winner," Business Week (August 17,1992): 87.		

Interpretation of Table:

From nowhere the Saturn could capture the third spot in the market by sheer will of the organisation.

Saturn dealerships were ranked by automobile dealers as the most valuable dealership to own in 1993. Six weeks before the 1992 model year was officially over, the Saturn dealers sold out of cars.

In spring 1992 Saturn started to ship cars to Taiwan.

In 1993, Saturn was operating near capacity with three shifts and was planning to export right-hand drive cars to Japan.

In early 1994, Saturn reported its first-ever profit and lobbied GM for funds to start another plant.





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One survey revealed the following strategy adopted in the Saturn project by

GM. It was during the profit target Saturn management realised that this policy be adopted. At a glance it is given in the form of table indicating various controlling measure and it's up and down order of control.

Table: 15.7: Marketing Cost Control plan adopted by GM in its Saturn project at a Glance:

Kind of Control	Major Responsibility of	Purpose/ Reason of control	Method of Control
1. Annual – Plan Control	Top Management and Middle Management	To examine whether the planned results are being achieved	a. Sales Analysis, b. Market-share analysis, c. Sales to expense ratios, d. Financial analysis, e. Total customer Satisfaction tracking.
2. Profitability Control	Marketing Controller	To examine and pin pointing where exact company is	Profitability by: a. Product, b. Territory, Customer, c. Segment,





		making and losing money.	d. Trade channel, e. Order size, f. Customer.
3. Efficiency Control	Line and staff monument marketing controller	To evaluate and improve the spending efficiency and impact of marketing expenditures.	Checking Efficiency of: a. Sales force, b. Advertising, c. Sales promotion, d. Distribution.
4. Strategic control	Top management and marketing auditor	To examine whether the company is pursuing its best opportunities with respect to market, products, and channels.	* Marketing effectiveness rating instrument, * Marketing audit, * Marketing excellence review, * Company ethical and social responsibility review.

Interpretation of the table: Thus, GM adopted some revolutionary techniques of cost control and achieved the pre-determined objective.



**Conclusions drawn from Saturn pilot project:**

GM took initiative while it planned the Indigenous world-class car-Saturn Mission to combat the MNC cars invasion in the US car market.

1. Saturn showed that GM could produce cars to global standards, with:

a. The Best Quality:

It can be achieved by the systematic Control of various factors against it. So, it depends on proper utilisation of resources like material, tools, machines, type of labour, working conditions, measuring instruments, etc.

b. Less Price:

With systematic plan or approach best quality can be achieved with minimum cost of production hence optimum cost for the final product for the customers.

c. Customer Satisfaction:

It was effective system for integrating the Quality Development, Quality Maintenances and Quality Improvement efforts, of various Quality Circles or Groups in the organisation. It enabled the production and services at the most economical levels, which allowed the full satisfaction of the customers.

With above criteria GM and hence US companies regained customers who had been lost to BMW, Mercedes-Benz, Honda, Nissan, Toyota and the other Japanese, German and other European competitors.





2. Saturn also showed that to be a world class, it takes both long-term, executive-level commitment to superior customer value and systemwide team approaches with suppliers, dealers, and workers.
3. Saturn and hence US company GM achieved great quality through increased employee input into managerial decisions, as well as higher level of employee training, to make low priced indigenous cars at lowest possible price.

How General Motors achieved it?

Further studies show that before launching this mission GM carried out lot of R & D and Benchmarking in particular, to get desired result.

The main functional and competitive benchmarking GM highlighted on their board and then adopted are given below:

B1.Lands' End: Principles of doing business.

B2. The great Japanese Secret: Building a chain of customers.

B3. a. Functional benchmarking ex. Xerox adopting L.L.Bean's order entry and billing system.

b Competitive bench marking ex. IBM studied and emulated how Microsoft designs new software for PCs.

B4. Implementation in many Japanese companies: Deming, Juran, Ishikawa, Crosby for high quality at low price.

B5. P.A.C.E. approach to Sea Ray Boats made by Brunswick Corporation (July 1991).





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B6.International Quality Studies by Ernst and Young on percentage of

businesses whose departments always or almost always translate Customer Expectations into the design of new products and services.

Let us study what are these important factors those have changed future events of GM and indigenous US car market.

B1: Lands' End: Principles of doing business-

Principle 1: We do everything we can to make our product better. We improve material and add back features and construction details that others have taken out over the years. We never reduce the quality of a product to make it cheaper.

Principle 2: We price out product fairly and honestly. We do not, have not, and will not participate in the common retailing practice of inflating mark-ups to set up a future not genuine “sale”.

Principle 3: We accept any return, for any reason, at any time. Our products are guaranteed. No fine print. No arguments. We mean exactly what we say: GUARENTEED.PERIOD.®

Principle 4: We ship faster than anyone we know of. We ship items in stock the day after we receive the order. At the height of the last Christmas season the longest time an order was in the house was 36 hours, excepting monograms, which took another 12 hours.

Principle 5: We believe that what is best for our customer is best for all of us. Everyone here understands that concept. Our sales and service people are trained to know our products, and to be friendly and helpful. They are





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urged to take all the time necessary to take care of you. We even pay for your call, for whatever reasons you call.

Principle 6: We are able to sell at lower prices because we don't buy branded merchandise with high-protected mark-ups; and because we have placed our contracts with manufacturers who have proved that they are cost conscious and efficient.

Principle 7: We are able to sell at lower prices because we operate efficiently. Our people are hard working, intelligent and share in the success of the company.

Principle 8: We are able to sell at lower prices because we support no fancy emporiums with their high overhead. Our main location is in the middle of a 40-acre cornfield in rural Wisconsin. We still operate our first location in Chicago's Near North tannery district.

[Source: Lands' End Inc. Annual Report (1992)]

B2: The great Japanese Secret: Building a chain of customers.

Japanese management rely on Quality, JIT, TQM, TPM, Reengineering, Equipment policies, and in development of broad view. It is just a matter of adopting continuing programs of cross training and cross functional shifts of people. That is why broad view remains as the great Japanese strength.

[Source: Building a Chain of Customers: Linking Business Functions to Create the World class Company, New York Free Press (1990): 130.

B3. Benchmarking.





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Even the greats like IBM, Xerox, adopt good policies from others in any kind

of business.

- a. Functional benchmarking ex. Xerox adopting L.L.Bean's order entry and billing system.
- b. Competitive bench marking ex. IBM studied and emulated how Microsoft designs new software for PCs.

B4. Implementation in many Japanese companies: Deming, Juran, Ishikawa, Crosby for high quality at low price.

B5. P.A.C.E. approach to Sea Ray Boats made by Brunswick Corporation (July 1991).

Sea Ray has put together a program/ a policy called P.A.C.E. – People Achieving Customer Expectations.

They have put it in the following fashion that appealed the General Motors Corporation:

In a very real sense, quality is a closed loop, beginning and ending with the customer. The quality process starts when we seek to understand what it takes to satisfy customers in our marketplace.

Quality then goes full circle:

- a. We define specifications to meet the customer's requirements. We manufacture products and develop the services necessary to satisfy those requirements.





b. Then we go back to customers and get feedback, “How are we doing?”

Did we meet your expectations? ? How can we serve you better? What improvements and innovations would you like to see from us?”

So you see, in pace setting company, quality must mean more than just a product characteristic. Rather it is an attitude that “the customer is king.” That belief must permeate the entire company, driving every decision and involving every employee. When quality improvement becomes truly ingrained in the corporate culture, error rates and defects plummet. Productivity and customer satisfaction mushroomed.

The goal of P.A.C.E. program is to continuously improve the quality of our products and to enhance our ability to satisfy the customer.

*B6. Interntional Quality Studies by Ernst and Young on percentage of businesses whose departments always or usually translate Customer Expectations into the design of new products and services. **This was another inspiration for the General Motors for its Saturn project.***

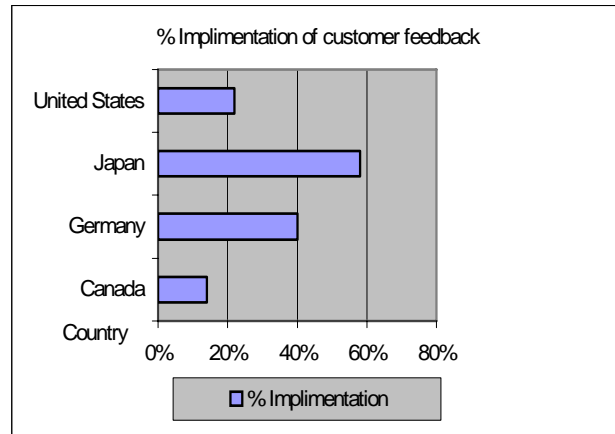
Table: 15.8 and Graph: Why Japan was leading the market?

Reference: GM survey report





SN	Country	%Implimentation
1	Canada	14%
2	Germany	40%
3	Japan	58%
4	United States	22%



Interpretation of the table and graph:

Japan was still leader in the implementations of R & D.

Here GM found that customers' feedback was thoroughly implemented in the quality Japanese products and hence they were ruling over the minds of their US customers. Infact much of the US car share was getting diverted to quality cars manufactured by the Japanese. Both GM and Ford had lost almost 10% of their market share by the time they realised its havoc in 1994.

Ex. Till 80's the aerodynamic design of the cars was a higher thought in US market so Impalas were still running on the US roads. Whereas, Japanese had already replaced those big looking sharp edge designed cars with Sedan or even smaller version of cars with smooth edgeless aerodynamic shapes.





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Here, GM carried out further studies over developing basic fundamentals of

the organisation for implementation in their Saturn project, in which they were highly successful.

The main aim of the project was how can managers and their organisation yield superior quality at low cost?

High Quality Low cost:

W. Edward Deming is sometimes called the father of the Japanese and American quality movements. He made a seminal contribution to business strategy and practice when he showed how high quality and low cost can go hand in hand.

Joseph Juran, Kaoru Ishikawa, Philip Crosby, and all taught the new logic of higher quality and lower costs.

Prior to this analysis of Deming, Economists argued that quality, or any feature of a product, costs money. It was wrongly conceived fact of the US Economists, Engineers and Managers that better the quality of the product, the higher the cost of the product. Since many managers relied on 'inspection after production' to achieve high quality the Economists were correct in observing that quality costs money. But it does not need to be that way.

So they studied how the Japanese could achieve it? Naturally Deming was to be studied thoroughly.

W. Edward Deming's logic:



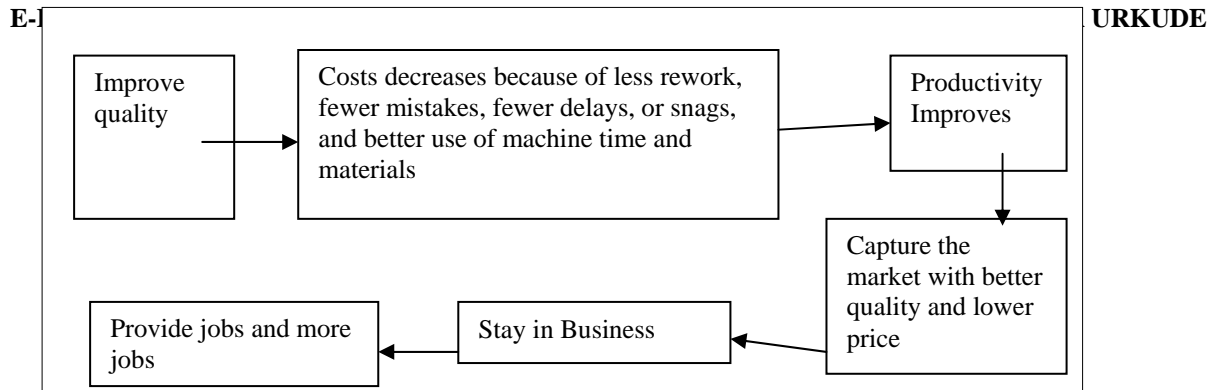


Diagram: 15.4: The Pervasive role of Quality-Edward Deming's Logic.

Reference book – “Out of Crisis”: Edward Deming.

Interpretation of the diagram:

The logic predicted in the diagram:

1. Higher the quality lowers the cost.
2. Quality is not an after production inspection business. He said, “Cease dependence on inspection to achieve quality. Eliminate the need for inspection on mass basis by building quality into the product in the first place.”
3. Quality is a strategy that must permeate an organisation throughout its business activities.

The results Deming achieved:

Earlier idea that high quality can be achieved at low cost was a watershed in business operations. After Deming's above predictions the world market is totally different:

1. Today organisations pay highest attention to design the product to eliminate recurring defects in production.





2. Firms also design-manufacturing processes so that operations are performed without errors.
3. Firms also manage systems to eliminate the cause of defects.
4. Organisations also try to improve the products or services and the processes to yield even greater value to customers.
5. Organisations pay due attention to the cost of quality- or to the cost of poor quality.

The cost of quality:

The cost of quality is the cost incurred in producing poor-quality products and services. It includes:

1. The costs of scrap,
2. The cost of rework,
3. The cost of warranty repair,
4. The cost of inspection,
5. The cost of Quality related maintenances.

These costs are sometimes expressed as a percentage of cost of goods sold.

1. In an earlier era many firms experienced a cost of quality from 15% to 30%
2. Firms that implemented Total Quality usually experienced dramatic declines in the cost of quality of 90% or even more.
3. Whereas some firms, through continuous improvement of the products or services and the process, some firms relentlessly drive the cost of quality towards 0%.





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Only then has become affordable quality as a realisable goal. This is the

reason why with lower cost and higher quality, the firms can provide more value to customers.

(This is how GM and Saturn in particular achieved their goal of better quality and lower price for technology and customer care.)

The world's best example for low cost of quality product is given to be of Capsugel Company.

It is a division of Warner-Lambert. The company is involved in making hard gelatine capsules for the worldwide pharmaceutical industry.

Capsugel Company has been lowering its cost of quality by one-half every five years. It does this primarily by eliminating inspection after production.

This was one of the inspirations for General Motors' Saturn project.

In an earlier process the firm employed over 100 inspectors per plan:

1. To inspect the product twice.
2. Redesign of the systems, including selecting a few suppliers based on quality,
3. For continuous process improvement,
4. For Training of new behaviour, and
5. Towards Attention to customers,

These five guidelines helped Capsugel accomplish the reductions in the cost of quality for hard gelatine capsules.

Research and Development in Management Systems and Behaviour – the GM approach:





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Earlier GM limited their Quality approach that Deming, Ishikawa and the other Quality Guru started.

This approach was quite different from Total Quality adopted in during implementations of few strategies and systems. Other approaches like customer value determination system and new product development system also had its importance. The reason given can be in the international competition, it is always necessary to understand the primacy of the customer. With the deregulated global competition customers' choice has its due importance.

In the present US market if customer does not like a Lincoln, the customer can choose among Cadillac, Mercedes, BMW, Lexus, Infiniti, Audi, Honda, Toyota, etc. But few decades ago customers had only one choice and that was Cadillac.

In the present Indian market similar case is there. If customer does not like Fiat or Ambassador, he can choose Maruti-800, Maruti-Zen, Maruti-Alto, Maruti-Wagon-R, Hyundai-Santro, Daewoo-Matiz, Fiat-Palio, Tata-Indica, etc. But a decade ago customers had only two options Fiat and Ambassador. Even in there are multiple choices in the bigger and luxurious cars segment. They are Tata-Sedan, Tata-Indiva, Maruti-Esteem, Maruti-1000, Maruti-Baleno, Honda-Accord, Honda-city, Toyota-Corolla, Opal-Astra, Opal-Corsa, Mercedes-Benz-S, Mercedes-Benz-E, Hyundai-Sonata, Daewoo-Cielo, and alike. Thus choices seemingly have no end.





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So, in these conditions customers demand high quality and low price with

higher value of customers' services.

1. Managers had to heed the customer in this international competitive era or had to face bankruptcy.

Such were the stricter measures taken by the GM Strategic planner.

2. American Quality Foundation made the following bold statement concerning the importance of quality as a business strategy: "Quality improvement is the fundamental business strategy of 1990s. No business without it will survive in the global marketplace."

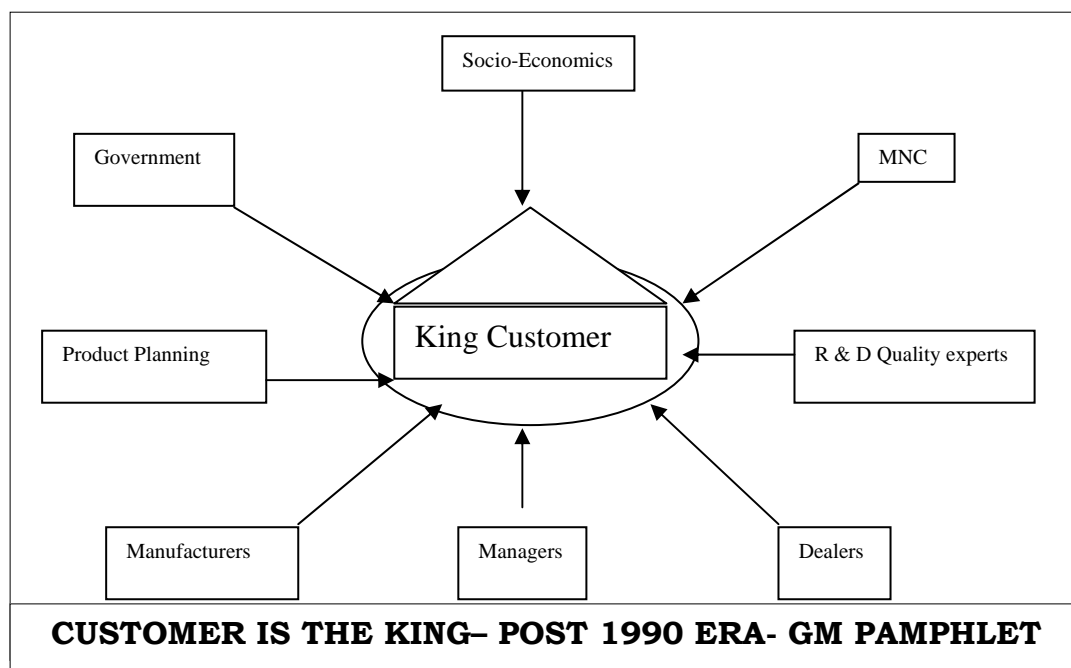


Diagram 15.5: Customer is the King- Post 1990 Era- GM Pamphlet.

Interpretation of the Diagram:

General Motors suffered a severe jolt as customers shifted to Japanese cars and almost rejected the GM cars. Thus everybody in the GM could come to





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the conclusion that in the multipolar global high quality market

competitions make the customer the boss of the situation and hence
required to be treated as a king.

But prior to global competition the domestic manufacturers had dictated the
terms and conditions, the prices and other associated things.

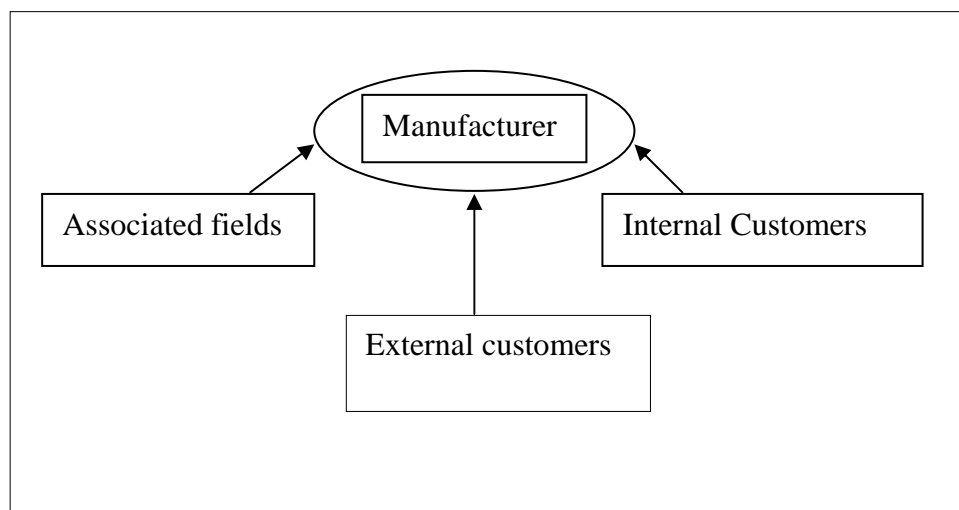


Diagram 15.6: Manufacturer used to dictate terms and conditions

Interpretation of the diagram:

In the earlier markets when less players were there manufacturer used to
dictate the terms and conditions in the market.

But latest market trend shows that customer needs and demands that
made big impact made everybody in the market feel its importance. It is
always said that lot of things have changed due to global competition.

