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INDIGENIZATION:

THE ONLY SOLUTION FOR SUSTAINABLE DEVELOPMENT OF INDIA: EVIDENCES FROM AUTOMOTIVE INDUSTRY AROUND THE WORLD: VOLUME 3

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(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. Prerna 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 18:

UPGRADING SKILLS OF THE INDIAN HUMAN RESOURCES

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Upgrading skills of Indian human resources has many facets. Huge population in India has variety as well. Since aeons, diversified skills are part of the human race in India. Few diversifications in the recent times are:

a. Students below SSC, 10th standard of younger age,

b. Working class people with 10th studies background,

c. 12th pass working class

d. ITI pass working class,

e. Diploma holders in the engineering companies,

f. Engineers with BE, BTech background,

g. Engineers with ME, MTech background,

h. PhD holders,

i. D.Sc. or D.Litt. Holders.

j. Non-technical background but technical work force.

k. Non-technical workforce involved in non-technical jobs.

There are still more working and non-working people in India. If they are properly trained and are tuned for the indigenisation of car technologies, they can become a valuable asset for the country. As mentioned earlier this work force can mould the future of the Technical Industry. These workers can keep the Techno-Socio-Economic world vibrant and dynamic in the Indian market. Their expertise can become useful in longer run in other allied fields too.

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Henceforth, we'll know the education and skill upgrading system in India and if it has any fault we'll analyse it from the progressive point of view. Few suggestions and solutions are also given wherever possible.

PART A:

AN EAGLE'S EYE VIEW ON PRESENT TECHNICAL EDUCATION SCENARIO:

If the Universities, Institutes, and various Industries go hand in hand, Indians can achieve miraculous improvement with its knowledgeable people to perform the various important tasks. *Ultimately this human resource force, with upgraded skills, is going to be the heart and soul of the development.* So, now let us see the present technical skill providing education and organizational system of India.

Chart One: Table 18.1:

Showing Universities and Technical Institutes and Colleges Offering Automobile Courses: Reference: Maharashtra Government Guide: 1995.

The courses in the Automobiles are divided into following categories:

SN	Course Title	Course Description and Kind of Training Offered.	Pre-Qualification	Hierarchical Rank and Position Offered
1	(ITI) Indian Technical Institute, Diploma	Automobile Repairing and complete engine overhauling.	SSC/10th std.	Worker
2	(DE) Diploma	Automobile Engineering (Designing	12th or ITI	Expert Mechanic

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	Engineering	few parts and Repairs)		
3	(BE) Bachelor of Engineering	Automobile Engineering (Advanced Designing, Developing and Repairs)	12th or DE	Service Engineer
4	(ME / MTech) Master of Engineering/ Master of Technology	Automobile Engineering (Advanced Designing and Advanced Developing)	BE / BTech	They do Actual Implementation of Designing and Development, which Ph.D. people plan.
5	(PhD) Doctorate in Engineering	Specialized Topic in Automobile Engineering (Advanced Designing and Advanced Developing)	MTech / ME	Planning for Research and Development at Strategic Level.
6	D.Sc. Doctorate of Science in Engineering	Innovative and Creative discoveries or invention in the field of Automobiles.	Ph.D. or That big level of work.	Devotion to this field.

Chart two: 18.2: Showing Number of Colleges, Strength, Facilities, and International Ranking of the Colleges.

Reference: Maharashtra Government Guide for the technical education, Nagpur.

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SN	College	NCI	SOC	Colleges : Urban Area	Colleges: Away from the City Areas.	IR
1	ITI Govt.	20	20	Good Facilities	Very poor facilities	NA
2	ITI Pvt.	25	20	Good Facilities	Very poor facilities	NA
3	DE Govt. Polytechnic	10	30	Good Facilities	Very poor facilities	NA
4	DE Pvt. Polytechnic	5	30	Good Facilities	Very poor facilities	NA
5	BE (Government + Pvt) Automobile	5	60	Good Facilities	Very poor facilities	NA
6	MTech (IIT)	5	60	Excellent facilities	Not Applicable	Exce llent
7	MTech/ ME REC+ Govt.	20	8	Excellent facilities	Not Applicable	Good
8	MTech / ME Pvt. Colleges	2	8	Good facilities	Not Applicable	NA
9	Ph.D. (IIT)	5	NS	Excellent facilities	Not Applicable	Exce llent
10	Ph.D. REC+ Govt	20	NS	Excellent facilities	Not Applicable	Exce llent
11	D.Sc. (IIT, Universities)	20	NS	Excellent facilities	Not Applicable	Exce llent

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Notes for the description:

In the chart please read: IR= International Ranking,

NCI= Number of Colleges in India,

SOC=Strength of College,

Pvt. = Private,

Govt. = Government,

NA= Not Applicable, and

NS= Not Specified.

Special Comment for the content of the Chart:

1. ITI Diploma in Automobiles: It offers the 10th passed students the basic of the Automobile Repairing and Overhauling of the Engine and the whole of the Automobile.

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

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

a. Vishwakarma Institute of Technology, Pune.

b. Bansilal Ramnath Charitable Trust, Pune.

c. Kasegaon Education society's College of engineering and Polytechnic Sakharale, Taluka Walva, District Sangli, City Sangli, Maharashtra State.

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d. Terna Institute of technology, Ternanagar, District Osmanabad, Maharashtra state.

e. Madras Institute of technology, Chennai, Tamilnadu state.

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

5.Ph.D. (Engineering): Doctor of Philosophy in Engineering: This is one of the Degrees offered to the candidate for research in the Automobile field over some specified specialized topic.

6. D.Sc. (Engineering): Doctor of Science in Engineering: This is the highest degree and a kind of authority offered to the person for his outstanding inventions, discoveries or creativity in the field of his studies in this case the Automobiles.

PART B:

HOW TO IMPROVE PRESENT CLASSROOM TEACHING METHODS IN TECHNICAL EDUCATION?

LACUNAE IN PRESENT TECHNICAL EDUCATION SYSTEM:

1. Whenever, you visit the classroom in any engineering college or any other college you will find following lacunae due to the lack of harmony within the teachers and the students:

a. Total ignorance of modern technology,

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b. Very poor communication,

c. Very poor eye contacts while interaction,

d. Deficiency of confidence,

e. Adopting traditional teaching methods.

2.Education that is more sort of bookish and is meant for the sake of qualification.

3.Emphasis on memorizing than on the concept and application,

4.Control and monitoring systems are too week to provide full time studentship,

5.Less sensitive to changes in technology and business environment,

6.It is suitable western culture and business industries only,

7.Rising materialism and individualism in the society with changing culture,

8.Role models are absolutely missing.

9. There is no consideration of Spiritual, Psychological, further Intellectual needs of the students and the faculty members.

SOLUTIONS SUGGESTED:

Christian Argaris, of Jossey Bass Inc., in 1993, in his revolutionary speech, 'Knowledge for Action' said that in the present era organisations need the skill up gradation programme in which, actionable knowledge that individuals can use to create organisations of any type, in which the search for valid knowledge, a commitment to personal responsibility and

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stewardship, and a dedication to effective action and learning are paramount.

Education system be given rejuvenation in the following manner:

1. Setting Aims of teaching are listed below:

a. Enlighten the soul and developing overall living according to the spiritual scripture as practiced in everyday life in India,
b. Disseminating knowledge,
c. Enhancing student's capacity to use ideas and information,
d. Amplify the students' ability to test ideas and evidence,
e. Develop capacity of students to plan and manage their own learning,
f. Improve students ability to generate new ideas,
g. Improve personality of students.
h. Improve logical thinking among students,
i. Improving social responsibility,
j. Developing Wisdom,
k. Cultured and Civilised behaviour,
l. Desire and potential of self realisation,
m. Team efforts and sportsman spirit,
n. Presence of mind and improving reflex action,
o. Adaptability in any circumstances and Politeness,
p. Confidence building,
q. Communication ability,

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r. At least one skill must be developed for the future.

2. Improve Theoretical Approach of teaching in the colleges by:

A. Improving Preliminary Method:

Referring various practices adopted in various other systems in the world can do it. There are few methods, which can add vigour to this method are listed below:

1. Adding a Yoga session in the curriculum. Every student has to under go some typical practices, which improves his efficiency and adds satisfaction level of the institute and organisation by leaps and bounds.

2. Adding the exercises as done in stress management session in various organisations.

3. Adding spiritual practices of various religions according to his or her religion

e.g. Muslim will read his Namaj before his session and after the session, Hindu will pray his God, Christian, Jews and Buddhists will follow their kind of path before the session begins every day. This adds a special touch to the every kind of work those people involved in to the act prescribed.

Many organisations in the world have tried and implemented one or many such kinds of methods and reaped the fantastic results in to their institutes or the organisations.

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In Japan Zen education is the must for every education Institute and no student can avoid this education. Zen means Dhyan in Sanskrit and which ultimately means meditation. If Japan can do it and get the stupendous results then why can't the Indian organisation do? So, try to improve this preliminary methods first can be the better-drawn conclusion.

Not only this system is better in education institute but also in Industrial organisation also it proved to be giving better results. China has implemented it in sports as well.

So some kind of Yoga or spiritual touch can bear the desired results, and thus has become must in the present hectic and turmoil life of the individuals and the organisations.

4. Convincing one and everyone about the importance of TQM and Quality. Letting them know the following advantages and multiple dimensions of the Quality and grooming them from the futuristic point of view.

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Table: 18.3: Multiple Dimensions of the Quality:

1. Conformance to the specifications	7. Durability
2. Performance	8. Serviceability
3.Quick Response	9. Aesthetics
4. Quick-change Expertise	10. Perceived Quality
5. Features	11. Humanity
6. Reliability	12. Value

B. Improving Diagnostic Methods by:

- Creating interest in students,
- By discussing importance of the subject,
- Discuss important topics,
- Start with historical background and some interesting achievements and interesting events.

C. Improving Telling methods by focusing active participation of students while:

- Introducing new topic,
- Reviewing work,
- Summary of the work,
- Delivering inspirational talk,
- Giving illustrative discussions,

D. Improving simple Lecture method by adopting new skills:

- Methods to motivate,
- To clarify professional and technical know how,
- To review,
- To expand contents.

E. Improving Discussion Methods:

- Improving formal discussion and
- Informal discussion by adopting.

Here useful exchange of free talk and opinions can improve skills of the students required for the following purpose:

- For laying plan of new work,
- For sharing information,
- For making future decision for the important action.

F. Problem Solving Methods:

a. Inductive Approach,

b. Deductive Approach,

c. Analytical Approach,

a. Synthetic Approach.

G. Assignment Methods:

a. Preparatory assignment,

b. Study assignment,

b. Revision Assignment,

c. Remedial assignment,

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d. Unit or sub-divisional assignment.

H. Teacher Supervised Methods:

a. Self-reliant independent effort to read, to prepare and to write on a specified topic,

b. Double period plan,

c. Daily extra period plan,

d. Library study plan,

e. Flexible supervised study plan.

I. Method of Seminar from an Expert to enhance skills of the targeted students:

- It gives sound knowledge,
- Students gets exposed to Latest technology,
- System gets on the well-defined track.

J. Method of implementing extracurricular activities:

- It is effective when you want to change mood and style of learning and teaching,
- Interaction method,
- Exchange of view without knowing learning process.

G. Demonstration Method: Most useful in Scientific and Professional courses

- Information,
- Training,

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- Knowledge,
- Interactive.

3. Using Specific Methods:

- Project Method: This method motivates students to bring out very good self-creation from the students.
- Heuristic Method: 'I discovered it, I find it' so I'll create a good thing only. It this kind of method.
- Play-way Method: Focusing on the required facts and neglecting the rejection. This method is the shortest cut to learn. It involves: a. Local survey, b. Debates, c. Discussions, d. Symposium, e. Dramatisation, f. Club and societies, g. Projects, h. Competitions, i. Cultural Activities, j. Social Services, k. Camping, l. Games, m. Community Books, n. Miscellaneous.

4.Use of different Audio Visual aids and advanced Technologies:

1. Over Head Projector (OHP),
2. Slide Projector Methods,
3. Double OHP methods,
4. Radio-Plays,
5. Video taping,
6. Television Programme method,
7. Instruction Methods,
8. Compact Disc Methods,

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9. Computer Technology Methods.

10. Combination of many of the above technologies.

5. Improving Teachers: These are the days of improving the skills of the learned and the elderly people than younger generation. As technology and knowledge explosion has created a huge generation gap.

a. Teachers must be groomed for the Physical parameters, which give 15% effect on his teaching. The parameters like dress code, posture, writing abilities, speed of teaching, imagination, habits, eye contacts, interest, interaction, language skills, expression, irritation, impression, character, emotional skills, positive thinking.

b. Teachers must be made aware about percent of effect that Biological parameters present i.e. 25% on the students in front. These parameters are learning power, confidence, fear, self-study, positive thinking, mental level, honesty, sharpness, voice, physical fitness, tolerance, character, and flexibility.

c. Scientific parameter from the most important aspect now a day as it gives 60% of the impression on the students. It includes, way of initial lecture, time management, student management, student-cantered lecture, teacher-centre lecture, student-teacher-cantered, type of topic, material n the topic, presentation, satisfaction and justification, closing of lecture, impression of students, changes of behaviour.

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6. Students must be encouraged: Teachers must encourage students for the following:

a. Regular study,
b. Interest in teaching,
c. Sound knowledge,
d. Sound nature with maturity,
e. Positive thinking,
f. Flexibility of nature as per need,
g. Honesty in evaluation,
h. Sound character,
i. Aware of latest technology,
j. Maintain equilibrium between teacher and learner.

7. Table: 18.4: Showing Paradigm shift of Teaching: Reference: website: www.education.com and a Research paper on effective classroom teaching methods by Mr. Gupta, Mr. Gaud, Mr. Gokhale- Monthly Indian Journal of Pharmaceutical Education, June, 2002:

Attribute	**Traditional Paradigm**	**New Paradigm**
Knowledge	Is transferred from teacher to students.	Jointly constructed by students and faculty.
Students	Passive vessel to be filled by knowledge of faculty.	Active, constructer, discoverer, transformer of own knowledge.
Purpose of Faculty	Classify and sort students.	Develop students' competencies and talents.

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Relationships	Interpersonal relationship between faculty and students and among students themselves.	Personal transaction among students and between faculty and students.
Context	Competitive and Individualistic.	Cooperative learning in classroom and cooperative teams among faculty.
Assumptions	Any expert can teach.	Teaching is complex and requires considerable international class of training.

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PART C:

TOTAL QUALITY MANAGEMENT (TQM) APPROACH IN IMPROVING SKILLS:

Quality is just a conformance to the specifications. In Education Scenario, it is related to Quality of Education imparted and its methodologies. It is applicable to the whole education system in India.

Recent Developments and rapid changes in technologies demand improvements at every level of education. It is the need at the employee development program as well. Thus right from the student level to employee level the quality approach at every level of work should be imbibed in the minds. It is possible with right kind of motivation in education and up gradation of skills is adopted in a following revolutionary manner.

1. Excellent Courseware: First and the most important requirement of the TQM in the Skill enhancement of employees or improvement in education system are the best form of Courseware. With the best courseware the job of teaching or knowledge updating becomes easier. Many a times the point wise written courseware brings positive results than the big textbook or lengthy texts in software.

The value addition is seen if we get:

a. Infrastructure design: Interactivity, cognition, Conceptual change, contents, use of multimedia its fruitful application and adaptability add sting in the system.
b. Software Design: Reliable Technical Interactive software has given fantastic results to the higher end industrial giants. This method can

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also be useful in the other forms of the education or the employee development program.

c. Contents of the courseware: It must be very precise, accurate, and fluent in navigation and presentation. Consistency with learning objectives adds vigour in the quality-learning objective.

2. Gap may be bridged between Expectations and Results: It is due to following aspects we are finding some unusual happening in the present day education and business systems-

a. Education has undergone a radical change from providing knowledge-based education to the need based education.
b. Perception and attitude have gone a sea change.
c. Response time and reliability have been seen improving,

3. Top notch higher performance institutions and organisations like IIT, IIM, Tata Engineering, Infosys, Wipro, GM, Ford, Hyundai, Daewoo, Toyota, etc. have already implemented a integrated traditional and good functioning system and are trying to undergo sea change in implementing this kind of system after a thorough R and D. This will improve administration, R & D; to fight global competition with positive frame of mind. Therefore these Institute need to focus on the improvement of following aspects:

o Number of students per computer,

o Participation of number of students/ employee in the research paper presentations,

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o Faster improvement in the laboratory or the on job services or the practical session.

o Staff students ratio, or employees and the coach ratio,

o Improvements in the satisfaction index of students in the college,

o Improvements in the index of internal and external customer satisfaction,

o Percentage of passing/ First class/Distinctions,

o Ranking in the university/State/National/International level,

o Number of research paper published per faculty per year and their recognition by National and International level authorities,

o Research Grants obtained by the faculty and their completion in schedule time,

o Number of continuing programs conducted per year.

o Improvement efforts in normalised quality index of teaching,

o Training imparted to the faculty per person per year,

o Number of consultancy projects taken up per year and funding,

o Number of funded projects received per year with funds available,

o Number of Books written by the faculty per year and their acceptance by the Students/ Faculty,

o Productivity index in the organisation,

o Number of community oriented programmes per project per year,

o Time taken for the clearing a file in the department and institution,

o Number of industry and institute interaction program per year.

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- Involvement of Industrial Experts in imparting education and their Frequency Of Visits,
- Addition in infrastructure facility per year,
- Systematic improvement in the office- standardisation of process carried out per year with least movements and lead-time.
- Number of Information technology tools in use per students.
- Grading system and their periodic updates,
- Collection in library Books, Periodicals, Journals, etc. and their additions per year,
- Attendance of students in theory and practical.
- For employees devotion to their job.
- Extra efforts taken by the teachers to upgrade the low ranked students,
- Number of Tutorials / Tests conducted and their assessments with positive result oriented discussions.
- Reading room facilities in exam time in late hours,
- Healthy atmosphere and positive atmosphere among students and teachers in the Institutions.
- Healthy atmosphere and positive work culture in the organisation.
- Placement of students in R & D and in Industry,
- Number of R & D institutes and industrial organisations visiting per year.

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4. Special Efforts needed in India over the following aspects to get the desired result:

- Awareness at its peak level,
- Starve for the excellence and achieve it by a quality circle at management, college/department level,
- Appropriate goals like zero defect should be set and achieved,
- New comers must be given the best awareness programme,
- Periodic progress reports must be published and corrective measures must be taken,
- Kaizen- the continuous improvement should be a common focus,
- Every contribution must be encouraged to achieve desired results,
- Staff department and each element like workshop, smithy shop, laboratory, library, Teaching and supporting staff, should be given points/score and these should be displayed on the board and also communicated to one and all in the organisation. This will keep the ideals known to all. Further more healthy competition can bring out the scope for improving.
- Self assessment can be given a high priority,
- Developing leadership quality be given due importance,
- Introduction to the modern and latest techniques of supervision be adopted most immediately,

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- The barriers between the departments must be thinned and individual rivalry be absolutely avoided,
- Pride of excellency be given highest recognition,
- Strict implementation of Academic programmes must be achieved,
- Improvement of Quality must be the motto of the Top Management,
- Strict implementation of control factors,
- Future targets must set up with consultation of every department and individuals,
- Proper recognition to every kind of suggestion,
- Holistic approach in Institution,
- Continuously aligned and linked education system,
- Radical changes in structural and sound property,
- Every member must be made accountable.

5. Mandatory Factors for Success in skill enhancement or improvement in education system using TQM:

a. Autonomy of the all departments in deciding and implementing better practices,
b. Cooperation, involvement and team efforts of every person attached to this project,
c. Willingness of the superior performer – laying down specific instructions and ensuring its adoption,

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d. Inclination and willingness of the follower group in effective implementation.

6.Results of implementation of TQM:

The results are astronomical wherever the TQM was adopted in the industrial sector whether in Japan, USA, even in India. So if the education and employee skill development programme is given the well-planned mould of TQM it will give results in the manner.

a. Appropriate student's and/ or employee's expectations and performance appraisal,

b. Kaizen- Continuous improvement becomes a strategic objective.

c. Improves the Quality of the teaching and learning and hence improvement in the desired results.

d. Consistency and inbuilt reliability,

e. Close monitoring of improvements and future needs,

f. Splitting and objective setting for long term and short term plans,

g. Faster Corrective Results based on employees' and / or students' feed back.

h. Possibilities of reward sharing on the improvements those were earlier affected.

i. Character building is also improved as Productivity improves due to high rate of transparency.

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j. Healthy competition among every one concerned to perform well results in achieving desired goal of continuous improvement in the skill improvement of the students and / or employees. The students and / or employees of course can be internal and external customers. Hence resulting in the customer delight.

PART D: IMPROVING MANAGEMENT EDUCATION:

This point is inspired from the article in the Business Standard, about how to use the Panchdhatu amalgam by Ms. Madhabi Puri Buch in on 7th October 2003 in their supplement the Strategist. It has given a very good formula over improving present Management Education in India, which has only one lacuna that it has no result-oriented approach.

It is not totally taken from this article. It has been modified here to make it suitable from the indigenisation of car, point of view.

It is mainly concerned with improving the Business Management Education in India.

The Five Steps formula: To build Result Oriented Business Schools in India:

Step 1: Bridging the gap between theory and practise:

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In every discipline whether it is MBA (IT), MBA (HR), MBA (Finance), MBA (Marketing), MBA (Systems), MBA (MIS) the ability to apply theory into practice is crucial. To inculcate this ability the best solutions would be:

i. Allocating almost 50% of teaching time to guest lectures delivered by the practitioners with specific mastery over singular topic or subject that too with specific objective.
ii. Allocating the time of faculty thus relieved to consulting assignments done either at free of cost with the organisation with which the Institute has tie up for placement or for consultations and achievements.
iii. Making core industrial experience mandatory for MBA admissions.
iv. All the organisations that allot the job to MBA aspiring students must realise the importance of these two years.

Step 2: Bridging the gap between thinking and doing:

Mr. Bill Gates has already conceived the future business as the "Business at the speed of thought". However, when it comes to ethos and the thought process of R & D personnel nobody can materialise quickly. One more thing is every human being on the earth, leave aside the internal and external customers in every organisation tend to value high quality thinking way above the high quality "doing". The solution over this can be as follows:

a. Giving more time for Summer Training to understand the business from very first step to the final step of customer satisfaction.

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b. Informal sessions with alumni to share practical experience to bridge the gap between the "doing" and "thinking".

Step 3: Bridging Gap between Functional and Organisational Skills:

Many people try to acquire functional skills like MBA in Finance or in HR or in IT or in MIS and like that. However, the books like "What they don't teach you at Harvard" and the book like "What we refuse t learn at B schools" are never been discussed. Hence, if these budding managers learn about how organisations work, the teams in the successful organisations work, how the inter personnel relationship exists in the successful organisations is there, how individuals are working in the successful organisations; then they also can mould themselves accordingly. This is the only way for assimilating the hard-core functional skills in the budding managers.

Step 4: Bridging the gap between the short term and long term thinking:

As managers we all need to learn how to effectively manage the short term while simultaneously building for the long term. This is very difficult process. However, the experienced faculties, professionals, who talk candidly about the subject would help student. The trick lies in ensuring that one not work against the other.

Step 5: Bridging the gap between the simple and the complex:

Infact B schools are meant for this purpose only. The very small issues like improving typing speeds, use of MS Office effectively, filing, catalogue, book

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keeping, standardising your own actions, standardising every kind of frequent work, templating, can be the best possible solutions.

To inculcate these skills the managers would spent a short “after hours” course on Time Management (TM), Spiritual Quotient Management (SQM), Emotional Quotient Management (EQM), Intelligent Quotient Management (IQM), Physical Quotient Management (PQM).

In all, Theory and Practical must go hand in hand so as to improve the Indian Techno-Socio-Economic front. In every department indigenous technologies, indigenous ethos e.g. in Indian case Indian ethos, would be given top priorities.

The Result: Thus the managers who are moulded in the above fashion, for the result-oriented approach would be able to accept the challenges at the technological front. They will decide the distinctive factors in the indigenisation of the car technologies in the following way:

a. Technology Adoption for the basic technologies,
b. Technologies Absorption for the middle ware technologies,
c. Technology Development for the advanced technologies,
d. Technologies for Research and further Advancement for the future kinds of cars.

Thus, slowly and steadily the target of total indigenisation is achievable.

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PART E:

INTERNAL AND EXTERNAL CUSTOMER EDUCATION OF THE ORGANISATION:

Remember the words used here are internal customers and external costumers have typical modern meaning:

1. a. Internal customers mean the employees and the workers in the organisation working in the Manufacturing unit. Every now and then they are to be always trained. The aim of worker's education is to enable the workers to put his fingered on problems confronting him in his social group; he must acquire a certain culture so that in his capacity of an individual, he can locate his proper place. He must understand both his position in the enterprise as well as the role of the enterprise itself within the general framework of national and economic development. The education mainly content:

- Organisation built toward a symbiotic and cohesive unit with humanitarian approach to attain productivity and develop work culture,
- Solving Economic and Social problems and helping in welfare of the society,
- In one more aspect it deals with the positive leadership development with skills to impart all his might towards developing his colleagues to attain the objective of the organisation and the national goal.

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It is done using all the aspects mentioned in the earlier topic of upgrading the skills using so many kinds of techniques. This upgrading is done though proper education with following intention:

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Table 18.5: Upgrading internal customers:

This education to these internal customers will be
1. Systematic
2. Documented
3. Periodic
4. Purposeful

Table 18.6: Upgrading Techniques:

This study will evaluate the following facts, figures, and ideas for improvement of
1. The Organisation
2. The Management support
3. Performance of Machines, systems and equipments
4. Future goals

Some old techniques and methods of education and training to upgrade skills will be assisted with the modern techniques as mentioned above. These improvised techniques will be like:

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a. On job training by giving proper instructions,
b. Vestibule training instructions like creating on job situation n classroom,
c. Demonstration and Examples method,
d. Simulation Method in which actual job condition are created,
e. Apprenticeship Method while creating art like skills,
f. Classroom method in which
    - Lectures,
    - Conference,
    - Group discussions,
    - Case studies,
    - Role playing,
    - Programmed Instructions,
    - T-Group Training consisting of associates, audio-visual aids, planned reading program, etc.