3. In the later half of the last decade of the twentieth century, Total
Quality (TQ) became a dire need Business Strategy. The concept of
customers had changed a lot. No longer customers were looked as the





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sales target of short duration. Marketing concept of longer and good

relation with customers got extreme importance in the market.

- Managers had to deliver value to every customer by adopting or developing different managerial systems.
- Total Quality by all means focused first and foremost on consistently satisfying customers and needs.
- Competitive strategy got a severe impact. As major mindset difference between customer-value strategy and competitive strategy was that if every time GM delivered the quality product to the customers, the competitions were left in the dust.

Earlier when competitors were given very much importance GM faced following *disadvantages*:

- a. Naturally GM lost its much focus on customers.
- b. It began conflict with the purpose of business strategy, which is to serve customers' needs.
- c. Many a times company lost it's "first be in market to introduce", thus it was destined to pursue a follower strategy, which was not at all tolerable for the GM.
- d. There were below average financial returns,

Where as focussing on the competition made GM find various ways to find improvement in their systems through the activity of bench marking.





a. Functional benchmarking: Studying and possibly emulating the best processes and the systems in the world whether from own industry or in another industry may it be even from competitors.

b. Competitive benchmarking: Analysing what the best competitors or leading companies in the industry are doing in order to discover the products, processes, and the practices that satisfy customer needs. Competitive benchmarking of processes is the prime area for focussing on competitors.

- o Other approach was giving more than what customer wanted. It was especially important as women in US increasingly started owning the cars that suited them the most.

- o “Total Customer Satisfaction”, “Customer Delight” or “Exceeding customer expectations” is the motto of many companies worldwide. These terms also express the firms are going beyond what the customers demands today to keep the customer as a customer tomorrow.

- o Few times car companies did highlight high performance, high quality, mail-order clothing retailer, which provided all the important services and the value and worth of their money.

- o When other small companies started showing dedication towards their customers GM made significant changes in their customer approach by even adopting strategies like Business Process Reengineering.

- o *Shareholders and Owners* of the firm. TQM with its focus on the customers could produce superior long-term financial value for the





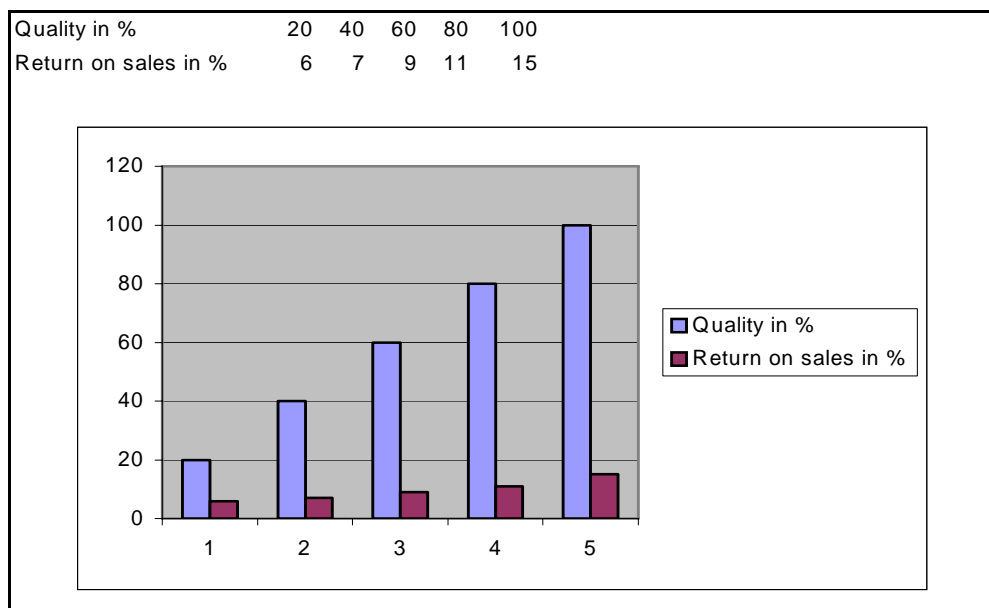
E-BOOK- ISBN: 978-93-5235-441-2. COPYRIGHT TO AUTHOR- DR. ASHISH MANOHAR URKUDE owners. During 1993 and 1995, the companies who were listed in the

Malcolm Baldrige National Quality Award were only those who had adopted management practices experienced an overall growth in the corporate performance, it included GM's Saturn.

- o Better the quality better the profitability became the basic fundamental.

Its positive result can be seen from the following data analysis: It is calculated in terms of return on investment with following data.

Table 15.9 and Graph: Relationship between Quality and Return on sales: Reference: GM's Saturn Report:





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Interpretation of the Table 15.9 and the Graph:

Improvement in the quality of the cars brought return on sales to its maximum and sales improved by fifteen percent.

People don't want the car with step-by-step increase but they want the product consisting of the total new generation car with lot of facilities and comforts packed in one car.

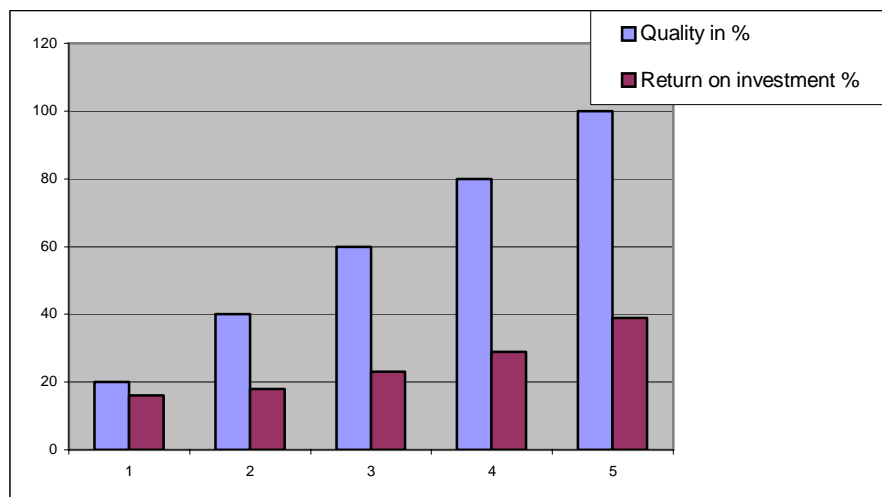
This was the strategy adopted by the Japanese that ultimately Saturn also started in effect.

Table 15.10 and Graph:

Relationship between Quality and Return on Investments:

Reference: General Motors' Saturn Report.

Quality in %	20	40	60	80	100
Return on investment %	16	18	23	29	39



Interpretation of Graph and Table:

Quality and return of investment are two sides of one coin and ROI touched almost forty percent, which was phenomenal.



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Thus the car companies who adopted TQM practices achieved:

- e. Better employee relations,
- f. Higher productivity,
- g. Greater customer satisfaction,
- h. Increased market share, and
- i. Improved profitability.

After this success to keep company on path of success various firms adopted some new measures few of which are given in brief.

Importance of Customer Value system and TQM associated with it:

1. Customer Value: Providing value to customers is more than simply eliminating defects. Customer value has many dimensions and must be systematically determined in the firm's products and services.
2. Multiple dimensions: Deming, Juran, Ishikawa, Crosby, and others taught the business world that it could deliver high quality with lower cost to the customers simultaneously. They made Quality that delivered customers more than what they expected.
3. Value Realised and Value sacrificed: Value can be either positive or negative. Because either it can be realised or it can be sacrificed.
 - a. Realised Value: It is the value that the customer receives. It can include comfort, image, ease of use, reliability, consistency, enjoyment, and a host of other characteristics.
 - b. Sacrificed value: It is the value that the customer gives up. It can include time, money, energy, frustration, worry, and a





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number of other components. So, a two dimensional view of

customer value has been proposed. Both dimensions have multiple components.

- c. It has been estimated that a satisfied customer will tell three other potential customers of his or her satisfaction. However, a dissatisfied customer will tell seven other potential customers of his or her dissatisfaction. So it has become important for managers to pay attention to the value sacrificed by that could lead to dissatisfaction.
4. Best Net value: The difference between value realised and value sacrificed is called net customer value or simply net value. A comparison of net value for all competitive firms in the industry determines the best net value, thereby giving the firm a target. The business strategy and objective is to move the firm's customers to a position of higher value realised and lower value sacrificed so that the best net value in the industry is offered. Frequently, managers make organisational decisions based on saving money. However, customers' need other than price reduction has been proved by this method.
5. New product development system: New product development systems in TQM firms are good examples of the use of cross-functional systems to create and deliver value to customers. The new product development system frequently utilise personnel from most of the





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functional areas in the company to work together on the design of the

new product.

In few of the Japanese and German firms, teams of research, design and development, manufacturing and marketing guide prototypes from the labs to market include experts as well as customers as team members.

GM, Ford, adopted this only after 1990's.

6. Quality Function Deployment (QFD): A technique being used more often today to ensure that the design of new products and services is based on customer criteria is QFD.

QFD is customer-driven design system that attempts to achieve early coupling between the requirements of the customer, marketing, and design engineering.

- a. This technique starts with Customer criteria
- b. Translate them into product,
- c. Provide services requirement measures.

Ex. In India small cars with high power, tough body, with good network of authorised service stations, high fuel efficiency, good aesthetics and ergonomics, but less price of product spare parts and services will always do well. Hence, Tata-Indica has become a successful product in the domestic car market.

7. After severe competition been posed by the German and the Japanese firms US industry including GM, Ford faced severe attack from the





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customers. Some industries were decimated in the 1980s. Some

companies lost thousands of customers and retrenched into smaller-size organisations. Many companies were brought under one banner called TQM to improve their competitiveness. TQM associated them with high quality, low costs, short cycle time, regained market share, and increased long-term profitability due to customer loyalty to the company.

Thus, Total Quality Control and Total Customer Satisfaction were the tricks US companies adopted when they faced severe competition from the MNC.

FROM THE SUCCSSFUL EXAMPLE AND TAKING AN INSPIRTON CAN INDIANS ACHIEVE THE SAME?

YES.

1. Indian Car industry is more than 50 years old. It has seen all kinds of ups and downs in the business. All the companies by now have their own well-defined well-focused set ups. They can focus on the technical front on the following technology:

Table: 15.11: Where R & D is needed in India?

Technical Factors of cars on which Research and Development is needed in India		
S Where R & N D is needed	FACTOR on which R & D is needed	Research findings why R & D is needed on these in India: Reasons / Comments / Remarks
A car	Shock Absorber	Indian climatic & road conditions cuts short the life of this MNC part
	Streamline body	Air and Rain Resistance is almost unavoidable in Indian climate.
	Safety Measures	To Pass all dash tests in accidents is





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		must in Euro Standards.
	Coats in Painting	Corrosion resistance paints and coatings needed in the competition.
	Night vision lights	All terrain roads in India and lack of night lamps and road signal.
	Doors and Door locks	These form the Most problematic part in Indian cars.
	Wind Shield Wipers	Improper wiping is done at present in varying climatic conditions.
	Back lights & Brake lights	Fusing these lights is a common phenomenon in India, research needed
	Panel & reading meters	On Panel / Dash Board most of the car's data must be visible.
	Emergency Needs	Air Bag, Message sending, Safety measures
Transmission	Automatic Transmission	Changing Gears very often.
	Alloys used	Breaking of Gears, Propeller shafts, etc.
	Lubricating Oils	Present oils must be brought to the international standards.
	Wheels	Improvement is needed on balancing front.
	Tyres	Quality of the material and standard needed
	Tubes	In this much improvement is needed
	Locking Nuts & Bolts	Age old nuts and bolts are still used
	Clutch	50 years old design is still used in India
	Constant Variable Tr.	No car in India yet running on CV Transmission
	Steering System	Needs Improvement in the Indian context.
C Gear Boxes	First and Second Gear	Much improvement is needed in Indian cars
	Top Gear	Due to road conditions and other factors
	Overdrive	Saves Lot of efforts and fuel consumption
	Synchromesh Rings	Indians are yet to make good quality rings
	Gear Shifting Mechanism	Second biggest problem in India



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		Automatic Gear Shifts	Gear Shifting can be avoided in Gear boxes
		Gear box lubrication	Improvement is needed in India as temperature range is -50 to +50
		GB Servicing a year	In India, it is yet to make a start at maintenance front.
		Alloys used in Gears	Metallurgical Improvements need of the hour.
D Engine		Cylinder Wear & Tear	Whole mechanism differ with conditions so needed research.
		Piston	Combustion Chamber is the Power Chamber
		Piston Rings	Pollution due to unburnt gas leaks.
		Tappet Valves	Most problematic in Diesel Engines.
		Rocker Arm	Few problems heard due to this.
		Cam Shafts	Metallurgical, Mechanism needs improvements
		Crank	Improvement is needed in Indian Contest
		Crank, Cam Mechanism	Improvement is needed in Indian Contest
		Fuel Injecting Mechanism	Perfect Combination is yet to be found.
		Combustion Timing	MNC vehicles misfires in Indian Contests
		Catalytic Converter	Heavy Pollution through exhaust gases can be avoided
E Fuels and		Mixture with Petrol	Unleaded Petrol misfires, detonates
Alternative Fuels		Diesel	Diesel forms the major automobile fuel in India
and Alternative		CNG	200 Tonnes of CNG produced at Bombay high everyday
Car Segment		LPG, Gobar Gas, etc.	It is feasible to run car on these fuels.
		Hydrogen as a fuel	Most abundant fuel and least pollutant. So need of the day
		Solar Car	Petroleum is getting extinct but Sun will last longer.
		Battery Car	Research on long lasting Batteries is need of the day.
		Air Car, Water Car	Future needs of the car are Air borne and water borne as well.
		Some other fuel	Liquid Nitrogen as fuel in the car.
		Auto pilot-GPS	Computer guides the car takes help of





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	car	Satellites for position.
	Fuel Consumption	Many organizations are trying to get maximum average from cars.
	Alternative Materials	China clay piston, Fiber glass body, etc.



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**Interpretation of the Table:**

All these technologies have been refined by the MNC to reach the quality they are giving so Indian must start early and reach the pinnacle as they reached in other sector with speed.

Also, all the companies have some or other kind of collaborations between them and some parent company those have developed their automobile machineries, units, assemblies and sub assemblies by MNC.

2. By now all the ancillary units, subunits, SSI, MSI, which are supporting the main plant for productions of the car, have developed themselves to the world standards.

3. Here we shall see the examples in other field where India has already achieved this and then compare it for our small car indigenisation purpose.

a. In the cycle Industry Hero cycles have achieved it much before and now they are leading cycle manufacturers in the world.

b. In the refrigeration industry,

c. In the most of the common medical equipments,

d. In the agricultural industry Indian organisations have achieved total indigenisation because of total customer satisfaction (TCS) and Total Quality Management (TQM).

e. India has successfully developed the most advanced kind of Super computers, with limited resources with well-defined time period and at cheaper costs,





f. In the Fast Moving Consumer goods (FMCG) India has achieved what any other countries cannot even dream of achieving it. India is totally self reliant in this kind of market. Even the toughest of though American McDonald, Kentucky Fried Chicken (KFC) could not disturb the hold of these local Indian companies.

g. Dr. Cherian, in the Operation flood, Indians could achieve the self-reliance in milk and milk products through sheer will power.

h. In the operation green, that is “Harit Kranti” started by Dr. M. S. Swami Nathan, made India self reliant in the field of food industry with extra tons of wheat, rice and cereals. In an extreme case in 2001 A.D., Indians produced so much of wheat and rice that they were short of godowns.

i. In the sugar sector India is the fourth best in the world.

j. India is almost on the verge of mastering the Space technology and research related to it and also the Military technology and research for total indigenisation.

k. There are many more such fields where India has achieved significant breakthrough in those sector either through technology or through proper development of work culture and developing the ground forces.

Similarly, within the stipulated time Indian Car companies can achieve the same what the Americans had achieved. Even some experts like Mr.





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Keshub Mahindra, of Mahindra and Mahindra predict that there will be at

least one company, which will be dominating the world car market in near future due to its quality technology at cheaper cost.

SOLUTION 10:

SOLVING PROBLEM OF ADULTERATION OF AUTOMOTIVE FUELS: CUSTOMERS ARE FORCING A PERMANANT IT AND WILL FORCE IT TO HAPPEN:

The biggest problem is that the oil companies refuse to take ultimate responsibility for the quality of the fuel they sell. They say government is averse to design tests that detect adulteration accurately. They feel it is happening due to penalty for the adulteration is very less and it is becoming weaker than ever before. Fuel quality standards remain so lax that adulterated fuels easily pass the test. Many petrol pump owners feel that warped pricing entices greed; policy legalises it. Nobody realises the crime called the adulteration.

The result is many damaged vehicles. Mr. V. D. Bhasin Vice President of Hyundai Motors India Limited said that recently they received complaints largely for the engine and fuel injection system failures. Both in the Common Rail Direct Injection (CRDI) in Diesel Cars and Multi Point Fuel Injection System (MPFI) in Petrol Cars, there was huge wear and tear in the engine. The reason later on found out to be adulterated petrol and diesel and the compounds, which were adulterated, were largely dry cleaning solvent like Chloro-pentane and dry cleaning agent Acetylene. The fuel along





E-BOOK- ISBN: 978-93-5235-441-2. COPYRIGHT TO AUTHOR- DR. ASHISH MANOHAR URKUDE with prices and the adulteration agents found in the fuels is given in the

following table which gives clear idea about the main reasons of adulterations:

Table: 15.12: Transport Fuels' and solvents' minimum prices in 2004:

SN	Fuels	Indian Prices
1	Petrol	> Rs. 35/-
2	Diesel	> Rs. 30/-
3	Naphtha	>Rs. 18/-
4	Kerosene	>= Rs. 10/-
5	Imported Kerosene	> Rs. 15/-
6	Aromex	> Rs. 10/-
7	Light diesel Oil	> Rs. 25/-
8	Turpentine	>= Rs. 13/-
9	Spirit	>= Rs. 21/-

Thus, the cheaper easily mixable oils can be adulterated is the complaint of the car companies.

Table: 15.13: Losses due to adulterated fuels:

SN	Kinds of Losses	Monetary Losses
1	Air pollution in the cities	Many thousands of crores on medical front and biodiversity getting damaged.
2	Damaged Vehicles	Many thousand crores
3	R & D efforts and the leapfrog	Many thousands of crores





	to ever cleaner technology is quashed, new improvements in the vehicles are losses.	
--	---	--

Thus the answer lies in the fact that technology roadmap should be made more aggressive, to beat pollution as well as adulteration. The corrosive impact of adulteration of new technology will whip up a public and the customers' anger and it is already is beginning to. This will definitely force the government and the oil companies to own up this fact and act. This is also the impact of customer behaviour on the development of the car technologies.

SOLUTION 11: FEW MORE STEPS, WHICH CAN BE ADOPTED AND FOLLOWED AS

SOLUTION:

1. Provisions must be made so that Management, Commerce, Arts, Home Science, Architecture, Engineering students will be given compulsory contributing internship towards nation as a practical project as part of curriculum after they complete their final year of graduation. If Doctors have one-year compulsory internship of one year, then why can't these students also have?
2. The Government can give concession to SSI for manufacturing the above-mentioned parts of Automobile and the higher end machineries. Government will favour policies those will offer counter guarantees to the





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Indian SSI, MSI and parent companies of Indigenous origin for fast track

projects without providing similar concessions to the MNC.

3. MIDC, GIDC, CII, IE, FICCI, IDBI, ICICI, SBI etc. should make special provision for this and must conduct lot of seminars and meets and awareness drives to get more advantages from this all important project of indigenisation of small cars according to Indian customers' demand and Indian conditions.

4. All the higher authorities must realize the need of indigenisation. As in India this forms the very important factor to mobilize the resources to such very good and giant projects.

5. Students to the Consumers all must realize that indigenisation means using their own resources for their own development for their own cause and thus helping their own nation and helping themselves as well.

6. Let everybody get convinced that if at all these people survive then only nation will survive.

7. Remember USA, Japan has biggest carmakers and more than half of the resources in USA and Japan are directly or indirectly related to the Automobile and Car Market.

8. Though India is not manufacturing the complete car now, still half of the businesses and industry in India listed in CII directory are some way or the other, are based on the Automobiles and Car market.





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9. Thus, if Indians manufacture their own indigenous cars they'll be able to

make more advanced machines very soon and thus will encourage the other businesses as well.

Other factors such as the technology advances the other commodities and market gets an automatic boost.

SOLUTION 12:

SOME POLICY RECOMMENDATIONS FOR THE GOVERNMENT OF INDIA:

Regarding initiative from the Government of India to help Car and Automobile Industries they could be either in the nature of policy or facilitations.