This education to upgrade skills with new look will be occurring definitely at certain level of the factory positions:

- At the top level management with strategic outlook will be trained to train the trainer who are going to be the actual teacher for the whole program,
- Actual trainers get the training from these top level strategic trainers,

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- Finally the workers among themselves will decide with responsibility to conduct their training and equip them with the skills, for the prescribed task or the tasks.

b. Internal customers also mean shareholders and those directly or indirectly related to production or services of the organisation. They are to be made aware about the various facets of the organisations whenever it is needed, through:

- Group discussion,
- Television shows,
- Advertisements,
- Correspondence courses,
- Sending on time letter,
- Showing films,
- Through Radio programs,
- Seminars,
- Class room lectures,
- Study tours,
- Factory visits, etc.

2. External customers mean the consumers who are buying satisfaction in the form of car as their need. This part is seen in details in the customer relation management and total customer satisfaction.

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PART F:

ROLE OF HIGHER INSTITUTES AND ORGANISATIONS:

They should present before the others their image as the role model for Indian Institutes and other Business Organizations.

Institutes like IIT, and also IIM, ARAI, PCRA, Institute of Engineers, ICWA, IFCA, CII, etc. and Industrial organizations can do lot of breakthroughs as follows:

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

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

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c. ARAI approves the Automobile products developed by the individual organizations or individuals in India with its final testing. The Engineers and the Scientists at the ARAI have shown interest in this kind of project when contacted and are ready to go ahead with this kind of challenging projects. They are ready to pass the well-designed car parts to the international norms.

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

e. Institute of Engineers, AICTE will highlight the advantages of the Indigenisation and constantly give support through to this program through IE conducted courses, seminars, and journals.

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

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

h. IDBI will give:

   o Financial Assistance,

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- Special Assistance to backward areas to get few projects from this project,
- Will provide refinance facilities through I.F.C.I., I.C.I.C.I. and other financial institutes.
- Assistance to small scale sector, and hence SSI,
- Through this project Indian government will balance Regional Development,
- Will introduce soft loan scheme along with IDBI, IFCI, ICICI for this projects,
- Will introduce Development assistance fund for this indigenisation of small car as per the customer expectations.
- Will introduce other promotional activities by setting up department of special task like.
    - Technology Department,
    - Market research Department,
    - Promote this activity in the Northeast region like backward area.
    - Will improve tempo of indigenisation of small cars and hence supporting industries,
    - Will provide other supports

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

j. FICCI, SIDBI should organise such kinds of program more often than present day scenario and that too at lower costs. This will require lesser input than what ultimately it will achieve as big shot output in longer run.

k. The organisations Banks and other financers should come forward for the loans facilities for the adventurous youth with some kind of experience, degree, or some kind of background to start the industry related to the small car.

l. There should be proper collaborations of all the technical, management and Industrial houses to implement the breakthroughs in the small car technology.

m. Boosting the buying and selling of only Indian made technologies can be the solution to give the rise in Market fluency. This can only be possible if all the Indian organisations show some kind of patriotism above all kinds of material attractions. This was possible in Korea, Japan, and USA, then why not in India. So a huge awakening among the masses and classes buying the indigenised small car is need of the hour. Right from the CII, FICCI, MIDC, ARAI, PCRI, Tata Engineering, Bajaj, Mahindra must advertise for it and with cooperative efforts strive for it.

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To, conclude with this chapter one must realise the situation of the higher education especially technical in Indian system. As the more result oriented and practical education according to the requirement of the present market condition at the time period can make any nation vibrant. This can make Indians realise the improvement required in the other fields too on the similar platform so as to make India self reliant on the Techno-Socio-Economic front.

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CHAPTER 19:

RESULTS OF UPGRADED SKILLS OF HUMAN RESOURCES ON THE CAR INDIGENISATION ORGANISATION AND ON THE COUNTRY

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In this regard let us see the case studies from this point of view. Thus it will clear the real advantage of upgrading the skills of the personnel in the organisation. Infact upgrading skills not only changes the fate of the organisation but also it changes the fate of the individual. The individual becomes better in his skills than he was previously.

LATEST CASE 1:

CHINA'S INDIGENISATION PROGRAM AND CONTRIBUTION OF UPGRADED SKILLS IN THE R & D VENTURES:

In China since 1989, there is a huge improvement in the education system. The awareness about the contribution required in the advanced education is increasing almost in double digits since then.

In brief it can be stated only in the technical and financial point of view. In the January 3, 2002, edition of China Daily, the contribution of the R & D in the China's indigenisation program following matter was published. *Most importantly there is huge contribution from the industry as well as from the institution and that too from the students of engineering and various colleges.*

In china, R & D expenditure increased to 96 Billion Yuan in 2001.

The state organised 647 key technical innovative and 1329 Pilot Production Projects for new Products. Most important thing is even students filled their R & D projects and got Patent. Almost 7.19 million undergraduate students enrolled for the Patent information system.

In the year 2001 A.D. 930,000 Persons-Years were spent in R & D activities including 700,000 years put in by scientists and engineers.

In 2001 A.D. 240,000 contracts on transfer of technology were signed with true value of 80 Billion Yuan i.e. USD 10 Billion; up by 23% than 2000.

Thus, it proves that success of China comes from well planned and well organised:

a. Research and Development Wing,

b. Indigenisation Wing,

c. Education System and

d. Industry Institute interaction.

The result of the upgraded skill in China is significantly been noticed from all the countries in the world. Infact, the cheaper but advanced technological consumer goods that are products of the above R & D has posed a big threat before all the countries in the world. Also, in coming years if China made cars and Bike may capture the world market. In fact it is already showing its success in the Nepal Market where china has literally captured India's almost 50% automobile market.

Similar counter balancing threats from the Indian side as well can only tackle this.

Infact few say more proactive steps need to be taken to tackle Chinese low cost goods is need of the hour. Otherwise the indigenously built and developed and manufactured Rupees One Lakh Car like projects must be

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given higher priority. Cheaper, more services, more facilities in the car sector are the needs of the latest customers which can be tackled if this project is take very seriously.

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LATEST CASE 2:

FORD MOTORS: PROJECT TAURUS: Effect of upgraded skills on the internal customers (employees and associates of the organisation):

System Prior to Upgraded skills:

Traditionally Ford company of USA was involved in the car development efforts that had a sequential approach.

However during 1980's in Project Taurus changed it all for better. Later on, this same approach was applied to Project Mustang in 1994.

Step 1: Product planners developed the general concept of the model and handed it over to the design department.

Step 2: The Design engineers then developed the specifications for

- Manufacturing staff,
- Suppliers.

Lacunae in the system:

a. There was little horizontal communication among the different groups.
b. Any defect that affected downstream production could be resolved only by going back to the design stage.
c. The whole process was inflexible, time consuming and resulted in high costs due to rework.

Skill Up gradation Exercise:

Under the leadership of Mr. Lewis Veraldi, head of the product planning and research, Ford's product development activities underwent a major revamp

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in 1980's. It was the effect of systematic approach/ exercise to the skill up gradation of the company associates or so called the internal customers.

Step 1: Ford's Management instructed Mr. Veraldi to 'design a world-class car' that would address two questions:

Question 1: What don't people have in their present car that they would want in this one?

Question 2: Why should I bother to cross over the road from another dealer's lot to buy this car?

Step 2: Veraldi introduced a totally different approach:

- He went on to, emphasising customer needs, and
- He tried to, ease of manufacturing at each stage of the process.

Step 3: Veraldi made a team called 'Team Taurus'. It was a cross functional team that had members from different departments like:

- Design,
- Manufacturing,
- Marketing, Procurement, and
- Suppliers.

Step 4: Veraldi made it compulsory for each of these members from each department would be a part of Project Taurus. These members would be involved right from the beginning.

Step 5: While actual development of the Taurus, Ford men conducted extensive market research. Research was both Quantitative as well as

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Qualitative. Throughout five years it was conducted vigorously. In this, the company carried out surveys among owners of both Ford and competitive brands. It was exercise to learn what problems they were facing. Ford later on literally benchmarked itself against the features of the best selling cars. The company purchased 50 automobiles representing a wide range and variety of models and broke them apart to gain useful insight.

Step 6: Regular meetings were held with all the departments. So that they understood how the car was taking shape and could anticipate problems in advance. Initially there were huge conflicts among team members who were not at all used to working in teams. However, as team members gradually began to appreciate the benefits of working together, cooperation increased.

Step 7: Workers were also educated on the importance of improving Quality.

Result of Upgrading Skills to the organisation:

1. These project, Taurus resulted not only in better cars for the customers but also higher levels of employee satisfaction.

2. A new style of management was introduced, which enabled lower managers to make decisions without the approval of higher-level managers.

3. Quick decisions and improved skills reduced the allocated budgets.

4. Ford's bold approach to Taurus project helped set their company in fluid motion the whole organisation. The attitude of employees changed. Procedural change was also quite significant to be noticed. Many concurrent engineering processes were institutionalised for the future.

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5. The more discipline among employees resulted in better performance for coming few years.

6. Project Taurus reduced the product development time for Ford. Ford took only four years to develop Taurus, two years less than the average time previously taken to develop a new model.

7. Project Taurus increased the manufacturability of the car, since manufacturing engineers were involved from the very beginning. There was less need of the trial runs.

8. Ford emphasized Total Quality Management in the Taurus project. So whenever quality problems arose, Ford-engineers started from scratch and made necessary changes in the manufacturing process. Design engineers regularly visited the manufacturing plant to identify difficulties in manufacturing their designs.

9. Project Taurus increased the degree of employee involvement. Infact even Line and Assembly line workers were consulted about many of the car's design elements.

Result of upgrading the skills to the nation:

1. Every other company in USA started the same approach as that of the Project Taurus. Thus, benchmarking improved the wide range of manufacturing industry and even the services industries. Better and quality product and the result oriented excellent services became the talk and walk and practise of USA.

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2. This project gave useful insight to the nation.

3. 'Improvement is the continuous process' was realised in practise.

4. Employee involvement and every employee has a say in the company was realised in this project. This can give the best possible result was also realised in this project.

5. It improved the Brand Image of USA made cars in parallel to the Japanese and European carmakers.

LATEST CASE 3:

FORD MOTORS: PROJECT MUSTANG, 1994: Impact of skills up gradation of internal customers on the consumers:

In 1994, Ford Motors decided to launch its popular model, the new Mustang. There was a huge demand to repeat the Taurus success.

The plan:

A completely revamped Mustang, which has been on the verge of extinction, was developed in only three years at a highly creditable cost of $700mn. This marked Ford's fastest and most cost effective new product development efforts in the history.

The dedicated staff:

A small group of dedicated Ford engineers took the initiative to revamp the Mustang. Staff members and associates form the internal customers of the organisation. The team assured the then CEO, Poling, that they would develop the car in 37 months and within allotted budget.

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The education and skill development exercise:

The Team Mustang was given all the materials in complete details and documents related to Project Taurus. The team members selected the team members on their own. The decision power was given to the team members for every point and for every step. They were given free authority to ask anything they want to any member in the Ford. If require the team members could watch and learn any process they wanted. They did.

The work place:

The team Mustang moved to an old warehouse in a Detroit suburb.

The work:

- The work was started even before the work place well equipped.
- The team retained certain hardware components like engine, transmission and parts of the chassis, to retain Mustang's identity and keep the costs low.

The Result:

1. The decisions, which took months, were made in minutes at informal chats around coffee vending machines.

2. The team delivered the car in 35 months.

The worldwide Customers' Responses:

1. The mustang became a big success.

2. The Mustang became Motor Trend Car of the year.

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3. The Mustang Car received advanced orders for 53000 cars. It became the extraordinary case in this competitive world.

Advantage to the nation:

1. Result oriented approach among the dedicated team members of various companies brought various other high quality products in every other field.

2. Faster time to develop a product became a trademark of the Mustang. The Benchmarking also improved the other industries product and process developments in the plants.

3. Low cost high quality cars and other products became order of the day.

4. Infact many nations including India got an inspiration from this project. Later on India's own team developed their indigenous Super Computer.

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LATEST CASE 4:

HIGHER TECHNICAL EDUCATION SYTEM IN USA:

In USA there are more than 3000 Universities offering advanced technical education. They offer bachelors and masters degrees in engineering and sciences.

1. Most highlighting thing is demand the engineers tried to be matched with the supply.

2. In the college itself engineers are exposed to the Basic Research and even to the practical knowledge as happen in the organisation they are going to work. Students carry out unique live projects, which are the requirements of the companies in the market. This gives students exposure to their future jobs. Hence, when they pass out they are able to think independently on any issue and are bale to implement it.

3. The laboratories and facilities of the engineering colleges are always placed at higher priority. The high tech exposures even at the time of students age is so significant that it is not even possible for the highly placed engineers in the country like India.

4. The staff members in these colleges are at least PhD and are expert in their respective fields. They teach only those subjects in which they are masters. They are full time employed, fully paid and are supposed to be asset to the organisation. They are supposed to publish at least four research papers every year other wise they lose their few points.

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5.After every five years every professionals including engineers, doctors, lawyers, are supposed to renew their professional licences every after five years otherwise they cannot work in their field. Appearing for an examination does it.

6.Every HOD of the departments has to publish four research papers and has to bring at least few thousand worth R &D project for the college otherwise he loses his post.

7.Industries in USA are ready to sponsor few projects irrespective of the project result. If the students and the advisor Professor succeed in their project a patent is raised in the name of Professor, that Company and in the name of the Students.

8.Allowing the students to work for more than 20 hours in the week reduces load of finances.

9.Basic research and advanced research are having highest priority in USA education system.

There are still more number of points. However, these many points are worth mentioning here to analyse the impact of skill up gradation to the organisations and the nation.

Advantage to the organisation of these skilled engineers:

a. They have to spend less time on educating the new aspirant for the job in their company.

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b. They get an engineer who has better exposure to technical skills as well as the skills required for the Research and Development.
c. This skilled work force gives better output and productivity. They are also eager to improve themselves. Hence, organisation improves at every level and in every department.
d. Feedback from the employers, employees and the associates is taken as the positive concern and it is tried to implement in their company to get good result in future. At individual that person take it as a future concern.

Advantage to the nation:

a. USA economy is the largest in the world. Out of One trillion dollar car industry USA has already captured the half of it.
b. USA has Ford, GM like organisation in the car sector, while there is Microsoft, Intel and IBM in the computer field, which can shake the world economy. They spent a lot on the R & D and always give quality product and satisfactory services.
c. Even in other fields like Computer Hardware, Software developments, Pharmaceuticals, Space Technologies, due to R &D and result oriented practical approach and independent thought process, which is blended while the students get education.

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d. Every one gets the job he/she wants to work and in the field he/she prefers. This, liking and working gives better output in every field.

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LATEST CASE 5:

HIGHER TECHNICAL EDUCATION SYTEM IN GERMANY:

Germany has a unique approach towards the education system. Infact it is one of the only countries in the world, which allows the free education to every body in their country. Free Education is one of the birthrights given to the civilians in Germany. It is applied to Engineering and Technical education as well.

Few more highlights:

1. Germany is the super power in the field of machineries that manufacture. Take example of Printing Press, The CNC Machines in the Manufacturing plants and many more. This got possible only due to the stress given on the project part of the engineering education and due to R & D activities at the Institutes.

2. Germany is the third largest economy in the world after USA and Japan due to free education system only.

Advantages to the Industries:

Industries sponsor many R & D projects and in return patent them in the name of students and the professors. While the project full exposure to the industry, machinery, and practical knowledge is given to the students. Hence earning of the student starts at the time he develops the project. Hence, students work extremely hard at the curriculum and at the projects. As by the time he/she is out of the technical course he becomes eligible for

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the independent work or project. Thus, it reduces the efforts of the industries and time as well to educate separately while allotting a job to the engineers.

Advantage to the Nation:

After the World War Two, when the German industries were almost destroyed, Germany decided to work cohesively for the national cause. Germany decided to give free and result oriented education to the next generations. Looking at the above points it has paid off to the Germany. As the German machines are supposed to be the best in the world and perform well and gives satisfaction to the customers around the world. It has resulted in making German Economy third biggest in the world.

Thus from all the cases it is concluded that upgrading skills not only benefits the individual but also improves the customer satisfaction level and brand loyalties to the car companies.

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CHAPTER 20:

DEVELOPING THE PROTOTYPES AND THEN TUNING ALL THE INDIAN RESOURCES FOR INDIGENISATION OF CAR TECHNOLOGIES

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PART 1:

INDIGENOUS CAR COMPONENTS MANUFACTURING PROCESS:

Step Zero: R & D First:

From technical point of view every indigenous car components manufacturing process involves following steps. However these specifications are meant only for the existing cars and their components only. Still these involve R & D first and then only these steps are been followed. It can be called as the *master plan of R & D* of Do's and Don'ts to be followed.

Step 1: Collecting the Samples of the products to be manufactured:

Many people are involved in such kinds of things. It is not a job of a single person. It requires many minds and many approaches at this level. Hence, there are many sources to do this. Few of them are given below:

- Few may buy the samples,
- Few may get samples of the parts to be manufactured in the scrap yards,
- Few may get the samples to manufactured in the throw away prices in the second hand market,
- Some may get the car components to be manufactured in the form of samples for studying from the present manufacturing companies around the world,

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- Some may even bring the car of which car components are to be manufactured and remove the part to be manufactured and study it.

Thus, there are many approaches to this. Even there are difficulties in collecting the samples. Still, this varied approach brings every detail of the car components to be manufactured from various angles from variety of sources. Samples are necessary for all the non-standard as well as the standard items where specifications are not available. Many times it is observed that unused items are rarely available in the free form than in the assembled form.

Step 2: Determination of Material Specifications of the product:

There are many laboratories in India, which can give the spectrographic analysis of the material of the metal components. Otherwise there are other chemical processes, which determine the material contents of the products. E.g. If a cut sample of the Steel Leaf Spring is brought under this spectrographic machine it shows that the leaf spring is made up of material having technical specifications like En 45 having 2% Silicon.

Step 3: Collecting Technical Specifications of the Data for the product:

These are not readily available in any of the laboratories or in any books or the technical books. Hence an innovative Reverse Engineering approach can be adopted. Thus, for the Electronic Components generally a black box

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concept is used where entire circuit is to be designed and denoted to replace the existing one.

E.g. Electronic circuits of the turning lights have to be denoted reproduced and then manufactured in India by this process of reverse engineering.

Step 4: Designing and Drawing according to the specifications:

Many experts feel that it is this step, which makes every product indigenous. Thus this is the starting step of the indigenisation of the cars in India. Detailed Engineering Drawing with all the dimensional details and the tolerance specifications, Layout Diagrams, Detailed Process charts, Heat treatment or other process and material specifications to be utilised are all documented for reference before undertaking the manufacture of prototype samples. Later on rectifying the faults in the prototype the final product is made and then marketed for the sales.

Step 5: Development of various Test Schedules:

Along with the drawings thee has to a programme to test these samples. The main purposes of these are:

a. Testing the Prototype sample, which has to be extremely elaborative and which has to under go the destructive testing as well.
b. Also for testing items after its bulk production, which may not be elaborative as the prototypes still more comprehensive to guard against possible comprehensive during bulk production.

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Step 6: Manufacturing the Prototype Samples: It involves lot of indigenous manufactures, lot of coordination among the various manufacturers being a trying stage. At this stage manufacturing capabilities of every manufacturer is tested. It also makes available the capabilities to manufacture those parts indigenously, which are to be manufactured in India. Otherwise vendors with high repute are to be selected and tasked with the indigenisation activity.

Step 7: Checking various Functions and Dimensions of the Product:

The Prototype samples have to undergo various checks required to confirm that the samples meet the details specified in the drawings. For critical items like engine parts, gearbox parts, electronic components, steering systems have to be subjected to engine test bed run or flight tests. The time required could at times be anything from six months to tow years before all the tests are completed.

Step 8: Type Approval of indigenised components:

Based on the dimensional, fitment, functional check and the results the indigenous part is giving, the final report is prepared. These Report are analysed reanalysed and checked for any error. Then the type approval is accorded for the product if it meets all the design, drawing and test criteria as specified.

PART 2:

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What should be the result of developing the Prototype?

There are various inferences drawn after the prototype is developed. The results explore the further possibilities. Any lacunae found in the product or the process can be rectified in the bulk manufacturing. Most important thing is the development of the human resources at various levels from various angles. Point wise the results are given below:

1. Developing the Vision: A foresight of time bound program and a vision of self reliant and prosperous India must be given to all the human resources involved in this process of developing prototype.

2. Determine the objectives of indigenisation: All the people involved in the indigenisation process will be imbibed with the following ideas and the objectives to get maximum efficiency from them:

- Objective of Synergy in all the indigenous operations,
- Objective of Self reliance at the techno-socio-economic front in India,
- Objective of enhancing the reliability factor of the 'Made In India' products,
- Objective of timely availability of the indigenous Indian items at every possible locations,
- Objective of Sharing risk with the joint venture among the indigenous companies,
- Objective of mutual benefits to the Indian organisations,
- Objective of streamlining procurements, policies, approval procedures,

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- Objective of saving and earning foreign exchanges,
- Objective of keeping Indian R & D ventures highly pulsating,
- Objective of generating lot of jobs in this field,
- Objective of keeping economy highly pulsating,
- Objective of upgrading economic living standards of the Indian people.

3. Tuning Human Resources for accepting the Challenges:

While the Prototype is developed the Indian human resources can be tuned for the accepting the challenges for this huge but very important task. If it is analysed well one can find that for Indian Industries this car indigenisation is a challenge as well as an opportunity. These challenges can be divided into three major categories:

a. It is a strong challenge to produce a world class quality car before the world,
b. Time bound manufacturing schedules with all the environmental and sustainable development considerations,
c. High quality services for customer delight from the indigenously developed car and its components.

4. Tuning the Human Resources for capitalising the opportunities:

Rs. 30000 crores is not a small sum of money. This is the turnover of the car companies in India even before the indigenisation. Thus, is not the big opportunity to become a quality indigenous manufacturer of the car

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product? It is. Thus, there are several more opportunities in this customer oriented car indigenisation projects to many Indians:

- Indigenisation of the car is like a testing laboratory to demonstrate the world Indian Technological capabilities. If achieved successfully, it will develop a strong industrial base in the country. For industrial units, it will be an opportunity to grow and enhance capacity utilisation.
- Due to high-level competition, the technology has to be of high quality and the products produced have to be of high standards with high degree of reliability. The infrastructure, the spare parts, the performance of the product, efficiency of the product, at every these steps there is an opportunity to prove every Indian citizen his ability to the world.
- Opportunity lies especially in targeting the sophisticated electronic parts and the state-of-the-art technologies used in every car. As these technologies cost several thousand crores it is better that Indian grab this opportunity to manufacture these things indigenously in India.
- Many existing Institutes, Organisations, Public Sector Companies, Private Sector companies can cohesively manufacture the whole car indigenously in India. It will project our country as one of the few countries having self managed manufacturing car technologies. Which becomes a very big opportunity for Indian people.

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5. Tuning the human resources for the Measures to be taken for the successful implementations of the indigenisation program: In this regards especially, many experts believed to take following measures to carry out this task as quickly as possible:

- Few only ISO achieved companies should be selected to manufacture the car parts indigenously in India,
- The R & D of the indigenisation cell should be targeted on few assemblies and parts, which are never been indigenised like Fuel Injection System, the carburettors, the electronic circuits may be localised first but it has to happen.
- Every giant Indian vehicle manufacturer who will help in this project, must have a corpus fund for financing R & D costs incurred by the short listed manufacturers. Such costs could be amortised over the entire period of order execution.
- Some most frequently needed parts in the existing cars need to be forced to indigenise in India.
- There must be criteria for repeat orders if the supply of 100% quality product is provided to the master plant.
- The order size must increase gradually but substantially.
- R & D in innovative modification in the product having past the destructive test must be encouraged.

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- Exhibitions, Seminars, Research Papers Meet, Suggestion Meets, Student's research papers and suggestions meet should be conducted regularly.
- Expanding Vendors base qualitatively and quantitatively to get timely supply of the spare parts of as many variety of the products and every version of the products, as the cars can have. It becomes the need in every near future.

6. Categorising the Industries for indigenising all the Car components:

The indigenisation can be categorised into following sub areas of specialisations. The indigenisation includes the manufacturing components their processes, manufacturing machineries of these following components:

a. Microwave communication components like GPS, Radio, TV, Mobile Services components,

b. PCB, Modules and subassemblies,

c. Hot end engine components,

d. Chemicals, consumables and Adhesives,

e. Testers, Meters, Dials, and their assemblies and subassemblies,

f. Motors, Generators, Dynamometers, Alternators.

g. Bearings and its Casings,

h. Circulators, Fluid supply assemblies, Shock absorbers, Fluid Brake systems,

i. Glass panels and assemblies,

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j. Lamps, circuit breakers, wiring harness, sensors, and burglar alarms,

k. Flanges, Flywheel, Various Gears and various Gear Box Assemblies.

l. Sheet metal works.

7. Tuning the Test Laboratories in India for this purpose: It is a need of the hour to develop the laboratories of the class of the following the best laboratories in India to achieve the best R & D standards in India.

a. Electronic Components Testing Laboratories: They should be developed at par with the standard of Electronic Regional Test Laboratories Located at Delhi, Mumbai, Kolkata and Indore.

b. Chemicals Testing Laboratories: They should be developed at par with the Quality Assurance Testing laboratory of Petroleum Products, Kanpur.

c. Rubber Testing Laboratory: They should be developed at par with the Rubber Manufacturing Association Laboratory, Thane.

d. Metallic Parts Testing Laboratory: They should be developed at par with the National Metallurgical Laboratory (NML), Jamshedpur or like the Geological Metallurgical Laboratory, Banglore.

8. Tuning the R & D centres in India:

Lot of experts feel that investment in the R & D and manufacturing of spares and components for this project may not be financially viable due to unlimited requirements of the spares and components of hundreds of car versions and products from various companies around the world. The large

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and medium scale industries require huge investments. However the Government of India's incentives and the concessions provided to the SSI can be very useful in this regard. Hence the special policy may be drafted for this indigenisation of car through the SSI of India. Many Financial Institutes and the SISI, SIDBI, PIS like organisations are willing to guide and help local industries. They have special plans to support the technologies and upgrading the technologies of the SSI. This parameter can take Indian SSI to such a high level that car indigenisation can become the steppingstone in further future versions of the advanced technologies indigenisation in India. As the demand for the cars and more sophisticated cars increases, everybody can guess the uninvited result of this investment and that is in long run, the growth opportunity would far outweigh the difficulties involved in the R & D of Product, R & D in the Process. Also difficulties of getting the registration and approval other formalities and then manufacturing the product and market it in the world market will become fruitful once the manufacturer comes across his ultimate result in the from of customer satisfaction. Of course through proper profit margin it is also likely that entry into such production for indigenous cars could open hew horizons for the new local and global markets for the domestic manufacturers. Finally these R & D centres would be the Heart and the Soul of the new car technologies to the Indian industries. Gradually they will honoured once they make a mark in contributing towards the national cause an objective of

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self-reliance for safeguarding our market from taking over by the MNC car giants. Thus, R & D can change the face of Indian car industry towards the indigenisation and self-reliance.