On the one hand Government's policy initiative would include rationalisation duties, simplification of regulations and control, deregulation of made-up sector and rationalisation of practical labour policies.

On the other hand the government as the facilitator, has to enable greater access to capital inflows in Car industries to affordable finance, creating regional competencies and finally to create of infrastructure facilities.

Taken this project as a challenge there is urgent need to focus all energies on meeting the impending challenges. Both car industry and government need to work together to achieve the desired results within the given or predefined time frame. Indians cannot miss this second revolution in the car industry and technological explosion era, if at all it misses it will be put into





E-BOOK- ISBN: 978-93-5235-441-2. COPYRIGHT TO AUTHOR- DR. ASHISH MANOHAR URKUDE shambles. Hence, following points are put into the form of background and the policy recommendations.

1. Background: While most of the giant car-companies all over the world 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. (Indian Automobile on fast track: Outlook and directions-Part II by the Author Mr. B.S. Murthy, formerly Professor IIT, Chennai- in the Motor India- India's Pioneer Automobile Journal, September 2003.).

Expected Policy 1: If this happens again and again then in few years from now onward then combined/ joint ventures would be stepping stone towards getting entry into Indian business and making firm grip in the market and then capturing the Indian side of the joint venture company. The policy should recommend that either there should be technology transfer of their should be other solution than take over. Otherwise the Rich companies around the world would buy all the Indian companies.

Background 2: 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





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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? Whether India is looking for the technologies from the developed countries or India will develop its own for this purpose?

Policy recommendation 2: Hence it was thought 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. R & D and car industry goes hand in hand hence if no R & D India will go dependent on the foreign hands. To avoid this small,





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medium and large scale R & D labs be set up in India employing very good engineers and technicians and supporting resources.

Background 3: 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.

Policy Recommendation 3: 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.



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* 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.

Background 4: Now let us see 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 the process of importing every kind of technologies even for the pollution control purpose, we will be constrained to borrow futile imported technologies. Mandatory





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wayside pollution checks on the vehicles or an ineffective catalytic converter rendered useless by adulterated fuel are just few examples.

Policy Recommendation of Policy 4: 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 of India (ARAI), at Pune or National Environmental Engineering Research Institute (NEERI) at Nagpur?

Thus, if local players will develop well India will develop well.

Background 5: If above recommendation is followed then the local people would develop the local technology and local industry. Hence, there would be local rules as well.

Policy Recommendation 5: In case local industrial scenario develops well there will be localisation norms, which could be applied to the company level instead of model and platform level. It is observed by the experts that this approach is more precise than the earlier policies of any Government in the world.

Background 6: There is recurring complaint of the heavy taxes the Indians pay, the Excise duty, the Octroi, etc.

Policy Recommendation 6: 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 by almost 12% to 25%. This will raise the demand of the cars by more than 25% in the year 2010 and bring new technologies as well.





Background 7: Global Car industry is worth at least USD 500 Billion. How much stake Indian industrialists have in it?

Policy Recommendation 7: Special provision needs to be made for overseas acquisitions at par with the software industry.

Background 8: Once India has turnover of one million new cars per year. Then the economy will be as such placed that there would be seven lac cars turn over to match with the new cars sells.

Policy Recommendation 8: Hence there should be a total ban on import of second-hand vehicles for a specific period or otherwise the provisions must be made into new policy such that import of used cars is made difficult if not impossible.

Background 9: Most of the scientists and almost all the automobile engineers feel that unless there is a lifetime of the vehicle is decided anti-pollution drive will be a futile effort. As older version of vehicles emit more pollutants than the latest ones.

Policy Recommendation 9:

- a. Life of every vehicle must be decided from the scientific analysis of its technologies so as to avoid further problems. Infact the company that manufactures the vehicle must decide its life as well.
- b. The two stroke engines, which are used in the two wheelers, which emit more smokes, may also be phased out in the gradual and smooth succession.





c. The Diesel Engines used in the heavy vehicles, which emit more smoke irrespective of technologies used, must also be phased out. Also parallel research be made to devise such a powerful engines running on other leaner pollution emitting fuel.

Background 10: How to make India the global competitive player was the question very often been asked. The answer lies in its policies hence the policy recommendation would be like below.

Recommendation of Policy 10:

- a. Revised or Clear picture and modification in the policy of duty revision on Completely Knock Down (CKD), Completely Broken Units (CBU) be made such that less import is there and more import substitution by indigenisation efforts are taken care.
- b. Positive focus on small cars, the automobile components, and two-wheeler segment is required. It a huge market worldwide having around USD 500 Billion industry in the world. India is not grabbed even 5% of it.
- c. In this competition only quality cars can be manufactured if initiatives are better implemented.
- d. Otherwise, policy should be such that the idea of enabling Indian vendors to plug into global supply chains should be capitalised.

By all these measures taken together the complacency in the Indian car industry would go away. By becoming the driver force to reckon with, the indigenisation of the car and its technologies can bring the Techno-Socio-Economic vibrancy in India in coming future.





Background 11: Dilip Chhabria has been a name synonymous to high quality original and distinctive automotive exercise. He designs the vehicle as per the likings of each individual customer. Even the top notched carmakers like Ford Motors, USA, accepts many of his designs worldwide.

Policy Recommendation: Why cannot India set up a new ultramodern Designing centre in India? After all Global Design business in the small cars only is USD 200 Billion. Even if India pulls 1% of it, India will be the force to reckon with.

Background 12: Indian software giants are always running for the Dollars and go after overseas projects. Even if they solve the problem of software for these designing purposes they will do their handful services to their country.

Policy Recommendation 12: A special cell of indigenisation wing in each Software Technology Park should be made for this purpose of software designing for the indigenous products including cars. As these software will be relatively cheaper than the present PRO-E, CAD/CAM/CIAD software. This will definitely improve the business base in the country as even SSI and MSI will be able to design their own products and will be able to develop it.

This will help Indians to attain the global concept of styling, prototyping and down stream activities like Computer Aided Design (CAD), Computer Aided Manufacturing (CAM) for the Car, other automobiles, and other industrial applications.





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Background 13: The car business is highly dependent on the services and

maintenances. As every vehicle has to under go:

A. Preventive Maintenances:

- * Simple servicing after every few months.
- * Scheduled check and replacement of few parts every after few months, and

B. Break Down Maintenances

Whenever there is damage due to accident in the vehicle it is dented, painted, repaired and is fixed to run on the road again.

Policy Recommendation 13: Extensive training of the dealers, their employees should be done regularly. It is the case with the Servicing and maintenances department. Otherwise exposure to new technologies may harm Indians in longer run in this extreme competitive age. Many times these skilled work force gets busy with their job and are forced to remain on the same track of monotonous working. These special training programs must be made compulsory and that too result oriented. These indigenous people with indigenous technologies have to perform well, better than their MNC court part. On result only the Dealership, Service Station, Spareparts business be continued or cancelled forever or for few years.

Background 14: It is observed on the Discovery channel Programs that every car has to pass the destructive test in USA. For this every car giants have their own testing laboratories with well-equipped ultramodern devises





E-BOOK- ISBN: 978-93-5235-441-2. COPYRIGHT TO AUTHOR- DR. ASHISH MANOHAR URKUDE and software. These all the facilities are not at all available in any Indian factory.

Policy Recommendation 14: The test track and the ultramodern equipment set up lab must be able to carry out the tests like, the wind tunnelling, the paint shop, the shot blasters. The there should be provision for the 40 kmph, 60 kmph, 90 kmph, and 120 kmph or more kmph dash tests.

Policy Recommendation 15: With more than one million cars added on the roads every year Automobile sector is going to be the highest job provider in India along with agricultural sector and textile sector. If this automobiles and hence car sector is providing high industrial production, employment generation, and some foreign exchange. It becomes the engine of growth of the country as well as the communication and basic needs provider sector of the country. Car is epitome of financial achievement of the person. Then car sector must have a wide spread forward and backward linkages with rest of the economy. Hence, few of the Government Policies which are fragmented and technologically backward and few which are even inward oriented in the Automobile Sector has to be amended to the latest world standards. Hence, a complete review of all these aspects, policies, rules and regulations is required in coming years.

Solution 13: CAPITALISING THE CHALLENGES OF NEW TRADING

REALITIES OF THE NEW WORLD: With the new policies of the world like





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Liberalisation, Privatisation and Globalisation (LPG) as India is opening up

its Economy it is the case with other countries. Indian big and organised players and players from other developing countries for the first time will have free market. There are large number of countries will be involving in these activities. As a result those countries which adopt first to the challenges of these new markets will be better place in future and will have secured market position.

Thus, Indian players will have to capitalise on following important trends as early as possible:

a. Emergence of new and growing markets: After 2005, Indian, Chinese, South Asian, South East Asian, South American and few African markets will see large number of car customers. Mainly the middle Income groups are growing at faster rate. Hence, India's value added car sector can become the force to reckon with in future.

b. Strengthening Indian made car markets share in the developing countries: India has the biggest advantage and that is cheaper labour, low cost manufacturing, and cheaper transportation charges, value of rupees verses dollar, and cost factor. These factors can make them strongest contender in the developing countries where cost conscious customers can buy and maintain Indian made cars.

c. Capitalise on lower cost out-sourcing policies of the giant car MNC:
All the carmakers from USA, Japan, UK, Sweden, France, Italy are always looking for the cheaper cost of manufacturing. Invest in car sector with low-





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cost destination and earn huge profit are the latest trends in the world.

Many times engine is manufactured in USA, Gear Box in Japan, Steering system in Italy and so on. Then the car is assembled and is sold in the country where only assembling is done. Many times even completely assembled car is sold in the country where that car is in demand.

d. Relocation from high cost economies: The developed countries are always attractant to the developing economies. Hence there is always a possibility of deterioration in the developing economies in terms of trade due to declining prices and relocation from high cost economies. So, it becomes all the more important for our players to be utmost cautious about the cost of the product factor. It is always seen that in the free trade practices this trend gets continued.

e. Adopting low cost but the best and latest production practices:

Analysts and industry experts feel that India is well poised to emerge as the preferred car component-manufacturing hub of the world. Well over China due to all essential ingredients like more English speaking population, inexpensive skilled labour, and cheaper raw material, stable market trends. However, Indian players have to bring in the best and the latest production practices, a major precondition generally laid by the major players like GM, Ford, and the Toyotas. Here also our indigenisation is the best policy. As ultimately these people who ask for these advantages are the internal customers who are behaving like this on the influence of external customers.



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f. Competition from the foreign suppliers on the domestic front: Since, 1994 Indian organisations are facing major challenge in the form of foreign competitors. In future also if proper steps are not taken then India will have to forcibly open its market for the foreign manufacturers, suppliers, even can be asked for the free trade zones near these foreign MNC factories. To go further many top countries and organisations have already planned how to invade Indian market. These days higher and middle income groups are generally got obsessed with these foreign made goods even the cars like Hyundai, Ford, General Motors, Honda, Mitsubishi, etc. This has already crossed few billion-dollar marks in India. Hence if indigenisation is not targeted then all these middle classes will be attracted toward imported items and cars will have totally negative impact on the car sector as whole.

g. Imposition of Antidumping duties: These are the things, which are a bit discussed in details in other lessons as well. However, here it categorically means Indians will not like that they should become the user of older technologies and thus become a dumping ground of these larger foreign MNC. Infact major lobbying happens in the developed countries over these things and are some way or other are forced into developing to under developed countries. In car industry also it is everyday happening.

h. Imposing ethos which help their nation but affects India: Some kind issue and marketing based ethos helping the developed nation and affects the developing or poor countries in the world. This is another hurdle, for developing countries; this is what experts believe in India. They suppose





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that There is hurdle for developing countries exporters created by western non-governmental organisations, the media and labour unions, is their campaign on 'sweatshop-free' sourcing of buying a car and its accessories and its spare parts. They are putting pressure on international buyers to source 'ethically correct genuine products' Such ethical sourcing standards are applied to all the developing countries their manufacturer if at all existing even the subcontractors and service stations where only degree holder engineers will be servicing the vehicles. Large international buyers apply these rules with ironhanded as they cannot afford negative publicity of their products. This affects the job chain of India as ITI and Diploma holders will find hardly a job if Bachelor of Engineering people jump into frame of actual technician jobs in the giant car organisations. Anyhow at present only diploma holders are appointed in the entire MNC car workshops that is ITI and other people find it very difficult to handle job market. The reason MNC claim is that less than Diploma means no communication in English and no understanding of technology and special tools and equipment understanding. Still many believe that job chain in India is getting redefined due to these entire new ethos. There are few more aspects which are hurting people is that Indian degree is not taken as equivalent to the American Degrees hence many times Indians have to work on the lesser pay package than their counterpart if Indian go for work in parent company of the car in its parent country.





i. Eco-friendly tag to the automobiles: In almost all the European, North American, Japanese and Australian countries Euro III or Euro IV norms are applicable to all the vehicles running on the roads. Where as in India lot of rules are made but hardly implemented as strictly as these countries can force. Hence, it may lead to some kind of marketing strategy to market your car but later on the petrol required for these cars will be or may not be available in the Indian market and if available will find hard to cope up with the stricter norms applicable to engine systems which is fully computerised and do not accept any discrepancy.

Thus, in brief the Solution 13 can be summarised as the Indians will have to become global car industrial players and they must begin with formulating a Vision a Strategy in alignment with global perspective. They should adopt global standards of corporate governance. Core competencies across the entire value chain will play an important role in determining the future of Indian Car Industry in the present Liberalisation, Privatisation and Globalisation era.

Solution 14: SPECIFIC INDUSTRY LEVEL EFFORTS:

Mainly three approaches are considered here.

a. Developing Strategic Linkages:

In this effort one of the important role would be to identify strategic linkages and enable individual members to create these direct linkages. The creation of direct strategic linkages will have various advantages like removal of





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middlemen (saving in margins), lower capital investment requirement at firm

level, improvement in quality and timeliness of delivery, higher bargaining power and preventing unfair competition which always result loss of value.

b. Cluster Approach:

To start with, creation of common infrastructure pools in terms of technology test centres, quality control, assisting in processing and finishing, information cell, buyers and sellers preferences, professional training centres, certification to individual and to organisation. This is all for the purpose of cost competitiveness. Today only competitive companies can survive in the Car Market. This means as discussed earlier they have to source inputs source inputs cheaply (Buy raw material together) and deliver products at competitive price. Also they need to show a respectable manufacturing scale to market their buyer. All this could happen easily if small companies form result-oriented consortia. However, movement towards this has been very sluggish and only show off seminars etc. are happening now a days. That is why it will be better if firms are convinced that if they form a result oriented consortia in which practical problems will be brought in to focus and these will be solved in the practical based seminars then Indian buyers can show strong buying power to vendors and use their collective scale to market themselves to their buyers i.e. all giant MNC car makers and sellers.

Example from India from other field:





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Earlier, the Tirupur Exporters Association and Apparel Export Promotion

Council very successfully adopt this approach, infact it will be Rupees Ten Thousand Crores at the end of 2005 from present Rupees five thousand crores only due to this Cluster Approach.

c. Building Brand India Image: It would be very important for the car and car component manufacturing industry to create “Brand India”; as it is impossible for a single firm to create a brand. Collective efforts of industry associations are the only way out in this case. CII, FICCI, IDBI, MIDC, all these have to strive hard to do this at high profile targets in the world, at vagrant rate and at stratified locations around the world. So that “Made in India” gets the brand image to reckon with.

Solution 15: Specified Organisation Level Efforts:

There are four approaches identified at this level of approach.

a. Identification of core competencies and formulating business plan:

The first and foremost important thing for a car component-manufacturing firm is to identify its core strengths/ competencies by employing extensive benchmarking study. Based on this study and then making SWOT analysis organisation can know where it stands. Based on its core competencies it should create a niche for itself in the market. Further, by keeping the best in the segment as its role model, chalk out a detailed plan to achieve its objectives.





b. Organisational Restructuring: Before venturing into the international arena, an indigenous car part manufacturing firm should restructure its organisational set up to bring it up to international standards. Organisational improvements are required to minimise absenteeism, rejection level and delays and work in progress. There is need to study their over-all operations, market operations and human resource set up. They must understand the value of human resources. In their urge to increase capacity and modernise units they face financial difficulties. Here innovative financing measures to fund their capital expenditure are of help. So far as the management's part is concerned, infusion of latest managerial practices particularly senior level would be of immense help to them. Further, introduction of Information Technologies and Modern Gadgets of Communication in various areas can work out the miracles by saving cost, time and efforts of human resources and improving profits.

c. Improving upon market responsiveness:

Today, when India is considered as a major outsourcing destination (this is point is also discussed at proper places elsewhere in the thesis), market responsiveness of units is of critical importance from the international buyer's point of view. Indigenous Manufacturing will have to address supply chain needs, optimise time to market and logistic costs, reliability, security and visibility. Market responsiveness involves a combination of various factors- like keeping itself aware of latest trends internationally, shorter lead times, timeliness in delivery, fast communications, social and environmental





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restrictions and transparency in deals, all of which have direct impact
international orders.

d. Developing various kinds of 'E-Applications':

This point is very well discussed in his book by the researcher in his book 'Computer and IT Competency Made Easy'. Infact E-Applications can be employed, not only to sell, but also to exchange information across electronic networks at any stage of the supply chain. Electronic Applications (E-Applications) facilitate sourcing and supply chain managements, production planning, design and forward integration, including the E-Commerce on the World Wide Web or Internet Trading. It improve the flexibility, shortens the overall value chain, it reduces lead-time. This leads to the fact that it improve companies image that it is willing to change for the modern trends. It shows that organisation is progressive, competitive, and is willing to adjust itself in the international and national demands of the market.

In short the crux of this Solution 15 is that although a huge potential awaits Indian Car Industry and over all Automobile Industry still actual outcome will be seen after five years hence. As how much indigenisation is targeted and how much actual outcome is and how much Indians can prepare themselves and improve their capabilities to grab this opportunity. If Indians have to achieve this goal then they must act together and they must do it within stipulated time frame.





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CHAPTER 16:

R & D IN THE CAR TECHNOLOGIES: A WORLDWIDE PREVIEW





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16.1: The Background:

All the giant market leaders in the world have their independent R & D cell working together with the Marketing, Finance, and Technical Fields. If R & D cells were not there the technologies would not have been so advanced. Go through the history every one will find advancement brought according to comforts and needs of the customers at that time in the cars.

It is only through R & D ventures any country can become self reliant on technological fronts by generating new technologies or developing technologies to develop existing technologies and services.

16.2: Definitions in R & D:

- (According to the Oxford Dictionary): Research and Development (in industry etc.): Work directed towards the innovations, introduction, and improvement of products and processes.

- Research:

First Definition: The systematic investigation into study of materials, source, etc. in order to establish facts and reach new conclusions.

Second Definition: An endeavour to discover new or collate old facts etc. by the scientific study of a subject or by a course of critical investigation.

- Development: The act or an instance of developing, or the process of being developed (i.e. to bring or come to an active or visible state or maturity).



**16.3: Metamorphic Steps involved in R & D of Car and its technologies:**

R & D essentially involves the following metamorphic steps:

- 1. Customer needs becomes an Opportunity of new Car Product, its Process, and its Services,
- 2. The organisation perceives Opportunity,
- 3. Project Activity begins,
- 4. Product definition and plans friezes,
- 5. Prototype of Car is made and undergoes various testing, feed back and corrections if any,
- 6. Car is released for the production through vendors network,
- 7. Dealers and Sells outlets sell the Car,
- 8. Service Stations and Garages carries out fist servicing and gives feedback to customers, dealers and ultimately to the manufacturing units or main factory of the car,
- 9. After correction in any fault in the car First batch of customers are satisfied,
- 10. Break even is reached and thus negative cash flow stops,
- 11. First Net Profit occurs,
- 12. Positive cash flow reaches the maturity level hence Net Profit Increases,
- 13. Slowly Project becomes extinct if car customers demand new version of car OR If cars like Maruti 800, Ambassador remains time tested popular product among the customers the Production and Profit continues.



**16.4: In car industry the R & D is a perpetual process:**

There are two distinct perpetual R & D happenings in the Car industry viz. the R & D in the Product and the R & D in the Process.

Part A: R & D in the car as a Product:

There are three kinds of customers related to Car Organisation:

- a. The Internal Customers of the organisation i.e. the employees, the vendors, the share holders, and
- b. The External Customers i.e. actual Consumers of the product who use the Car.
- c. Both in One kind of customers: Most importantly many internal customers can be the consumer of the product and hence can have suggestions for the development of the car as a Product.

These customers contribute hugely to the car as a product and then to develop its processes according to the requirements. However R & D in the car as a product can be described in the following ways:

- *It looks out for the product innovation:* Take example of the T model Car made by the Ford Motors in 1908. This car was made for masses than for classes. Then customers came out with suggestions as their demand for innovation in the car as a product. Now look at the Ford-Ikon. The product went sea change due to many versions brought out from the innovations.
- *On Physical Attribution of Product (The Car):* The Customers demand for the particular distinguishing feature in their car. R & D scientists and engineers





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work hard to develop that feature. Take example of the collapsible steering

column, it was the highlight of the Cadillac in 1970's.

- Financial Performance on Sales:* Look at the sales figures of the cars. Take example of Ford model T, 1908, when it was manufactured only few were sold, but when its popularity grew, 15 million cars were sold within the span of 19 years. Thus, improving the financial performance on the sales.

- It involves the differentiation strategies: Certainly. In the present market not a single organisation manufacture more than 30,000 parts of the car individually. There is a differentiation strategy. Different vendors manufacture the different parts of the cars. Each vendor is master in manufacturing that particular part of the car.

- Many times even the dying product can be revitalized, ex. Beetle car has been revitalised into its new shape. Whopping forty million cars were sold prior to its fall in demand. Thus, R & D can change the product from its gloomy look to its attractive looks.

- US companies spend 70% of its R & D efforts on the Car as a product than on its processes,

- Japan spends 30% on the Car as product than on its processes,

- It made USA increasing life of product and hence USA is worldwide leader in home appliances.

Part B: R & D in the car manufacturing and servicing Process:

- It improves the manufacturing facilities,

- It improves product quality,





- It develops faster distribution network to give more economic returns,
- It is the core of successful cost leadership strategies,
- Japan and Germany are the best and USA stands behind,
- USA spends 30% of its R & D on this aspect,
- Japan spend 70% of its R & D on this aspect,
- Japanese car and electronic industries have reduced the number of assemblies in the product and improving its quality and durability and process of manufacturing got reduced to nearly half of its earliest version.

In all R & D in the Car Industry is like Kaizen; a process of continuous improvements in product, processes and services.

16.5: Gist of what is R & D in the Car Industry:

- 1. R & D essentially means the through research in the product, the process and in the services. Take the example of Suzuki venture in India. Its R & D section worked extremely hard over the product, process and historical services network in India. Now, it is leader in the fresh and secondary cars sell in India with 54.2% stake in the Maruti-Suzuki venture with nearly one million-car turnover. It is claimed in the advertisement that world's highest service station of the cars is present in India on the Himalayas and it belongs to the Maruti- Suzuki.
- 2. R & D engineers improve the physical attributes of the car like the design, robustness and the looks. Thus attracting customers who are looking for these qualities in their product. Take example of Beetle car made





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by the Volkswagen. With four million similar looking cars, it is the highest sold car around the world for its physical attributes.

•3. R & D scientist and engineers improve the content of the product and thus improving its life by revitalizing it. Take example of Daewoo- Matiz. It was the most popular small car in 1996 around 114 countries in the world. The reason being its R & D department added the steel rods at all the week joints to avoid any harm to the passengers sitting in it. There were more than nineteen rods fitted in it at all the week points. Customers were shown these rods prior to sell so that the R & D engineers could get the appreciation on every sell of the car. The life cars got increased, thus building the confidence among the loyal customers.

•4. R & D scientists and engineers, improve the manufacturing facilities, product quality, faster distribution and services network thus returning good economic values, it improves the product life and it improves the productivity in the plants. The setting up of the Toyota Japan's network in the USA is the best example for this kind of R & D. Within three years Toyota could capture more than three percent market in USA. Whereas the Saturn cars of GM is the best example in the R & D to improve the productivity. In the Saturn Car Project GM improved its productivity highly significantly, so much so that it could sell the similar quality cars at lower prices than the rest of the competitors thus earning more profit than its competitors, in 1996.





•5. Since, 1994, R & D engineers and scientists reduced the new product time in Japan from 5 years to 3 years thus defeating their other competitors around the world in the car and the electronics goods sector. The Sony Handy cam (Video Camera) is the best example of replacement to the bigger versions of video cameras sold by other companies in the world. Whereas, in the car sector Honda Accord is the best example, though its name remains the same customer finds its aesthetics and ergonomics always in an upgraded stage. This is also the reason why the luxury car sector customers remain brand loyal to certain products. Especially mentioning would be the example of Mercedes (Daimler-Chrysler), Rolls Rice and Limousine (BMW) owners. These people never change there brand of cars may they change their car after three years or so but the product is made by the same company.

•6. Sometimes R & D engineers and scientists carry out the Reengineering, that is, total collate of the old ideas with the new ones. Constant Variable Transmission (CVT) is the best example in this. CVT categorically means improving torque and speed with the simple raise of accelerator. Thus, CVT has almost replaced the Gearbox and Clutch assembling mechanism because of its complexity and its cumbersome changing mechanism in the two wheelers segment. Many American and Korean carmakers have successfully tires this venture in the car sectors too.

16.6: Importance of R & D:





1901. Because it was conscious of stiff competition it would be posing in future. It invested heavily in R & D in the hope that future profits and growth would be higher. Almost all the business leaders were aggressive, visionary, bold and entrepreneurial. There was no conflict in present profit and future profits. The demands of current activities were very well balanced with the demands for R & D in new product development and process development. This helped them in attaining goals such as survival, minimum secure earnings and growth rate. Infact R & D helped GEC in a very well served industrial planning as well.

Thus, importance of R & D can be very well guessed from the leaders in the worldwide market not only in the Car sector but also in the various other businesses. A further brief review is given below:

A. Company wise statements:

- This question was asked to Mr. Akio Morita of Sony Corporation Japan. His answer was simple: “The key to Sony’s success lies in the fact that we are trying to give new convenience or new methods or new benefits or new products to the general public through our extensive R & D.”
- AT & T: R & D is engine that will keep us vital and growing.
- General Mills explanation: Innovation and R & D is principal driver of our growth.
- Gerber: Our mission can be achieved only by investing in R & D.





•Gillette: We will invest in R & D and master the key technologies vital to category success.

•Intel: CEO Mr. Andy Grove: To succeed we must maintain our environment for innovation and R& D. Ultimately speed in the R & D is a very big weapon for us. Thus Intel plans to continue developing new chip families every two years. This fast pace of development will keep chip cloners (AMD, Cyrix, etc.) from ever catching up with the Intel. After all, Intel invests USD One Billion every year on R & D, and hence it is claiming to reach the faster than the brain speed in the microprocessor within coming twenty years.

•Merc and Company: We are dedicated to achieving the highest level of scientific excellence and commit our research to maintain human health and improving the quality of life.

•Chrysler: Chrysler carmakers could achieve 40% development time of new vehicles only due to the R & D.

•General Motors R & D department: Innovation and market responsiveness are rooted in GM's history and form the foundation of our success.

B. The Japanese Case in Car R & D:

•In the 1980's Japanese Car manufacturers gained the incredible competitive advantage over the USA manufacturer. Infact the USA Companies had to reengineer or rethink about their strategies. The main advantage for the Japanese cars was that their R & D scientists reduced the new product's time to only three years. Where as still US car companies have five years of the new product time.





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•Thus, the whole new product idea generation, its inception, its marketing, everything takes only three years in Japan where as it is still more in USA. It has inspired more than three to four car and vehicle giants from Japan to conquer the world car and other vehicle market.

C. Indian customers are paying heavy Price for the foreign technology car over following aspects:

- 1. The R & D and technology invention and patenting of the car parts having foreign origin,
- 2. The technology shipment and taxes and other obligations of foreign origin,
- 3. The technology assembling and plant fabrication in India,
- 4. The difference of cost of technology in India versus its Country of Origin is exorbitant. It can be called as the difference between the Dollar Economy and the Rupee Economy.

D. Why Indian customers are paying high cost for the cars?

- 1. The customer pays for the investments in the R & D and its implementations by the original MNCC giants for the car venture right from the idea generation to the product sell. Remember every car part is created once but innovated and improved time and again from its earlier versions.
- 2. All the Multinational Car Companies (MNCC) manufactures own-patented car parts. Otherwise, with highest possibilities, they assemble parts from the company of their own countries or from one among the conglomerate.





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•3. The customers also pay the cost of infrastructures and building plants in India. This includes the Assembling Robotics and Supporting Technologies. MNCC, invest less pay less but earn more profits. Also, Indians are paying for their profit as well once MNCC invest in the stock market.

•4. The cost of shipping these technologies: The CKD (Complete Knock Down) form is the imported car assemblies or the car parts. These are assembled in India and then sold.

•5. The Cost of Advertisements and Marketing for the latest technologies in the cars.

Thus, if the cars are manufactured indigenously the cost of the car may be reduced to almost 50% of its present price.

E. Indians will pay less if the car and its technologies are totally made in India:

The indigenisation boom can bring following proceedings in India:

- 1. All the technologies with world class quality and standard will be Researched & Developed in India,
- 2. All the patents will have Indian origin,
- 3. Shipping intra country is always cheaper than the inter country around the world,
- 4. Fabrication Technology will be Indian and Assembling Technologies for the Plant like Robotics also will be Indian,
- 5. Fewer obligations of taxes,





- 6. All the terms will be in Rupees.

Prices will be reduced to almost 50% of present value 'even if these six parameters are only considered'. Hence Indians will pay fewer prices for the totally indigenously made cars.

16.7: Why ultramodern R & D labs be set up in India?

•1. The latest world Norms for the Cars:

- A. By the end of 2005, the entire car manufacturing organisations around the world will have to manufacture the car, with minimum condition of having 85% of its parts Recyclable.
- B. By the end of the year 2007 A.D. this will be increased to 100% recyclable cars.

This clearly indicates, if Indians do not adopt the stricter Quality Norms and Legal Bindings and adopt the important Culture of R & D then India will be the most famous dumping ground for the world's giant car companies which sell millions of cars and have turn over of more than few dozen Billion Dollars. In India, these world car giants may market older versions of their cars that may have less recycling parts fitted in them. Remember, unless India has the latest R & D labs to check Recyclable Quality of every car part in India, Indians cannot judge rest of things. It required competent testing facilities in the R & D labs.





- 2. It indicates that requirements of R & D investments in the Car Sector are huge for developing recyclable parts as mentioned above. Indians are not doing it at present, which probes the major opportunity.
- 3. SIAM has predicted One Million New Cars Turnover by the year 2010 A.D. Thus, if it does not happen India will be dumping ground of Technologies for the World Car Giants having Billions of Dollars turnover (which is more than GDP of many individual countries for example GM, Ford and Toyota have USD 100 Billion Annual Turn Over All Around the World).
- 4. This is the era of fast technical obsolescence due to R & D thrust and fast technical versioning in the products.
- 5. So every company must have minimal R& D set up to assess Value of Technology developed by others.
- 6. R & D creates a Capability in the firm to assimilate and exploit new knowledge and technologies.
- 7. If the Absorptive Capacity of the organisation and many such organisations in the nation is increased the nation quickly advances to the developed nation status.
- 8. In the lack of R & D set up the firm dies out at fast pace. Nation loses its dependence to the technology ruling organisations.

Example: Mexico, Indonesia, Argentina, Brazil, Malaysia, have seen the economic crisis as they lost their sovereignty to the biggest organisation of the technological world.





- 9.** The assimilation of the technology and exploitation of new knowledge brings ever-new technologies in the world. It opens new industries, new skills, and totally new knowledge.
- 10.** Thus R & D can help to keep the social balance by generation of new jobs of varying skills.
- 11.** R & D labs come out with the next generation of the technologies, which are developed and marketed by the organization. At present it is not vigorously happening in India.
- 12.** The organizations buying technologies from the foreign source of parent company becomes dependent on it.
- 13.** The Organisation and the nation of its origin who develop the product, gets at least fifteen years of financial backing with the help of patenting rights from the R & D.
- 14.** The people handling the tech and the R & D trains its staff for handling the new technology thus creating the new batch of skilled workers every time. Which becomes an asset for the future.
- 15.** Even in USA the Robotics implementation was dropped due to 25% illiteracy of the workers. Thus, 44% companies failed to introduce Robotics in their factory and 22% abandoned the Robotics project. This indicates that 60% successfully implemented the project in USA. It improved productivity. Hence USA is the leading nation in the world market. Almost in every possible field it has introduced the R & D labs. Even the computer with Internet Network can act as the R & D labs.





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- 16.** More than 50% of the R & D in the world is done at the labs in USA.
- 17.** More than 20,000 patents are introduced every year in USA. After successful implementation of few of them brings at least \$200 Billion for the USA.

•**18. Table 16.1: R & D In SSI, MSI and LSI worldwide situation:**

SN	Features	SSI	MSI	LSI
1	Technology Transfer	Highest	Moderate	List
2	Creativity	Least Consistent	Moderately Consistent	Consistent
3	Innovations	Moderate	Maximum	Least
4	Application of Technology	Improving Productivity, Quality and Customer Satisfaction	Moderate use for the same purpose	Moderate use for the same purpose
5	Waste on R & D	Least	Moderate	Highest
6	Contribution/ Million Employees	322/ Million employees	Statistics not available	225/ Million Employees

Thus, with indigenisation efforts Indian SSI, MSI, and LSI will up to the age and start listing in the above world wide group of contributors.

•**19. Country wise Implementations and Advantages achieved:**

- Japan ranked the highest in implementation of R & D.



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- Second is the Germany.

- Third ranker is the Canada.

- Fourth is the USA in technical field.

- In Automobile, Electronics, and Steel Industry Japan has improved its sales because of successful R & D ventures only.

- Germany has consistent sales of machineries and cars.

- USA has highest implementation in the Pharmaceutical industry and has captured over 50% market worldwide.

•20. Time of implementing innovations through R & D:

- In 1980's implementation of the R & D was supposed to be best after 7 to 11 years, but now a day, this cycle time has reduced.

- Mr. K.Kaske, CEO, Siemens, says, "In past 10 to 15 years went before old products were replaced by the new ones... Now it takes only 4 to 5 years".

- However, in 1980's Japanese Auto manufacturers gained incredible competitive advantage over the US manufacturers by reducing this product time to market to only 3 years as US auto manufacturers still take 5 years for the same.

•21. Time to Duplicate the Newest Technologies:

- Time to market is also important from this point of view.

- With the development of the Internet and other communication technologies, almost 60% of the patented innovations are generally Imitated (Duplicated) within Four Years at less than 65% of its Cost of earliest Innovations.





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•In the Mechanical and Automobile industries (worldwide) this duplication is done at extremely fast pace now a days due to CAD, CAM, Metallurgical analysis, Chemical analysis, Physical analysis, and other such technologies available through out the world.

•In the Electronics field this advancement is still not reached in duplicating certain advanced technologies like chip development, etc.

•22. Sample Calculations:

•Simple Screws, Nuts and Bolts, Circlip, Holding Pins, like simple parts when manufactured in India cost maximum Rs. 10/= to Rs. 20/= Where as the same costs Rs. 120/= to Rs. 180/= when imported from the country of origin.

•The simple oil filter of the car manufactured in India costs Rs. 200/= maximum. Whereas its same imported version costs Rs. 760/ =

•Same is the case with the oils, lubricants, tyres and tubes, greases, paints and other products.

•The cars are sold at par with the prices in USA like USD 8000 or Rs. 4 Lacs and so on. However, spending of MNC has drastically reduced. Engineers are paid almost Rs. 1 lac per annum or USD 2000 per annum, where as in USA they get same terms in USD 1 lac per annum. Thus spending of these cars giants has reduced to one tenth. However, profit margin has increased.

•So prices can reduce drastically when the product (CAR) is totally Indiginize.

•23. To become Leader and not the Follower in the world market:





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With sound cultural background and with huge material and human

resources Indians have a natural edge over many of the countries in the world. So, Indians must have the ambition to evolve new technologies out of domestic knowledge resources, both modern as well as the traditional ones. This is the surest way adopted earlier in Japan, China and in India itself in only few sectors like software. Collective working of Universities with all its science and engineering disciplines, in close partnership with the industry and national laboratory, infrastructure must have this important agenda. It also needs the coordinated efforts between researchers, technology developers, and industries and financiers.

•24. Taking advantage of the fear psychosis:

In its Export ventures Tata engineering has entered into the UK market. Tata are selling cars at the price one-third than its competitors. Tata-Indica is priced at USD six Thousand, where as its UK counter part is sold more than this price. So the competitors have already started looking at this factor of price in the UK market with fear. To remain in the competition for longer time Tata will have to indigenise its car totally, for the further version in the Indica. Otherwise this advantage of fear psychosis will remain short lived. One of the reasons being every customer in UK keeps his car with him at an average of nearly three years. As the Chinese have permanently captured the Indian car market in the Nepal similar bite of the car sell must be captured by the Indian companies in the UK will be the added boom for the R & D ventures and indigenisation ventures in the car in India.



**•25. On Board Diagnostic Technology (OBD):**

In American Law, since 1996, has made it compulsory to fit an On Board Diagnostic (OBD) technology in all the cars that are sold in the USA. These are meant for the recording every kind of material from the cars. Thus, keeping control on the environmental hazards. Sooner or later it will also be made compulsory in India. To manufacture this technology requires again a higher end set up of labs and of course to develop it a crew of scientists and engineers of higher grade.

Since, 2003 June, The OBD-2 has been launched in the USA. This technology keeps not only the OBD information but also keeps the knowledge of every details of the car. It is fitted with lot of sensors, which shows every kind of details about the engine, the car body and the functioning of the every car part. Even the servicing or cleaning is possible remotely with this technology. Especially it is fitted in all the Luxury cars of General Motors, USA. Sooner or later Indians have to prepare for this technologies, which needs the set up of advanced, and ultramodern laboratories.

•26. Require new tools:

According to few scientists mere innovation in the product and process, which Indians are doing, is not an R & D. The reason being the manager to implement innovation or even the suggestion maker may not be an engineer or a technocrat. Infact this man can be a failure due to his narrow vision. The R & D person is he who can visualise vulnerability and opportunity. The





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non R & D person as an innovator can make an effort, which may bring no result for many years. Here comes the devoted R & D work culture. New goals and measurement require new tools for their attainment because the traditional goals become useless in the above criteria.

•27. Next Generation belongs to R & D and Knowledge Banks:

Scientists claim that next generations belong to the nation, which is knowledge powerhouse. Hence, in USA almost in every organization the knowledge bank related to the field of manufacturing the company's products and services is collected year after year. It also includes the patents collected from worldwide sources in their field of work. There is a special cell in the R & D, which analyses it and takes decision to implement the latest quality standards or manufacture the patented parts or improves the product, process, and services. If R & D department comes across some important knowledge bank; it takes decision along with the decision makers to implement it. Also, many HRD scientists feel that India has remained to be important contributor of knowledge and wisdom to the rest of the world. Intelligence of Indian mind has been acknowledged time and again around the world. Hence with efforts of R & D as India moves on the new world order characterised by knowledge revolution, the conscious mind should awaken the Indian mind which perhaps could be the largest knowledge resource globally. It will not only benefit from the materialistic point of view but also from the spiritual elevation point of view for entire human kind around the globe.





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CHAPTER 17:

MODIFYING INDIAN CAR R & D FOR INDIGENISING PRESENT AND FUTURISTIC CAR TECHNOLOGIES



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Let us go through the present conditions of the prevailing in the Indian scenario. It is divided into several parts to understand better the present conditions and requirements for the future. It is the efforts of lot of experts and the novice that brings the improvements in any nation. All these efforts are directed towards making India self reliant on the technological front first and then on the Socio-Techno-Economic front.

PART 1: MAJOR PLAYERS IN THE R & D FOR VEHICLE IN INDIA:

In this particularly those institutes and organisation are given which are busy with R & D by their own way.

TABLE: 17.1: R & D Institutes & Organizations Associated with Automobile & Mechanical 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	Tata Motors	Automobile R & D	Pune and





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			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 Institute (NEERI)	Auto-Industrial Pollution Control	Nagpur
9	India Heavy Electrical Ltd.	R & D in Mech-Electrical	Delhi, Bhopal
10	Tisco	R & D in Metallurgy of parts used	Tata Nagar.
11	ACC Castings	R & D in Castings of Auto- Parts	Nagpur.
12	MRF tyres and tubes	R & D in Auto tyres and tubes	Chennai
13	CEAT tyres and tubes	R & D in Auto tyres and tubes	Mumbai
14	India Forge Ltd.	R & D in Forging of Auto parts	Pune
15	Sundaram Fasteners	R & D in Fasteners	Chennai
16	Castrol India Ltd.	R & D in Lubricating Oils	Chennai
17	Kinetic- Honda	R & D in Two Wheeler	Pune,



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		Technology	Ahemadnagar
18	Neptune India Ltd.	R & D in Automotive	Delhi
19	Birla Tyres	R & D in Tyres	Delhi
20	ACMA	R & D in Automotive Systems	Delhi
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	Ashok Leyland	R & D in Trucks and Buses	Chennai
25	Maruti Udyog Ltd.(MUL)	R & D in Cars segment	Delhi

Interpretation of the table:

These players are some of the possible solution providers, for our car indigenisation as they are some way or other are related to vehicle manufacturing in India.