9. Tuning the Institutes and Organisations in India:

If one observes the CII directory it can be clearly seen that more than half industrial base in India is directly or indirectly related to the vehicle industries. There are number of organisations like MIDC, VIA, GIDC, CII, SISI, NML, NCL, NEERI which are involved in the R & D, Testing, Developing and organising various seminars and shows to build the industrial base in India.

Then there are hundreds of Institutes in India, which are involved in the technical education and management education. A cohesive effort among these can bring miraculous results.

Especially mentioning here would be tuning these all organisation and institutes through proper channel of World Wide Web can literally change the face of Indian car industry. It will move more toward indigenisation. As no one likes to remain dependent on others for longer times may it be even at the technological front. Students and Technocrats will feel that instead of studying some foreign technologies every now and then why shouldn't we develop such technologies in Indian soil, and they will develop it.

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CHAPTER 21:

GENERAL GUIDELINES TO SET UP INDIGENOUS CAR AND CAR COMPONENTS MANUFACTURING UNIT: A PRACTICAL IMPLEMENTATION AT VERY BASIC LEVEL

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PART 1: A SAMPLE BUT SUCCESSFUL INNOVATIVE APPROACH:

A PRACTICAL APPROACH TO MANUFACTURE AN INDIGENOUS CAR WORTH RS. 100,000/=.

With the existing indigenous components and assemblies Indian Engineers can manufacture a car, which can cost less than Rs. 100,000/= that too with the present technologies they have. The consumers would mostly be the middle class people who can afford the Motor Bikes. Though it is a challenging task still it is proved here that it is a possible project.

Table: 21.1: Actual Project Report of Manufacturing a Car approximately at Rs. 100,000/=:

SN	Aspect	Description
1	Product and Its Uses	It can be the most viable option for mostly the middle class people who can afford the scooters to the upper crest two wheelers.
2	Capacity of Car	Four family members.
3	Manufacturing Processes using indigenously made parts/ assemblies.	Following parts and assemblies are bought from the indigenous Indian manufacturers with proper permission and are assemble in the plant. The parts/ assemblies those required are: 1. Engine of Enfield Bullet OR Bajaj Chetak. 2. The frame of the Chassis is fabricated in the

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		form of square-shape for this car with putting the material like the frame of the Bajaj Three Wheeler. 3. Round wheel Steering system of old version of Premier Padmini. 1. Brake System of Old version of Premier Padmini. 2. Gear System of Six sitters will be used. 3. Body is made up of local fibre with hinges on six places. Other option is putting the Army Tent fabric on and around the car instead of doors and backside is made up of fibres. It will reduce the cost by more than ten thousand Rupees. 4. Upholstery used is local. 5. Electrical System of Bajaj Auto Rickshaw. 6. Wheels and Tyres used are of Bajaj Rickshaw.
4	Where Manufactured	Proto-type was manufactured in the Garage of the size of 15 feet X 15 feet.
5	Raw Materials Required	Mainly all the parts are Indian made from various Indigenous companies, which are assembled in this plant. The description of these parts and car assemblies are given in the Production Process.
6	Costing of the Proto-Type of	

SN	*Assembly or Part of the Car*	*Estimated Cost*

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	the car worth Rs. 100,000/=		1	A. Engine Enfield Bullet	Rs. 30,000/=
			OR	B. Bajaj Chetak	Rs. 18000/=
			2	A. Chassis and Fibre Body	Rs. 35,000/=
			OR	B. Chassis and Army Tent Fabric	Rs. 28000/=
			3	Transmission system	Rs. 28,000/=
			5	Upholstery and Electrical	Rs. 4,000/=
			A	*Total for Fibre Body*	*Rs. 97,000/=*
			B	*Total for Army Tent Fabric Doors and Cover*	*Rs. 78,000/=*

The Practical Project Report to set up the SSI for this project:

The above project of Fibre Body cost Rs. 97000/= hence if sold it will fetch less profit. With other option of Bajaj Chetak Scooter Engine and Army Tent Fabric Doors and Cover, it costs Rs. 78,000/= and can fetch more Profit. However, the spares and other matter will have to be taken care.

That is why; the bulk manufacturing is needed which can cost lesser. The profit earned and quality can be even better. Most importantly, this car can be manufactured in SSI with a determined structure and well-organised production management and processes. The following are the requirements for setting up the SSI for this kind of project. Once the product is

successful, the factory can be improved and converted slowly into a big organisation.

Table: 21.2: Project Report for setting up a SSI unit for Made in India Car with Rs. 100,000/= as a Selling Price:

1	Utilities required	Electricity: Power load of 3 KVA. Requirement of Water: Nominal Requirement of Oil: Ten-Kilo Litre per annum.
2	Required Plant and Machinery	i. Hearth/Heat Treatment, ii. Beading/ Cutting Machine, iii. Lathe Machine, iv. Circle Shearing Machine, v. Welding machine, vi. Other Fabrication Equipments, vii. Grinding machine, viii. Spray Painting machine.
3	Estimated cost of the project as on October 2003.	

SN	*Cost of*	*Rs in Lacs*
1	Plant and Machinery	3.50
2	Fixed Asset	12.50
3	Preliminary and Preoperative	5.00

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			Expenses	
		4	For Contingencies and Future growth plan.	5.00
		5	Margin Money for Working Capital	1.25
			Total Requirement Expenditure	26.25

4	Means of Finances	*SN*	*Means of Finances*	*Rs in Lacs*
		1	Long Term Loans	19.00
		2	Cash Subsidy	3.00
		3	Promoters Capital	4.25
			Total Requirements	26.25

5	Cost of car if 10 units manufactured every day in pre organised structure and JIT format of the manufacturing.	*SN*	*Assembly or Part of the Car with fabric body*	*Estimated Cost*
		1	Engine	Rs. 25,000/=
		2	Chassis and Body	Rs. 30,000/=
		3	Transmission system	Rs. 25,000/=
		5	Upholstery and Electrical	Rs. 3,000/=
		6	Other expenses including labour, electricity, etc.	Rs. 8000/=
			Total	Rs. 91,000/=

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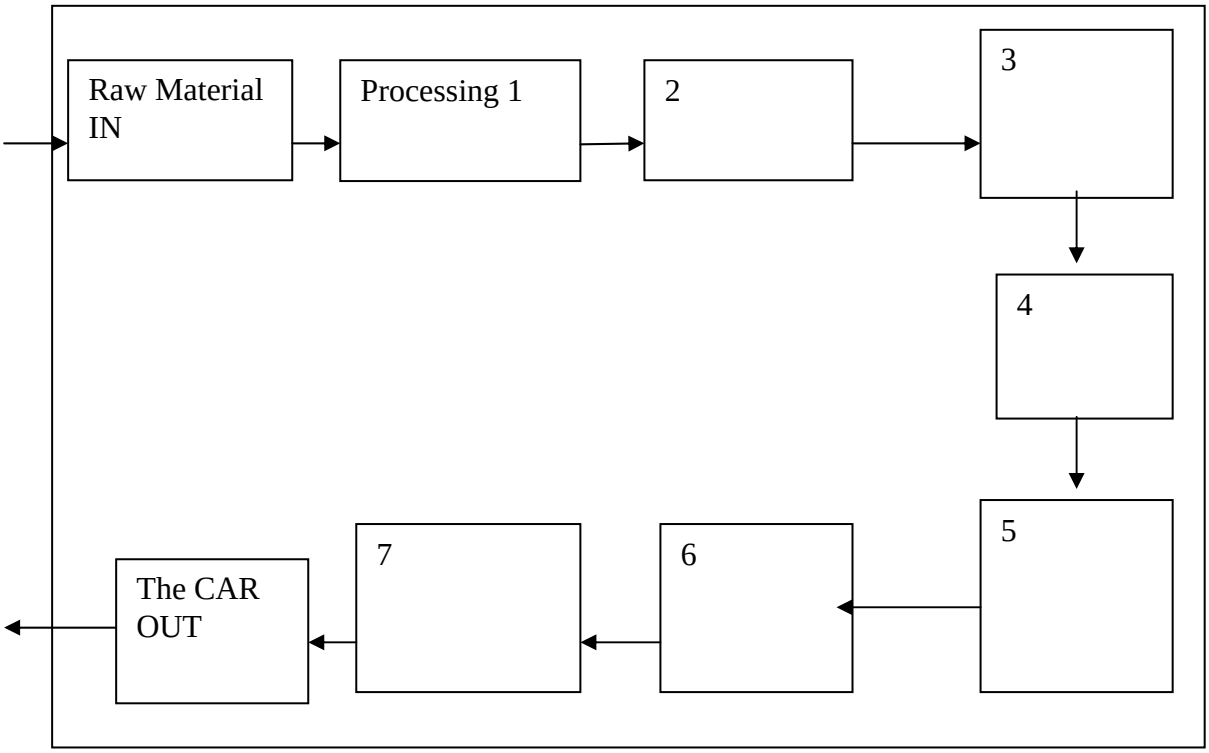
<u>Diagram: 21.1</u>: The Production Plant Set up of SSI for manufacturing Rs. One Lakh Car:



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Description of the figure: Numbers in the boxes indicate the departmental work.

1. Hearth/Heat Treatment: Heat Treatment is mainly required for the two distinct chassis of the Auto-rickshaws to be moulded into the square shape. Similarly following machines are needed mainly for the assembling of all the parts and for getting better finish to make a unitised car made from these distinct assemblies and parts.
2. Beading/ Cutting Machine,
3. Lathe Machine,
4. Circle Shearing Machine,
5. Welding machine,
6. Other Fabrication Equipments,
7. Grinding machine,
8. Spray Painting machine.

Once the organisation gets thorough in the R & D and the human resources get methodical in their work, the quality of the car will improve and the cost will decrease. The bulk production will increase and hence the profit will increase. Hence Indian Engineers can bring this engineering marvel at lower prices lower than this. It proves the viability of this project. Also, in one survey, consumers supported the feelings that they are safe on four wheelers than on two wheelers, hence they will prefer a Rs.100, 000/= Car than buying a hefty priced Motor-Bike.

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PART 2:

READY MADE PRACTICAL APPROACH AND SOLUTIONS FOR SETTING UP AN SSI TO MANUFACTURE INDIGENOUS CAR COMPONENTS:

Apart from the technical specifications of the product and the processes, the actual business proceedings are also given in this chapter. These are parts actually manufactured by the researcher in various manufacturing units in India. The steps adopted to manufacture them practically are given below.

Step 1: Extensive Market Research:

It was mainly focussed on the selective car parts, which were most required and could be manufactured by the SSI.

In the survey the most concerned factors shown by present Entrepreneurs and the upcoming Entrepreneurs were:

a. Technological Know How for the product and the process of manufacturing,
b. Finances,
c. Marketing and getting orders regularly.
d. How to manufacture Export oriented products?

Step 2: Product Selection and Preparing Project Report:

In an extensive survey over the product selection it is found that there are thirteen (13) most demanding parts in the Car industry. The detailed Project Report in the Tabular Form is given below for these Car Parts, which can be

easily manufactured indigenously in India. The SSI on these parts can change the face of the Indian Techno-Socio-Economic face of the country. The Project Report in Tabular form for investment range is divided into three categories:

** Project Report for Investment A: Below Rupees One Lac,*

***Project Report for Investment B: Between Rupees One Lac to Rupees Five Lacs,*

****Project Report for Investment C: Above Five Lacs.*

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Table: 21.3: Project Report 1: Hubcaps of the Car:

SN	Aspect	Description
1	Product and Its Uses	Hubcaps are used for covering the ends of the car hubs. It has two functions: a. To protect the hub's locking nuts and balls and b. For better appearance. It is either press fitted or secured by circlip. Hubs are available in decorative colours and shades as well. In the replacement market it has continuous demand.
2	Suggested Capacity	Almost 100 numbers per day. *With the increasing demand of the Indigenised Car and this quality product it has further growth option.*
3	Manufacturing Processes	Sheets are cut to required circle, pressed to shape and finally edges are folded in the beading machine. The caps thus made are sent for electroplating or powder coating on contract basis for the job work.
4	Land and Building Requirement	A covered area of about 75 square meters is required for the project. The same can be taken on rent.

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5	Required Plant and Machinery	i. Circle Shearing Machine, ii. Pneumatic Press, iii. Beading/ Cutting Machine, iv. Die Punch
6	Raw Materials Required	The main Raw Material required for the project is Mild Steel (M.S.) sheets of 20-20 S.W. G.
7	Utilities like Electricity, Water and Fuel	Electricity: The unit will need a total connected power load of 10 KVA. Requirement of Water: Nominal
8	Estimated cost of the project as on October 2003.	

SN	Cost of	Rs in Lacs
1	Plant and Machinery	0.75
2	Miscellaneous Fixed Asset	0.40
3	Preliminary and Preoperative Expenses	0.13
4	Contingencies	0.12
5	Margin Money for Working Capital	0.25
	Total Requirement for the Project	1.65
	Thus this comes under our category	B

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9	Means of Finances		SN	Means of Finances	Rs in Lacs
			1	Long Term Loans	1.05
			2	Cash Subsidy	0.15
			3	Promoters Capital	0.45
				Total Requirements	1.65

Table: 21.4:

Project Report 2: Hose Pipes and Radiator Hoses of the Car:

SN	Aspect	Description
1	Product and Its Uses	Hose are non-metallic tubes generally categorised as simple pipe lines used for supplying fluids. Hoses are further strengthening by providing metallic branding over rubber tubes. These are suitable for high pressure and temperature fluids transportation. In view of proposed expansion of the automobile industry this has a very good future.
2	Suggested Capacity	Almost 100 numbers per day. *With the increasing demand of the indigenised Car and this quality product it has further growth option.*
3	Manufacturing	Rubber compounds with various ingredients are

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	Processes	mixed in the mixing mill. The compound is extruded on core mandrel. Then the cotton fabric layers are applied over each layer of rubber. Depending upon the end uses, the hoses are made of different layers of rubberised fabrics and sheets of 2-ply, 3-ply and so on. Then the whole assembly is vulcanised in the Sulphur and then packed.
4	Land and Building Requirement	The unit needs the total cover area of 250 square metres. The total area required will be 500 square metres.
5	Required Plant and Machinery	1. Mixing Mill, 2. Extruder, 3. Cheering Mill, 4. Vulcanises, 5. Air Compressor, 6. Boiler, and 7. Hose building machine.
6	Raw Materials Required	Natural Rubber, Synthetic Rubber, Reclaimed Rubber, Carbon Black, Clay, Naphthalene Oil, Zinc Oxide, Stearic Acid, Anti Oxidant, Wrapping Cloth, Mould Lubricants, etc. are required.
7	Utilities like	Electricity: The unit requires the total connected

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<table>
<tr><td></td><td>Electricity, Water, and Fuel.</td><td>electric power of load of 2 KVA,
Requirements of Fuel the Furnace Oil: 20 Kilo Litre/ Annum,
Requirement of Water: 1500 Kilo Litre/ Annum</td></tr>
<tr><td>8</td><td>Estimated cost of the project as on October 2003.</td><td>
<table>
<tr><td>SN</td><td>Cost of</td><td>Rs in Lacs</td></tr>
<tr><td>1</td><td>Land and Site Development</td><td>0.75</td></tr>
<tr><td>2</td><td>Buildings</td><td>4.00</td></tr>
<tr><td>3</td><td>Plant and Machinery</td><td>8.60</td></tr>
<tr><td>4</td><td>Miscellaneous fixed assets</td><td>2.25</td></tr>
<tr><td>5</td><td>Preliminary and preoperative expenses</td><td>2.15</td></tr>
<tr><td>6</td><td>Total Requirement for the Project</td><td>1.50</td></tr>
<tr><td>7</td><td>Contingencies</td><td>1.50</td></tr>
<tr><td>8</td><td>Margin for working Capital</td><td>2.30</td></tr>
<tr><td></td><td>Total in Rupees</td><td>21.55</td></tr>
<tr><td></td><td>Thus this comes under our category</td><td>C</td></tr>
</table>
</td></tr>
<tr><td>9</td><td>Means of Finances</td><td>
<table>
<tr><td>SN</td><td>Means of Finances</td><td>Rs in Lacs</td></tr>
<tr><td>1</td><td>Long Term Loans</td><td>14.70</td></tr>
<tr><td>2</td><td>Cash Subsidy</td><td>1.60</td></tr>
<tr><td>3</td><td>Promoters Capital</td><td>5.25</td></tr>
</table>
</td></tr>
</table>

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				Total Requirements	21.55

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Table: 21.5: Project Report 3: Horn buttons of the Car:

SN	Aspect	Description
1	Product and Its Uses	Horn button is the up most part and the main component of the electric horn. When this horn button is pressed, it closes the circuit and current starts flowing through the electric field coil and of the horn relay to horn buzzer. This works on electro magnet system. The size and type of horn depends upon the type of car it is being fixed in numbers against the present production of more than 16.83 lacs in numbers. The demand and the supply gap indicate good scope for electric horn units and so of the horn button.
2	Suggested Capacity	1000 Per Day. *With the increasing demand of the indigenised Car and this quality product it has further growth option.*
3	Manufacturing Processes	The body of the horn button, which is Die cast, is machined, drilled and painted. The other component like Steel Diaphragm, Vibration coil, Contact Relays and Plastic Bakelite Bobbin are procured from outside. Magnetic Coil is wound by a machine with 'E' shape laminations and fitted

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		with bobbin in die cast. Vibration Coil, contact relay, and diaphragm are fitted together to complete the assembly and finally tested for its proper operation.
4	Land and Building Requirement	A covered area of about 200 square meters. Is required by the unit. The same can be taken on rent.
5	Required Plant and Machinery	1. Lamination Cutting Machine, 2. Coil Winding Machine, 3. Varnish Coating/ Drying Equipments, 4. Milling Machine, 5. Power Press, and 6. Testing Equipments.
6	Raw Materials Required	The main raw materials required are: 1. High Silicon Steel, 2. Enamelled Copper wire, 3. Bakelite sheets, and 4. Bronze Strips, etc.
7	Utilities like Electricity, Water, and Fuel.	Electricity: The unit requires total connected power load of 15 H. P. Water: Nominal.

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8	Estimated cost of the project as on October 2003.		SN	Cost of	Rs in Lacs
			1	Plant and Machinery	3.50
			2	Miscellaneous fixed assets	0.75
			3	Preliminary and preoperative expenses	0.35
			4	Contingencies	0.05
			5	Margin for working Capital	0.50
				Total in Rupees	5.15
				Thus this comes under our category	C
9	Means of Finances		SN	Means of Finances	Rs in Lacs
			1	Long Term Loans	3.40
			2	Cash Subsidy	0.42
			3	Promoters Capital	1.33
				Total Requirements	5.15

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Table: 21.6: Project Report 4: Piston Pins of the engine in the Car:

SN	Aspect	Description
1	Product and Its Uses	Piston Pins are cylindrical solid finished rods used to connect tow parts where movements of either of the parts exit. Since pins are always under rotational motion, hence they are subjected to dynamic stress causing heavy wear and tear. Their sizes vary with the type of cars and the vehicles. However the general shape remains the same. Total estimated production requirement is around demand as in 2003 is around 173 lacs in 2002. There is also a good export demand to this product from number of countries.
2	Suggested Capacity	Almost 100 per day. *With the increasing demand of the indigenised Car and this quality product it has further growth option.*
3	Manufacturing Processes	Piston Pins are made up of bright rolled annealed nickel steel bars having 1% to 5% of Nickel, 0.5% to 0.6% of Chromium and 0.35% of Carbon. The pins are turned to size as per the design and drawings. Pins are ground, milled and cut. Pins are then care hardened in cyanide salt bath or by

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		induction hardening and finally ground to specific tolerances. These are then checked for hardness number. An anti-corrosive chemical is applied to pins before packing.
4	Land and Building Requirement	A covered area about 200 square meters is required for the project. The same can be taken on rent.
5	Required Plant and Machinery	1. Universal Lathe Machine, 2. Centre less Grinder, 3. Horizontal Milling Machine, 4. Thermo Pack (i.e. Fuel Fired Boiler) 5. Power Hacksaw, 6. Rockwell or Vicker Hardness Tester, and 7. Heat Bath Tempering Furnace.
6	Raw Materials Required	The main Raw Material is EN 8 and EN 12 Grade Steel.
7	Utilities like Electricity, Water, and Fuel.	Electricity: The unit will need a total connected power load of 10 KVA. Requirement of Fuel Oil: 10 Kilo Litre per Annum, Requirement of Water: Nominal.
8	Estimated cost	SN | Cost of | Rs in

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	of the project as on October 2003.				Lacs
			1	Plant and Machinery	3.50
			2	Miscellaneous fixed assets	0.50
			3	Preliminary and preoperative expenses	0.35
			4	Contingencies	0.25
			5	Margin for working Capital	0.60
				Total in Rupees	5.20
				Thus this comes under our category	C
9	Means of Finances		SN	Means of Finances	Rs in Lacs
			1	Long Term Loans	3.30
			2	Cash Subsidy	0.40
			3	Promoters Capital	1.50
				Total Requirements	5.20

Special Note: Rupees Hundred Thousand is equivalent to Rupees One Lac. It also can be spelled Rupees One Lakh. Hence, both Lac and Lakh have the same meaning in this project.

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Table: 21.7: Project Report 5: Leaf Springs of the Car:

SN	Aspect	Description
1	Product and Its Uses	The wheels of the car are mounted on the frame by leaf springs. These springs are attached with the telescopic shock absorber; together they absorb the shocks on bumpy roads thus giving comfortable ride to the driver and the passengers. The springs are thus part of the suspension system of the car. Conventionally there are three kinds of the car springs viz. Leaf, Coil and Torsion Bar. The Leaf Springs most commonly used in cars in the rear suspensions. These Leaf springs comprises of several plates or leaves.
2	Suggested Capacity	25 Sets of 10 Leaves per Day. *With the increasing demand of the indigenised Car and this quality product it has further growth option.*
3	Manufacturing Processes	Mild Steel (M.S.) strips are cut to suitable size by treadle sheet cutting machine and heated to about 1000^0C. Heated strips are bent to desired shape. The master leaf is folded at the ends into circular hole. Holes are drilled at suitable point on all strips of set leaves. Finally these strips are

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		suitably joined together by "V" shaped belts and by nuts. The assembly is finally load tested with compression tester.
4	Land and Building Requirement	The unit requires the covered area of about 300 square meters. Consisting of work place, stores and office. The total area required will be about 500 square meters. The same can be taken on the rent.
5	Required Plant and Machinery	1. Eye rolling machine, 2. Power cutting machine (Power Hack Saw), 3. Turret Lathe, 4. Surface Grinder, 5. Universal Drilling Machine, 6. Cylinder Grinder, 7. Oil fired Furnace, 8. Chamfering Machine, 9. Case Hardening/ Quenching Tank, 10. Air Blower, 11. Load/ Compression Testing Equipments, 12. Miscellaneous tools like Dies, Fixtures, Chucks, Steady Rest, etc.
6	Raw Materials	The main Raw Materials are: En 45-A SS

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	Required	Si/2mm/90spring steel strips, Mild Steel (MS.) strips. Cold headed nuts and bolts, Carburising material and consumables like Shackle Pins, Clips, etc.
7	Utilities like Electricity, Water, and Fuel.	Electricity: The unit will need a total connected power load of 15 KVA. Requirement of Fuel: 20 Kilo Litre per annum, Requirement of Water: 1500 Kilo Litre per annum.
8	Estimated cost of the project as on October 2003.	

SN	Cost of	Rs in Lacs
1	Plant and Machinery	4.25
2	Miscellaneous fixed assets	0.85
3	Preliminary and preoperative expenses	1.00
4	Contingencies	0.50
5	Margin for working Capital	1.25
6	Land and site Development	0.45
7	Buildings	4.50
	Total	12.80
	Thus this comes under our category	C

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9	Means of Finances		SN	Means of Finances	Rs in Lacs
			1	Long Term Loans	8.5
			2	Cash Subsidy	1.1
			3	Promoters Capital	3.2
				Total Requirements	12.80

Table: 21.8: Project Report 6: Luggage Carrier fitted over the Car rooftop:

SN	**Aspect**	**Description**
1	Product and Its Uses	Luggage carrier is fabricated from pipes and is used to carry luggage. Cars has luggage carrier fixed on the rooftop of the body whereas two-wheeler has luggage carrier on its side. These are not fixed with cars as original accessories but for the tourists taxis it is required. Hence the market is limited because of negligible replacement of the item.
2	Suggested Capacity	10 numbers per day. *With the increasing demand of the indigenised Car and this quality product it has further growth option.*
3	Manufacturing	Pipes of appropriate diameter are cut to size and

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	Processes	bent according to the design using a tube-bending machine. Various bend pipes segments are welded to give required shape of luggage carrier. Finally the product is either painted or electroplated. For Electroplating, it is advised to get it done from out side unit. In addition, with the same plant and machinery, units may undertake utilisation to manufacture other fabrication work of the structure for techno-economic viability.
4	Land and Building Requirement	Covered Shed including office and store of about 100 square metres is required for the project. It can be taken on rent.
5	Required Plant and Machinery	1. Power Hack Saw, 2. Pipe Bending machine, 3. Power Drilling Machine, 4. Electric Welding Set, 5. Spray Painting machine with compressor, 6. Bench Grinder, and 7. Miscellaneous Hand Tools.
6	Raw Materials Required	The main raw material required by the project are: ERW tubes/ pipes, M.S. Sheet and Paints, etc.
7	Utilities like	Electricity: The unit will need a total connected

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<table>
<tr><td></td><td>Electricity, Water, and Fuel.</td><td colspan="3">power load of 5 KVA.
Water: Nominal.</td></tr>
<tr><td>8</td><td>Estimated cost of the project as on October 2003.</td><td>SN</td><td>Cost of</td><td>Rs in Lacs</td></tr>
<tr><td></td><td></td><td>1</td><td>Plant and Machinery</td><td>0.50</td></tr>
<tr><td></td><td></td><td>2</td><td>Miscellaneous fixed assets</td><td>0.10</td></tr>
<tr><td></td><td></td><td>3</td><td>Preliminary and preoperative expenses</td><td>0.05</td></tr>
<tr><td></td><td></td><td>4</td><td>Contingencies</td><td>0.03</td></tr>
<tr><td></td><td></td><td>5</td><td>Margin for working Capital</td><td>0.12</td></tr>
<tr><td></td><td></td><td></td><td>Total in Rupees</td><td>0.80</td></tr>
<tr><td></td><td></td><td></td><td>Thus this comes under our category</td><td>A</td></tr>
<tr><td>9</td><td>Means of Finances</td><td>SN</td><td>Means of Finances</td><td>Rs in Lacs</td></tr>
<tr><td></td><td></td><td>1</td><td>Long Term Loans</td><td>0.50</td></tr>
<tr><td></td><td></td><td>2</td><td>Cash Subsidy</td><td>0.06</td></tr>
<tr><td></td><td></td><td>3</td><td>Promoters Capital</td><td>0.24</td></tr>
<tr><td></td><td></td><td></td><td>Total Requirements</td><td>0.80</td></tr>
</table>

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Table: 21.9: Project Report 7: Ornamental Fittings to the Car:

SN	Aspect	Description
1	Product and Its Uses	Ornamental Fitting is exhibit decorative items like emblem, monogram, metallic bands, artificial jewellery; toys, reflectors, window fittings, etc. are used in car to impart grace and attractive looks to the cars. It is a fashion oriented labour intensive industry. The product can be divided into two groups namely articles with extra decoration. There is a continuous demand for these articles for these items especially in the replacement market.
2	Suggested Capacity	250 Kilograms per Day. *With the increasing demand of the indigenised Car and this quality product it has further growth option.*
3	Manufacturing Processes	Different units manufacture these items by different methods. However, the main operation are pattern making, economical layout of pattern, cutting, turning, blanking, shaping, machining, chrome/ electro plating and engraving, etc.
4	Land and Building Requirement	A land of about 500 Square metres with a covered area of 300 Square metres is required for the project. Similar premises can be taken on rent.

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<table>
<tr><td>5</td><td>Required Plant and Machinery</td><td>1. Foundry Patterns,
2. Pit Furnace,
3. Injection Moulding Machine,
4. Pantograph machine,
5. Lathe Machine,
6. Power Drilling Machine,
7. Anodising Unit, and
8. Jigs and Fixtures.</td></tr>
<tr><td>6</td><td>Raw Materials Required</td><td>The main Raw Materials required for this project are: Aluminium Ingots, Brass Strips, M.S. Sheets, Plastic Sheets, etc.</td></tr>
<tr><td>7</td><td>Utilities like Electricity, Water, and Fuel.</td><td>Electricity: The unit will need a total connected power load of 10 KVA.
Water: Nominal.</td></tr>
<tr><td>8</td><td>Estimated cost of the project as on October 2003.</td><td>
<table>
<tr><td>SN</td><td>Cost of</td><td>Rs in Lacs</td></tr>
<tr><td>1</td><td>Plant and Machinery</td><td>1.5</td></tr>
<tr><td>2</td><td>Miscellaneous fixed assets</td><td>0.4</td></tr>
<tr><td>3</td><td>Preliminary and preoperative expenses</td><td>0.25</td></tr>
<tr><td>4</td><td>Contingencies</td><td>0.10</td></tr>
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			5	Margin for working Capital	0.35
				Total in Rupees	2.60
				Thus this comes under our category	B
9	Means of Finances		SN	Means of Finances	Rs in Lacs
			1	Long Term Loans	1.73
			2	Cash Subsidy	0.20
			3	Promoters Capital	0.67
				Total Requirements	2.60

Table: 21.10: Project Report 8: Brakes and Pedal Pads used in the Car:

SN	Aspect	Description
1	Product and Its Uses	Rubber made Brake Pedal and Clutch Pedal are generally used in the car. These pads are press fitted on the metallic end of the clutch or the brake to avoid the slipping of the leg or shoes of the drivers. These are frequently needed items. There is huge scope and market is not at all the problem.
2	Suggested Capacity	1000 Pieces per day. *With the increasing demand of the indigenised Car and this quality product it has further growth option.*

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3	Manufacturing Processes	Generally, the rubber compounds required are Syneprene 1712- 70 parts, Natural Rubber- 30 parts, FEF Black- 25 parts, Hard Clay – 100 parts, Naphthalene oil- 15 parts, Zinc Oxide – 4 parts, Stearic Acid – 15 parts, A.O. PBN – 1 Part, Paraffin Wax- 2 Parts, CBS – 1 Part, T. M. T. D. – 0.2 part and Seal Peer – 1.8 parts, are mixed together by mill and melted in crucible furnace for about 10 minutes at 152^0 C. The molten material is then poured in suitable moulds and fettled after cooling. Finally, the lining or friction marks on the pads are made by rasp file.
4	Land and Building Requirement	A covered area of about 150 square metres is required for the project. The same can be taken on rent.
5	Required Plant and Machinery	1. Wooden vat and mixture mill, 2. Crucible furnace, 3. Casting pattern, and 4. Hand Tools.
6	Raw Materials Required	The main raw material is rubber compounds.
7	Utilities like	Electricity: The unit will need a total connected

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<table>
<tr><td></td><td>Electricity, Water, and Fuel.</td><td colspan="3">power load of 5 KVA.
Water: Nominal.</td></tr>
<tr><td>8</td><td>Estimated cost of the project as on October 2003.</td><td>SN</td><td>Cost of</td><td>Rs in Lacs</td></tr>
<tr><td></td><td></td><td>1</td><td>Plant and Machinery</td><td>1.30</td></tr>
<tr><td></td><td></td><td>2</td><td>Miscellaneous fixed assets</td><td>0.50</td></tr>
<tr><td></td><td></td><td>3</td><td>Preliminary and preoperative expenses</td><td>0.20</td></tr>
<tr><td></td><td></td><td>4</td><td>Contingencies</td><td>0.10</td></tr>
<tr><td></td><td></td><td>5</td><td>Margin for working Capital</td><td>0.30</td></tr>
<tr><td></td><td></td><td></td><td>Total in Rupees</td><td>2.40</td></tr>
<tr><td></td><td></td><td></td><td>Thus this comes under our category</td><td>B</td></tr>
<tr><td>9</td><td>Means of Finances</td><td>SN</td><td>Means of Finances</td><td>Rs in Lacs</td></tr>
<tr><td></td><td></td><td>1</td><td>Long Term Loans</td><td>1.60</td></tr>
<tr><td></td><td></td><td>2</td><td>Cash Subsidy</td><td>0.18</td></tr>
<tr><td></td><td></td><td>3</td><td>Promoters Capital</td><td>0.62</td></tr>
<tr><td></td><td></td><td></td><td>Total Requirements</td><td>2.40</td></tr>
</table>

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Table: 21.11: Project Report 9: Radiators used in the Cars:

SN	Aspect	Description
1	Product and Its Uses	The Radiator is the device for holding a large volume of coolant in close contact with a large volume of air. This allows a heat transfer from coolant to the incoming air. The coolant lows through tubes and air passes around and outside the tubes between the fins. This keeps the engine under control and it avoids getting overheated. Radiator can be classified according to the direction of the coolant flow through them e.g. down flow/ cross flow type etc. Market enquiries have revealed that these trends are likely to continue for few more years. The demand for power plants and car and other vehicles radiators are expected to rise around 10% per annum both in the original parts manufacturing also in the spare parts since the one million cars is going to reach by 2007-08.
2	Suggested Capacity	50 numbers per day. *With the increasing demand of the indigenised Car and this quality product it has further growth option.*

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3	Manufacturing Processes	The core of the radiator is either of copper or brass tubes. These tubes are straightened and cleaned by flux. The both ends of the tubes are expanded into hexagonal shape. The set of tubes are bundled together and blanking each opening of the tube's mouth with plug. The tube bundled is dipped in soldering bath tank for 3 to 4 hours. Then the header plates are hot dipped in solder bath and assembled with core. Prior to assembly core should be tested for pressure testing. Now the plugs are removed and cleaned for any metallic burr etc.
4	Land and Building Requirement	A covered area of about 300 square meters is required for the project. The same can be taken on rent as well.
5	Required Plant and Machinery	1. Car Radiator tube drawing machine. 2. Tube Expander, 3. Soldering Bath with heating equipments, 4. Power Hacksaw, 5. Squaring Jigs, 6. Small size Drill Machine, 7. Cylinder less grinder,

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<table>
<tr><td></td><td></td><td>8. Core Assembly fixture,
9. Hydraulic Testing Machine; and
10. Miscellaneous tools like Scrapper, Pull through Dies, Fixtures, Gadgets, Ball Press, etc.</td></tr>
<tr><td>6</td><td>Raw Materials Required</td><td>The main raw materials required for the project are: Brass or Copper tubes, Soldering material, or Tin and lead ingots, Zinc ingots, and Chemical flux, etc.</td></tr>
<tr><td>7</td><td>Utilities like Electricity, Water, and Fuel.</td><td>Electricity: The unit will need a total connected power load of 10 H.P.
Water: 1000 Kilo Litres per Annum.</td></tr>
<tr><td>8</td><td>Estimated cost of the project as on October 2003.</td><td>
<table>
<tr><td>SN</td><td>Cost of</td><td>Rs in Lacs</td></tr>
<tr><td>1</td><td>Plant and Machinery</td><td>9.00</td></tr>
<tr><td>2</td><td>Miscellaneous fixed assets</td><td>1.5</td></tr>
<tr><td>3</td><td>Preliminary and preoperative expenses</td><td>0.60</td></tr>
<tr><td>4</td><td>Contingencies</td><td>0.30</td></tr>
<tr><td>5</td><td>Margin for working Capital</td><td>1. 0</td></tr>
<tr><td></td><td>Total in Rupees</td><td>12.40</td></tr>
</table>
</td></tr>
</table>

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				Thus this comes under our category	C
9	Means of Finances		SN	Means of Finances	Rs in Lacs
			1	Long Term Loans	8.20
			2	Cash Subsidy	1.06
			3	Promoters Capital	3.14
				Total Requirements	12.40

Table: 21.12: Project Report 10: Radiator Grills used in the Car:

SN	Aspect	Description
1	Product and Its Uses	Radiator Grills are a set of linked rectangular metallic sheet strips moved up and down over radiator core by a control lever fitted inside the driver's cabin. During Cold Conditions in winter or on the hilly areas of Himalayas like regions, when oil circulation is required in hot state, the grills are moved to down of 'off' position which allow the air flow through radiator parts and cooling is achieved.
2	Suggested Capacity	50 Grills per day. *With the increasing demand of the indigenised Car and this quality product it has*

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		further growth option.
3	Manufacturing Processes	Mild Steel (M.S.) sheets of 18 to S.W. G. are cut by Guillotine shearing machine, blanked and bent shape. A hole is drilled in each strip and chrome plated. These strips are assembled to get the grills.
4	Land and Building Requirement	A covered area of about 150 square metres is required for the project. The same can be taken on rent.
5	Required Plant and Machinery	1. A Guillotine shearing machine, 2. Power Press, 3. Special purpose roll forming machine, 4. Power drilling machine, 5. Double ended bench grinder, and 6. Chrome plating unit.
6	Raw Materials Required	The main raw material is Mild Steel (M.S.) Sheets.
7	Utilities like Electricity, Water, and Fuel.	Electricity: The unit will need a total connected power load of 10 HP. Water: Nominal.
8	Estimated cost of the project	SN | Cost of | Rs in Lacs

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	as on October 2003.		1	Plant and Machinery	3.00
			2	Miscellaneous fixed assets	0.70
			3	Preliminary and preoperative expenses	0.30
			4	Contingencies	0.10
			5	Margin for working Capital	0.30
				Total in Rupees	4.40
				Thus this comes under our category	B
9	Means of Finances		SN	Means of Finances	Rs in Lacs
			1	Long Term Loans	3.0
			2	Cash Subsidy	0.36
			3	Promoters Capital	1.04
				Total Requirements	4.40

Table: 21.13: Project Report 11: Seat Cushions fitted in the Car:

SN	Aspect	Description
1	Product and Its Uses	Seat cushions essentially have cotton clothe cover filled with foam rubber sheet, cotton or jute with or without springs. These are used for car seats and in offices and homes for comfortable sitting in

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		chairs, sofas, etc. even can be fitted on the headrests or side rests. Car furniture and seats are fitted with the cushion to provide better comfort. The same product if modified can be extensively used in hotels, railway stations, airport luggage, buses, trains and houses as well. With the increasing number of sale of the luxury cars and even small car indigenisation efforts demand for the seat cushions is increasing day by day.
2	Suggested Capacity	100 Cushions per day. *With the increasing demand of the indigenised Car and this quality product it has further growth option.*
3	Manufacturing Processes	The cotton is used as cushioning material for general-purpose seat cushions. According to the size of cushion, the rexin material is cut with the help of templates and stitched on industrial sewing machines, then cushioning materials like coir, rubberised coir, cotton, springs, synthetic foam etc. are filled in the seat cover and stitched. Cushioning seat using rubber foam material can also be manufactured in the same unit without addition of machinery and equipments.

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<table>
<tr><td>4</td><td>Land and Building Requirement</td><td>A covered area of about 50 Square metres is required for the project. The same can be taken on rent.</td></tr>
<tr><td>5</td><td>Required Plant and Machinery</td><td>1. Industrial Sewing Machine,
2. Cloth Cutter (mostly power driven will do),
3. Measuring Tape, Scissors, Templates and other hand tools.</td></tr>
<tr><td>6</td><td>Raw Materials Required</td><td>The main raw materials required are: Rexin Cloth, Cushioning material, Sewing thread, and other consumable items.</td></tr>
<tr><td>7</td><td>Utilities like Electricity, Water, and Fuel.</td><td>Electricity: The unit will need a total connected power load of 3 KVA.
Water: Nominal.</td></tr>
<tr><td>8</td><td>Estimated cost of the project as on October 2003.</td><td>
<table>
<tr><td>SN</td><td>Cost of</td><td>Rs in Lacs</td></tr>
<tr><td>1</td><td>Plant and Machinery</td><td>0.70</td></tr>
<tr><td>2</td><td>Miscellaneous fixed assets</td><td>0.20</td></tr>
<tr><td>3</td><td>Preliminary and preoperative expenses</td><td>0.10</td></tr>
<tr><td>4</td><td>Contingencies</td><td>0.10</td></tr>
<tr><td>5</td><td>Margin for working Capital</td><td>0.26</td></tr>
</table>
</td></tr>
</table>

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				Total in Rupees	1.36
				Thus this comes under our category	B
9	Means of Finances		SN	Means of Finances	Rs in Lacs
			1	Long Term Loans	1.00
			2	Cash Subsidy	0.13
			3	Promoters Capital	0.23
				Total Requirements	1.36

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Table: 21.14: Project Report 12: Steering Wheel of the Car:

SN	Aspect	Description
1	Product and Its Uses	It is main cruise control in the car. Steering wheel is a manually controlled lever of steering system. It is attached horizontally on vertical steering column. It is fitted to some angle so as to provide easy handling to driver while banking the Car. Steering wheel in its simplest construction is a circular shaped wheel with 2 to 3 spokes. This also has the provision to accommodate horn button in a centre hole. There are different sizes of steering wheels to suit the space provided for the handling of the steering wheel.
2	Suggested Capacity	250 wheels per day. *With the increasing demand of the indigenised Car and this quality product, it has further growth option.*
3	Manufacturing Processes	M.S. Rods of 6 to 8 mm are cut to pieces of required size as per the requirements. Ring is formed and spokes are welded to it. It is covered with an ebonite compound in compression moulding press. The moulded product is cleaned, ground painted and baked or vulcanised. Finally,

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		horn switch is fixed. For good product epoxy paints should be used in painting.
4	Land and Building Requirement	The unit required a covered area of about 10 square metres with the total area of about 200 square metres. The same can be taken on rent.
5	Required Plant and Machinery	1. Hydraulic Moulding Machine, 2. Rubber mixing mill, 3. Extruder, 4. Electronic Ovens, 5. Boiler Fuel Fired, 6. Capstan Lathe, 7. Drilling Machine, 8. Spot Welding Machine, 9. Grinding machine with buffing set, and 10. Measuring instruments.
6	Raw Materials Required	The main Raw Materials required for this project are M.S. Rods of 6 to 8 mm diameter, Rubber Compounds and Paint.
7	Utilities like Electricity, Water, and Fuel.	Electricity: The unit will need a total connected power load of 20 KVA. Requirement of Fuel: 8 Kilo Litres per Annum. Water: Nominal.

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8	Estimated cost of the project as on October 2003.		SN	Cost of	Rs in Lacs
			1	Plant and Machinery	5.50
			2	Miscellaneous fixed assets	2.70
			3	Preliminary and preoperative expenses	0.64
			4	Contingencies	0.36
			5	Margin for working Capital	0.80
				Total in Rupees	10.00
				Thus this comes under our category	C
9	Means of Finances		SN	Means of Finances	Rs in Lacs
			1	Long Term Loans	6.70
			2	Cash Subsidy	0.82
			3	Promoters Capital	2.48
				Total Requirements	10.0
				Thus this comes under our category	C

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Table: 21.15: Project Report 13: Sun Shades of the Car:

SN	Aspect	Description
1	Product and Its Uses	In order to protect driver vision from bright sunrays falling on the front windshield glass, sunshades are fitted outside the windshields. These are made of either of metallic sheets or of acrylic sheets. However, metallic sunshades are more popular.
2	Suggested Capacity	20 numbers per day.
3	Manufacturing Processes	M. S. Sheet is cut to size, pressed to shape and grooving the lines on the sheet by using separate die. Parts are spray painted in different colours to match with the body coloured of the cars. The product should have a good finish and proper shade.
4	Land and Building Requirement	A covered area of about 80 square metres is required for the project. The same can be taken on rent.
5	Required Plant and Machinery	1. Treadle Shearing Machine, 2. Fly Press, 3. Hand Press,

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<table>
<tr><td></td><td></td><td>4. Spray Painting Equipment including air compressor,
5. Grooving Dies, and
6. Miscellaneous hand tools.</td></tr>
<tr><td>6</td><td>Raw Materials Required</td><td>The main Raw Materials required for this project are M.S. Sheets and Paints.</td></tr>
<tr><td>7</td><td>Utilities like Electricity, Water, and Fuel.</td><td>Electricity: The unit will need a total connected power load of 3 H. P.
Water: Nominal.</td></tr>
<tr><td>8</td><td>Estimated cost of the project as on October 2003.</td><td>
<table>
<tr><td>SN</td><td>Cost of</td><td>Rs in Lacs</td></tr>
<tr><td>1</td><td>Plant and Machinery</td><td>1.00</td></tr>
<tr><td>2</td><td>Miscellaneous fixed assets</td><td>0.30</td></tr>
<tr><td>3</td><td>Preliminary and preoperative expenses</td><td>0.10</td></tr>
<tr><td>4</td><td>Contingencies</td><td>0.06</td></tr>
<tr><td>5</td><td>Margin for working Capital</td><td>0.24</td></tr>
<tr><td></td><td>Total in Rupees</td><td>1.70</td></tr>
<tr><td></td><td>Thus this comes under our category</td><td>B</td></tr>
</table>
</td></tr>
<tr><td>9</td><td>Means of Finances</td><td>
<table>
<tr><td>SN</td><td>Means of Finances</td><td>Rs in Lacs</td></tr>
</table>
</td></tr>
</table>

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			1	Long Term Loans	1.10
			2	Cash Subsidy	0.14
			3	Promoters Capital	0.46
				Total Requirements	1.70

Step 3: Selection of Place: After the Project Report is produced before the government a place has to be decided where the plant is to be built.

Step 4: SSI Registration: Up to Rs. 1 Crore investment on product government provides provisional registration for SSI registration.

Step 5: Finances Provision: There are two categories in the Finances provision

A. Self Finances Option or

B. Finances from some institution/ organisation/ other provisions:

   a. Bank like ICICI, SBI, IDBI, etc.

   b. Getting Some Subsidy or the Schemes like PMRY, etc.

   c. Managing finances through Co-Operative approach or by other sources and provisions those fit into the legal framework of the Government.

Step 6: Plant Foundation Layout and Set Up:

The simplest among the above-mentioned product is Luggage Carrier made up of ERW tubes and MS sheets. The building and the plant layout are provided below. For this specific job Product Layout is selected to suit the

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singular product and for faster output and from the future expansion point of view.

In this layout the machines are arranged according to their operations. The crux is that raw material is put in from one end and the last step is performed at the other end where the final product comes out.

The ready-made diagram is given below to understand the Layout.

Diagram: 21.2: *Plant Set up and Layout for the Luggage Carrier (Product 6 above):*

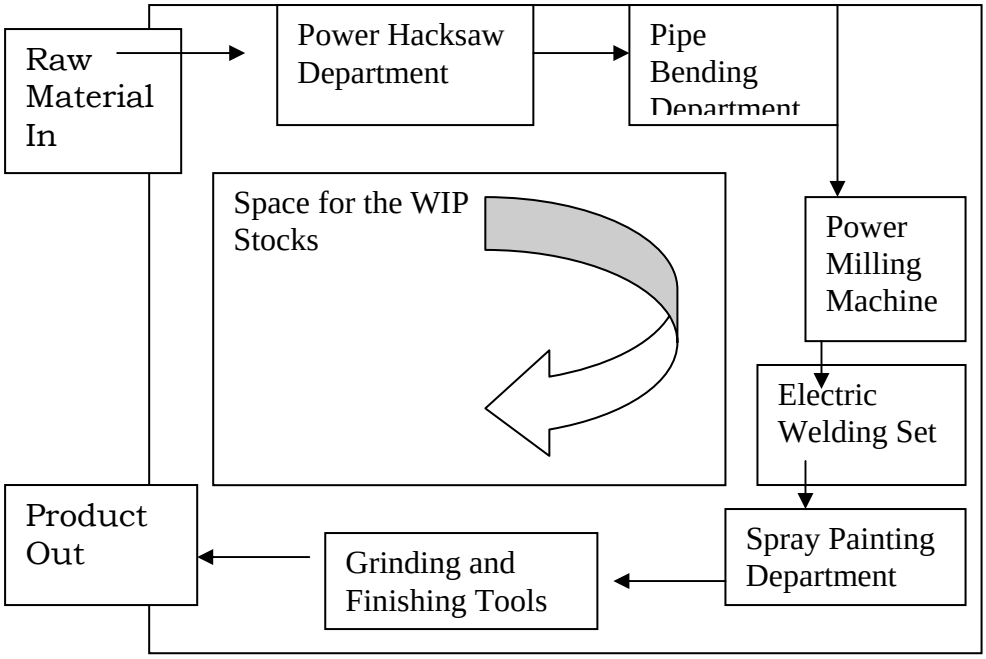

Diagram 21.2: Sample Plant Layout manufacturing the Luggage Carrier

Step 7: SSI Permanent Registration:

Once the First Batch comes out government of India and Government of Maharashtra grants several concessions and the leases and the subsidies.

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For the SSI with the special concessions on Sales Tax, Income Tax, Water, Electricity, R & D schemes, are there. The owner or owners may take advantages of these provisions after permanent registration occurred after the first batch of product is out.

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Step 8: Marketing your product:

There are three ways:

A. Self Marketing approach or

B. Taking Help from the Maharashtra Small Scale Industrial Development Corporations (MSSIDC) like Government organisations.

C. Taking Professional help from the Private Organisations.

PART 3:

Helps provided by the Government of India through SISI in setting up SSI for indigenous Car products:

Many new Entrepreneurs must know that Government of India Ministry of Small Scale Industry has its- Small Industries Service Institute (SISI), which provides various helps to the interested parties. It has technical officers who provide guidance to Entrepreneurs relating to SSI in the following manner, through separate sections:

1. Technical consultancy is provided for product, machinery, and equipments their installation procedures. It also provides assistance for marketing. On request it can provide even solve the managerial problems in the firms.
2. Economic Counselling is provided for industrial studies for product, processes and services.

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3. Management Consultancy provides help to solve the problems in methodical manner over the industrial, financial, marketing, organisational management and even on export marketing.
4. Special help for the modernisation of the units is given.
5. Interested parties are even assisted to get them registered as ancillary unit to the large firms through techno-economic studies.
6. Assistance is even provided for the utilisation of all the resources at their maximum efficiency by the program called sub-contract exchange from large industries.
7. Export worthy products are helped to be displayed on the trade fairs organised in the foreign countries. Even special programmes on export management and packaging for export are organised to assist the interested parties.
8. It also provides the help for designing and development of the machineries like jigs and fixtures and special training is also provided to manufacture and handle these machines.
9. Marketing assistance is provided through the Central government's NSIC and DGS and D programmes.
10. There is a special Women's cell to provide them all kinds of help in setting up and running businesses of any kind.

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11. Educated unemployed youth are provided with special entrepreneur development program in the intensive industrial development campaign.
12. Through survey of the sick industries SISI also provides the help to rehabilitation of the sick industries. The special help from the Bank and DIC is also given to the parties and SISI takes nominal charges for that. The process is like this:
    a. SISI conducts survey on request,
    b. The problem is identified:
        i. Whether it is Labour Problem,
        ii. Whether it is Raw Material Problem,
        iii. Working Capital Problem, or else
    c. SISI make a Project Report,
    d. It is submitted to Bank/ Financers,
    e. They pin point the problem,
    f. Recommendations are made,
    g. Problem is tried to be totally rectified,
    h. Then SISI helps in total debt recovery,
    i. Some period/ time limit is given to the SSI; say for 6 months to get recovered fully, on the provision of Bank finances.
13. By charging the stipulated fees SISI also helps in preparing the detailed project report for the SSI.

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14. Under Prime Minster Rojagar Yojana (PMRY) institute provides help to unemployed youth for identifying and setting up the industry by providing special loan under this scheme for the valid projects.
15. The Institute also provides help to reduce pollution for the factory.
16. SISI also provides help in getting ISO certifications, preparing status report, and modernisation program.

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17. **Table 21.16: Charges of SISI for various services:**

SN	**Activity**	**Charges in Rupees**
1	District wise and Area wise Survey	5000/=
2	Feasibility Report	5000/=
3	Project Report	5000/=
4	Appraisal and Evaluation Report	0.5% of Fixed cost or 5000/= which eve less
5	In-plant studies	1500/=
6	Quantitative and Qualitative assessment of capacity, Raw material, Technical components, etc.	1500/=
7	Sick Unit studies	750/=
8	Single point registration	700/=
9	ISO certification for SSI: Government pays 75% charges.	25% of total charges
Special Note: Consultancy charges are levied to 50% of prescribed rates for areas declared backward by Central Government.		

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PART 4:

Helps provided by the Small Industries Development Bank of India (SIDBI) for developing SSI of indigenous car components:

SIDBI also provides helps to the SSI at various level of the work. It also has wide range of financing options.