Few players like Hindustan Motors, Tata, Mahindra and Mahindra are old players in this game. Their expertise is valuable in developing parts required for the Trucks, Buses, Tractors as similar technologies are used in the cars as well.



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PART 2:

INDUSTRIAL ASSOCIATIONS IN INDIA ATTACHED TO THE AUTOMOTIVE SECTOR:

These are highly influential bodies in India. Hence there review is also important.

TABLE: 17.2: C.I.I. LISTED AUTOMOBILE ASSOCIATIONS IN INDIA:

Reference: CII Directory 1998 edition.

SN	Association Name	Products & Services	Address
1	Association of Indian Automobile Manufacturers	Automobiles, Tractors and Vehicular Engines.	Army-Navy Building, 148, M.G. Road, Mumbai-400023
2	Abrasive Manufacturers Association of India	Abrasives for Machineries	Pallikarnai, Chennai-600302
3	All India Electric Motors Manufacturers Association	Electric Motors used in Machineries	Annie Besant Road, Worli, Mumbai, 400018.
4	All India Industrial Gases Manufacturing Association	Industrial Gas Manufacturing	9-A, Connought Place, Delhi, 110001
5	All India Instrument	Instrumentation Industry	Opposite to Minerva Theatre, Mumbai, 400007.





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	Manufacturers & Dealers Association		
	All India Rubber Industries 6 Association	Rubber Products	Lamington road, Mumbai,400008
	Association of Indian Drop Forging & Stamping 7 Industries	Drop Forging & Stamping	80, Annie Bezzant Road, Mumbai,400008
	Association of small tool 8 Manufacturers	Small Tools	803, Anna Salai, Chennai,600002
	Automotive component Manufacturers 9 Association	All Kinds of Automotive Component	Nan gal Raya business Centre, New Delhi- 110046
	Ball & Roller Bearings Manufacturers 10 Association of India	Cylindrical, Spherical, Needle Bearings-all purpose	Kalkaji Extension, New Delhi,110019
	Fan Makers 11 Association	Electric Fans, Radiator Fans, etc.	Lodi Road, New Delhi,110003



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12	Indian Diesel Engine Manufacturers Association	All Kinds of Diesel Engines	132, Annie Bezan Road, Mumbai, 400008
13	Indian Earthmoving & Contraction Industry Association	Earth moving and Construction Vehicles and Equipments	23-26, Lodi Road, New Delhi, 110003
14	Indian Electrical & Electronics Manufacturers Association	Automotive and all kinds of Electrical & Electronics Items	501, Kakad Chambers, 132, Dr.A.B. Rd, Mumbai, 18.
15	Indian Machine Tools Manufacturers Association	Machine Tools and Allied Products	IMTMA House, Nana gal Raya Business Center, New Delhi
16	Indian Pump Manufacturers Association	Oil Pump, Water Pumps, etc. kinds of Pumps	501, Kakad Chambers, 132, Dr.A.B. Rd, Mumbai, 18
17	Indian Refractory Makers Association	Refractory Manufacturers for Foundries etc.	6, Netaji Subhash road, Kolkata, 700001.



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18	Indian Fasteners Association of India	Automotive and Industrial Fasteners	6, Netaji Subhash road, Kolkata, 700001.
19	Manufacturers Association for Information Technology	Training, Including Automotive sector and I T Hardware.	PHD House, Asian Games Village, New Delhi-110016
20	National Association of Consulting Engineers	Engineering Consultancy services for Industries, etc	23,26 Institutional Area, Lodi Road, New Delhi-110003
21	National association of software & service Companies	Automotive and other software and Service Industry	109, Ashok Hotel, Chankya puri, New Delhi,21
22	Process Plant Machinery Association of India	Automotive and other Process Plant & machinery	McKinnon Mackenzie Bldg Ballard Estate, Mumbai,38.
23	Steel Furnace Association of India	Automotive secondary steel manufacturing-electric furnace	3-D, Vandhana 11, Tolstoy Marg, New Delhi-110001
24	Steel Wire Manufacturing	Steel wires for Automobiles and	57-A Park Street, Kolkata, 700001.



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	Association	other purpose	
25	The Alloy Steel Producers Association	Steel Alloy for Automotive and other purpose	A M Marg, Prabhadeve, Mumbai,400025.
26	The Indian Ferro Alloy Producers Association	Automotive and for other purpose Ferro Alloys	14, Karve Road, Mumbai,20.
27	Tinplate Manufacturers Association	For all kinds of Petroleum Containers and Tanks.	6, Netaji Subhash road, Kolkata, 700001.
28	Tractor Manufacturers Association	Agricultural Tractors, etc.	23,26, Lodi Road.Delhi,3.
29	Association of Indian Automobile Manufacturers	All kinds of Automobiles	Pune
30	Central Mechanical Engineering Research Institute	R & D Activities in the field of Mechanical/ Automobile field.	MG Road, Durgapur
31	Jallandar Foundry Association	Services to Foundry companies	Kapurthala rd, Jalandar
32	Rajkot Engineering	On No profit No loss	Bhaktinagar Industrial



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	Association	basis it provides raw material to SSI	Estate, Rajkot- 360002.
	Southern India Engineering Manufacturer's	Engineering	PO Box-3847, Coimbtore-
33	Association	Manufacturing	641018.
	Thane Manufacturer's	Industrial Association	
34	Association	of Thane District	Wagle Estate,Thane-64.
	The Indian Institute of	Association of	4/2, Middleton road,
35	Foundry men	Foundry men	Kolkata, 700071.
	Tirupur Export	Exporting Co.	
36	Association	Association	Tirupur, Tamilnadu.
	Vatva Industrial	Indu. Asso., GIDC,	Vatva-
37	Association	Ahemdabad	GIDC,Ahemdabad,382445
	The Institute of	Association of Indian	8, Gokhale Rd,
38	Engineers(India)	Engineers	Kolkata,20.
	Federation of Indian Export Organization	Minstry of commerce	Cuffe Parade,
39	(FIEO)	for Export Promotion	Mumbai,400005



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INTERPRETATION OF THE TABLE:

These associations pump lot of energy always in their respective fields and areas by conducting lot of awareness programmes for the fruitful purposes. Thus they are always useful in car indigenisation program with respect to customer behaviour.

PART 3:

ARE ALL THE RESOURCES AVAILABLE IN INDIA?

TABLE: 17.3: RESOURCES AVAILABILITY OR CAN BE DEVELOPED IN INDIA:

SN	RESOURCE	AVAILABILITY
1.	Human Resource	Yes. Every year enough graduates form Engineering. Commerce, Management fields.
2.	Material	Yes. Look at the following table.
3.	Technology	Can be developed as we have experts but R & D is needed.
4.	Finances	Can be raised. Look at the solutions provided.
5.	Infrastructure	India is on the verge of being called Infrastructure advanced country in the world.





Interpretation of table: Indians having expertise are ready to offer their service in this project; only thing needed is tapping their energy and expertise as soon as possible.

2. All the material resources are available in plenty in India to conceive the India's own car.

Part 4:

Is all the material required for developing the car available in India?

Table: 17.4: Material Availability in India: Reference: CII Directory:

Survey for – Availability of Few Materials Required for Manufacturing Car Parts					
S N	Material required for Car Manufacturing	Required for Which car part?	Location of the Part in the Car	Availa ble in India	Can India Develop it?
1	Cast Iron	Engine Block, etc.	Engine, etc.	Yes	Yes
2	Alloyed Steel	Gears	GB, etc.	Yes	Yes
3	Brass	Rings, etc.	GB, etc.	Yes	Yes
4	Copper	Connecting rod, etc.	Engine, etc	Yes	Yes
5	Plain carbon steel	Frames, etc.	Frames, etc.	Yes	Yes
6	Rubber	Rubber seals, etc.	Brakes, etc.	Yes	Yes
7	Ferrodo Lines	Brake shoe liner	Brakes, etc.	Yes	Yes
8	Glasses	Windshield glass, etc.	Glasses, etc.	Yes	Yes
9	Special cloth	Furniture , etc.	Seats, etc.	Yes	Yes
10	Ethylene Glycol	Coolant	Radiator	Yes	Yes
11	GB Oil	GB, Differential, etc.	GB, Differential, etc.	Yes	Yes
12	Engine Oil	Engine Block, etc.	Engine	Yes	Yes
13	Grease	Clutch, GB,	Transmission	Yes	Yes





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		etc.	system		
14	Lubricating Oil	Engine parts, etc.	Engine, GB, etc.	Yes	Yes
15	Petrol	Engine	Engine	Yes	Yes
16	Diesel	Engine	Engine	Yes	Yes
17	Other fuel	Like CNG, etc.	Engine	Yes	Yes
18	Aluminium	Engine, Body, etc.	Engine, Etc.	Yes	Yes
19	Plastic	Lamp cover, etc.	Lights cover	Yes	Yes
20	Fibre glass	Body, Seats, etc.	Body of the seats	Yes	Yes
21	Polyethylene sheets	Sunscreens glass	Glasses	Yes	Yes
22	Tin covers	Protection to lamps	Light covers	Yes	Yes
23	Raincoat cloth	Car cover	Covering the car	Yes	Yes
24	Zinc Lubrication	Leaf plates	Leaf Springs	Yes	Yes
25	Primer	Metal Plate	Metal Sheet Body	Yes	Yes
26	Paint	Body of the car	Metal Sheet Body	Yes	Yes
27	LCD Screen	Dash board	Dash Board	Yes	Yes
28	Silicon Chips	Electronic Devices	Electronic Devices	Yes	Yes
29	Nylon Tyres	Tyres	Tyres	Yes	Yes
30	Special Rubber	Tubes	Tubes in tyre	Yes	Yes
31	Special Alloyed Steel	Tappet valves	Engine	Yes	Yes
32	Freon Gas	For a.c.	Air Conditioner	Yes	Yes
33	Solar cell	Solar Batteries	Solar cars	Yes	Yes
34	Acids etc.	Car Batteries	Cars	Yes	Yes
35	Ceramic etc.	Catalytic Converter	In front of Silencer	Yes	Yes
36	Tin alloy	Silencer Body	Silencer	Yes	Yes
37	Cushion	Inside Seats	Seats, etc.	Yes	Yes
38	Halogen Bulbs	Lights Night vision	Body	Yes	Yes
39	Glow indicator	Panel	Dash Board	Yes	Yes



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40	3D Radium Plates	Bulb covers	Light covers	Yes	Yes
41	NiChrome plated sheets	Gap fitters	Doors, Lights, etc.	Yes	Yes
42	Leather or Ropes	Safety Belts	Seats, etc.	Yes	Yes
43	Special Alloyed Metal	Torsion Bars	Suspension system	Yes	Yes
44	PVC coated wires	Electrical devices	All devices	Yes	Yes

Interpretation of the Table:

1. There are experts who can develop these technologies with their experience in this field.
2. About finances special provision in the five-year plan or raising security bonds, etc. can be the possible solutions.

Part 5:

Areas where R & D is needed in the car from the Indian context?

Table 17.5: Technical Factors of cars on which Research and Development is needed in India:

SN	Where R & D is needed	FACTOR on which R & D is needed	Research findings why R & D is needed on these in India: Reasons / Comments / Remarks
A	Body of the car	Shock Absorber	Indian climatic & road conditions cut short the life of these parts.
		Streamline body	Air and Rain Resistance is almost unavoidable in Indian climate.





	Safety Measures	To Pass all dash tests in accidents is must in Euro Standards.
	Coats in Painting	Corrosion resistance paints and coatings needed in the competition.
	Night vision lights	All terrain roads in India and lack of night lamps and road signal.
	Doors and Door locks	These form the Most problematic part in Indian cars.
	Wind Shield Wipers	Improper wiping is done at present in varying climatic conditions.
	Back lights & Brake lights	Fusing these lights is a common phenomenon in India, research needed
	Panel & reading meters	On Panel / Dash Board most of the car's data must be visible.
	Emergency Needs	Air Bag, Message sending, Safety measures
B on	TransmissiAutomatic Transmission	Changing Gears very often.
	Alloys used	Breaking of Gears, Propeller shafts, etc.
	Lubricating Oils	Present oils must be brought to the international standards.





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		Wheels	Improvement is needed on balancing front.
		Tyres	Quality of the material and standard needed
		Tubes	In this much improvement is needed
		Locking Nuts & Bolts	Age old nuts and bolts are still used
		Clutch	50 years old design is still used in India
		Constant Variable Tr.	No car in India yet running on CV Transmission
		Steering System	Needs Improvement in the Indian context.
C	Gear Boxes	First and Second Gear	Much improvement is needed in Indian cars
		Top Gear	Due to road conditions and other factors
		Overdrive	Saves Lot of efforts and fuel consumption
		Synchromesh Rings	Indians are yet to make good quality rings
		Gear Shifting	Second biggest problem in India



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		Mechanism	
		Automatic Gear Shifts	Gear Shifting can be avoided in Gear boxes
		Gear box lubrication	Improvement is needed in India as temperature range is -50 to +50
		GB Servicing a year	In India, it is yet to make a start at maintenance front.
		Alloys used in Gears	Metallurgical Improvements need of the hour.
D	Engine	Cylinder Wear & Tear	Whole mechanism differ with conditions so needed research.
		Piston	Combustion Chamber is the Power Chamber
		Piston Rings	Pollution due to unburnt gas leaks.
		Tappet Valves	Most problematic in Diesel Engines.
		Rocker Arm	Few problems heard due to this.
		Cam Shafts	Metallurgical, Mechanism needs improvements
		Crank	Improvement is needed in Indian Contest
		Crank, Cam Mechanism	Improvement is needed in Indian Contest



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		Fuel Injecting Mechanism	Perfect Combination is yet to be found.
		Combustion Timing	MNC vehicles misfires in Indian Contests
		Catalytic Converter	Heavy Pollution through exhaust gases can be avoided
E	Fuels and	Petrol	Unleaded Petrol misfires, detonates
	Alternative		Diesel forms the major automobile
	Fuels	Diesel	fuel in India
	and		200 Tonnes of CNG produced at
	Alternative	CNG	Bombay high everyday
	Fuel Car	LPG, Gobar	It is feasible to run car on these
	Segment	Gas, etc.	fuels.
		Hydrogen as a fuel	Most abundant fuel and least pollutant. So need of the day
		Solar Car	Petroleum is getting extinct but Sun will last longer.
		Battery Car	Research on long lasting Batteries is need of the day.
		Air Car, Water Car	Future needs of the car are Air borne and water borne as well.
		Some other fuel	Liquid Nitrogen as fuel in the car.





	Auto pilot-GPS car	Computer guides the car takes help of Satellites for position.
	Fuel Consumption	Many organizations are trying to get maximum average from cars.
	Alternative Materials	China clay piston, Fibre glass body, etc.

Interpretation of the Table:

All these technologies have been refined by the MNC to reach the quality they are giving so Indian must start early and reach the pinnacle as they reached in other sector with speed.

**Also, all the companies have some or other kind of collaborations between them and some parent company those have developed their automobile machineries, units, assemblies and sub assemblies by MNC.

**By now all the ancillary units, subunits, SSI, MSI, which are supporting the main plant for productions of the car, have developed themselves to the world standards.

**Here we shall see the examples in other field where India has already achieved this and then compare it for our small car indigenisation purpose.

- In the cycle Industry Hero cycles have achieved it much before and now they are leading cycle manufacturers in the world.
- In the refrigeration industry,
- In the most of the common medical equipments,





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- In the agricultural industry Indian organisations have achieved total indigenisation because of total customer satisfaction (TCS) and Total Quality Management (TQM).
- India has successfully developed the most advanced kind of Super computers, with limited resources with well-defined time period and at cheaper costs,
- In the Fast Moving Consumer goods (FMCG) India has achieved what any other countries cannot even dream of achieving it. India is totally self reliant in this kind of market. Even the toughest of though American McDonald, Kentucky Fried Chicken (KFC) could not disturb the hold of these local Indian companies.
- Dr. Cherian, in the Operation flood, Indians could achieve the self-reliance in milk and milk products through sheer will power.
- In the operation green, that is “Harit Kranti” started by Dr. M. S. Swami Nathan, made India self reliant in the field of food industry with extra tons of wheat, rice and cereals. In an extreme case in 2001 A.D., Indians produced so much of wheat and rice that they were short of godowns.
- In the sugar sector India is the fourth best in the world.
- India is almost on the verge of mastering the Space technology and research related to it and also the Military technology and research for total indigenisation.





➤ There are many more such fields where India has achieved significant

breakthrough in those sector either through technology or through proper development of work culture and developing the ground forces.

Similarly, within the stipulated time Indian Car companies can achieve the same what the Americans had achieved. Even some experts like Mr. Keshub Mahindra, of Mahindra and Mahindra predict that there will be at least one company, which will be dominating the world car market in near future due to its quality technology at cheaper cost.

PART 6:

Organisations involved in the Automobile R & D in India:

Taking help from the present vast automotive industrial set up which is concentrating more on manufacturing side than on the R & D.

TABLE: 17.6:

Major Organisations involved in Automobile Industry in India:

		City of	Minimum	Minimum
SN	Organisation Name	Location	Vendors	No. Of SSI dependency
1	TATA MOTORS	Pune	250	12500
2	ESCORTS	Faridabad	150	780
3	KINETIC	Aurangabad	78	400
4	MAHINDRA & MAHINDRA	Mumbai	158	2010
5	MARUTI SUZUKI U.L.	Delhi	180	15000





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6	PREMIER Auto Limited	Mumbai	120	750
7	HINDUSTHAN MOTORS	Indore	60	500
8	FIAT	Mumbai	80	68
9	TVS-SUZUKI	Chennai	120	250
10	BAJAJ	Pune	80	250
11	HYUNDAI	Shri- Perumbudur	40	350
12	MITSUBISHI- HM	Indore	--	100
13	HONDA	Chennai	--	--
14	FORD	Chennai	40	250
15	MERCEDES	Pune	--	--
16	TOYOTA-DCM-KIRLOSKAR	Pune	--	500
17	SKODA	Aurangabad	---	-----
18	BHARAT FORGE	Pune	---	50
19	MRF	Chennai	---	-----
20	ASHOK LEYLAND	Hossur	40	100

Interpretation of the table:

1. Look at the number of ancillary units and vendors the each automobile is providing. This huge number describes the motive behind the indigenisation.
2. Number of employment generated is highest and comparable to mining and railway sector in India.



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3. These companies are involved more in production side. If they cannot concentrate on R & D they must get united to set up Indian R & D and Indigenisation Association kind of organisation to carry out independent research in this sector.

Automobile Industry in India is almost a half-century-old and thus expertise in others can be utilised while indigenising the small car.

PART 7:

LACUNAE IN THE PRESENT R & D IN THE CAR SECTOR IN INDIA:

The most prominent lacunae are been presented here not from the negative point of view but from the practical and the progressive point of view.

In Indian companies where the R& D is rather operational or R & D is totally involved only in benchmarking than actually developing new technologies, following lacunae have been observed:

- **1. MNC lack willingness to share:** Even in the joint venture of 50-50 kind, with foreign MNC, this includes the R & D for that firms too; Indian organizations have started realizing that their MNC partner are not willing and prompt in solving their technical difficulties. The most important reason being huge investment and time spent on developing of the technology by these MNC in their country. It would be therefore be foolish to expect MNC to part their technology even in 50:50 or 51:49 partnerships.
- **2. MNC take advantage of ignorance:** MNC are also found to be taking advantage of the ignorance and weaknesses in technical knowledge of





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Indian partners. May be due to lack of exposure even the highest level of the

Technocrats and the Management of the organization.

•**3. R & D is not moving with the Market Demand:** R &D should be responsive towards customer demands and consumer feed back. To make it happen, R & D personnel have to work closely with marketing personnel. However, such teamwork is found to be lacking in more than 90% organizations. R & D personnel mostly work in isolation; at most in association with production and quality departments. As this has no direct effect on capital gains many organizations have closed the R & D departments.

•**4. Lack of Proper Documentation:** This infact is one the biggest drawback in the Indian firms may it be Public Sector or the Private Sector. It happens mostly due to the work apathy, lack of accountability and large employee turn over.

•**5.Maximum R & D in India are focused only on Cost Reduction and are not developing innovative technologies:** Although R & D has to be directed towards import substitution in raw materials and components, it cannot be its sole activity. Its focus has to be on the innovative research as well. This however is neglected in number of companies in India.