1. SIDBI provides all forms of small-scale sector finance for infrastructure development. However cost of project must not exceed Rs. 10 Crores.
2. It provides finance for setting up small-scale units or for expansion of SSI. It also provides financial help for modernisation and diversification to all the existing units. The limit of the project cost is Rs. 10 Crores.
3. For SSI rehabilitation of potentially viable projects Under Equity Fund Scheme assistance is provided. However the cost must not exceed Rs. 50 Lacs and soft loan limit is Rs. 10 Lacs per project excluding 5% service charges.
4. Finance is provided through scheduled commercial banks or cooperative banks up to Rs. 2 Crores for setting up of SSI or for modernisation of the SSI or for Technology up-gradation under the Single Window Scheme.
5. Assistance is provided to up-gradation of technology of products with thrust on quality improvement and for ISO 9000 and TQM. However

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the project cost must not exceed Rs. 1 Crore. This is for Refinance Scheme for Technology Development and Modernisation (RTDM).

6. Under RISO 9000 i.e. Refinance Scheme for Acquisition of ISO 9000 Certification to the SSI, which has, show positive result for two successive years. This includes the expenses for consultancy, documentation, audit, certification, equipment, and calibrating instrument.
7. Under direct Assistance Project Finance scheme Finance is also provided for marketing the product through SSI. This Finance is for marketing, R & D, product up gradation and standardisation, advertisement, training of personnel, etc. however amount of loan must not exceed Rs. 10 Lakh per borrower.
8. Even for the Working Capital Term Loan is also provided to the SSI provided they show good track record to SIDBI.
9. Then there is a Finance scheme for Industrial Infrastructure Development and for Equipment as well.
10. There are special Fast Track Financing scheme and Micro Credit Schemes to those who show good track record.
11. There are special provisions for Foreign Currency Term Loans for acquisition of fixed assets and for the Working capital as well.

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12. SIDBI has a very good Export Provisions for Pre-shipment Credit in Foreign Currency for SSI or for Post-shipment Credit in Foreign Currency for SSI.
13. SIDBI provides the vendor development schemes to *manufacture the indigenous machinery for the SSI.*
14. Repayment period for all the schemes is 3 to 5 or 3 to 8 years depending upon the type of schemes.

SIDBI has more than 30 branches in India. Its regional offices are situated in Mumbai, Delhi, Kolkata, Chennai, and Guwahati. Where as its head office is situated in Lucknow.

PART 5:

Other Helps of Government of India on Technology Front:

This is especially useful for the indigenisation of the car sector.

1. It provides help for inducting modern technologies to manufacture the quality product.
2. It provides help to export the better quality product at competitive price.
3. It takes active measures to facilitate transfer of technologies.
4. Government gives more emphasis on the R & D to SSI and MSI to constantly upgrade the technologies to constantly update technologies

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with view to optimal utilisation of scarce resources, better service to consumer and achieving a greater volume of even the export.

5. It helps the SSI through modernisation package proposed to be involved for every kind of industry, in our case the car sector indigenisation.
6. It helps SSI to replace old technologies with the new one to up grade quality of the product and for higher productivity.
7. Special provisions are made to the SSI who have demonstrated the output from the well established R & D.
8. To use alternative resources of energy government provides special financial package.

PART 6:

Incentives provided by the Government of Maharashtra:

Under the 1993 latest Industrial Policy Government of Maharashtra provides following incentives to the SSI:

1. Package Scheme of incentives to provide essential infrastructure, land, water, power, communication, etc. through MIDC.
    a. Special zones are created,
    b. Special provisions for the NRI is given,
    c. Complex procedures are simplified.
2. More liberal Sales Tax incentives,

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3. Doing away with the concept of National Sales Tax Policies,
4. Decentralisation nodal point for package schemes,
5. Refund of Electric duty, sales tax paid on purchase of capital equipment and exemption from sales tax on purchase of raw materials for 100% export oriented unit.
6. Special support to SSI for:
    a. R & D,
    b. Technology,
    c. Designing,
    d. Training and Quality Concessions,
    e. Marketing and Procurement of Raw Materials through Maharashtra Small Scale Industries Development Corporation Limited (MSSIDC).
7. Seed Capital (Starting Capital): This scheme is realigned with the National Equity Fund Scheme of the Small Industries Development Bank of India (SIDBI) implemented by MSFC and the banks.
8. MIDC builds Land, Readymade Galas and Industrial Sheds at subsidised rates. MIDC also earmark 25% of its industrial area for allotment to SSI units.
9. MIDC delegated powers to allot 25000 Square Meters of land in several districts for the industrial developments from which SSI get benefited.

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10. There is provision for Industrial Sickness Subsidy as well.
11. In single window schemes a coordinated mechanism with the Udyog Mitra it takes up the problems of the industries both at micro and macro level with relevant agencies for resolution. Then it provides the guidelines to solve the problem as well.
12. Special Export incentives are also been provided.
13. Through Quality Circes of India it provides all the help to build the Total Quality Management Approach in the industry.
14. It provides help to get ISO certification even re-embers certain amount of fees to the accrediting certification agency.
15. Maharashtra State provides support for technological improvement for control of pollution and its reduction, without any long procedure or formalities.

PART 7:

Table: 21.17: Addresses of the important organisations:

Organisations providing help for Starting, Conservation and Development of the progress of the SSI are given below:

SN	Address of the organisation	Consulting for
1	Small Industries Services Institute (SISI): 1. SISI, CGO complex, Block 'C', Seminary Hills, Nagpur- 440006.	1.Technical, 2.Economic, 3.Management,

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	Fax: 0712-2510352, Telephone: 0712-2510046. 2. SISI, Kurla Andheri Road, Saki Naka, Mumbai- 400072. Phone-022-28576090, 28573091/8092. Fax- 022-28570663. 3. SISI, 32/33, Chikhalthana, Industrial Area, Aurangabad- 10.	4. Modernisation, 5. Ancillary development, 6. Sub-Contract Exchange, 7. Export Promotion, 8. R & D, 9. EDP, 10. To sick units, 11. Project Report, 12. Pollution control, 13. Financial Assistance, 14. ISO Certifications,
2	MIDC of Nagpur, Mumbai, Aurangabad, Nashik, and others.	Providing land and other facilities to the factory.
3	Government of India, Delhi. It works through the SISI like organisations.	All the aspects in the SISI plus incentives.
4	Government of Maharashtra, Mumbai	All the aspects in the

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	(H.Q.) Other respective addresses are available from the SISI, MIDC offices.	SISI plus incentives.
5	Office of the Patent Information System, 1. 3rd Floor, C block, Seminary Hills, Nagpur, 440006. Phone: 0712-2525670, Telex- 07157504, Telefax- 0712-2528186. 3. Nizam Palace, 2nd MS office Building, 5th to 7th floor, 234/4, Acharya Jagadish Bose Road, Kolkata, 700020. Phone: 033-22474402, Telex: 021-4169, Telefax: 033-22473851. 4. 3rd floor, Municipal Market Building, Saraswati Marg, Carol Babh, New Delhi, 110005. Telephone: 011-25716209 Telex- 031-77186 Telefax: 011-25716209. 5. 61, Wallajah Road, Chennai,	1. How to Patent/ Copyright your product or the process, 2. How to manufacture the patented components, 3. How to proceed?

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	600002. Telephone: 044- 2845324, Telex: 041-76358, Telefax- 044- 2841014. 6. Todi Estate, 3rd Floor, Sun Mill Compound, Lower Parel (West), Mumbai- 400013. Telephone: 022-24924058, Telex: 11-76358, Telefax: 022- 24950622.	
6	Direct Financial Help providers: 1. Industrial Development Bank of India (IDBI), 2. SIDBI, 3. SBI, and other banks.	For the financial helps required at various stages.
7	Small Industries Development Bank of India (SIDBI), It has 5 regional offices, 32 branch offices in India. 1. Main Office- 10/10, Pandit Madan Mohan Malaviya Road, Lucknow- Uttar Pradesh, Pinocde-226001. Phone- 2209517-21.	

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	Fax- (0522) 2209513/14. 2.Regional Office- Hoechst House, 193, Vinay K shah Marg, Nariman Point, Mumbai- 400021. Telephone- 022-22872508, 22872475. Fax- (022) 22872490. 3. Branch Office- Usha Complex, 6th Floor, 345, Kingsway, Nagpur- 440001. Telefax- (0712) 2553202. Website- http://www.sidbi.com.	

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PART 8:

READY MADE PRACTICAL APPROACH TO SET UP EXPORT ORIENTED INDIAN MADE CAR COMPONENT BUSINESS IN THE PRESENT INDIAN CONTEXT:

In the Export Oriented kind of business there are two types of products, which can be manufactured:

1. The product required for the indigenous car. This car can be exported which has already solved all the patents related problems due to indigenously developed car products and processes. Few car products need to take patented products and Indian companies pay the royalties for that to the inventor and the developer of the product.
2. The Patented car components and assemblies that are patented by the scientists of any location around the world and the foreign car manufacturers put the order to the Indian firm. These will also be indigenously made but the royalty and other rights are associated to the car firm of the foreign land according to their specifications Indian manufacturer has to manufacture. This, is done to upgrade the technological up front in the car sector, as manufacturing ever new components or the conventional car components can help the Indian industries to master the art of design and manufacturing and it managements as well.

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Thus both way India is going to master the car technologies and its indigenisation efforts will benefit the India on technological front.

There will be lot of inventors who will be involved in developing more than 30000 car parts indigenously in India, which makes the whole car. Hence to patent those car parts to manufacture them needs the knowledge of the Patents and the copyrights. Thus, lot of inventors, developers may get benefited in India.

Hence it is must to know what is patent and how the patented car product can be manufactured indigenously.

Following are points on the Patents:

1. The inventor uses all his knowledge, creativity, research skills, ideas to develop and inventive ingenuity to invent. The product of this is a new invention, which helps the human kind. Governments help the inventor to disclose his invention to the public by giving him copyright or the patent.
2. A Patent is thus a monopoly right to the exclusive use of an invention, granted to the inventor or his assignee. This right is granted only for a limited period called “term of patent”. This may cease if the fees are not renewed during the patent period or after the term of patent is over. Then the invention becomes public and it is made free to use.
3. To get the patent, inventor or his assignee has to apply for the patent for the invention to the Patent Office. He has to give complete

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information and the sketches to the Patent Office, which grants the patent once it fulfils the prerequisites. After this anybody can obtain the copy of the patent.

4. With the patent,
    a. The patentee can use this patent to develop his own business,
    b. The patentee can Secure his invention from copying,
    c. Others can use his invention by mutual agreement of prices,
    d. Even the patentee can sell his invention out rightly to the mutually agreed adequate consideration.
5. Patent of the indigenous car technologies can help the society:
    a. By providing better, cheaper products to the public,
    b. Many get inspiration once the invention matter is available to the public to invent new technologies,
    c. Easy transfer of invented technology occurs without any legal bindings once the term of the patent is over.
    d. Transfer may even transfer agreement finalisation technologies to the public.
6. It is the only novel invention, non-obvious invention, having capability to benefit the industry can be patented. Only thing required is it must not be specifically declared as non-patent-able under the relevant patent law of any country.

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7. Always the invention belongs to the inventor unless he has assigned his rights to somebody.
8. Patent Information concerning patent inventions discloses the Patent Document. Inventions in the context of Patents are successful solutions to technical solutions to technical problems.
9. Patent document answers several questions like who has invented the technologies, which technical problem it solves, what was the prior art, who is the inventor, what was the earliest Patent, where was this technology first developed, and whether the technology is public domain or not.
10. The Patent document discloses the bibliographic data concerning the Patent, the Title of invention, the Abstract of invention, the references to prior art, and the complete description as well as practical details of the invention with references to suitable drawings/ formulae, and finally the claims defining the monopoly.
11. Why Indigenous car makers must hold most of the patents of its Car, and why the Patent is the unique source of Technical Information are further questions to be answered. The answers to these questions lies in the fact that Creative brains have not been well utilised India hence lot of people left India. Many of the car patents belong to Indians, which they have sold to the world Car giants. Another thing is most of the portion of the Patent is not at all disclosed to the world thus

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securing the rights can benefit the indigenous inventors in long run. Also, Patent is written in standard format, which contains the technological information covering widest range of technologies simple and most sophisticated as well. The information is available in the form of paper, or on the electronic database format as well.

12. How and Who can register maximum number of Patents and benefit Indian indigenous car developers and how can Indian indigenous car developer get benefited from the Patent Information system are the next things to follow:

    a. Indigenous car parts researchers, inventors in the industry and R & D organisations and the Universities can avoid the duplication of their research. These people can assess the state of the art technology procedure and the technology itself before its practical implementations. Thus, the ready-made problem can be put before the scientists on the ongoing research. Most important thing is this keeps the inventor up-to-date on the research front.

    b. Improving the existing technologies can benefit the indigenous car components developing industry. Even they can get the ready made solutions over the technical problems, the industry can increase its productivity, locate the suppliers, assess the

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state of the art before the project, and ultimately can evaluate alternative technologies for the transfer.

c. The indigenous business enterprises involved in the indigenous car business can identify new products for marketing, licence or distribution. They can locate the inventor; identify the competitors of foreign land as well as in the domestic market.

d. It will avoid the possible infringement problems and it will help to locate the areas of the investments to these indigenous businessmen.

e. The consultants and the planners in the indigenisation business can assess the technological viabilities of the patented parts in the particular business and then setting up the indigenous car part manufacturing industry. Even these consultants can provide methodical R & D, and even advise the financial matters on the technological issues.

f. The Financial Institutes ahs to play a very important role in all these activities, they can asses the technologies of the indigenous car parts the research projects and then provide the financial supports to the entrepreneurs. The viabilities of these projects and the progress of the projects to recover the finances are also bound to be there.

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g. Once in the business the Patent Agents and number of Applicants for the Patents get increased. Hence, to ascertain patent-ability and other aspects in respect of an application for patent, opposition, revocation, and other aspects, the proceedings are conducted under the relevant patent laws. Agents ha to study all these matters to provide batter help to the seekers.

h. As mentioned above the Patent Information offices are located in Nagpur, Mumbai, Kolkata, Chennai, and New Delhi. The charges for various Patent Information and Search Services and help for the business provided by the Patent Information Services (PIS), India especially the Nagpur-Centre are given below:

Reference: Patent Information System (PIS) Pamphlet- Nagpur: December 2003, and Web site on the Patent.

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Table: 21:18: Services provided by the Patent Information System (PIS):

SN	Service/ Information	Fees in Rupees	Additional charges in Rupees
1	State-of-the-art Search	2000/=	20/= per document reported
2	Bibliographic Search	500/=	5/= per document reported
3	Patent Watch Search	2000/=	20/= per abstract of retrieved patent
4	Patent Family Search	50/ family member	------
5	Legal Status Search	500/=	----------
6	English equivalent patent search	50/= for locating family	----------

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		member who knows English	
7	Technological Monographs	2000/= per year.	--------
8	Patentability search (Excluding Novelty)	2000/=	----------
9	Patent Infringement Search	2000/=	---------
10	Patent Validity Search (Including Novelty Search)	5000/= fixed till date	----------
11	Novelty Search	5000/=	---------
12	Technical Consultancy for R & D Organisation and Industries a. Initial Consultancy, b. For Detailed Report	500/= + 5000/=	----------

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13	Xerox copy of Indian Patent	30/=	------
14	Xerox copy of Foreign Patent	300/=	30/= per document.
15	Abstract Claim	25/= for each abstract /claim.	----------

More Recommendations: For more information on the Patents and patented parts of the cars can be obtained from the Web sites of:

1. European Patent Office,
2. Patent Sites of the countries like UK, France, USA, India, Japan, Germany, Netherlands, Russia, and Soviet Union.
3. The Car Companies having maximum patents to their name General Motors, Ford, Daimler-Chrysler, Toyota, Mitsubishi, Fiat and Volkswagen.

Standard Procedure to Start Export Oriented Car product Business:

The standard procedure is given below to start the Export oriented Car product manufacturing and selling Business:

Step 1: Naming the Firm in unique fashion having some meaning and which does not exists in any part of the world.

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Step 2: The entrepreneur may decide the constitution either partnership or private or the public or even the cooperative society.

Step 3: Registration in the state or union territory.

Step 4: Get the R BI Code number under the Foreign Exchange Regulations for the firm under whose name entrepreneur want to operate. Also obtain a permanent Income Tax Number from the Income Tax authorities.

Step 5: Next obtain the Import Export Code Number.

Step 6: Obtain a Registration cum Membership from Export Promotional Council, and obtain a Bank confidential Certificate, and Statement of Export they are valid for five years.

Step 7: If there is any mistake or any change in registration is observed is to be observed then it must be intimated within the span of 30 days to the CCI&E, Regional Licensing Authority and Registration Authority.

Step 8: Sales Tax Registration within the jurisdiction of the authority he is located.

Step 9: Central Excise Registration for the customs and the Central Excise Collector have to be obtained.

Step 10: Selection of Export Product has marketing dimension as well. It has following selection criteria:

a. Check the Export-Import Trends through the available Journals, or from the Monthly Statistical Journal, or from Export Promotion Councils/ Commodity Board, or from Indian Institute of Foreign

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Trade Development Authority, or the Director General of Commercial Intelligence and Statistics situated in Kolkata. Even user may refer all these nodes, which can give the details about the demand of that product in various countries.

b. The Entrepreneurs background and experience also plays very important role in this e.g. Highly technical background person go for the similar product where as others may or may not opt for the similar product.
c. The good working supply base in both the countries.
d. Product Adaptability according to he market requirement.
e. Service Facility availability from the dealers and distributors or agents is also important factor.
f. Good demand in the Target Market is naturally an important factor.
g. Then there should be stability in demand.
h. Check whether the product is in the negative list of the EXIM policy of that country. Otherwise there are some products, which can be freely exported.
i. Factor of Profitability in selling the product is very important. All the transaction right from the start to finish must be rechecked and rechecked before arriving any conclusion. Sometimes few transactions are done to get knowledge in other countries and for

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knowing the technologies and to build the friendship with other countries. So this is very crucial point.

j. Market Accessibility is also important, as few countries are partial or preferential in treatment some times.

k. Few countries cannot provide the export assistance hence those countries may be avoided.

l. Location of the country where the product is to be exported is very important.

m. The country, which must be preferred, also includes the countries having the product specifications very similar to the product that is made by you.

n. The country that has familiar Trading Practise should be preferred.

Step 11: Identify the products whether they are from the list of the Board of Trade. As Government of India, has identified 30 thrust items for exports on the basis of its assessment of their potential to attain annual growth rate of 30% in Dollar Terms. Out of them following are related to the indigenous car products which high demands:

n. Software Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM),

o. Complete Car or Vehicles of any types,

p. Car or other Vehicle Assemblies,

q. Spare parts and components of the Car or other Vehicles,

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r. Castings of any type including Car or Vehicle parts,

s. Internal Combustion (IC) Engine of the Car or the Automobiles,

t. Part of the IC engines of every type used in the cars or the Automobiles,

u. Hand tools and equipments used in fixing car parts or any other machinery.

Step 12: Then there are selective efforts, which are based upon the above-mentioned points, which can reduce the efforts, time, and money to be spent on the export. Of them most important are as follows:

a. Prospective Customer Selection and their Location,

b. Placing Agents, and distributors abroad,

c. Send the very brief letters about the product sales,

d. Send sample of exports,

Step 13: Export Price can be fixed on the following considerations:

a. The cost price of the raw material,

b. Manufacturing expenses,

c. Labour and other costs in the plant,

d. Processing and handling expenses,

e. Special Packing and labelling for the export,

f. Transportation Charges from factory to the godwon,

g. Transportation from the Godown to port or airport,

h. Port Commissioner's charge,

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i. Charges of insurance premium, export duties, wharf age and Port rage, cost of checking operations, export duties, to destination port,
j. Shipping freight,
k. Shipping agents fees,
l. Documentation charges and legislation fees,
m. Fiscal and Financial Assistance provided by the extended by the government, in the from of particular commodity or the products,
n. Other charges which may be required at any step or place for some purpose.

Step 14: Obtain a pre-shipment inspection letter or obtain a letter- Pre-shipment inspection not required for this purpose.

Step 15: Get the order for the product by satisfying the prospective customer.

Step 15: Check the terms and conditions set by the buyer for the products, sizes, specifications, quantity, sizes, specifications, delivery schedule, terms of payment, packing, labelling, marketing requirements, export inspections required if any, and check whether it for the product send as the sample or not.

Step 16: Processing of an Export Order for the kind of the order mode of payment and shipment.

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Step 17: Reservation of the Shipping Space according to the shipping schedule.

Step 18: Making Shipping Documents:

A. Though the format of the shipping documents is similar still there are number of shipping documents required to export a product. Of all these Shipping Bill is the main document required by the customs authority for allowing shipment. There are five documents of the ship:

a. Export Duty/ Cess,

b. Free of Duty/ Cess,

c. Entitlement to duty drawback,

d. Re-Report of imported goods, and

e. For shipment from one coast to another in the country.

B. Few more points to be noted are:

- Then there are shipping bills used for export of goods which neither attract neither any duty/ cess nor entitling to duty drawback on their exportation.
- Dutiable Shipping Bill is used in case of goods subject to export duty /cess but ay or may not be entitled to duty drawback.
- Drawback Shipping Bill or Bill of exports is the document to be filed with the land, which are entitled to drawback.
- Shipping bill for the Shipment Ex-Bond is for use in case of imported goods for re-exports and which are kept in bond.

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- Costal shipping bill is used for shipment of goods from one port to another by sea in India; hence it is not an export document.

C. Particulars to be given on the Shipping Bill are:

a. Responsibility of the Exporter and Clearing Agent:

- Put exact number of packages,
- Shipping Mark,
- Weight,
- Description and
- Value of the goods.

b. Responsibility of the Clearing Agents' Staff:

- Sign Shipping Bill on behalf of the exporter,
- Put Invoice,
- Packing List, etc.

c. In the Drawback shipping bill, rate and amount of drawback, serial and schedule number of item should be declared in the shipping bill. The account number of the SBI has to be obtained and put into the drawback claim copy.

d. During Physical Verification of the cargo in the port, the examination report has to be obtained in duplicate so that the report appears on the reverse of the drawback claim copy also.

D. Documents required for processing of shipping bill:

a. GR forms duplicate for all the countries,

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b. Four copies of packing list giving contents, quantity, gross and net weight of each package.

c. Four copies of invoices indicating all relevant particulars such as number of packages, quantity, Unit Rate, total f.o.b. / c. i. f. value, correct and full description of goods etc. One copy of this invoice is to be pasted to the duplicate copy of the shipping bill.

d. Contract, Letter of Credit, Purchase Order.

e. Inspection and Examination Certificate.

E. Processing of Shipping Bills: The Shipping Bills completed in all respects and supported by relevant documents when presented to Export Department is preceded as under:

a. The shipping bill are sorted, and distributed.

b. The scrutiny for the valuation, export restrictions, and ETC Licence.

c. The shipping bill thus scrutinised by the Appraising Officers / Examining Officers (AO/ EO) are put before Drawback Scrutiny Unit (DSU) for the scrutiny of Drawback claim if nay.

d. Shipping Bills after the counter signature of EO/ AO/ AC are sent to GR Clerk who will retain the original copy of the GR and shipping bill and return it to window clerk.

e. The GR forms thus retained are later forwarded to the RBI after they are registered for record.

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f. The original shipping bills retained by the department are forwarded to daily list section for noting down the particulars for publishing the same in the daily list of exports, and thereafter, the original copy moves to the Statistical Department of compiling statistics, and later forwarded to MCD/ DB department for noting down in the Export General Manifest and for the payment of drawback amounts.

g. Shipping Bills involving payments of duty or cess are forwarded by GR clerk to the comptist who check and certifies the amount of duty or cess recoverable, these are taken to the cash department for payment of duty. After payment of duty duplicate and other copies of shipping bills are returned to the agent for carting the goods to the docks/ air Unit/ Airport as the case may be.

F. Drawbacks: It is an incentive or relief given to the exporter to make his exports competitive in the world market. It enables the exporters to drawback to a possible extent the customs and the Central Excise duties paid in respect of the goods by the Government under section 74, 75, and 76 of the Customs Act, 1962, subject to some conditions. The rates and conditions are always prescribed earlier. In case number of cases are their there is provision for the Provisional Drawback only thing required is that the application for the drawback should proceed and not follow the shipment of goods.

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G. Octroi: Most of the goods brought into municipal corporation limits of any port say Mumbai are subject to levy Octroi. However few goods are exempted from this.

Hence their refund claiming is done within the six months of entry in the Municipal Limits through following procedures:

Procedure I: Claiming Refund of Octroi when already paid:

a. At the time of entry form A and assessment form and From B a Receipt of payment form are filled. Form A is retained and from B is returned.

b. At the time of Shipment form C is prepared and is collected by Clearing Agent.

c. Application of the refund of the Octroi is paid is made on form D in original and submitted to Municipal department, together with E form duplicate and copy of from B.

Procedure II: N Form procedure:

It is made when consignment meant for exports are to be cleared without payment of Octroi to which is made in triplicate. It requires the proofs till the last step is done.

Procedure III: Export Promotion form Procedure:

By filling up the Export Promotion (EP) form exporter can register himself with the Municipal Authority, which permits him to bring the goods for shipment without payment of octroi.

Procedure IV: Central Excise Waiving Procedure:

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By filling up the AR4 form in duplicate Central Excise authority which ahs due sign of Excise Superintendent who certify for the quality, quantity, and price the Central Excise Duty can be waived on the Export Goods.

Step 19: Maintaining well organised Export Documentation and its framework. There are four types of Export Documentation in this Framework:

A. Commercial Documents:

- Export Contract- inco terms,
- Five Invoices viz. Commercial, Pro-forma, Consular, Customs, Legalised.
- Payment Documents viz. Letter of Credit IX UCPDC, D/ P and Sight Bill, D/A and Bill Exchange.
- Transport documents viz. Bill of landing, Airway Bill, Combined Transport Document (CTD), Railway Receipt (RR), Postal Receipt, and Truck Receipt.
- Risk Coverage Documents viz. Marine Insurance, ECGC cover, Forward Exchange cover.
- Packing List,
- Warranty Certificates/ Cards,
- Product Literature.

B. Statutory Requirements:

- Custom Formalities about the shipping bill,

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- Exchange Control Rules: Code Number for Export – CNX form, GR form, PP form.
- Quality Control Certificate,
- Export Control Clearance,
- Quota Certificate,
- Importer/ Exporter Code Number.

C. Claiming Export Incentives:

- Duty Drawback,
- Central Excise Rebate,
- IPRS claim for steel subsidy if applicable.

D. Requirements of Importing Countries:

- Certificate of Origin,
- GSO Certificate of Origin,
- Consular Invoice,
- Legalised Invoice,
- Weight Certificate,
- Manufacturer's Certificate,
- Marking and Labelling Requirements,
- Chemical analyser's Certificate.

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Step 20: Manufacturing world-class product:

After this only thing required is manufacturing a world-class product using the procedure given in the earlier part of the chapter.

Step 21: Managing Export Finances:

A. The areas where Finance is exclusively needed after obtaining the export orders are:

a. Procuring Raw Materials and components and manufacturing the product,
b. Refinance facilities so as to get proceeds of export bills at the time of negotiation of export documents, soon after shipping the goods,
c. Availability of funds until the export benefits are realised.
d. Refinance facilities for long term credits offered for the export of products.

B. For Terms and Payment in Export the following are usual payment terms in any export transaction:

a. Payment by document credit,
b. Advanced payment,
c. Cash against document,
d. Document on acceptance,
e. Consignment basis.

C. Pre-shipment Finances,

D. Post Shipment Finances,

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E. Foreign Exchange Cover,

F. Managing the Risks involved in the Shipments. E.g. Export Credit and Guarantee Corporation (ECGC) issue Standard Policies, Specific Policies, Financial Guaranties, and some Specific Schemes.

Step 22: Keeping abreast with the latest:

The entrepreneurs must keep themselves always abreast with the present business and technological trends in the world. This is a continuous process otherwise the entrepreneur can get thrown away out of business. For this he must take part in the following worldwide activities:

a. Attain the conferences, seminars, workshops, exhibition and meets, trade-fairs of the Car and its technologies and management. It becomes easier if the person becomes authorised representative by joining the bodies like FICCI, FIEO, CII, and ASSOCHAM.
b. By carrying out the testing of his product in his country and also from the foreign bodies regularly.
c. Putting different advertisement of his product in different journals, newspapers, and other media.
d. Securing Samples of the competitors and upgrading his product regularly.
e. Studying the Market Research Reports of various car and automobile companies.

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f. By setting up R & D in his organisation and keeping this department always vibrant.

g. By upgrading the organisation for ISO 9000, ISO 14000, and OHSAS 18000 to meet the world standards.

Thus, in the indigenisation of car business, the businessmen, the technocrats, and beurocrats has to remain always alert to remain the world class in their field is need of the day. Especially in the indigenisation program of the car and its export oriented highly competitive business. Remember the car business is almost One Trillion Dollar Business in the world. If grabbed, even 10% part of the world car business around the world can put India on the technologically developed nation status in future.

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CHAPTER 22:

REQUIREMENTS OF FOREIGN INVESTMENTS REQUIREMENTS OF FOREIGN INVESTMENTS ONLY FOR THE PURPOSE OF INDIGENISATION

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22.1: Why this investment problem arises?

Observe the satellite channels. Keenly watch the programs like Super Structures, Technologies and Space Age programmed on the Discovery Channel. The major difference anyone can find is the technological development. It requires huge investments. It requires domestic investment for manufacturing most frequently required car parts indigenously in India. If this investment remains to be inadequate to manufacture all the parts in India to manufacture the car parts within the stipulated time frame then help must be taken from the foreign sources. As India is the developing country it can get the required funds from International Banks or from the any foreign developed nation sources. Also, India can raise part of the funds from the domestic sources.

Now let us see the Problems, Reason and the Solution of this problem:

Table 22.1: Investment required in the indigenisation of car-

Problems, Reasons and Solutions:

SN	Problem	Reason	Possible Solution
1	Requirement of Complicated Technology	a. There are minute intricacies in the smaller technologies. b. There are also big dimensions to deal with.	a. Few Indian experts in this field can utilise their expertise with minimum investment to develop these technologies. b. By bringing Technical Education in every college to

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		c. It requires moulding, casting, and equipments. It requires number of machineries to manufacture these complicated technologies.	international level can develop few more experts. c. Existing semiskilled workforces, managers and technocrats can improvise their skills through Executive Development Programmes (EDP).
2	Requirement of Giant Technological Set Up	a. Look at the giant plants or Assembly line plants to manufacture the cars. It requires huge area of land. b. It also requires the advanced technologies to do the job. c. It requires expertise as well.	a. Bigger jobs can be divided into smaller jobs. Thus, developing Vendors, Ancillary units, SSI and MSI. b. Advanced technology can be developed in number of factories. c. Thus, huge investment can be divided into smaller investments.
3	Requirements of Domestic	The money flow is within India by the	a. Raising money through shares.

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	investments.	Indians but less people are investing in this business.	b. Investment through LIC, IDBI. c. Investment by the indigenous companies like Kirloskar, Mahindra, Tata Inc. Etc.
4	Requirement of Foreign Direct Investment (FDI)	The MNC like BMW, Toyota, Mitsubishi, Daimler-Chrysler, and Suzuki have shown interest in investment due to huge market potentials.	Letting them invest but in collaboration is the policy of the Indian government. It is correct. Wherever required it is been done at present. However one cautious suggestion is when these companies are investing USD 700 million or so in Indian land they will try to exploit the resources as happened in Indonesia, Mexico, Argentina, and Malaysia. They earn minimum ten times more than what they invest within the span of a decade. Still, as India needs the exposure of the

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			technology in the car sector at the moment hence, it's a good decision. However, Built Operate and Transfer or Selling the whole technology at relatively cheaper cost has not yet happened in the FDI. Which is the need of the hour. Otherwise, Tata Motors, like companies will take one more decade to role out indigenously built luxury cars in India. Thus, foreign investments are coming direct from the Car companies of the world repute into the Indian market and Indian government is welcoming it at the moment.

22.2: Why Foreign Investments? :

First preference is Indian Organisations should invest.

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However, Indian Government has allowed the foreign investors to invest up to Rs. 100 Crore since Annual Budget 2003. Hence, let us know this factor in details.

Peter Drucker said, " Increasingly world investment rather than world trade will be driving the international economy. Exchange rates, Taxes, Legal Rules will become more important than wage rates and tariffs". (Reference: Managing for the Future)

It happened after 1980s in the following manner: {All the statistical references in this chapter are taken from UNCTAD's World Investment Report and Organisation for Economic and Development (OECD)}:

1. The economic liberalisations swept across world.

2. Significant changes occurred in the international private financial flows.

3. The massive inflow of international money has substantially improved global productions,

4. There is phenomenal growth in the job generations especially in the services and marketing sectors.

When major reasons were analysed it was observed that the ratio of world foreign investment to global domestic investment increase from 2% in 1970s to 14% in 2000s. Similarly, the ratio of world foreign investment to world GDP increased from 5% to 16% during this period.

The types of foreign investment were in the form of:

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1. Foreign Direct Investment (FDI): In this a foreign country investor can retain control of his investment. FDI in turn is possible in two forms:

a. Green field investment: By establishing totally new wholly owned project in foreign market,
b. Joint venture: Joining hand with the domestic company there can be a joint venture.
c. Merging and Acquisition: This has become the major investment driver in many countries.

2. Portfolio investment: There are mainly two routes of portfolio investments in India:

a. This investment is in the form of Foreign Institutional Investment (FII). It is in the form of Mutual Funds, Shares, Debentures and Warrants and government of India has liberalised this policy allowing investing the foreign companies in the stock market listed and unlisted stock companies in 1996-97. This investment can be in the government and non-government organisations. This has become an important determinant in the foreign investment in the stock market in India. This, is also been happening in the Car industries. As Suzuki bought Rs. 1000 Crore stake of Maruti to raised its investment from 51% to 54.2%.
b. Through Global Depository Receipts (GDR), American Depository Receipts (ADR) and Foreign Currency Convertible Bonds (FCCB).

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22.3: Advantages put up by World Bank in 2002 of the foreign Investments observed worldwide:

In the Car sector in developing as well as the developed countries following advantages have been observed:

a. Foreign investment transfers the load of possible threat of the investment from totally domestic front to the foreign investors as well.
b. Repayments are linked to profitability of the underlying investment, where as under debt financing the borrowed funds must be serviced regardless of the project costs.
c. Any many countries it is very much observed that foreign investments in particular foreign direct investments (FDI) is the only capital inflow that has been strongly associated with the higher GDP growth since 1970.

22.4: Factors Moving Foreign Investments:

In the car industries worldwide following are the major factors that can determine the dynamism of the foreign investments in the host country:

1. Policies for the foreign investments:
    a. Economic Stability,
    b. Social Stability,
    c. Political Stability,

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d. Rules for the entry of the organisations,

e. Rules to carry out daily tasks,

f. Standards of treatment of foreign affiliates,

g. Market policies,

h. Structure of the market,

i. International agreement on the foreign investments,

j. Privatisation policies,

k. Trade and Tariff policies,

l. Coherence of foreign investments and trade policies,

m. Tax System.

2. Business Facilitation:

a. Investment promotion for:

- Image building,
- Investment generating,
- Investment facilitation services.

b. Investment incentives,

c. Hassle Costs related to administrative efficiency,

d. Social Amenities:

- Language of teaching in the schools,
- Quality of life, etc.

e. After investment services.

3. Economic Determinants:

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a. Market Looking for Foreign investments:

- Market size,
- Per capita income,
- Market growth,
- Access to regional market,
- Access to global market,
- Country specific consumer preferences,
- Structure of the markets.

b. Resources/ Asset- Looking for foreign investments:

- Raw material availability,
- Lower cost of unskilled labour,
- Skilled work force,
- Brand names,
- Technological assets,
- Firms and clusters,
- Innovatory other created assets including embodied in individual and companies,
- Infrastructure facilities:
    - Ports,
    - Roads,
    - Power,
    - Telecommunications.

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c. A strong Local currency,

d. Freedom of activity in the market,

e. An effective government,

f. A large and growing market,

g. Property rights and protection,

h. Ability to remit profits, dividends and interests,

i. Freedom to act between markets in that country and outside,

j. Availability of high-quality factors of production,

k. Efficiency required -for looking for foreign investments:

- Productivity of the labour resources,
- Assets looking for foreign investments,
- Costs of resources,
- Assets listed in the resources,
- Cost of intermediate products,
- Cohesiveness of the regional integrated agreements and membership of that country,
- Relationship with the neighbouring countries,
- Other input costs:

  -Transport, and

  -Communications.

22.5: Recent Trends in the foreign investment a global review:

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Since 1980s it has been observed that in USA, Japan, Europe, China and India foreign investments are increasing rapidly.

In the year 2000, it was USD 1490 billion was inflow of money in the global market due to foreign investments. Of these USD 238 Billion was in the developing countries.

Where as in the year 2001, the same flow was global-USD 735 and developing countries-USD 204.

Due to following factors it has been observed that foreign investments are been welcomed every where in the world:

a. Policy Liberalisation and opening up of national markets,
b. Rapid Technological changes, and
c. Increasing competition-forcing firms to explore new markets to enhance their efficiency.

Table: 22.2: Worldwide foreign investments in specified regions:

Reference: UNCTAD, World Investment Report 2002.

SN	Year	Developed Countries	Developing Countries	Europe
1	1986-90	82.4	17.5	0.1
2	1991-92	66.5	31.2	2.2
3	1993-98	61.2	35.3	3.5
4	1999-02	80.0	17.9	2.0
5	2001	68.4	27.9	3.7

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With the reference of Organisation for Economic and Development (OECD), March 2003, Report, the major inflow and outflow of the foreign investments during this period was in the following countries.

a. Canada,
b. France,
c. Germany,
d. Italy,
e. Japan,
f. UK, and
g. USA.

22.6: Foreign Investments in India: UNCTAD March 2003 Report:

In India, the foreign investment was USD 3.5 Billion in the year 1997 and in the year it is USD 6 Billion. The only downfall observed was in the year 2001whenit was only USD 0.6 Billion.

From the new policy analysis it is observed that the industries are divided into following categories:

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Table: 22.3: Category of investments in India:

SN	Percentage of investment
1	Up to 26%
2	Up to 50%
3	Up to 51%
4	Up to 74%
5	Up to 100%

Though it has been observed that top three industries attracting foreign investments are:

1. Tourism,
2. Telecom, and
3. Agriculture.

Automobile is also is not behind.

22.7: Investments in the Indian Automobile Industry:

Of these since, 2002, Maruti-Suzuki has seen the investment of 54.2% by the Suzuki from Japan. Thus, it has been cleared that in the field of Automobile sector foreign investment can be more than even Rs. 100 Crores.

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Hence, more number of world car giants like Volkswagen, Volvo, BMW are taking interest in investing in India after Daimler-Chrysler, Toyota, Suzuki, General Motors, Ford and Fiat.

This will introduce new technologies in India and the citizens will get exposure to the way of working with these companies and global exposure as well.

Slowly exposure to new technologies will boost the local R & D and will develop the new technologies in India. Thus, ultimately indigenisation will get the boost. As foreign technologies in the car are costly affair and localising those technologies through proper R & D will be a cheaper affair and will boost the total indigenisation of car sector due to cheaper demands of technologies by the local customers.

Hence foreign investments are no problem for this particular project of course, as ultimately Indians will be repaying the debt/ loan / investment honestly in future.

Rest of things are discussed in various chapters on this topic according to the need of the situation.

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CHAPTER 23:

PRESENT COSTS AND ESTIMATION OF MANUFACTURING MOST FREQUENTLY REQUIRED CAR PARTS INDIGENOUSLY IN INDIA AND TOTAL PROJECT VIABILITY

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In this chapter, every kind of technical calculation shows that the indigenously manufactured car parts may be of basic technology type or middle ware technology type or higher end technology type estimated for lesser cost. After manufacturing also its costing shows the true result. It is also lesser cost than its counter part the foreign made part. However, only thing required is the maturity of the manufacturing industry in manufacturing these car parts.

Given the List of Financers (Government non governmental organisations) for manufacturing car part indigenously lot of manufactured can come forward for this indigenisation purpose.

Comparing the cost sheet of the two companies each from USA, UK and India.

After, finding out the average cost of the similar kind of vehicle sold there and in India, proves that India costs cheaper and can won the race. Indian labour is cheaper and at the same time is skilled enough to handle the jobs of these kinds.

Comparing the cost of milling, honing, turning, thread cutting, chipping, forging, casting, stamping, painting, rubber, upholstery, copper, steel, manual labour, etc. and prove India is the cheapest and the best.

Comparing the Profit and Loss Account and Balance Sheet of the similar level companies, prove India is the best among all. That is why Automakers around the world prefer India for Business Process Outsourcing (BPO).

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PART 1:

Carmakers around the world think India is a Viable option:

Day by day it is been thought around the world that it is the second biggest market in the world with cheap labour and other resources. Adding stuff is the economic stability and the biggest democratic republic. From this angle only lot of carmakers around the world are entering by all the means in India. Recently BMW, Mercedes, Bentley have also decided to sale their product in India. Infact BMW is about to set up its plant in India. Mercedes has already started their working in India.

Table 23.1: Carmakers around the world prefer India for their Business Process Outsourcing (BPO):

Reference: Business world: 13th October 2003 pp 20.

SN	Country	Associated Car Organisations	% Respondent to various countries
1	USA	Ford, GM, Daimler-Chrysler, etc.	India 24%, China 15%, Mexico 13%
2	Japan	Suzuki, Honda, Toyota,	India 24%, China 15%,

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		Mitsubishi	Mexico 13%
3	Germany	Daimler-Chrysler, BMW, etc.	India 24%, China 15%, Mexico 13%
4	Korea	Hyundai	India 24%, China 15%, Mexico 13%
5	Italy	Fiat	India 24%, China 15%, Mexico 13%
6	Czech Republic	Skoda	India 24%, China 15%.
7	Sweden	Volvo	India 24%.

Thus why to become a cheaper BPO, instead Indians must design, and develop those parts as fast as the market requirements are and thus become a global giant in this field.

PART 2:

Comparative Cost of Few important Car Manufacturing Activities:

The comparisons mainly show that any part even manufactured at relatively cheap cost in the parent country costs very much high in India due to

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difference in economies and standard of living and the steps involved in the manufacturing.

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Table 23.2: Approximate Comparative cost differences of manufacturing in India and USA and Japan:

Reference: Independent and Unique research on these activities.

(**Special Note:** All having Same Finishing, Same Sizes, Same Quantity, and Similar World Standards. As ultimately Indian customer pays it in terms of rupees. Data is collected from various mines and manufacturing plants and from Daily Economic Times' time-to-time review of prices of the metal, etc.)

SN	Manufacturing Activity	Cost in India (Rs./$-USA Dollar)	In the source Countries (Rs. / Dollar)
A	**Material Extraction**		
1	Iron Extraction	Rs.14/$ 0.3	Rs. 100/ $2
2	Copper Extraction	Rs. 50/ $ 1	Rs. 250/ $5
3	Aluminium Extraction	Rs. 28/ $ 0.5	Rs. 200/ $4
4	Making proper Steel Alloy	Rs. 20/ $0.4	Rs. 150/ $3
B	**Casting Cylinder Block**	Rs. 26000/ $ 500	Rs. 50000/ $1000
C	**Forging Crank Shaft**	Rs. 1500/ $30	Rs. 10000/ $300

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D	**Stamping**	Rs. 25/ $ 0.5	Rs. 100/ $2
E	**Machining**		
1	Chipping on Lathe	Rs. 25/ $ 0.5	Rs. 100/ $2
2	Turning on Lathe	Rs. 25/ $ 0.5	Rs. 100/ $2
3	Milling	Rs. 25/ $ 0.5	Rs. 100/ $2
4	Honing	Rs. 25/ $ 0.5	Rs. 100/ $2
5	Polishing	Rs. 25/ $ 0.5	Rs. 100/ $2
F	**Chemical Products**		
1	Painting	Rs. 100 to Rs. 1000/ $ 2 to $20.	Rs. 100 to Rs. 100000/ $20 to $2000.
2	Rubber tubes	Rs. 500/ $10	Rs. 2500/ $50
3	Plastic Coatings	Rs. 1500/ $30	Rs. 5000/ $ 100.
4	Petrol	Rs. 10/ $0.2	Rs. 50/ $1
5	Diesel	Rs. 10/ $0.2	Rs. 50/ $1
6	Oil	Rs. 10/ $0.2	Rs. 50/ $1
7	Coolant	Rs. 10/ $0.2	Rs. 50/ $1
8	Defroster	Rs. 15/ $0.3	Rs. 75/ $1.5

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Table: 23.3: Electronics (Autotronics and Mechatronics) Assemblies to be made totally indigenous in India:

SN	Electronic Products	Cost in India (Rs./$-USA Dollar)	In the source Countries (Rs. / Dollar)	Estimated Cost in India if Indigenised (Rs. / Dollar)
1	Liquid Crystal Diode (LCD) Screens for the Control Panel	Indigenously Not at all manufactured in India	Rs. 125000/ $250	Will be reduced significantly
2	Computerised Fuel Injector System	Indigenously Not at all manufactured in India	Rs. 67000/ $1800	Will reduce extensively
3	On board Diagnostic System (OBD)	Indigenously Not at all manufactured in India	Rs. 125000/ $2500	Will reduce drastically
4	Microprocessors	Indigenously Not at all manufactured in India	Rs. 25000/ $500	Will reduce at some extent.

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Table: 23.4: Comparative Costs of Few important Car Assemblies:

(Same Quality Finishing, Same Quantity, Similar World Standards)

SN	Major Part or Assembly of the car	Cost in India In Rs./ Dollar	Estimation in Other Countries for the same product In Rs. / Dollar
1	Engine of car	Rs. 1,20,000/=	Rs. 2,19,000/=
2	Gear Box	Rs. 40,000/=	Rs. 1,20,000/=

PART 3:

Section 1: Viability of the indigenisation of car project from every car parts point of view:

Following is the one more comparative study of the few most important car parts. This comparison is self explanatory in the table still few points will find their description later. The table proves that it is the viable project in case the manufacturing technology reaches the maturity.

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Table: 23.5: Comparative price difference between American manufactured part and Indian manufactured part of same sizes and qualities:

SN	Name of the few Part to be Manufactured in India	Production Procedure	Production Prices in USA in USD/ Rupees which Indians pay	Production in India in Indian Prices which Indians pay	Of car-parts MFG in India
1	Tyres	Special	$100 (Rs.5000/=)	Rs.1500/=	1. For Castings: Experts advise: "Indian industrialists, to compete with the global market keep
2	Tubes	Pulverizing etc.	$15 (Rs.750/=)	Rs.200/=	
3	Piston and Rings	Forging & Machining	$200 (Rs.10000/=)	Rs.9000/=	
4	Fuel Injector Assembly	Forging & Machining	$1000 (Rs.50000/=)	Rs.22000/=	
5	Clutch Disc Assembly	Casting	$700 (Rs.35000/=)	Rs.30000/=	

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6	Carburettor Gaskets	Special	$5 (Rs.250/=)	Rs.200/=	your aim to manufacture all world class Products. May it be Gears of G.B. or any other car parts".
7	Injectors	Forging & Machining	$25 (Rs.2500/=)	Rs.500/=	
8	Spark Plug	Special dies	$10 (Rs.500/=)	Rs.60/=	2. For Forging manufactured parts: Experts feel Indians should master in this field and
9	Brake Fluid	Ethylene glycol liquid	$25 (Rs.500/=)	Rs.200/ Litre	
10	Rubber Seals/Washers	Special Pulverizing	$2 (Rs.100/=)	Rs.20/=	
11	Petrol Pipes	Casting	$25 (Rs.2500/=)	Rs.700/=	

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12	Distributor	Special dies	$50 (Rs.2500/=)	Rs.1000/=	must produce International standard products. Metallurgical aspects will be taken care as it decides quality of the product.
13	Electrical Wires	Drawing metal	$2 (Rs.100/=)	Rs.25/ Meter	
14	Hose (Pipes)	Special method	$100 (Rs.5000/=)	Rs.2000/=	
15	Radiator Pipes	Casting	$10(Rs.500/=)	Rs.100/=	3.For the Special Method Adopted for the manufacturing: Experts feel that the method
16	Bleeder pipes	Casting, machining	$5(Rs.250/=)	Rs.20/=	
17	Wheels	Forging & Casting	$200 (Rs.10000/=)	Rs.5000/=	
18	Inlet Valves in Engine	Forging & Casting	$50 (Rs.2000/=)	Rs.1000/=	
19	Valves in Tyre-Tubes	Forging & Casting	$10 (Rs.500/=)	Rs.100/=	

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20	Condensers	Special method	$50 (Rs.2500/=)	Rs.500/=	must be Indiginize to suit Indian conditions and according to that further research must be Carried out and product be Developed for total Indian Conditions.
21	Cylinder Head cover	Casting	$100 (Rs.5000/=)	Rs.1500/=	
22	Dynamo Pulley	Casting	$50 (Rs.2000/=)	Rs.800/=	
23	V- Belts of Pulley	Special methods	$25 (Rs.2500/=)	Rs.250/=	
24	Steering Box	Forging & Casting	$25 (Rs.2500/=)	Rs.1000/=	4. Experts are of the opinion that New
25	Steering Gear	Forging & Casting	$25 (Rs.2500/=)	Rs.1500/=	

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26	Nut	Forging & Machining	$1 (Rs.50/=)	Rs.5/=	methods, procedures, Alloys, etc. will be developed Once India start manufacturing.
27	Screw	Forging & Machining	$1 (Rs.50/=)	Rs.5/=	
28	Exhaust Valves (Engine)	Forging & Casting	$25 (Rs.2500/=)	Rs.1600/=	

Interpretation of the Table:

Ultimately Indian customers pay in terms of rupees. Hence the conversion and the prices have their significant meanings. Also, all the values are the latest seen from the Catalogues, World Car Guide 2001- Daily Express, 47th Edition, Pedigree, UK, for all the companies in the world.

Section 2: The cost of Indigenisation:

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

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

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

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

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

Section 3: Question: Is the project Viable?

Answer: Yes.

Certainly, when it comes as a challenge to the national pride Indians can make the whole car. Researcher can even claim for many breakthroughs in this field if Indians enter in this field. Indian can make a car relatively at

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cheaper cost than what MNC are doing. In India all the overheads, developing techniques always cost lesser than what the Western, Europeans, and Japanese charge.

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

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

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

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

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2. When it was thought HR Development program and EDP or even to train and improve skills of the technicians, Indian spending are usually one fourth chargeable than what their Western and Japanese counterparts do.

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

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

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

Section 4: For making the car indigenisation project viable Synergistic efforts are required: The major possible involvements, expectations and

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considerations in the cost of the indigenously built car and its technologies. United efforts of all the concerned Indian, especially efforts from:

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

- Design: Zero Technologies to Higher End technologies,
- Drawing: Simple parts to complicated parts in three dimensions,
- Product: Design, development, manufacturing and servicing,
- Marketing: It more than selling is yet to be conceived in India,
- Commerce: Of Indigenous cars, supporting products and services,

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- Costing: To make Indian indigenous products cheap but better,
- Metallurgical: From basic part development to the process,
- Development: Product must be developed at par with latest trends,
- Kaizen through TQM and TPM: To achieve better quality at cheap cost and better other supporting services.

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

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

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

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

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

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

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

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

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

10.Look at the chart One and Two: If the Universities, Institutes, and the Industries go hand in hand Indians can achieve miraculous improvement with its knowledgeable people to perform the various important tasks. To be precise these people can make this result oriented project a huge success. Such is the prime concern I'm giving to this educated class of people.

The job will be given according to their expertise. Few will be trained at the time of preparing Prototype others will be learning with quick succession. A huge batch will be trained for the newly developed indigenous car parts and cars and their servicing and repairs.

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Table 23.6: Chart One: Categories of modified Automobile Courses:

Showing Universities and Colleges Offering Automobile Courses:

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

SN	Course Title	Pre-Qualification Required	Hierarchical Rank offered at the entry level and trained for indigenisation
1	(ITI) ITI Diploma	SSC/10th std.	Workers trained for repairing developed parts
2	(DE) Diploma Engineering	12th or ITI	Will be trained for repairing, designing, servicing the parts
3	(BE) Bachelor of Engineering	12th or DE	Service Engineer- These will supervise the job of above people and will suggest further improvement if any.
4	(ME / MTech) Master in Engineering/ Technology	BE or BTech	Actual Implementation of Designing & Development, which Ph.D. people plan.
5	(PhD) Doctor of	MTech / ME	Planning for Research and Development at Strategic

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	Philosophy in Engineering		Level of core technology and management.
6	(D.Sc.) Doctorate of Science in Engineering	Ph.D. in Engineering or equivalent honorary work	Extraordinary Contribution in Engineering- in work, invention, or discovery new ways of manufacturing, designing, etc.