•**6. Total Negligence on Technical Know-Why:** The route of innovative research passes through technical-know why. This mainly adds the dependencies on the MNCC. As unless the technical workforce know the scientific reason behind the particular arrangements of components,





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assemblies, subassemblies, electromagnetic work functions,

electromechanical operations and the related aspects, it not at all possible
for them to upgrade or innovate the technology.

•**7. MNCC try every way for the dependence on them:** All the MNCC who
sell the technologies try to aim at ensuing the buyer's dependence on him
for technical knowledge, components, maintenances, designing,
refinements, etc.

•**8. No link with commercial production:** Industrial Research must be
market oriented and directed towards the customer satisfaction of the
product.

•**9. Negligence of customer feedback:** Customers always give feed back
about the product. But, Indian companies do not pose the diversification or
timely up gradation in their product. Indian companies do not have the user
friendliness and additional features in their product and services, which
help in market expansion and retention.

•**10. No Heavy Academic Research:** There is hardly any basic research in
India in the Academic world. Even the Engineering Colleges neglect this
issue. There is no importance to practical creativity but to making a
academic qualification.

•**11. Lack of Academic and Industrial Interaction:** There are little
collaborations between the Academic world and the Industrial world. Lot of
experts feel that if one-year compulsory internship like adventure (One year
Compulsory to Doctors after MBBS) can kept with the Engineers too. If it is





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done, there will be huge Industrial and Institute interaction. As without

significant contribution the companies offering training to the Engineers will get the complete interaction with the students and the Professors.

•**12. MNC use technology to increase their market share:** Look at the advertisements of the MNC cars they use technologies as a tool to increase their market base.

•**13.MNC use technology for increasing stake in the joint venture:** What happened with Maruti? It had earlier 51% stake in the company. However, the Suzuki from Japan built a tactical pressure on Maruti and thus Maruti is now 46% partner of the Suzuki. Out of it now 26% is going public. Thus, MNC try to increase their stake in the joint venture. Similar situations are occurring in other companies too.

•**14. MNC carry out most of the R & D in home country:** Almost every MNC carry out the basic research in their home countries. No MNC conduct basic research outside their country where the technology has the origin. Sadly India is included I it.

•**15. Fear of Huge investment in R & D:** All the MNC have the R & D, which is capital intensive and has a long tradition. Indian companies fear that they will also have to invest billions of dollars in this regard. So many Indian companies even scrap the project at its budding level.

•**16. Illusion of Joint Venture:** Many Multinational Corporations have 50:50 or 51:49 kinds of joint ventures in India as equity participation. However, this participation ratio refers only to their business in India and





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the MNC share is negligible in comparison with their worldwide size of

operations. This do not include the technology transfer or giving the same partnership to the technical know how to the partner of joint venture.

•**17. Latest Technology is not Transferred:** No MNC is willing to transfer their latest technologies. Instead the technology transferred is mostly older or the obsolete one.

•**18. High Rate of obsolescence in Electronic Industries:** Look at the microprocessors, which are used in the fuel injection of the cars. After almost six months the manufacturer of that microprocessor stops its production as it develops the newer version. Thus, obsolescence is very high in electronic industry. Even the chips used in Computers have the same destiny. Thus, Indian companies are at least a generation away in the technical R & D.

•**19. Not Developing R & D in SSI and MSI at lower costs:** Instead of huge investment in the R & D at bigger level, Indian industries can create a consortium with the Research Laboratories and Universities and Engineering colleges. Thus, SSI and the MSI can get benefited from the technical expertise of the scientists as also the research facilities at the laboratories.

•**20. Every MNC is here to exploit Indian Market and Resources:** It includes the MNC Car makers and sellers as well. This has multiple facets and it is a multilevel process.





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•A. Human Resources at Cheaper cost: Even Technical work force at available at Cheaper Salaries than in their countries. Even the working hours are more.

•B. Material Resources at Cheaper cost: India is a big multi-terrain country with every kind of mineral resources available at cheaper cost than the country of origin.

•C. Maximum Profit with Minimum Investment: Investment in Millions of Dollars and Sales in Billions of Dollars can speak the volume of loss India is suffering.

•D. Ever Growing Market: Indian Car Sells is doubled over the period of six years. In 2010 it will touch one million mar then its six-lac cars at present.

•21. Claims versus Facts of R & D, and Indigenisation in the present Indian Car Sector:

A. **Tata-engineering claims:** Tata Indica is the totally indigenous Car. However, it is a partially correct statement. Here are few visible facts, which can shake this claim:

- It is designed by IDEAS of Italy.
- It is fitted with Hitachi Fuel Injection System,
- It is using Robotics in the factory, which is made in USA, Italy, Japan, and Germany,
- It is fitted with microprocessors made in Japan.

B. **Maruti-Suzuki Claims:** Even after entering in to market since last two decades, Maruti- Suzuki claims that it has Indiginize only 70% dealings in





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India including, the R & D ventures, the technologies, and the Cars it

manufactures. However, still it is not so:

- Still many Engine Parts and the Gear Box parts are directly imported from the parent Suzuki Factory. Even for few cars, the Engine and the Gear Box are directly imported from Japan.
- Mr. Khattar, MD, of Maruti claimed to have Indiginize maximum parts of Maruti Cars. While in MBA Review of ICFAI, august 2002, it was observed that Maruti 800 the 1984 model is still to be indigenised fully. Zen, Esteem, Omni are 90% indigenised along with Maruti-800. The Gypsi whose sells is dropping day by day is been indigenised up to 82% and export version of the Zen called alto is indigenised up to only 76%.
- The Robotic Technology to assemble various parts of the car in the factory are totally brought and maintained from the Japanese counterpart.
- Last but not the least Suzuki has 54% claim in the factory so ultimate say will be from the Suzuki, Japan. Means Management has the power to reject any thing that harms the parent company in Japan.
- Total indigenisation efforts have been already rejected. Suzuki is not ready to sell its total claim. At present Suzuki-54.2 % ahs the highest share in the Maruti Suzuki Venture. Government of India has 18.3% share and Public Issue- 27.5%.
- Isn't it true that 54% Profit of Suzuki every moment is siphoned out from India and is going towards Japan?





- Many MNCC claim that they have collaborated with the Indian Car companies for some share, 25%, 50%, or like that. Where as they have Billions of Dollars worldwide turnover. Thus, these tiny investments are opportunities. Later on, these MNC adopt simple management tricks to buy more shares of the Indian Company (Counterpart).
- The Technology Transfer is a distant Indian expectation from these MNCC. They keep their Indian counterpart dependant on them. Also, MNCC take advantage of ignorance of technologies, and treating R & D as a burden activity and even lack of awareness about the latest technologies among their Indian counterpart.
- Recent Research shows that, directly or indirectly, these companies in Indian collaborations bring their other products made by their sister concerns into Indian market. The way to bring may be by giving gift, concession, or some kind of lucky draw. They make people addict of their products.
- By the versioning (Next improved products) in the products, these foreign MNC keep their R & D ventures full fledged working and keep customers busy with them. Thus, market forces have all the capability to shake the Indian counterpart. Thus, if these technologies are not Indiginize India will get looted.





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➤ R & D brings versioning revolutions around the world. Due to

Versioning and, Japanese companies stop manufacturing the parts after they pass some ten advanced versions.

Example: Camera bought in 1992 could not get its spare parts in 2000 as the company stopped manufacturing its every kind of production and dealings (of this older version).

➤ Recent Market Research shows that, Japanese people Sale product at low cost where as the spare parts and services are costlier. Many Indian consumers cannot afford these hefty ventures. As many consumers in India, especially the middle class people treat important commodity like car as a life long asset. The company, which can manufacture Luxury cars, can easily manufacture the small cars.

➤ With heavy budget over the R & D, Marketing, and Advertising (Almost 1.5% to 2% of their annual turn over) these multibillion-dollar companies capture market and internal and external customers. Internal customer (Employees and Vendors) and External Customers mean Consumers of the product. Infact they keep the loyal customers always luring. Specially mentioning here would be GM, Ford, Toyota, each of these companies have more than USD 100 Billion Turnover every year.

22. Intensity of R & D worldwide situation:



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- Computer software and Hardware companies invest 11% to 13% of their annual sales in Dollars over the R & D to keep their edge on others.
- Intel invested more than **\$1 Billion** on the R & D in the year 2000.
- Dupont Textile Corporation has invested whopping \$13 Billion in 1980's.
- Every food and package industry, which are among the lowest in R & D investment, also invest at least 1% of their annual sales in R & D in USA.
- In 1992, in USA, World's biggest car company, General Motors (GM) invested more than **\$5 Billion** on totally new project of Saturn Cars. R &D took **\$1Billion**. Thus 20% of the Saturn project went to R & D, which fetched GM at least \$2 Billion every year thus making GM again profit making company in 1996 only after 6 years.

23. R & D in the car technology can put the best Import Substitute: In India new trends in product innovation are given very scanty consideration, even though it gives replacement to the foreign product for the option of import substitutes. Market Planning, production planning and research planning are distressingly lacking. While 60% to 70% of the industrial capacity is lacking idle, both in the public and private sectors, a considerable amount of foreign exchange is spent on machines, raw material and parts. Hardly any attention is given to indigenous know-how and productive factors. There are hardly any economies of large-scale





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production of quality car parts. There is scarcely any application of new process, which has been developed in the Indian laboratories. Hence, without a better understanding of product innovation, the import substitutes programme and the export programme will not at all succeed.

24. Absence of Values: It has been observed that Research is neglected due to absence of values, and wrong attitude of the organisations. On the other hand where some research has been done, it is not related to the other aspects of the product innovations.

25. Mere Seminars and Talks and Research Thesis won't achieve: It has been observed in India that in IIT, IIM, Engineering Colleges, Management Colleges, Commerce and Economics Colleges bring out lot of solutions in their research but those are left either mere talk in a seminar or left in the Thesis or Project form. Hardly any project or thesis finds any application in India. The young generation has realised this fact very early in their life due to early exposure to all these activities. Many enlighten souls are raring to go for the action to achieve independence on the technological front for India.

26. Borrowed Dependency: As Indians Are Totally Dependent on R & D and the technologies from the foreign source its economy also has become dependant on the foreign sources.

Though Customers are aware about few of these facts and are demanding indigenous cars, still Indian companies are not so intense on developing new technologies and products innovatively. However, they are stressing





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more on manufacturing older but reliable versions of Car. It includes spares, its services, and its maintenances.

27. Less Competition for Long Period: In India for almost four to five decades PAL and HM have dominated the car market. After 1980's only Maruti posted some competition for them. Later on when more MNCC arrived in India these grand fathers of car sectors had to close their few plants due to lack of any kind of innovation in their product and services. Customers were bored about the monotonous product and services and hegemonies of these two organisations.

28. Indian car organisations do not have aim to be dominant in the world car market: since, last fifty years, Indian car firms don't have aim to be global competitors they get satisfied once they capture the national market. Where as look at the US firms. US car firms have to face stiff competition from the European, Korean and Japanese Car organisations. They have to ensure higher returns on an increasing physical scale of the capital investment in the new car, new equipments, new processes; take full advantage of the market potential at home and abroad, and accelerate economic growth. Hence, these firms spend a lot on R & D. They study every alien culture locally and invest more to capture the market by using various management tricks including vigorous advertised campaigns and nominal collaborations with the local firms around the world. Infact there is not a single automobile company in the world where US car organisations do not





E-BOOK- ISBN: 978-93-5235-441-2. COPYRIGHT TO AUTHOR- DR. ASHISH MANOHAR URKUDE have the collaborations. Even in Japan Toyota has some share to General Motors of USA.

29. **Recruitment of specialised Engineers, Accountants and Scientists**

for specialised tasks: In USA every R & D department have to perform specialised task. In Germany Siemens had appointed more than 1500 engineers, accountants and scientists to determine how the cost may be reduced so that its products are made cheaper and better. How many Indian firms have employed even one tenth of these for the same kind of R & D projects? The answer is obviously, Absolutely None.

30. **Ill-conceived policies:** Mr. T. Thomas a Scientists advocates a shift in emphasis from public sector R & D to private sector R & D. How ever, the private sector R & D has been discouraged by the ill-conceived policy of the Indian government. There is always an uncertainty about the licensing of capacity, monopoly regulation, imports and exports.

31. **The problems of being small Indian Companies:** Indian companies are very small from every mode in comparison to MNC from the developed countries. Hence, they are not allowed to invest huge amount of money in R & D because they are small and can't be sure of further growth. There is therefore, no incentive to undertake basic R & D. This also has cause sickness in the Car industry recently. Not only these small firms become shaky in setting up long term objective but also find get carried away in the too short-term profit oriented goals or even in the vague goals of the organisation.



**PART 8:****HOW TO IMPROVE R & D IN THE CAR SECTOR IN INDIA? :**

The improvements in the R & D division were the major problem for Japan and USA once the saturation level of the Quality Standards were reached. That is why they started exchanging few practices. Thus, Kaizen, TQM, ISO, TPM, Reengineering, Zero Defect, Just in Time, Six sigma and other such terms became household names. Many people claim that these practices were followed not even in the factories and offices but also in several homes. Thus, Indian companies must understand the importance of these practices. When all these practices were combined, they can make a road map of Indian R & D success. Following are the measures taken not only by the American and the Japanese Companies but are supposed to be the best practices to make R & D truly fruitful.

A. Following the best and most reliable practices in the Car R & D around the world:

- 1.The Corporate and Business Unit Strategies are well defined and clearly communicated.
- 2.Core Technologies are defined and communicated to R & D department.
- 3.Investments are made in developing multinational R & D capabilities to tap ideas through out the world.
- 4.Funding for the basic research must come from the corporate sources to ensure long-term focus.





5. Funding for the development of these basic researches must come from business units to ensure accountability.

6. Basic and Applied Research are performed either at a central facility or at a small number of labs, each focused on a particular discipline of science or technology.

7. Development of this Basic and Applied Research work is usually performed at the business sites.

8. Formal, cross-functional teams are created for the basic, applied and developmental projects.

9. Formal mechanisms exist for regular interaction among scientists, and between R & D and other functions.

10. Analytical Tools are used for selecting projects as well as for on going project evaluation.

11. The Transfer of technology to business units is the most important measure of R & D performance.

12. Effective measures of career development are in place at all levels of R & D.

13. Recruiting of new people is from diverse universities and from other companies when specific experience or skills are required that would take long to develop internally.

14. Some Basic Research is performed internally, but there are also many university and third-party relationships.





15. Formal mechanisms are used for monitoring external technological developments.

B. Evaluating over the Parameters of R & D strengths in the Indian Car Sector:

Once the best practices around the world are followed; following are the parameters for its evaluations for the results. Evaluating it against these following parameters can strengthen R&D in car the Indian Sector:

- 1. Cost,
- 2. Quality,
- 3. Time,
- 4. Design,
- 5. Manufacturing,
- 6. Marketing,
- 7. Workforce required,
- 8. Customer Satisfaction Index (CSI).

C. Assessment of R & D Performance In the Indian Car Sector At the present juncture:

R & D performance must be continuously assessed. Once assessed the measures to bring R & D in cars sector can become very easy for every organisation. There are formulae also for the national level analysing. The most general terms used for these assessments are:

1. Personal Intensity,
2. Expenditure Intensity,





3. Marketing Intensity,

4. Expenditure on R & D to the GNP ratio,

5. Number of Scientists per thousand.

The generalised formulae to assess R & D at organisational and the national level are:

• 1. *Personal Intensity* = *Value of R & D in the firm* =

$$= \frac{\text{Strength of R \& D employees}}{\text{The total number of employees in the company}}$$

If this analysis is taken to be the strength of the company then more than 90% Indian company would find no place in this list.

• 2. *Expenditure Intensity* = $\frac{\text{R \& D Investment}}{\text{Sales Turn Over}}$

Even Tata Engineering, which is the biggest conglomerate in India, is not investing more than 2% in R & D then leaves other companies aside.

• 3. *Marketing New Product* = $\frac{\text{Sales of new Product}}{\text{Total sales of product mix}}$

In this Tata Engineering has a tremendous success story when it introduced the Tata-Indica V2 version of Indica cars. Which, also indicates that Indian customers are demanding indigenous but cheaper cars with cheaper servicing facilities and cheaper spare parts, too. However, Tata is yet to make totally indigenous Cars.





•4. *National level technological capabilities*=

$$\frac{\text{Expenditure on Research and Development}}{\text{GNP (Gross National Product)}} \times 100$$

GNP (Gross National Product)

Take example of India and USA here. These are figure given by Mr. T. Thomas in 2000 A.D. Though it is not proper to compare still let us see what is the position at present. India is spending 0.23% of its GNP i.e. approximately Rs. 2500 Crores, on R& D while USA is spending 3% of GNP i.e. USD 60 Billion, i.e. approximately Rs. 22800 Crores on R & D. Thus, India needs to improve at this front, which it is trying.

•5. *Success in R & D of the nation*=

$$\frac{\text{Number of R \& D Scientists}}{10000 \text{ of the population}}$$

10000 of the population

Mr. T. Thomas review, 2000 A.D. deplores that out of 120,000 Scientists only 10000 scientists are in private companies in India. Out of 28,000 patents in 2001 A.D. world wide only 3000 have Indian names and are backed by the indigenous Indian technology.

•Remember, the national level indicators always use the data, which is too heterogeneous to calculate exact figures for a typical parameter.

However, these five formulae are used to assess the R & D performances in the Individual Organization and Performance At The National Level.





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At present, India stands nowhere around the category of R & D giants of the world like USA and Japan. Therefore, India has to adopt following the best practices accepted around the world.



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**D. Preparing Indian companies for the Future Car R & D Requirements****is the need of the hour:**

There are several aspects in this regard, which need to be modified for the future. Few of them are as follows:

- 1.The existing patent statute in India grants only process protection and not the product protection.
2. As a signatory of the WTO, the government of India is now required to provide a full product patent protection no later than January 1, 2005.
- 3.Besides, in tune with the WTO, agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), patent exclusively period has to be extended from 14 years to 20 years.
- 4.It would be suffice for our purpose here to say that creation of innovative technology having novelty; non-obviousness and utility can be commercial success on if it is patented. Hence, training to scientists, technocrats, entrepreneurs, and financiers have to understand the finer and wider implantations of the patens.
- 5.Patent Writing is also a highly specialized task and its importance is being recognized in India since late nineties. Still Finer issues cannot be put up over here.
- 6.The organizations around the world are beginning to rely that benefits from cross-functional teams in the product development activities. This should become the dominant design model in the coming years.





7.To be competitive in the global market companies must find the proper mix of the product and process R & D.

8.The inability of standard marketing research in the diversified global market to properly evaluate the market potential of novel products suggests that many firms will be adopting Sony's approach of continually developing new products to be tested in the marketplace with sophisticated information system market feedback. If it sells, make more. If it does not sell, cancel the production and try another product.

9.The inability of many established firms to be as innovative as smaller firms indicates that companies may continue to break themselves down into smaller units to encourage creativity and innovations.

10. One more aspect need to be focused is balancing the efficiency rationales for centralizing R & D at corporate headquarters with the effectiveness rationale for decentralizing R & D to business units. For the MNCC it is very serious implication.

11. There are several technological developments happenings worldwide in the car sector like Hydrogen Fuel Driven Cars, Fuel Cell Cars, and Solar Cell Cars, or even cars running on other alternative fuels, in which field there is a huge scope in future. Few scientists are planning to develop Sky Cars at par with the aeroplanes; few scientists are busy in manufacturing Multi-terrain car (the car which can fly in sky, the same car can be driven on the road, even the same car can move on the water or the same car can move even like the submarine). However, Indians find nowhere near





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acquiring these technologies. Hence, if Indians take this project seriously they will be able to move smoothly on this future track.

12. Infact at one stage the R & D in the luxury cars matches closely with the R & D in other advanced fields like aeroplanes, submarines and other same technologies. Hence, India will be benefited directly or even indirectly in these important sectors too. Thus, what India is spending on these sectors almost Rs. 40, 000 Crores every year will be automatically saved. In other terms India will be generating the same sum to benefit these sectors.

Example.

There is an Axle to drive the vehicle which may be either cars, trucks, or even aeroplanes and submarines. The Ozar Factory of Nashik unit of Indian Air Force (IAF) has manufactured the Axle indigenously at par with the Russian technology, for the MIG-23 and MIG-29 at the cost of Rs. 60, 000/= as against its original Russian made part has the price tag of Rs. 3,50,000/= Thus, showing the advantage of indigenisation. The price got reduced to one sixth. It has made the human resources exposure and the mastery over the technology and making IAF self reliant on this front.

E. R & D, Technologies, and Finances for the Entrepreneurs in India:

E: Section I: Present Status:

To take a preview of every kind of efforts Indians are taking is beyond scope of this thesis. So, at least taking previews of most important industrial sector in India that is in the SSI will clear what are the efforts are taken by the government of India and other organisations in this aspects. Infact,





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there is no such thing as the R & D improvement efforts what ever is been

done it done in the name of Technology Improvements.