Special Mention: Industries also can afford and offer the specific job-training course for the newly appointed employee in its organisation. This program ranges from few days to a week or to few weeks depending upon the requirement of the skills of the employee to be developed. This will also be developed using latest technologies using latest world standard systems.

Special Comment: If these DE, BE, BTech, courses are made as such that there are projects of six months and six months theory they can become result oriented. Also at the final year BE project, Final year Post Graduate Project, Projects are made result oriented then these kinds of projects will get a face-lift. If free hand be given for the implementation of the PhD and D.Sc./ D.Litt. Projects then it will fetch better results. Even India can grow at faster rate.

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This is the best procedure for the young Technocrats involved from ITI to IIT and PhD to DSc/ D. Litt. for feelings of fulfilled dreams to contribute to the nation and humanity as whole.

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TABLE 23.7: CHART TWO: MODIFIED Colleges, Strengths, and Job allotted with same facilities to Urban and Rural technical colleges/ institutes:

SN	College	NCI	SOC	Colleges: Urban/ Rural	Job Allotted
1	ITI Government	20	20	Good Facilities	Actual repairs
2	ITI Private	25	20	Good Facilities	Actual Repairs
3	DE Govt. Polytechnic	10	30	Good Facilities	Finding Problem
4	DE Private Polytechnic	5	30	Good Facilities	Finding Problem
5	BE (Government + Private) Automobile	5	60	Good Facilities	They will do the basic designing
6	MTech (IIT)	5	60	Excellent facilities	Modify design
7	MTech/ ME REC+ Private	20	8	Excellent facilities	Modify design/ process
8	MTech /	2	8	Good facilities	Not Applicable

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	ME Private Colleges				
9	Ph.D. (IIT)	5	Not Specified	Excellent facilities	Bring innovative technologies
10	Ph.D. REC+ Government and others	20	Not Specified	Excellent facilities	Bring innovative technologies
11	DSc/ DLitt	NS	NS	Excellent	Breakthrough

Interpretation of the Charts 1 and 2:

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

2. Diploma in Engineering: This course is offered to the students who have cleared ITI or passed 10th standard or 12th standard. They will do the above-mentioned job.

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

i. Vishwakarma Institute of Technology, Pune.

ii. Bansilal Ramnath Charitable Trust, Pune.

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iii. Kasegaon Education society's College of engineering and Polytechnic Sakharale, Taluka Walva, District Sangli, City Sangli, Maharashtra State.

iv. Terna Institute of technology, Ternanagar, District Osmanabad, Maharashtra state.

v. Madras Institute of technology, Chennai, Tamilnadu state.

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

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

11. Importance of the higher up Institutes and organisations:

Institutes like Indian Institute of Technology (IIT), and also Indian Institute of Management (IIM), Automotive Research Association of India (ARAI), Pollution Control and Research Association (PCRA), Institution of Engineers (IE), Indian Cost Accounting working Association (ICWA), Indian Finance and Cost Accountants (IFCA), Confederation of Indian Industry (CII), etc. and these organizations can do lot of breakthroughs individually, one of them can be as follows:

IIT Professors pursue lot of research with the help of students and assistants in the field of the automobile. These research-scholars must get the support to go ahead for implementations in the factories of the

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Indigenisation program. Similar is the case with hundred and fifty odd Engineering colleges. If the wild idea of designing and developing all the intricate parts of the Automobile united with the help of students as a part of final year project is implemented then whole of the project can be achieved in one year itself, provided all technical institution take part by division of parts done judiciously.

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

ARAI approves the Automobile products developed by the individual organizations or individuals in India with its final testing. The Engineers and the Scientists at the ARAI have shown interest in this kind of project when contacted and are ready to go ahead with this kind of challenging projects. They are ready to pass the well-designed car parts to the international norms.

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

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

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

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

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

12. When can it be done?

The earlier the better is the proper answer.

If Indians start coming together for this common cause of Indigenisation program at there earliest the better it would be. As, in the market the car that gives consistent performance with early market capture generally dominates the car world. This has been the worldwide experience since last few decades, so Indians must come out with a grand small car with best design with the most factor of safety in all the parts with the most economic

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advantage to the Indian people and for others too while the Indians export it.

13. Which departments need to be concentrated more?

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

The Individual Planning of each concerned organizations: The organizations taking part in this program must give their own plans. As the LMV are made up of almost 30,000 distinct parts, and each part requires its unique manufacturing set up which will be done by these organizations, may it be vendors, SSI, MSI, ancillary units, or sub vendors.

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

14. Where is the special attention required?

Quality norms, International standards, and India's all terrain multi weather aspect be given special attention and followed well by each and every manufacturer. Availability of quality labs, performance checking labs,

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to check these criteria must also be given importance for making it as a well groomed habit to all concerned.

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

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

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

15. How can it be made possible?

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

2.The knowledgeable people in this field of small cars should come together. They must realize the loss the nation is suffering due to over dependency in the field of cars on the other developed nation or on the highly exploitative MNC car manufacturers. The researcher made a survey in which he found

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that once the crux of the project is known many are ready to contribute to this project.

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

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

5.Look at the difference in the Prices of the Iron, Bronze, Brass, Copper, Aluminium, Plastic, Rubber, Glasses, Paints, Labour, Forging, Casting, etc. Everybody will find the huge difference in the Europeans, American, and the Indian Prices. When compared the prices of the same cars, which are

manufactured in US, European countries comes down to almost half. Infact, on this date TISCO are the cheapest Steel manufacturing empire in the world. (Hindustan Times- New Delhi- 10 December 2001). Almost same is the case with all the other metals and materials, that are required for the manufacturing of LMV.

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

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

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

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

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Section 5: Viability to Customers from the indigenous cars:

Indigenous cars will give customers:

a. The car truly made in India from design, development, and idea conception point of view.

b. It will give the business transparency of the company in India itself. As maximum internal customers will be from India only.

c. India will be developed at the techno-socio-economic point of view as the employment generation will be huge and thus car buyers will be more.

d. More the car buyers more the percolation of knowledge of technologies to the grass root level in the country.

e. More indigenisation means more R & D and hence more benchmarking and technical spin-off and hence up gradation of the industries and institutes in all the fields.

Point A. Is the project viable for the customers or not can be the first and the last question asked in all these efforts and that too time and again. Hence the table of content in the following form:

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Table 23.8: Customers' Advantage in Research of making and buying indigenous cars:

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

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			MNC owners seating in the host foreign countries, hence affects the Indians.	program must always help the Indigenisation of small cars program.
		3.Market share analysis	Any kind of piece of share the MNC gets is but loss to the Indians as it is but the dependency bought as discussed earlier.	More the market share in cars is taken by the indigenously built car more is the expansion of the economy at various fronts and more the advantages the customers get
		4.Internal employee studies: morale, communicat ion, etc.	When, more the employees are trained they try for more market share thus	When, Indigenisation of small cars program train more the employees they will try for more market share thus helping the

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			helping the MNC for their profits and uplifting the product, productivity, proficiency, profit, performance, and customer satisfaction.	organization to grow its profits and uplifting the structure of the product, improving productivity, proficiency, profit, performance, and hence customer satisfaction which mostly will be Indians.
B	Pricing	1.Cost Analysis	Studies show that, Cost of the foreign built cars of any type will always be 40% more than their Indian counterpart with the same	In the total indigenisation of small car program every penny paid to develop the product and procedure and services of small car goes to the Indian citizen only. At every level Indian costs are much less than its counterpart American

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			criteria. If taxes are levied then it will be almost twice as much as what Indigenously built cars will have.	or European car products, services and its makers. May be it is even more when Rupee to Dollar conversion and tax levied are taken into considerations. Therefore, indigenisation increases the cost benefit to the Indian consumers.
		2.Profit analysis	Where as the MNC carmakers grows their roots in that country by gaining	When profit of the Indigenous carmakers increases any further growth increases the job potentials, growth in the Indian market, technological advances,

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			growth and sustainable profit growth. Much of the part of profit is siphoned out of India. This profit utilized in growing company and increasing Hi-Tech machineries and reducing jobs for the Indian Indigenous people.	increase in the R & D investment hence futuristic growth. Some more market segment gets uplift. Consumer will get more benefits at the same prices what they are paying today.
		3.Price elasticity and	In the present worldwide recession in	Always maximum the Indian made parts in the small car lesser is

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		competitive pricing analysis.	the market capturing the market, keeping the customers loyalty, more servicing facilities, affects the prices. The prices are it s lowest possible ebb, for the long run benefit of the organizations involved in various tasks of cars sales and servicing.	the price. E.g. Tata-Indica the maximum Indiginize car is priced Rs. 3,29,000 where as its other counterpart at the same level is more by Rs.50000 at least. Thus, more the indigenisation of every part of the cars more will be the price benefits.

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		4.Demand Analysis: a. Market potential, b. Sales Potential, c. Sales Forecasts.	India is looked as highly potential market due to lucrative high population of consumers. So, various techniques are used to increase unwanted increase in demands. a. Potentially people earning more than one million has tripled since last four years	Indigenously built cars will not only fulfil the demands but also improve the manufacturing capabilities of the Indian manufacturers. Dramatic improvement in the cars quality and number of manufacturing. a. Potential Market of these one million sells in the cars will also increase the abilities of other dependent avenues of cars. b. Early Indians start manufacturing the whole cars indigenously earlier they will reach the

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			in India. Indian are brand loyal, so these MNC try to lure these people through various surveys to advertise their mutual benefits b. In the event of GDP growth of 6.5% and industrial growth of more than 8%, increase in the sales potential of cars market	manufacturing ability of one million per annum. Thus benefiting the Indian consumers. Similarly, market will show always-pulsating Indian economy. c. So, Government and the other decision makes must seat together and plan the future of Indian on this crisis and encourage indigenisation of the small car. May be 10th five year plan concentrate more on indigenisation of Technology of small cars and allied fields. This will improve

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			will touch the demand of almost 1.5 million. At present, no Indian company can manufacture so many cars in a year where as MNC can take advantage of it. Much loss to the Indians. c. Sales forecast shows that for the cars sales is going to increase and	satisfaction level of Indian consumers with increase in technological advances.

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			it may reach one million mark by the next five year plan of 2002 to 200 7. Again, the MNC benefits will add the woes to Indian economy.	
C	Product	1.Concept developmen t and testing,	MNC cars use various business techniques to help their so-called technologicall y advanced car concept grow. Many	Concept of fully Indiginize cars or any other Hi-Tech product must be given very much importance. If not internal customers and consumers must demand for indigenisation. As ultimately mutual

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			give test ride to the potential consumers and let them compare with the any other car product. The car that is already a successful product in the EU, Japan, or USA is brought in the Indian market but shows little benefits to the Indian consumers and conditions.	growth is the only way to sustainable growth of the country, which is possible through thorough indigenisation of cars only.

		2. Brand name generation and testing,	MNC actually make a contract with world famous Indian personality like happened with Hyundai-Santro, Shaharuk Khan was given contract, and Brand name has increased the sales due to his popularity. The advertise mentions that it is owned by this popular	Whereas if Brand name is generated by the Indian counterpart the benefits goes to the indigenous people only. Right from the Advertiser to the manufacturers and consumers are indigenous Indians. While testing and more testing improves the quality performances generating systems in the organizations. It gives more exposure to the Indian technocrats and the marketers. The next generation consumers get benefited due to these kinds of Brands. The

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

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

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	Network	location studies.	are kept normally in the plants' main warehouses only. Suzuki and other MNC have big warehouses to accommodate cars more than 25000. Till today MNC has not given more importance to number of stratified locations in the distribution channel.	of Tata Indica car very well in advanced and has made ware houses very well equipped. Infact it has the best Distribution Network in India. Number wise also Tata Engineering has the most number of stratified as well as localized distribution network.

		2. Channel performance studies.	As MNC has less number of exposures in distribution network, it takes a week to each the vehicles in the hands of customer, if the available stock is over.	Tata has never faced this problem since 1990, when they reached 300 small and big distributor numbers in India.
		3. Channel coverage studies.	There are only 22 distributors of Daewoo in India, 50 Hyundai distributors, 302 distributors of Suzuki, 20	If local manufacturer like Tata Engineering produces the car then it gets more than 500 distributing destinations and roadside garages at almost at every 20 kilometres on the highways.

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			distributors for Ford and GM, too.	
		4. Export and Internationa l studies.	MNC lead at this front but when it comes to pricing, they value their car at the international price tag thus Indian customer and Government suffers the most.	If Countrymen manufacture the car and export it the return from it gives the Government most valued foreign currency. If the product is very good then international acclamations gives boost to the overall export to other products too.
E	Promotion	1. Motivation research.	MNC are very experienced in this area of research. Not	Local manufacturers have started all the kinds of things MNC adopt but at lesser

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			only monetary but also at all the levels internal and external customers are motivated for the achievement of further goals. Many a times customers have to pay price for it also.	costs.
		2. Media research,	MNC adopt every new kind of thing to promote their product.	Indigenous companies do the same things but at the lower costs from every angle.

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			Price of course has to be paid by the customers only and at a higher rate, too.	
		3. Advertising effectiveness and Competitive advertising studies.	With the huge monetary backgrounds the MNC pay millions of rupees to the most valued personalities in that country. These personalities include Sachin Tendulkar,	Though the local companies cannot pay but they are trying to fill the gap between the MNC and themselves by adopting some revolutionary measures like new jingles, new music, new software, new models, catchy tunes, catching human moments of the prospective clients. Many ads became very effective thus

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			Amitabh Bachchan, Sahahruk Khan, etc. This makes the advertisement very effective.	increasing the killer instinct of the of the local firms to do better.
		4. Public Image studies.	Brand image of MNC vehicles like Opal-Astra, Ford, Mercedes, and Honda is well maintained in the pubic eye.	'Our own India car' with lot of service station and roadside garages. This is the public image of Tata-Indica.
		5. Sales force compensation studies,	In early days of its inception Suzuki dominated the	Indian companies with their wide range of network of distributors, retailers, godowns, local technology, and

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			car market with its all possible effective productivity norms for every employee. The sales team highlighted only good qualities of their products but later on Indian public realized the high cost of maintenances .	indigenous people have acquired all the strategies adopted by the MNC. In few years all the work culture of the sales team will be having similar kinds of out put as that of any most effective sales force in the world can have.
		6. Studies of deals.	The deals ultimately	All the deals ultimately generate more profits

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			leads to higher profit of the MNC leading siphoning of the finances to the home base of the MNC.	and all lead to the employment generations, revenue up gradation, infrastructure development hence development of the society.
F	Buying Behaviour	1. Brand Preference.	Almost Rs. 5000 Crores is been siphoned out of India every year due to Brand names like Mercedes-Benz, Honda, Opal, Ford, Suzuki, Toyota, as the customers go	Tata- Indica was sold like any other popular brand in the market, due to Tata tag on it. Still Tata is the trusted name in India. With every Tata vehicle part there are two hundred plus employments related to it. So the mouth-to-mouth publicity for the Tata-Indica is astronomical

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			for these vehicles on their trusted for years vehicles.	in India due to its maximum utilization of indigenous resources.
		2. Brand Attitude.	MNC organisations with their heavy research in the market and then targeting customer behaviour carry on advertisings campaign. This makes their brand image suiting to those kinds	Slowly but with dint of hard work and perfect planning Tata Engineering is moving towards developing the brand image of Tata-India and also developing brand attitude of the customers, in India.

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			of people who are targeted. Thus Brand attitude is developed and thus only Ford-Ikon, Maruti-Esteem, Honda-Accord, Mercedes has achieved the success.	
		3. Product satisfaction,	'Even the coin does not fall if it is kept on the top of the roof of the Merc', thus is the advertisement	If it is the same satisfaction consumers will be getting from the Indian developed cars then that company is going to be phenomenal in the Indian Industry.

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			of the Mercedes. The services are also provided to these kinds of multimillion cars. Not only satisfaction but also Mercedes gives the most valued customers the delight from their cars.	
		4. Purchase Behaviour,	Due to limited dealerships customer has but few options to visit. Still	Even Indianised cars cost less. So obviously the indigenisation will cost relatively less price. So the car with international quality

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

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			as they get every details of the car. Every Brand tries to prove their brand the best. Thus they expose each other and customers are benefited most. But MNC have managed this factor well in India.	c. Most number of connecting link in India, d. Fair price of the product, d. Time saving due to dealer available at the nearest location, e. The best Quality product, f. Educate internal and external customer with patriotic fever, and thus reach every corner of the country through mouth-to-mouth publicity.

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Point B: Let us know ultimately why the customer will buy the indigenously built car?

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

1. Time Management,
2. Status, esteem, and position,
3. Class consciousness,
4. Career consciousness,
5. Life pattern,
6. Comfort of family,
7. Family car,
8. Weekend family car,
9. Car with advanced gadgets,
10. A patriotic bug bite,

And if it becomes the need of that customer he buys the car. So with the cost of indigenously built car will give their full value of their investment.

Point C: Customers' expectations from indigenously built car is one and only one thing the value for the money:

Hence, the efforts will be taken by the Indian indigenisation forced for the following aspects:

1. Every customer feel that he should get out of car as fresh as he got into the car.

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2. To fulfil this criteria car must have suitable aesthetics, ergonomics, comfort, most needed gadgets and equipments and technology.

3. It must fulfil the safety, technological, and legal norms of the province where ever it is driven.

4. It must have provisions for present and future built ups and developments if required.

Point D: Why customer behaviour is given so much importance? :

In one sentence customers can make the market or break the market for your products. Hence the indigenisation force will over come all the barriers given in this context. Few will be benchmarked few will be innovated and few will be let go to achieve the total customer satisfaction form the product. With the explosion of the Tele-Communication and Network Systems in the world the era Internet and fast services, customer awareness is now reached at its peak in the graph.

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

1. Organisations are providing fast courier, quick delivery services, dial-and-enjoy the home delivery to their customers, E.g. Mercedes-Benz cars, Daewoo-Matiz cars, etc.

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2. Taxing effect through the advertising explosion on TV, Movie Theatre, Hoardings, Cable Network, etc. customers feel its effect, E.g. You will find our service centre at every corner in India a MUL advertise at every five minutes in the cricket match.

3. Customers are provided some kind of message trough Pamphlets, Newspapers, Catalogues, Receipts with full of the product and services. E.g. Hindustan Lever and their soaps

4. Seminars, customer interactions services, customer awareness drives, free services, etc. E.g. MUL is conducting free services camp since few years for their all kinds of car segments.

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

6. Technology awareness drive to prove the upper hand of their Cars, E.g. In the SPICE campaign Daewoo-Matiz convinced their world wide customers that their car is the best in the segment and they received the prize for it and that is why they have reached in more than 122 countries in the world. Many bought the Matiz and thus helped it to grow in India as well. Though Matiz-Daewoo is not existing now still some other company may act similarly hence precautions must be taken at this front.

7. The demand for the other segment of car got reduction and these small cars from the MNC and the MUL and TATA got big demands. Infact the PAL

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had to close its few plants. Thus if you care for the customer the customer grows your business.

8. The Rolls rice people give their customers the car they demand and the way they want. Similar demand is there in US and the Japan now a day. It is in India as well; the smaller but significant players like Dilip Chhabriya DC players fulfill this need of high class customers. In future it may take big leap, hence efforts on this front are also required.

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

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

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

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

12. Now a day, more and more profit-motivated companies are also is more and more customer-care-retain-grow kind of companies.

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

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

15. Every person who drives the car, related to car business and even the roadside person is also a customer. This is because whether he is reach or poor he is marketing the car by his gestures. E.g. Whenever Merc is seen everybody on the road makes a road for it right from the cyclist to the Maruti car driver. This is because Merc is symbol of Reach and Top class family. This gesture also gives the owner special feelings.

16. *According to the Society of Indian Automobile Manufacturers' Association of India (SIAM), by the end of 2006 A.D., Indians will have annual turn over of one million cars per year. By the end of this decade, it is expected that every one in five family will have a car in India.*

Hence if question arises that can the nation like India having so much resources neglect such a huge opportunity? The answer will be: No. Never. This also proves the viability of the project.

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CHAPTER 24:

AUTOMOBILE FINANCE AND ENGINEERING ECONOMY FOR THE INDIGENOUS CARS FOR THE TOTAL CUSTOMER SATISFACTION

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24.1: Automobile Finance from Engineering point of view, in brief:

(Special Note: A Technical Lecture was delivered on this topic in the Institution of Engineers (India), Nagpur Local Centre, Nagpur, by Engineer Ashish Manohar Urkude**.)**

Almost 80% of the industries in CII Directory (Ref: CII Directory) directly or indirectly are linked to the Automobile related business in India. Similar kind of dependency ratio is also there in other countries as well. Infact, with USD One Trillion worldwide turnovers (Ref: 29th August, 2003, Tarun Bharat, Nagpur) presently Automobile Industry stands number one industry in the world. In terms of jobs involved, revenue generated and becoming a engine of growth of the country's economy; Automobile Industry forms the peak of the contributor in the socio-techno-economic field of many developed economies in the world including USA, Japan, Germany, France, The Great Britain, Italy and Canada all among the worlds largest economies. On the other hand, USD Ten Billion (SIAM annual results 2002) is the annual turnover in the Automobiles related businesses in India. When such a hefty sum of money is involved in the Automobile sector then there must be lot of big to very big transactions occurring in the Automobile sector. That is why every financial organisation including various banks and other players are offering loans on every Phase of Car Life cycle (SIDBI Guidelines booklet 2003). There is a finance facility for the manufacturers of the car or car components. There is a fiancé option for the R & D and Technology up-

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gradation in the factories. There is a finance facility for getting rid of bad debts, for the sick units. There is a finance provision for the renovation of industrial units. Even there is finance option for getting ISO 9000. Government of India offers 75% money to the SSI involved in these indigenisation ventures. Consumers also have loan facilities to buy the automobile and to maintain it. There can be many ideas put here in this regard. However at present we consider few as given below:

1. AMC for the Automobiles:

One new idea is Finance for the Annual Maintenance Contract (AMC). It will be as same as in the computer field; with some modified versions and with various options according to:

a. *The type, make and kind of fuel used in the vehicle:* Whether small car or middle segment car made by Ford, General Motors, Tata Motors, Toyota, etc. Electric driven, Hydrogen Fuel driven, etc.
b. *Life of the vehicle:* It assumed that every vehicle has almost fifteen years of life span according to new rule in many countries, in some cases in India as well, and
c. *Phase of the vehicle in its life cycle:* For example, First Servicing, Second Servicing, Three years Servicing, One Lakh Kilometres Servicing, etc.

Special Note: This is the most appreciated idea by the Institution of Engineers (India), Nagpur Local Centre, and appeared in the Maharashtra

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State Centre's "Bulletin" monthly magazine as one of the best technical lecture from Nagpur Local Centre. It appears in the Bibliography and Reference section at the end of the Thesis.

2. Manufacturing new Patented Parts in big volumes:

Another new idea here is manufacturing more than ten million car part units that too 'patented' ones. It can set up almost Rs. 10 Crore unit hence a MSI in India. Thus, it can be proved that the indigenisation of the car is a feasible option and can give amazing results.

Present finance options:

Then there are finance options available in the market with three options:

a. 100% finance provision with some kind of deposit or like that,
b. Partial loans facility and
c. Paying only EMI the Equal Monthly Instalment.

How ever using Internal Rate of Return (IRR)/ Interest a classical Engineering Economy is concerned, it can be proved that many a times in reducing rate of return ca be very dangerous option than of course for the flat rate of return.

Engineering Economy shows that the every kind discount sale, gift or other facilities given by the indigenous people is always costs less for the customers than their foreign counter part. There is huge difference between dollar Economy and the Rupees Economy.

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Part A:

(Special Note: These Analysis and Suggestions were made during Car Finances before 2001: Engineering Economy and Instalment Financing.**)**

1. What is Engineering Economy? In the present market conditions every other day every other organisation comes out with the new idea of growing customer base. Which include every kind of incentives and benefits. Here, Engineering Economy can evaluate what exactly is involved in the venture customer is interested in.

Here the Engineering Economy provides systematic evaluations of the equivalent worth of benefits from proposed venture, in relation with the cost associated with it. It provides both enough information and systematic evaluated data to:

a. The Management and

b. The Customers, to take the decision whether the capital to invested or not in the present venture.

2. Basic concept of engineering Economy: Engineering Economy studies involve the commitment of capital, expressed in the form of money, for a period of time, such that the effect of time on the money must be considered.

Money in any form always has time value.

A rupee today is worth more than a rupee one year from now because of the interest it could earn.

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Engineering economy mainly deals with comparing the alternative options, or proposals by reducing them to an equivalent basis that is dependant upon:

1. The interest rate,
2. The amount of money involved,
3. The timing of the monetary receipt/ disbursement,
4. The manner in which the interest or profit on invested capital is rapid and the initial capital recovered i.e. interest can be simple or compound.

Notations used for interest calculations:

First:

For Simple Interest:

P= Principal Amount lent to be borrowed,

N= Number of Interest Periods,

i= Interest Rate per interest period,

I= Total Interest Earned.

Second:

For Compound Interest:

i= Interest Rate per interest period,

N= Number of Compound Interest Periods

P= Present Sum of Money, (the equivalent worth of one or more cash flows at a relative point in time is called the present),

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F= Future sum of money (the equivalent worth of one or more cash flows at a relative point in time is called the Future),

A= End-of-period cost flows in a uniform series continuing for specified number of periods.

3. CASH FLOW DIAGRAM (CFD):-

Cash flow diagram are the rupee transactions that 'trade hands' or represents opportunities during whatever study period is being considered for an alternative. These diagrams are strongly recommended to situations in which the analyst needs to clarify or visualise what is involved when flows of money occurs at various times. The usefulness of these diagrams is analogous to the use of the free-body diagrams for the engineering mechanics problems.

Conventions used for drawing Cash Flow Diagrams:

1. There is a horizontal line, which is time scale with progression of time moving from left to right. The period or the year labels are applied to intervals of time rather than points on the time scale. Only if specific dates are employed should the points in time rather than intervals are labelled.
2. The arrow shows the cash flows. If a distinction needs to be made, downwards arrow represent disbursement (i.e. negative cash flows or cash outflows) and upward arrows represent receipt (i.e. positive cash flows or cash inflows).

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3. The cash flow diagram is dependant on point of view e.g. the below the new cash flow are drawn as seen by the lender. If the direction of all arrows had been reversed, the diagram would have been diagrammed from the borrower's point of view.