Under the Apex body as the Small Industries Development Bank of India (SIDBI) there are several bodies and organisations, which are providing Specialised Support Services to the SSI. It is the case in bigger industries too only difference is few are other bodies and organisations which are doing these things.

So for the SSI under the Apex body as Small Industries Development Bank of India (SIDBI) following are the Providers of Specialised Services to make the SSI Self reliant:

a. In the Technology Up gradation (R & D is part of this):

- i. National Small Industries Corporations (NSIC),
- ii. Small Industries Development Organisation (SIDO),
- iii. SISI,
- iv. RTC,
- v. PPDC,
- vi. TBSE.

b. In the Technical Training:

- i. Small Industries Development Organisations (SIDO),
- ii. SISI,
- iii. TCO,
- iv. PPDC,
- v. District Industries Centre (DIC),





vi. RTC,

vii. CFTI,

c. Industrial Inputs:

i. NSIC,

ii. SSIDC,

iii. DIC.

d. Industrial Infrastructure:

i. State Small Industries Development Corporations (SSIDC),

ii. State Industries Development corporations (SIDC),

iii. HUDCO.

e. Finance:

i. Banks: Commercial Banks, Regional Rural Banks (RRB), Co-operative Banks.

ii. State Level: State Finance Corporations (SFC), SIDC, State Small Industries Corporations (SSIC), SIICOM, Gujarat Industrial Investment Corporations (GICC), and SSIDC.

iii. Others: National Bank for Agriculture and Rural Development (NABARD), and National small Industries Corporations (NSIC).

f. Entrepreneurship Development:

i. SIDO,

ii. Specialists Institutes,

iii. EDII,

iv. NIESBUD,





v. EDI,

vi. SISI.

g. Marketing:

i. SIDO,

ii. NSIC,

iii. SSIDC,

iv. SISI,

v. EPC,

vi. State Export Corporations (SEC).

Thus, even at the SSI level Government of India is trying very hard to help the technological up gradation and R & D. By various means like helping the human resource for technical training, building infrastructure, financing the whole unit and even in marketing. Still due to following lacunae in it and in the medium and large-scale sector too Indian firms are not been able to achieve the leadership in the technological front (may be we can say not on any other front too) around the world.

E: Section II: Present Problems:

➤ Once the R & D labs comes out with the technologies to satisfy customers' needs Market forces start functioning. It is the entrepreneur who senses the business potential of a technology and commercialise it. Such passion for innovating various application of a technological concept and converting it into a business has to be supported by the conducive or





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favourable environment of easy accessibility to the technology finance.

Unfortunately, there is lack of both of these features in India. Thus, aspiring entrepreneurs have to fight competition at every possible level. Due to lack of professional consultations the entrepreneurs have to manage every aspect of a business single-handed. Under these circumstances his entire energy is focused on day-to-day survival. It leaves hardly any time for the latest in the technological world, kinds of issues. In India there are many associations working on this fronts. However, these associations also have not lived up to the cause adequately.

➤ One more aspect, Employers, Federations, having SSI wing, are found to be sitting on the fence when it comes to solving problems. *Example:* Let us consider the issue of timely payment of bills to the Vendors. An office bearer of employers, organisations, while fighting for the Justice to big players, conveniently ignore the injustice meted out to small companies by the very same members. Along with their counterparts in the Public Sector Units, they do not pay interest on delayed payments and thus violet the statutory provisions under the interest on delayed payments to SSI and Ancillary Industrial undertaking act, 1993.

➤ Also, one of the basic problems leading to sickness of SSI is the over dependence on one single customer due to non-diversification of their business activity. The reason behind this is Entrepreneurs are unaware of the technological avenues available for the business expansion.

➤ Entrepreneurs are also found to be lacking in advertising and marketing,





➤ In addition to all of these problems the main problem of dearth of funds required for the technological up gradation is also very much significant in India. In countries like USA private firms there has been phenomenal growth in industry-funded R & D in educational institutes, so much so that private sector's contribution is now greater than the government in many Institutes including top ranked MIT.

E: Section III:

Possible Solutions provided by various organisations: These entrepreneurs can do well if they know that they can get the solution over their problem. In India there are several organisation, which are meant for this purpose. Few of them are as follows:

- National Research and Development Corporation (NRDC),
- Small Scale Industrial Development Bank of India (SIDBI),
- Technological Bureau for Small Enterprises (Joint venture of SIDBI and Asian and Pacific Centre for Transfer of Technology),
- Department of Science and Technology (DST),
- Department of Science and Industrial Research (DSIR),
- National Innovation Foundation (NIF),
- Technology Information, Forecasting and Assessment council (TIFAC) of Ministry of Science and Technologies, India.

These organisations are providing solutions over these problems. Each organisation has their unique solutions. Few are given below:





- DSIR has initiated a techno-preneur Promotion Programme in 1998-1999. Technology based entrepreneurs are encouraged under this programme. Most importantly it provides financial support to innovators for developing prototypes, working models and their commercial production.
- NIF also has taken a commendable step towards this direction. Government of India has full backing to this project. Infact, Government of India has supported the NIF with corpus of Rs. 20 Crores, for documenting grass root level, innovators lying outside the organised sector. Encouraged by this efforts, even the small farmers have developed tilt able bullock carts, cotton stripers, disk brakes for the bicycles, etc. NIF is now trying to commercialise these technologies.
- DSIR also has initiated another nodal scheme for availing Self-Reliance to entrepreneurs at technological front. It is known as the Programmed Aimed at Technological Self Reliance (PASTER). It funds applied R & D in industry for technology development and commercialisation. Most importantly, it promotes conversion of laboratory scale innovation into commercially viable products. PASTER funds are categorically used for testing and evaluating developed products through laboratories and end users filling patents.
- Ministry of Science and Technology through TIFAC has provided similar assistance to industries under Home Grown Technology Program.

E: Section IV: Further Expectations:





➤ Many private players must come forward for industry-assisted funds for R & D in the educational Institutes. This will help growing Basic Research and encourage budding engineers, entrepreneurs, to work in the desired direction right from the student age. Innovative and creative brains of the Professors and students also will be able to contribute to industry by providing solution to the SSI, MSI and LSI as the case may arise. This looks rather radical but it is also a result-oriented approach.

➤ Government funded R & D in India should come in to the form of incentives, soft loans, research grants, research funding, for key R & D projects. This must continue. However, it has been observed that many national laboratories concentrate more on creating riches of their own be targeting selected areas. Thus, industries having a self-motive and product centred approach should encourage wider coverage and genuine desire to promote R & D infrastructure development in laboratory and in the educational institutes. Enhancements of industry's R & D infrastructure in parallel, both in private and public sectors, would add to the effectiveness of the industry's involvement in total program. This may lead to centres of excellence emerging in selected areas and a win-win situation for the nation.

➤ Also for greater and meaningful involvements of industrial R & D, the Government must come up with the rational measures conducive to R & D in a timely manner. Government involvement in this type of interactions should be restricted to that of facilitator; bureaucratic procedures should not stand in the way. Research Laboratories, Academic Institutes could not





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even get involved in enterprises to provide analytical solutions, software expertise and scope for continued research on specific topics for potential product and process updates. This would prevent Indian Industries from looking at partners overseas to undertake such tasks. Thus, any further exploitation of resources from Indian sides would be automatically being avoided. This practise is very much successful in USA. In USA, in the year 2000 A.D. Industries provided 69% of US R & D funding and Government only 25%. Where as in 1960 it was 25% to Industries and 69% to Government, which clearly means a reverse case, was there forty years ago. In the year 2000 A.D. USA spent USD 260 Billion on the R & D out of which around 60% was utilised for the development research and 23% was spent on the Applied Research and 16% was utilised on the Basic Research taken by the Academic Institutes. An independent research revels that similar things are expected by the new generations of engineers and entrepreneurs from the decisions makers may it private players who want to like Dr. Reddy's Laboratory or the Government institutes like BARC of India.

➤ Lot of Management Gurus has following suggestions regarding R & D in Indian firms. The extract of what these gurus are expecting from the Indian firms are put here. Management Gurus feel that Indian firms must pay attention to:

- i. Target of improvement in production and process R & D to come up to the world standard,





- ii. Depth of research efforts to basic research as well as the applied research. Though expensive and time consuming applied research involving engineering, designing of car its components, tooling, manufacturing proto type, test marketing, and final launching of product must be done by Indian firms only.
- iii. Offensive R & D involving strategy to counter attack the products by the competitors around the world,
- iv. Defensive R & D involving adoption of the survival of the fittest tact. The strategy differs from the car-to-car and product-to-product in the international market.
- v. How far R & D be taken from the out side agency is also an important criteria. Many Indian firms go to MNC for technical know how on royalty basis or on licence basis. Both the options are found to be hazardous in the long run as it promotes the siphoning of money and over dependency on the foreign and relatively unknown firms and persons.
- vi. Limit on the total commitment means that total commitment must be determined after taking into account the ability t spend, the need for the other activities of the firms and the uncertainty of the results. For this purpose, percentage of sales or gross profit or the difference between the minimum and the maximum expected profit may be taken account. Future market growth must be given more importance than myopic goals or than the immediate profits. About twenty percent of the profits after four years are far better than only four percent profits now.





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vii. All the Indian firms must spent at least three percent of their profit on

the R & D.

viii. Finally there must be new techniques of management must adopted to create an atmosphere of creativity and innovation in the whole organisation. Also, for this there must be integrated approach to R & D, linking it with corporate long-range planning and it should be so designed as to contribute to the attainment of corporate objective and goals.

ix. For export marketing special attention be given to the latest world norms about that part of the car.

➤ Only IIT and IIM and few Regional engineering Colleges and some private institutes like BIT Pilani come close to the ideal place for learning. These institutes have extremely conducive atmosphere for studies and research, they have excellent campus, and they have excellent libraries, documentation facilities, reprographics, lot of computers and 24 hours Internet facilities, fabrication facilities, which are comparable to the best institutes among the world. If number of such world class institutes increases in India due to Government and Industrial efforts. If at least a hundred of such institutes work for the long-range interest of the nation then indigenising the technologies will not be a distant dreams. As they will bring devoted education, post graduate courses of repute and doctoral programs and industrial consultancies including lot of R & D projects sponsored by various organisations.





➤ For all these things Government and Private organisations must notice the importance of R & D and must take advice and assistance from the outstanding experts in the fields of various disciplines. The Technologists and the experts from various engineering branches can provide expertise in their own field. There are thousands in India. These world-class experts can design a road map of success in indigenising technologies through R & D. Thus, India has the basic resources but only thing needed is a cohesive effort from all these citizens of India.

F. Human Resources Needs for the R & D:

In a world in which Howard Perlmutter's "geocentric" system expected to be adopted effectively by the developed countries in the future, there will be a greater stress on the technological change, which will further widen the gap between developed and developing countries. For this purpose Indians have to develop its Human resources for the future.

a. Needed Determined and Persistent Team of R & D Scientists:

- i.** An idea can generate like a flash of a lightning but to convert it into the working technology needs a team of scientists, technocrats and financiers.
- ii.** Especially it needs determined and persistent team of R & D scientists. These scientists can convert the idea into actual product supported by number of experiments, validations from variety of angles.





iii. The First step towards this direction is to make manufacturability in product design with supportive drawings for developing the prototype.

iv. It is a very tiresome process, which involves the selection of right kind of material, processing equipments and machineries, supporting instruments, gadgets, may be even advanced equipped laboratory to make a product of high quality in a fully functional form.

v. Similarly, it needs Process R & D to reduce time required for the manufacturing of million numbers of products. It requires expert scientists in the field of TQM, Zero Defect, TPM, CPM, PERT, and scientists master in other Quantitative Techniques. They can the product reality for the end users.

vi. Thus, these Scientists culminate the brainchild of only one scientist into technology through team efforts and supports from the entrepreneurs as well as other technocrats.

vii. To make these efforts simpler it has been observed that R & D scientists always get benefited if they get a support from Industry Institute Interaction, also Industry and R & D Laboratory interaction.

b. Commercialisation of technologies developed by R & D scientists:

For commercialisation of the car and its products developed by the scientists the top management needs to be truly innovative and entrepreneurial. Before some car is introduced in the market this management must realise its value. This is even true in the international market. In USA and Japan it is common for most of the firms in Car





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Industry to have 30% to 50% of their sales volume represented by high technology new products introduced in the preceding three to five years. There is enough evidence to conclude that high rate of new products entering the market lead to high rates of growth in the firms. As it has been observed that R & D brings about a reduction in cost of the improved version of the car and its products. Thus, it improves the profit of the organisation while putting the same price tag over the improved version of the car and its product.

- i.** Technologies emerged in the R & D laboratories can reach the car consumers only if they are transferred into reality i.e. only when they are transferred to industries effectively and commercialised by the later appropriately.
- ii.** Converting a product conception into the product technology and later on into the laboratory level prototype and lastly into a commercial level item requires many things. Few worth mentioning here would be the blue prints for the engineers, the drawings for the shop floor mechanic, and then if user appeal adds some features in it they are to be brought into the product drawing. Nobody on the earth can expect the mastery of any single person on all these aspects. Hence, R & D labs are expected to think of creating corporations to handle al kinds of interface with industries.
- iii.** Commercialisation can be faster and more efficient if the scientists and technocrats have the important functional powers. They need to be





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supported by professional bodies in assessing the market potential of their technologies. Otherwise no industry will come forward to buy their developed technologies.

iv. By taking help from the specialised agencies market needs must be actually created through awareness campaign and advertising as well.

v. In India, Commercialisation of Car technologies would be highly effective in case the R & D Laboratories and Industries can form joint ventures with majority equity stake of Industries. Thus, laboratories can contribute by making technical inputs. The commercial aspects of production, advertising and marketing can be entrusted to industries.

vi. R & D Laboratory interface with the small and medium enterprises are a good source of developing entrepreneurships in any country. India has to face the eternal problem entrepreneurs raising their own capital. Hence to solve this problem nodal agencies must bring together Financial Institutions, Venture Capitalists, Budding Technocrats, Budding Scientists, and Experienced people in every field.

vii. For vigorous pursuit of this goal India needs to have a clear cut policy on R & D and then implementing it and then Technologies spin-off and their commercialisation. Also for implementing the policy guidelines, many of the bureaucratic procedures will have to be changed.

c. Few Successful Indian Examples in R & D ventures from other fields:





These are the examples happened in India. The Technology developed indigenously has been used in their core purpose. After their successful implementations in their own field these technologies were also used in other fields. This use for the technology in other fields is always called as the Technology Spin-off. India has achieved this in many basic fields. Especially mentioning here would be the R & D in the Agricultural Technologies, the Atomic Energy Technologies and the Bio-Medical Technologies.

i. R & D in the Defence Technologies used in Bio-Medical

Technologies: Dr. A.P.J. Abdul Kalam, the present President of India, in 1990, envisaged the use of Defence Technologies for the Medical purpose. In this venture, Society of Bio-Medical Technology facilitated the development of an Ophthalmic LASER system, for photo disruption applications by the LASER Science and Technology Centre, New Delhi.

ii. R & D in Atomic Energy used for Medical Treatment of Cancer:

Defence Bioengineering and Electro-Medical Laboratory (DEBEL) Bangalore, has developed a number of low-cost health care products which are spin-off from the Atomic R & D. Even Tata Institute of Fundamental Research (TIFR) of Mumbai, Bhabha Atomic Research (BARC) of Mumbai, and Department of Atomic Energy (DAE) has developed Radiation Therapy for the Cancer, the Cobalt therapy. Radiation therapy to improve the yields from the existing seeds is also a very good example. These are the commendable R & D ventures India





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has successfully implemented other than developing giant Atomic Power

Plants in various locations in India.

iii. Interaction with the SSI and MSI done by the NALTEC: National Aerospace Laboratory (NALTEC), Bangalore, has been doing emulative work in SSI and MSI interface with the R & D Laboratories. It is also helping these small ventures to raise the capital.

iv. The example of Dr. Reddy's Laboratory: It is the Pharmaceutical Company in the private sector. It is the only Lab in India, which has more than a hundred patents in the field of Medicines and Medical Procedures. All are developed indigenously in India. In short it is the Best Indian R & D firm in the field of Pharmacy and Medicines.

All these Indian examples prove that technology developed through R & D in various laboratories in which so ever field it may be can be used for the concord and prosperity of all the nations. Their potential for improving the economy and quality of life too, is above political differences. It also proves that Technology consortium between Industry, University and R & D Laboratory can vitalise Indian Economy.





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d. Human Resources working in the R & D Laboratory only can prove

the good side of every technology in the world:

Remember the technology used in the car like remote sensing lock openers, batteries, generators, wires are also can be used in bomb means for the destructive purpose. It is only the R & D scientists who develop these technologies for the betterment of the societies. Same is the case with the Atomic Technologies, which can cause the total destruction of the world through Nuclear Holocaust. The Scientists convert these destructive technologies into the useful one for the Cancer medicines etc. The scientists can stop the exploitation of the nation from the foreign hands as well. Thus, it is the Human Resources, which is the backbone of the whole of these things. Humans are the Researchers, the Developers of the Technologies, the Financers, the Economists, the Consumers, the Sufferers, the benefactors, the Destructors; every thing revolves around the Human Resources only. Ultimately it is the scientists who come out with the best possible solution over any problem after R & D. It also proves the importance of the R & D. Also it proves that Human Resource is a very big asset in the Indian context. So, the question is how to develop human resource to reach pinnacle in the R & D sector.

e. Developing Human Resources for future in car R & D: Only few features are been discussed here. There can be many such features, which others may come across. As discussing all the features is beyond the scope of this thesis.



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**i. Present Lacunae in the HRD for R & D:**

Not yet realised the importance of HR: India has not yet realised that its human resource is the biggest and strongest asset not only for R & D but also for total development. Our technical experts working R & D are supposed to be top bosses in their field of work. Before taking any decision they must be consulted. However it is not done at present.

- **Not a world-class work culture:** Though India has the time bound Weather and climatic conditions unlike other countries, Indians are not exploiting it at its best. Lot of European, American, Asian countries is facing scorching heat, biting colds that too severe subzero temperatures but still they are in the category of developed nation. They have a work culture, which India does not have. Many holidays, lockouts have tarnished it. Apart from it even to get recognition or to establish something in the education and business world the procedure very lengthy and tiresome. So, this side of the system needs a very critical look and a very good solution to promote the before R & D and after R & D procedures in India.
- **Basic Research is not at par with the best of the world:** R & D has given no significant importance in India. Hence, in Basic Research also India is at least a generation behind its counter part in the developed nation.





- **Applied Research and testing:** In applied research the product is tested and its technologies are tested on the basis of deployment in the Industry and its impact on the society. It needs a careful review to bring appropriate correction. As Indians are yet realise the importance of world norms and yardstick of International excellence in the product quality, process and services and technologies used for these activities.
- **Mimicking technologies and culture developed in alien source:** Many times Indians accept copycat Technologies and R & D culture evolved under alien situations.
- **Engineering Education:** Indian education system is very large. However, it is in a serious problem in terms of quality and competence. Most of Indian students are perhaps trained in ill-equipped institution both in terms of Faculty as well as Laboratories and workshop facilities. There is also a problem of mismatch between demand and supply in specific areas. Few areas of engineering lack good quality personnel, where as large number of pass out engineers approximately one million, are waiting to find employment. The problem is further aggravated by migration of our talented students, some aboard, and others to profession/ discipline different from the discipline in which they are trained. Lastly, this may be the case in other fields too.

ii. Solutions over the present problems:





➤ **Realising the importance of HR:** Instead of crying for the population explosion Indians must think about how to use it for the national cause. Take example of lot of people below poverty line. If they are provided with a job through these kinds of projects they will earn handsomely and few of them can even rise within few years and become customer for the indigenous cars. Similarly, an army of devoted R & D scientists and other skilled technocrats, businessmen and workers can become a national workforce for the future. Thus, every single individual is a potential source of energy for the nation.

➤ **Developing world-class work culture on their own instead of mimicking:** The business procedures should be one window clearance. Apart from that the work culture in the organisation also has to go sea changes in India. For the successful implantation of R & D and technological change in India, a technology friendly work culture has to be developed across all the industries and sectors. By the technology friendly work culture meant a positive attitude towards technology and willingness to learn new things. Most importantly number of undesirable work practices must be eliminated through continuous dialogue with the people and also punitive measures in extreme cases. Some stricture measures are to taken in areas like:

a. Quota system i.e. Tendency to produce limited out put.





b. Compartmentalisation of work and refusal to do any other

work outside the specified job.

c. Wastage of Energy like Electricity and water.

d. Extending Work to get overtime wages or other allowances.

e. A casual approach to any work.

f. Corruption must be avoided at any level. Ethics should percolate from the top management.

g. Only self-disciplined employee must have rights to discipline other employees.

h. The Safety, Health, Environment, and Social Responsibilities go hand in hand that is why they must not be separated from the business and even in the technology indigenisation and technologies utilisation in practices.

Thus, Management in every organisation should evolve organisational systems conducive to improving individual accountability and the management information system facilitating timely checks on quality and services and maintenances. After all it is the people who make the indigenous or any technologies work and achieve the best results. As it is said that there is 'no substitute to hard work' there is also no substitute to good employees, good employee relations characterised by mutual trust and opinion and enthusiasm to work to achieve the desired goal of indigenisation of technologies may it be in car field or any other fields.





➤ **Engineering Education:** As far as developing engineering education

is concerned, there is urgent need to groom budding engineers in the country including students. These fresh graduates or the students must be oriented to the problems of our country. For this purpose seniors may use engineering knowledge drawn from eclectic sources but communicated in the backdrop of Indian scenario. With an army of talented and committed engineers taking upon themselves the task of implementing right solution in right manner, India can develop at faster rate. Thus, in the budding Engineers only the education system must light a spark of innovativeness and creativeness. These will workout original ideas from these young engineers and they will implement it with courage and confidence. However, it requires deep involvement in the personal progress along with the development of the society.

➤ **Indian Universities:** They should adjust to the rapid changes in the technologies and prepare their courses for the future requisites. If they do not act immediately they will become obsolete and bypassed.

➤ **Applied Research and Testing:** As the government of India wisely states it that India no longer needs the testing of nuclear fission or nuclear fusion as it has developed the best possible simulation for that purpose. Every Indian knows the software expertise Indians have. So in this applied research scientists are trying to minimise





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the efforts of applied research and testing for the techno-products.

They are taking help of the simulation software in their field. These are carried out according to the present world norms. However this system and facility must percolate to even SSI situated in the remote corner of the country.

➤ **Conflict between time tested product and new developments:**

Take example of Maruti 800, Ambassador, they are so popular cars that their organisations have not at all changed their lot of features since few decades. The major reason behind it is this conflict. The conflict between the so called time tested proven car products and the new innovations with attendant teething troubles; or the manoeuvres by the established businesses, which may feel threatened by arrival of new product or innovations on the market scenes.

- **Few more expectations:** Few R & D experts believe that awareness of the technologies can improve the interest in indigenisation. Few even suggest that while taking driving test basic features of the technologies must be added in the test. The book by the Petroleum Conservation Research Association (PCRA) booklet should be provided before the test. Simple manual of the vehicle the licence seeker is going to drive must be provided so that the licence seeker must be able to answer the simple things correctly.





Also, all the engineers, commerce graduates, management graduates must be convinced at the time of learning that it is easier to become an entrepreneur in the technology sector. They must be convinced about the importance of technology and its indigenisation so as to make every individual independent on the technology front. By making it so they themselves as well as their clients will also get benefited.

PART 9:

How should be the Human Resource Management for the R & D in the car organisation? :

To know this aspect let us see the examples of the big bosses in the car sector.

When Ford Company reorganised the structure and the strategy in after the Second World War, there were no competent senior managers to become the heads of the new divisions that were created on the basis of modern organisation. Hence, Henry Ford II, the eldest grand son of Henry Ford, waited for almost an year, till he was able to secure the services of competent managers from the General Motors. He did not fill up the new posts hurriedly by taking mediocre. Peter Drucker pointed out this in his article in the Management, in 1974. Here, Peter Drucker says that when a corporation wants to grow fast by introducing new products and expanding the market for existing products or improved products unless the decisions on the Managers are sound the objective of the corporations will be





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defeated. If mediocre are recruited for some reason or other the downfall of the firm can never be avoided. That is why Peter Drucker has an advice. He says that leadership, culture, values, treatment of employees, at all the levels and so has to be given highest priority. Many times, diversification and decentralisation of authority requires higher calibre managers to manage expanding activities. Thus, the organisation performance and organisation spirit depends very largely on the qualitative aspect of the Human Resource Management in the Car firms.

PART 10:

What should be the goal of the R & D in the Car sector? :

Generally the goal of R & D is to translate technical knowledge in to marketable products and processes. Still the progressive technical advancement in the cars has reached a long path. Just look at the advancements in the Car technologies since its first mass production in early part of the twentieth century. This will give the idea of how Indian technological sector in the car field is at least a generation behind the world car giants. This will also give an idea of what can be the goal of technological and R & D achievement in the car field. At least it will give the direction and step-by-step aims of achievements for the Indian scientists. I'm fully confident Indians can achieve this feat at faster rate than these companies have due to explosion in the Information Technologies, Knowledge Management and due availability of easier modes of developing



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software used in every field, in which Indians are supposed to be the master

around the world.

A. About Present Worldwide Achievements by various organisations:

There are several car-making companies in the world. They are leaders in the car market as they manufacture their own developed Technologies. The leaders in the car industries are General Motors (GM), Ford Motors, BMW, Daimler Chrysler, Toyota, Suzuki, Honda, and Rolls Royce.

Mainly we shall see what the biggest two in the world Car market are doing and what they have achieved in the past two years, as it impossible to take a review of all these car companies.

One more aspect is all the companies are trying to achieve the same things in their organisations with some or other variations.

So, let us see what Ford and GM the two big bosses, having more than more than USD 100 Billion turn over every year, have achieved this year in the Technological front and on the Customer services front. Remember these two companies are extreme competitors of each other. Among these organisations, every other company in a short time achieves what one company achieve in at the technological front. Similarly what one company achieves, other also complements at the customer satisfaction level.

a. General Motor R & D's Recent Accomplishments in the technological

field: Just look at the intensity of R & D in this company. Anybody can realize the future of this company, which is working hard to minimize pollution through its cars, which is trying to attain the peak of the



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technological up gradation at all the times and which is trying for new avenues in the car sector and which is full time busy with developing ever new technologies in the car sector which can be useful in some other fields too. Some of the achievements are given below. It needs extremely high technological base to develop each and every aspect of these technologies. It can also give the direction to the Indian R & D ventures though they should not copy these technologies but they must develop parallel technologies, at least.

- System for EV1, first purpose-built electric car produced in modern times,
- VisualEyes virtual-reality technology for engineering and manufacturing design,
- Fuel System for bifuel (gasoline and compressed natural gas) GMC and Chevrolet full-size pickups,
- StabiliTrak integrated chassis control system,
- MagnaSteer speed-sensitive electric power steering,
- Operational methodologies for Custom Xpress Delivery vehicle distribution,
- AcuZinc die casting alloy,
- Specifications for DEXRON III "fill-for-life" automatic transmission fluid,
- Specifications for reformulated gasoline to reduce vehicle emissions,
- Cadillac Road Sensing Suspension System,





- STAMP high-strength epoxy tooling from sheet metal stamping,
- Robotic paint simulation methods,
- Machining process simulation,
- DYNA-AIR engine air-fuel control,
- Partitioned-reservoir fuel tank for reducing evaporative emissions,
- Materials advances applied to composite pickup box,
- VehSim: Math-Based Environment for Chassis/Driveline Controls and Integration,
- Precept Hybrid Vehicle,
- Four Wheel Steering for Truck,
- MagneRide Semi-Active Suspension.

b. Ford Motor's Recent Accomplishments in the Customer interactions services:

At Ford Motor Company, they are forging partnerships to better connect with customers. Together, with partnership companies like Lincoln, Mercury, Mazda, Volvo, Jaguar, Land Rover, and Aston Martin, Ford can offer digitally a broad range of innovative products and services. Ford carefully selects those alliance opportunities that enable to deliver better ideas into the marketplace in new and exciting ways. Look at the company's first hand report and advertisement to the specific purposes.

- Direct to the Consumer:





By this method Ford have strengthen their relationships with customers through these alliances.

➤ Percepta:

A partnership with TeleTech, this alliance develops individualized relationships with ford customers through worldwide Customer Relationship Centres.

➤ DriveOne

Ford R & D head claims, “Not only do we build safer vehicles, we educate safer drivers. Our equity stake in this top-notch driver education company furthers our commitment to safety”.

➤ Improving Business Processes

Through collaborate with others to revolutionize core business processes and to stay ahead in the rapidly changing industry.

➤ Covisint

A partnership with three other auto manufacturers, Covisint maintains an online global supply-chain network.

➤ UPS Supply Chain Solutions

Joining forces with a division of UPS, Ford Motor Company can greatly reduce the time required to deliver vehicles from plant to dealer to customer.

➤ NewView

Ford R & D head claims, “We chose NewView (formerly e-Steel) to help us launch a steel-e-commerce procurement system that maximizes efficiency and operational savings”.





➤ The Beanstalk Group:

Ford Marketing head claims, “By collaborating with The Beanstalk Group for management of our trademark licensing programs, we're maximizing the value of our brands worldwide while offering Beanstalk access to our worldwide network of offices and relationships”.

➤ Conservation & Environmental Grants for Participating Countries:

One of the Directors says, “If you are involved in a project to protect the natural environment, or to preserve cultural heritage, we want to hear about it.

The Ford Motor Company Conservation & Environmental Grants program is one of the world's largest environmental and conservation grants efforts, offering a total grant money of USD 1,240,000 in over 50 participating countries since the year 2000.

The Grants program comes from the Henry Ford Conservation Awards, originated in Britain in 1983 with a vision to encourage a wide range of people to initiate or join programs that help their local environment, heritage, and natural resources. It provides support to organizations and individuals that focus on preservation of the natural environment and support conservation in a noteworthy manner.

The Grants Program is only available in participating countries.”

Thus, both GM and Ford companies try to maintain their nose up at the technological, customer services front as well as on the social front. For this purpose these companies utilise every kind of their resources. What ever





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they achieve they immediately highlight it and take marketing advantage of

that achievement on the Web or off the Web.

What these companies achieve in the R&D front and even at the services front can be the goal of Indian car companies and their vendors in coming decade.

B. About Future of the car technologies:

Take one example of Research Labs in the US Car organisations, to know what is their goal:

General Motors (GM): Mr. Larry Burns Head of GM R & D says, “The GM’s R&D Centre is generating hundreds of inventive ideas for GM's future. Innovation like this helps us respond to customers with better products and technologies, faster to market. To accelerate the pace even further, we're also partnering with government, academia, and suppliers, leveraging their breadth of knowledge and expertise”. On this one question was asked to him and his reply is given below which explains the crystal clear ideas of GM about the Car business, Car technologies and its future. This can be an inspiration to many organisations not only in India but also around the world. This also keeps the inspired person or organisations well focused.

The Direct Question from the customer: How the future General Motors enterprises will operate?

Answer of Larry Burns Head of General Motors R & D on the Internet:

That's the question especially the Manufacturing Systems Research (MSR) Lab is devoted to answering. The focus of this lab is to provide math-based





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processes and systems for GM's planning, vehicle development, manufacturing, and distribution operations - to enable GM to be the leading (and most agile) competitor in the global transportation industry. MSR aims to develop the following:

- Math-based methods to enable agility, reduce costs, and improve quality in body assembly and joining operations,
- Math-based processes and systems modelling for the manufacture of body components that will reduce development cost and lead time, and enable new process technologies to be implemented at GM,
- Principles, analytic models, and decision tools to improve the design and operation of GM's supply chain systems and to help build strategies in electronic commerce,
- Math-based process and systems models, and next-generation agile system designs for power train-related manufacturing operations that will enable GM to reduce piece cost and lead time, and improve part quality for current and future manufacturing operations,
- Principles, analytic models, and decision tools to optimise the design and operation of GM's production systems.

The lab's competencies range from statistics, optimisation, and operations research to engineering mechanics, materials science, production planning, information sciences, and financial and systems modelling. MSR is also active in quality research (not only investigating assembly issues, but also





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customer assessment and perception of quality); organization research, including decision making, alliances, social networks, and vehicle options; and market research and statistical modelling in product development. The lab is drawing upon all of these capabilities, working with GM operating units and key universities, in its efforts to transform virtually every aspect of the automotive enterprise.

The evaluation of the GM and the Ford at the technological front and the customer satisfaction front can give us an idea about how both things go hand in hand. The interaction with customer gives the car company about the idea of what lies in future and the future customer is demanding. Thus, R & D in the technological field also works for customer satisfaction. This is the goal of R & D in the Car Sector. Let us hope, though India is lagging behind at this front very soon it will be able to catch up pace to come up to the world level.



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Thus Indian firms have started realizing the true importance of R &D:

With the advancement in the television, radio, telephone, mobile, pager, Internet and other communication channels all the Indians got the exposure of the latest technologies around the world. They saw developed world with full throttled audio-visual impact on T.V. and cable network. When they felt that India should also be like that, they started thinking over it. Every matured brain realised that a basic understanding of the complex world we live in is hard to imagine without mastering the technological tools around us at a minimum level. Many of the most important social issues including education system, business, employment generation, revenue generations, that Indians are facing have strong technological and scientific element in them. Thus, Indians realised the importance of developing new technologies. Then they realised it can be achieved only through proper R & D set-ups and Industries and Institutions interactions. Few more highlighting points in this regard are also given below:

- 1. After Liberalization competitive MNC dominated market has forced Indian firms to think about harms caused due to ignoring the R & D.
- 2. Earlier there was not even simple product or processes benchmarking.
- 3. Many organizations suffered on account of their weaknesses in R & D in the Tie-Ups with the MNCC.





•4. The smart MNCC in their Joint ventures have given merely the product know how and denied the process know how so indispensable for achieving quality standards.

•5. Almost all the MNCC have denied the CAD (Computer Aided Design) facility and the source code (the primary and basic software of the design and development) given by MNCC partners. Especially Automobile (Car, Motor Bikes, Trucks, Tractors, Heavy Motor Vehicles, etc.) industry suffered a sever jolt.

•6. Indian companies have started spending considerable:

- a. Time,
- b. Money, and
- c. Energy; for building these capabilities.

These R & D efforts of India proves only one proverb, it is better late than never.

PART 12:

A. Accomplishments of General Motors-USA over the Years

1920s: First anti-knock gasoline additives - led to high-performance fuels

1930s: First non-flammable, low-pressure refrigerants, which made vehicle and home refrigerators practical

1940s: First high-compression, internal-combustion engines





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1950s: America's first turbine-powered car; forerunner of present-day

computer operating systems

1960s: Pioneering work on experimental powerplants: gas turbines, steam, free piston, and Stirling engines; electric drive; and hybrids; first comprehensive data on human injury tolerance

1970s: Zirconia exhaust gas sensor - led to the successful use of three-way catalysts; pioneering work on atmospheric chemistry; first computer simulation of an automobile crash

1980s: Magnequench rare-earth permanent magnets; industry-leading computer vision systems for manufacturing; computer-based structural and acoustic analysis for vehicle design

1990s: Integrated chassis control; series of modern experimental vehicles: advanced electric, diesel-electric hybrid, turbine-electric hybrid, compressed natural gas-fueled and fuel cell-electric vehicles; Partnership for a New Generation of Vehicles (PNGV); magneto-rheological fluids; Adaptive MagnaSteer Variable-Effort Steering.

B. GM's India Science Laboratory, Bangalore, India

Why establish an India Science Laboratory? GM recognizes the excellent scientific talent available in India. Indian scientists have achieved significant success in a number of fields, including nuclear energy, space exploration, computational sciences and information technology, electronic design and control automation, aircraft and space vehicles, and materials and chemical





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E-BOOK- ISBN: 978-93-5235-441-2. COPYRIGHT TO AUTHOR- DR. ASHISH MANOHAR URKUDE sciences. These accomplishments demonstrate scientific and technical

expertise that have direct bearing on the four thrust areas that the India

Science Laboratory will target:

a. R & D Math-based tools for product design

- * IFAD module and system development
- * Human modeling for crashworthiness prediction
- * Vehicle structures

b. R & D in manufacturing technologies

- * Manufacturing enterprise modeling
- * Manufacturing operations
- * Virtual manufacturing
- * Manufacturing CAE
- * Knowledge systems
- * Embedded Control Infrastructure

c. R & D in Employment Opportunities

- * Control software engineering methods
- * Control software engineering tools
- * Distributed system engineering process
- * Distributed system engineering tools
- * Mission-critical processes
- * Formal methods
- * V&V tools, artifacts



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- * Libraries, incl V&V
- * Automotive materials and chemical systems
- * Lightweight metals and polymer composites
- * Microstructure/property modeling
- * Advanced joining including dissimilar materials
- * Engineered surfaces
- * Electrochemical systems and corrosion
- * Chemical reaction modeling
- * Sustainability/lifecycle analysis

C. GM Accomplishment in R & D

GM R&D's history of innovation began back in 1920, when the legendary Charles F. "Boss" Kettering organized GM's first research lab. He dedicated the lab to "intensive study of the problems ahead for the automotive industry." Over the years, we've put many of those "problems ahead" behind us and turned to face new issues. Look and you'll see hundreds of accomplishments over eight decades, from anti-knock gasoline additives to injury tolerance data to computer vision systems to drive-by-wire vehicles to much, much more. As Kettering said, research can be defined as "trying to find out what you're going to do when you can't keep on doing what you've been doing. "GM Research remains committed to intensive study to tackle the challenges of our industry now and in the future.



**D. What advanced technologies could you be developed at GM****Research?**

- * Low-cost aluminum bodies
- * Ultra-low emission exhaust after-treatment methods
- * Engine controls that allow "drive-by-wire" capability
- * Recyclable automotive materials
- * Math-based product-development processes
- * Safety systems that substantially lower accident rates
- * New transportation systems those combine evolving technology with expanding transportation needs

E. Recent Accomplishments

- * System for EV1, first purpose-built electric car produced in modern times
- VisualEyes virtual-reality technology for engineering and manufacturing design
- * Fuel System for bifuel (gasoline and compressed natural gas) GMC and Chevrolet full-size pickups
- * StabiliTrak integrated chassis control system
- * MagnaSteer speed-sensitive electric power steering
- * Operational methodologies for Custom Xpress Delivery vehicle distribution
- AcuZinc die casting alloy
- * Specifications for DEXRON III "fill-for-life" automatic transmission fluid
- * Specifications for reformulated gasolines to reduce vehicle emissions





- * Cadillac Road Sensing Suspension System
- * STAMP high-strength epoxy tooling from sheet metal stamping
- * Robotic paint simulation methods
- * Machining process simulation
- * DYNA-AIR engine air-fuel control
- * Partitioned-reservoir fuel tank for reducing evaporative emissions
- * Materials advances applied to composite pickup box
- * VehSim: Math-Based Environment for Chassis/Driveline Controls and Integration
- * Precept Hybrid Vehicle
- * Four Wheel Steering for Truck
- * MagneRide Semi-Active Suspension.

F. Why GM R & D and India Science Laboratory example here? The reason is if American come all the way from ten thousand kilometres to India and can find the talent in Indian people why cannot Indians find their own talent and develop their own R & D as better as the GM have? Why cannot India have the India's own Indigenous Car R & D Laboratory? This also proves that India has exceptional hidden talent in this field only thing needed is that it has to be digging out and utilised for the total indigenisation of the car sector.



**PART 13:****EXERCISE NEEDED:**

Thorough survey of the Indian Car Market and the conclusions are drawn after discussions with the bosses in their field.

Researcher took five thousand odd samples. The research sample range is quite huge and varied having interest in this field. The samples taken are from Masters in the Research Associated Field of this topic, may them be the Scientists to the roadside Mechanics and Housewives. Samples are Engineers in the plant, from the service stations, or the big garages. Samples are Managers of MNC Cars Manufacturer. Samples are Future Customers, other Consumers, and Dealers in the Car Market. Lastly but not the least, the names not to be mentioned, the consumers of the PAL the manufacturer themselves are also specially targeted samples of the Research Analysis and for Further Studies.

After the in-depth studies, analysis and core industrial experience now researcher firmly believes that it is high time that all the Indians must come together and start the exercise of building their own cars and other higher end technologies, military vehicles and systems relying on it, as if they are on the war front.

PART 14:



WARNING: Please remember, if this Remedy suggested is not implemented, very soon the consequences will be very harsh. The consequences can be like; at present, few Indian giants have closed their businesses and may be more will also follow the same path. Similarly, there may be a case on the Military front especially with Indian Air force. IAF will have the Fighter planes but devoid of spare part to fly them.

The Indian economy will suffer a major jolt life of the technology will end and may it be facing the economical downslide as well at the same time. Like happened with the INS Vikrant, India does not have funds to raise to develop such a complex technology and expertise as well. So let us start as early as possible.

Apart from this, the Indian Car industry is more than 50 years old. It has seen all kinds of ups and downs in the business. All the companies by now have their own well-defined well-focused set ups.

-----**Up coming volume 3**-----