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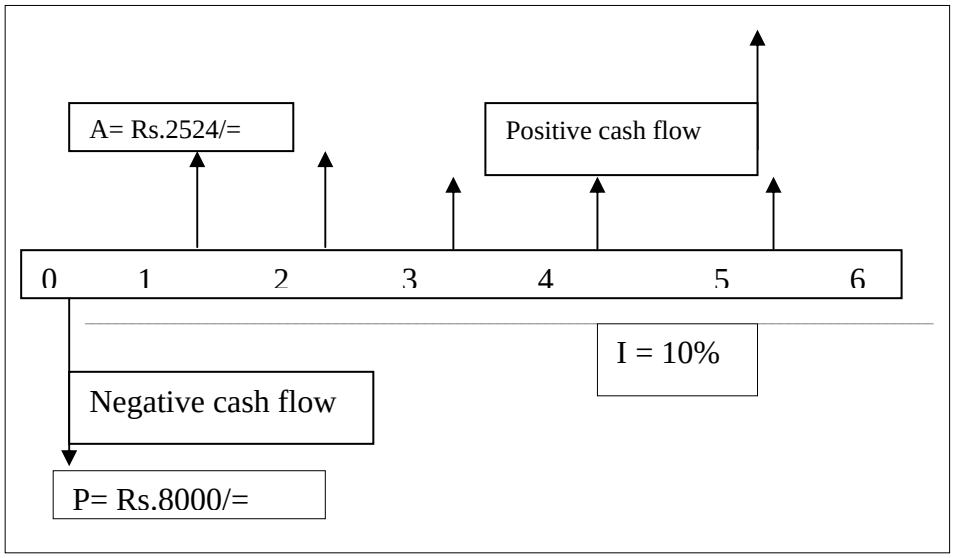
Example: Cash Flow diagram (CFD): Diagram 24.1:



Interpretation of the diagram: The diagram shows the positive and the negative cash flow, which is explained later.

Table 24.1: Interest Calculations Formulae:

To find	*Given*	*Factor by which to multiply*	*Name of the Factor*	*Symbol of the functional factor*
For Single Cash Flows:				
F	P	$(1 + i)^n$	Single Payment Compound Amount	(F/p, I%, N)
P	F	$1/ (1 + I\%)^n$	Single Payment Present Worth	(P/F, i%, N)

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For Uniform Series (Annuities):				
F	A	$(1 + i)^n - (1/ i)$	Uniform Series Compound Interest	(F/A, i%, n)
P	A	$[i(1 + i)^n] / [(1 + i)^n - 1]$	Uniform Series Present Worth	(P/S, i%, n)
A	F	$i / (1 + i)^n - 1$	Sinking Fund	(A/F, i%, n)
A	P	$[i(1 + i)^n] / [(1 + i)^n -1]$	Capital Recovery	A/P, i%, n)

Interpretation of the Table:

Using following convention:

i= Effective interest rate per interest period,

n= Number of interest period,

A = Uniform series amount which occurs at the end of each interest period,

F= Future worth,

P = Present worth.

The table gives us the description of the cash flow.

4. Nominal and Effective Interest Rates:

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When the compounding of the interest is compounded only in a year then it is called nominal interest i.e. the basic annual rate of interest is known as the nominal rate. It is represented by 'r'.

But when it comes to actual annual rate on the principal it is something greater than this because of the compounding that occurs more than once in a year.

This actual on exact rate of interest earned on the principal during the year is called effective rate.

The effective interest rates are always expressed on an annual basis, unless specially stated otherwise.

It is represented by 'i'.

So, effective rate, $I = (1 + r/M) - 1$.

$= (F/P, r/M, M) - 1$.

Where M = Number of compounding period/year.

The effective rate of interest is useful for describing the compounding effect of interest earned on interest within year.

5. BASIC OF INSTALMENT FINANCING:

When a series of deferred equal periodic cash flows in the substituted for a single (lump-sum) cash amount, as when merchandise such as an automobile is purchased, a modification of the ordinary annuity frequently is used.

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A finance charge is made upon the total amount owed at the beginning of the loan instead of only upon the unpaid balance such a charge is of course not in accord with the true nature and the definition of interest. The true interest rate being charged is more than always the shown in the figure. This forms the principal of instalment financing.

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6. Basic Method for making Engineering Economy studies:

All the Engineering economy studies of capital projects should conduct the return that a given project will or should produce. The fundamental behind this study is whether a proposed capital investment and its associated expenditures can be recovered over time in addition to return on the capital that is sufficiently attractive in view of risks involved and alternative uses of limited funds. This is explained by the time-money relationship.

As the pattern of capital investment, revenue or savings cash flows and the cost cash flows are different for different projects; there are different methods for making this study. They are as given below:

Type 1: Equivalent Worth Method-

e. Present Worth Method (P.W.),
f. Annual Worth Method (A.W.),
g. Future Worth Method (F.W.).

Type 2: Rate of Return Method-

a. Internal Rate of Return Method (I.R.R.),
b. External Rate of Return Method (E.R.R.),
c. Explicit Reinvestment Rate of Return Method (E.R.R.R.).

But to evaluate most the projects internal rate of return method (I.R.R.) is most widely used.

Now, the mechanism of this I.R.R. is described in details.

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7. Internal Rate of Return Method:

This method is also known by the names such as-

a. Investor's method,
b. Discounted Cash Flow method,
c. Receipts verses Disbursement method, and
d. Profitability Index.

This method solves the interest rate that evaluates the present worth of an alternative's cash *inflows* (receipts on savings) to the present worth of cash *out flows* (expenditures, including investments). The resultant interest rate is termed as the "internal rate of return (I.R.R.)". For a single alternative, the IRR is not defined unless both receipts and disbursements are present in the cash flow pattern.

Expressed in general, the IRR is the i' % at which:

$$\sum_{k=0}^{N} Rk\,(P/F, i\%, K) = \sum_{k=0}^{N} Ek\,(P/F, i\%, K)$$

Rk = net receipt or savings for the k'th year.

Ek = net expenditures including investments for the k'th year.

N = Project life.

Once 'i' has been calculated, it is then compaired with MARR i.e. (minimum attractive rate of return) to asses whether the alternative in questions is acceptable if 'i'>MARR the alternative is acceptable; otherwise it is not.

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From the question we have to determine the 'i' at which the net present worth is zero. Hence IRR is the value of 'i' at which:

$$\sum_{k=0}^{N} Rk\,(P/F, i\%, K) = \sum_{k=0}^{N} Ek\,(P/F, i\%, K) = 0;$$

Another way to interpret the IRR is through an unrecovered investment diagrams it shows how much of an original investment in an alternative is still to be recovered as a function of time. In the diagram the downward arrow represents returns (Rk – Ek) for 1 <= K <=N against the unrecovered investment and the dashed lines indicates the opportunity cost of interest or profit on the beginning of the year investment balance. The IRR is that value of 'i' in the diagram that causes the unrecovered investment balance to exactly equal to zero at the end of the stud period (i.e. year N). It is important to notice that 'i' is calculated on the beginning of year's unrecovered investment through the life of a project rather than on the total initial investment.

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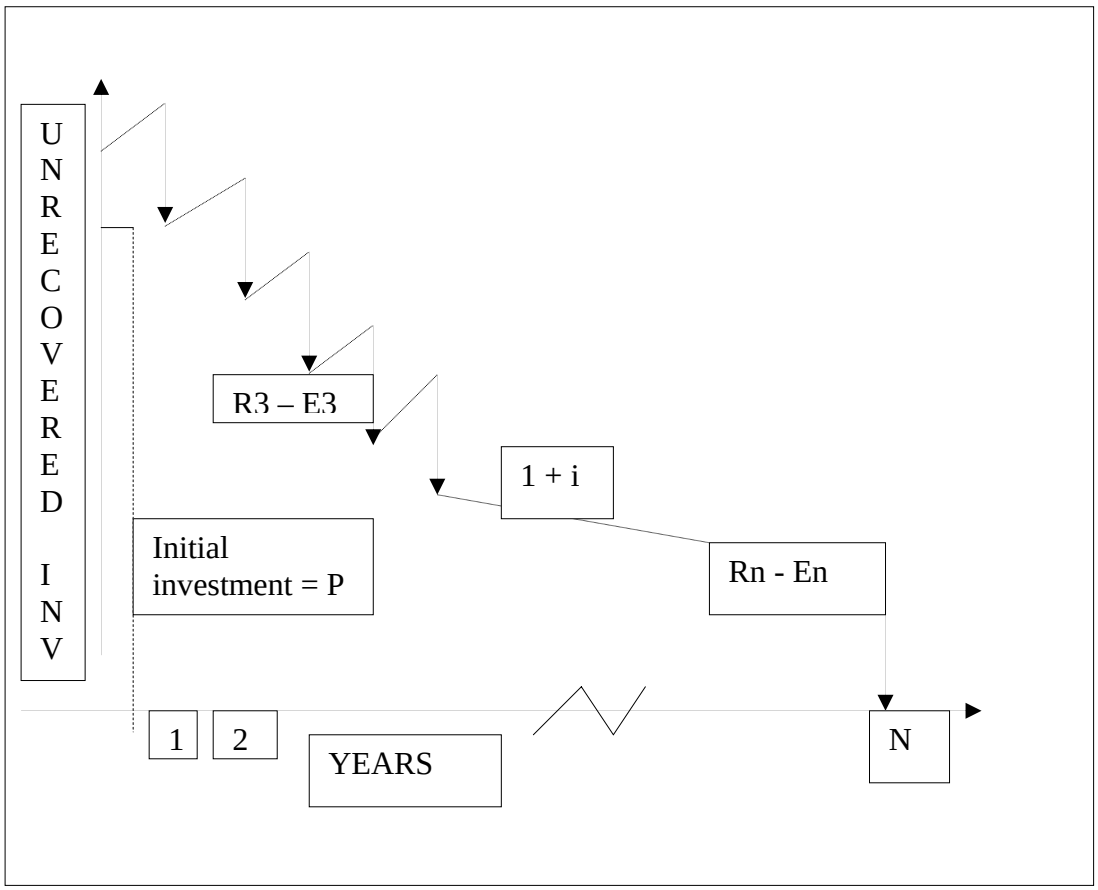
Based on it is the following diagram:

<u>Diagram 24.2:</u> Internal Rate of Return (IRR):



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Interpretation of the diagram:

The diagram shows us the diminishing unrecovered investment as the maturity of business is reached.

The method of solving all the above equation normally involve trial and error method of calculations until the 'i' % is found or can be interpolated.

8. INSTALLMENT FINANCE FOR THE CAR:

At least a dozen of companies are in the Indian Car market.

The Indian Financers among them are:

1. Sundaram Auto Finance,
2. Anagram Auto Finance,
3. Bajaj Auto Finance,
4. Apple Auto Finance,
5. ICICI Car Loans,
6. Cholamandalam Investments and Finance Company Ltd.,
7. HDFC Car Loans,
8. Tata Finance,
9. Hyundai Finance,
10. State Bank of India Car Finance,
11. Maruti Finance, etc.

The Multinational Banks or Car Financers among them are:

1. Standard Chartered Car Finance,
2. GE Countrywide, and others.

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9. Study of the Latest Finance Packages Offered:

In the event of Inflation and deflation in the market every other company is coming out with its own finance company. Now a days, Bajaj Car Finance, Maruti Car Finance, Hyundai Car Finance, ICICI Car Finance, HDFC Car Finance, Tata Car Finance, and other competitors are coming out with more and more luring offers for the customers.

As stated earlier Allianz Insurance and Finance other foreign companies have turn over of more than all our banks yearly turn over we have in India. Where as at the premier car segments dominance of the GE Finance, and Standard Chartered is clearly seen. As, Tata has launched its Sedan, and Maruti and Tata have launched their own Finance companies definitely the future belongs to Indian companies.

As many a times the middle manager level once get a promotion they are given the perquisites for the car maintenances so they shift from smaller cars to the middle level cars. At this time the executives prefer the best offer from the finance companies.

10. HOW FINANCE SCHEMES WORK?

Here few finance packages are systematically dissected to know in details.

Example 1. Sundaram Auto Finance:

This Company offers schemes to its customers in the following way:

a. Margin Money Scheme,

b. Security Deposited scheme.

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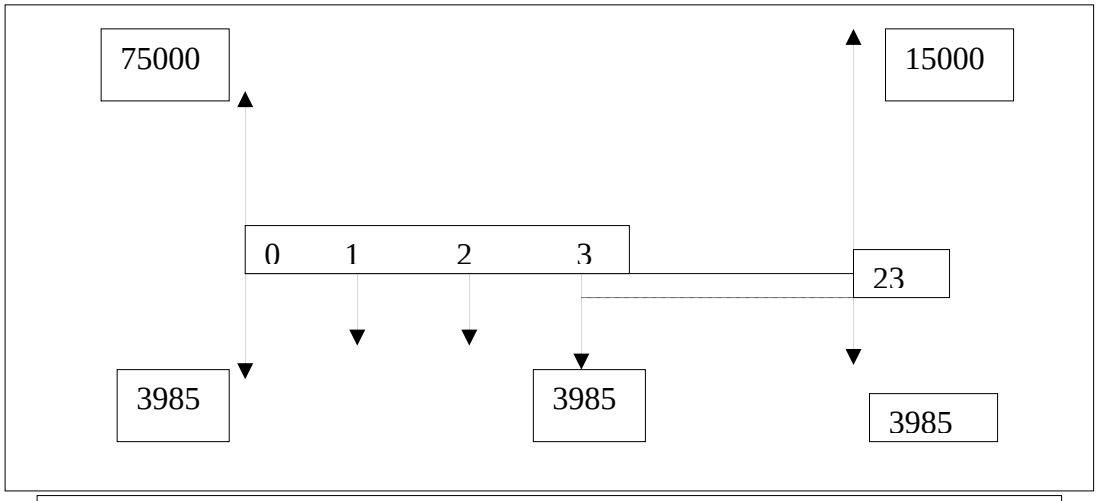
a. Margin Money Scheme: Sundaram Auto Finance:

Table 24.2: Margin Money Scheme (MMS):

PERIOD	FLAT RATE PER ANNUM
12	12.80%
18	13.45%
24	13.75%
36	14.10%
48	15.00%

Diagram 24. 3: Cash flow diagram for the Margin Money Scheme:



Cash Flow Diagram for the Marginal Money Scheme

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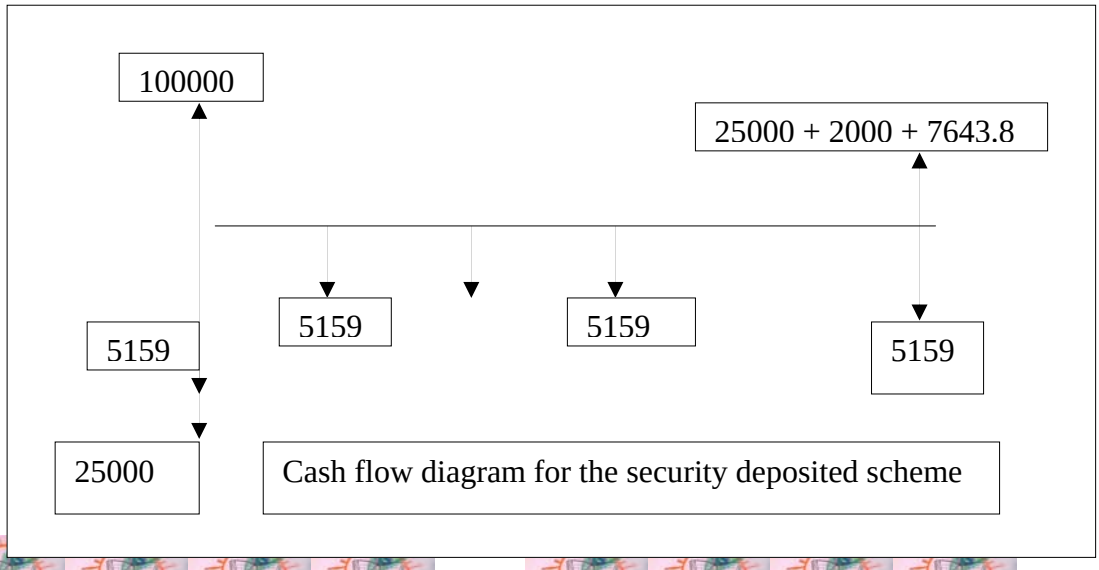
b. Security Deposited Scheme (SDS): Sundaram Auto Finance:

Table 24. 3:

PERIOD	SECURITY DEPOSITE	FLAT RATE PER ANNUM
36	25%	12.29%
36	20%	12.75%
36	15%	12.95%
24	25%	11.90%
24	20%	12.50%
24	15%	12.90%

Diagram 24.4: Cash Flow diagram for Security Deposited Scheme: Sundaram Auto Finance:

Here, Rs.5159/= is the instalment paid per one hundred thousand (one lac) of the total sum to be paid to the bank. Where as the Rs.25000 is the security deposited per one hundred thousand (one lac).



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E.g.2 Anagram Auto Finance:

This company offers *Ana-wheels – Car finance scheme, which is divided into three different types*:

I) Advanced Instalment Scheme,

II) Security Deposited Scheme,

III) Down Payment Scheme.

I) *Advanced Instalment Scheme:* The format of this scheme is like you have to pay 2% of your amount to be financed as a Management fees. Then you've to pay the instalment per Rs.1 lakh, rest of the details is given in the table given below:

Table: 24.4: Advanced Instalment Scheme (AIS):

Period (In months)	**Number of Instalments In advanced**	**EMI Rupees**	**IRR Calculated/ Arms**
24	04	5105	2.5%
36	04	3790	2.5%
48	04	3144	2.5%

EMI= Equal Monthly Instalments,

IRR= Internal Rate of Return.

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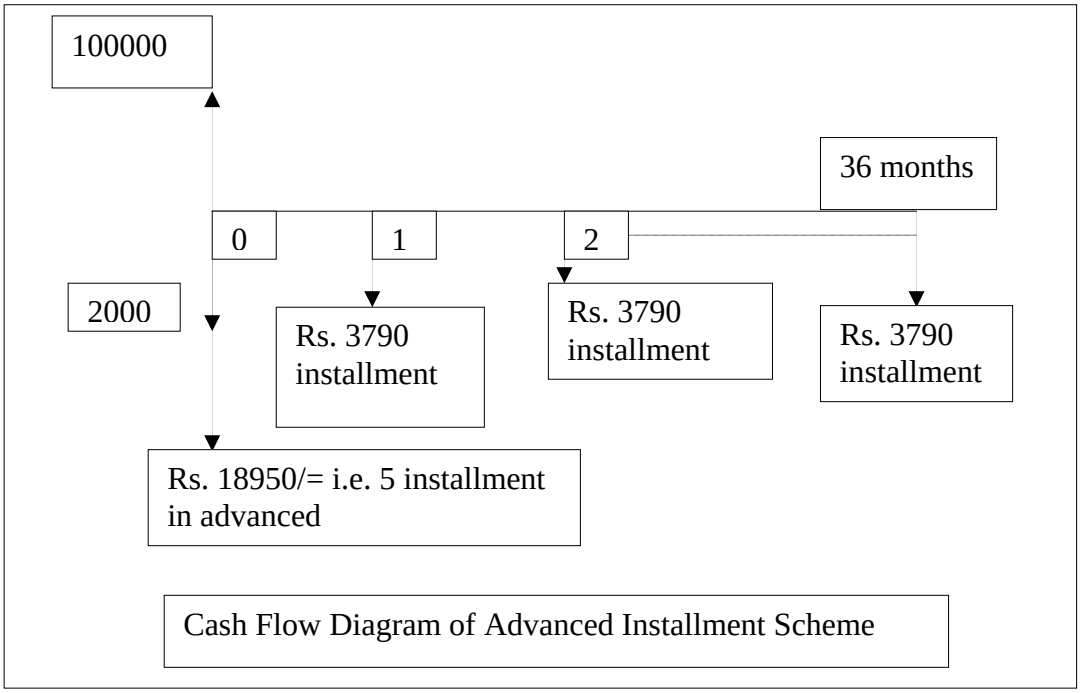
Diagram 24.5: Cash Flow Diagram of Advanced Instalment Scheme:

Anagram Auto Finance:



II) Security Deposited Scheme of 100% Finance:

This scheme works as below:

a. Management Fees- 2% of the total amount to be financed,
b. Security Deposited- 25% of the car cost,
c. Interest payable @14% Compounded interest at quarterly,
d. First instalment to be paid in advanced (per Rs.1.00 Lakh as a standard).

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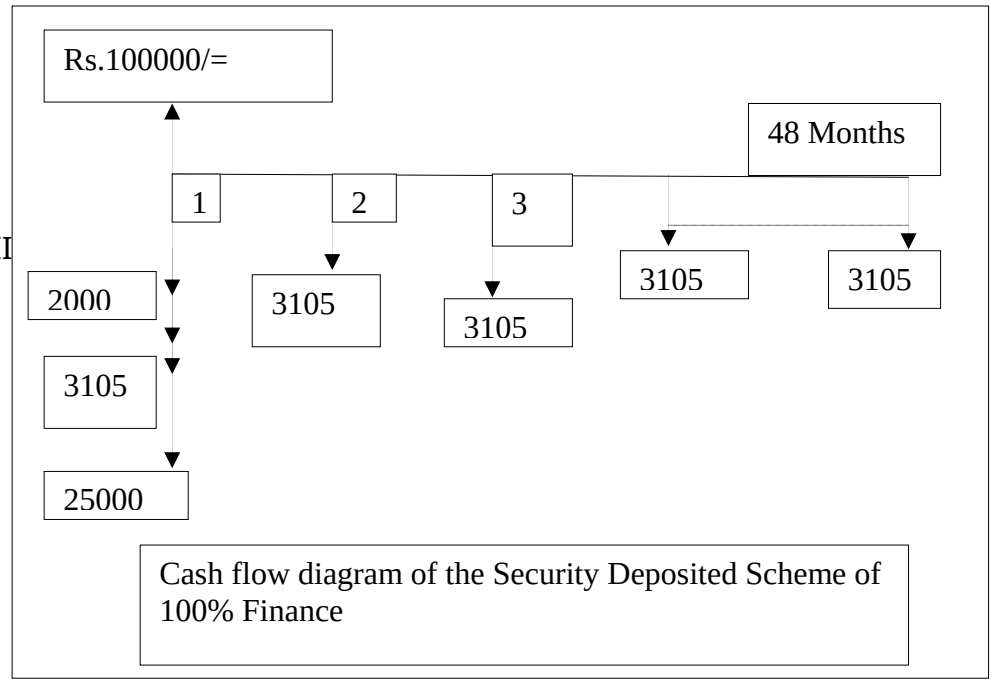
Table 24.5: Details of instalments:

Period in months	EMI in Rs.	IRR Calculated Monthly
24	5090	2.52%
36	3753	2.52%
48	3105	2.52%

Diagram 24.6: Cash flow diagram of the Security Deposited Scheme of 100% Finance:



III) Down Payment Scheme of 75% Finance:

In this scheme the payment is done like below-

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a. Management Fees- 2% of the amount of fees to be financed,

b. First instalment is payable in advanced (Per Rs.1 Lakh).

Rest of the things are given in the following table.

Table: 24.6: Table of EMI and IRR calculated in advanced.

Period in Months	**EMI in Rs.**	**IRR calculated for Monthly scheme**
24	5456	2.66%
36	4142	2.61%
48	3513	2.59%

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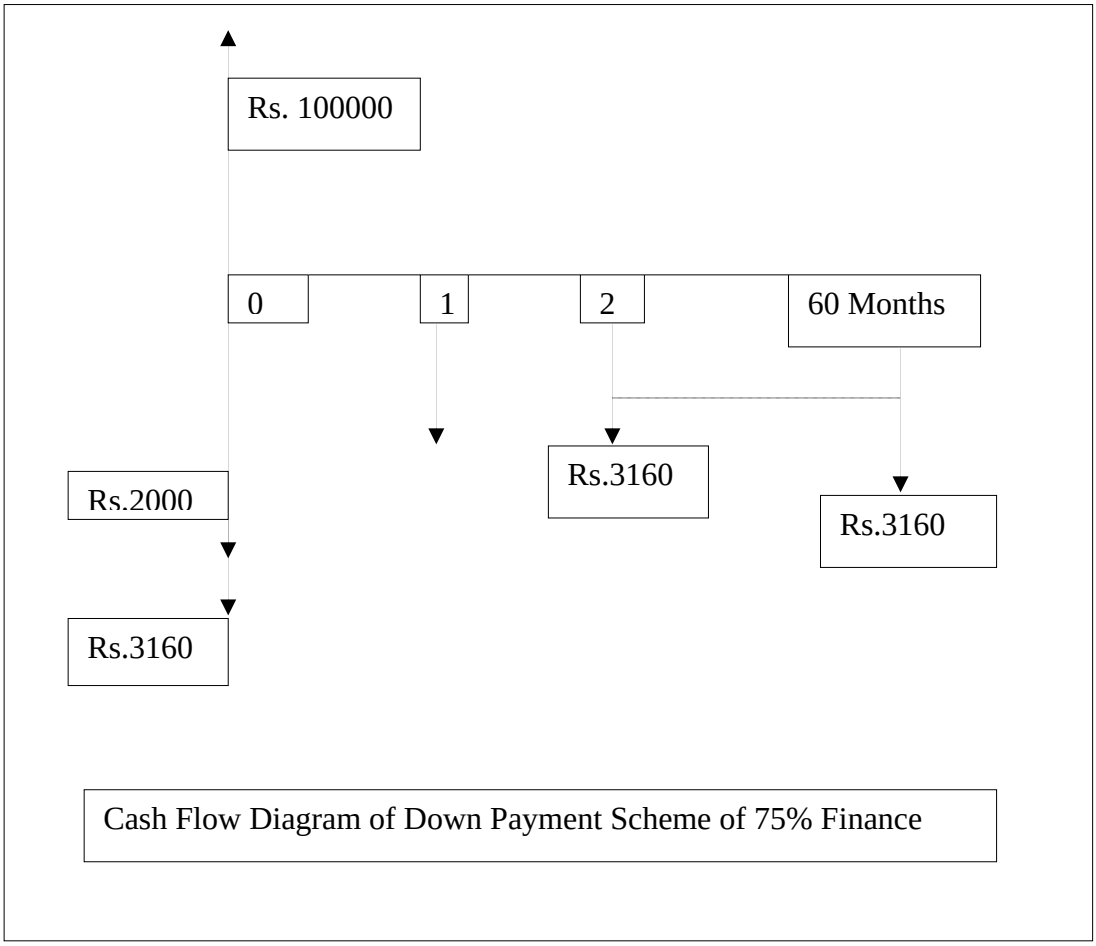
Diagram 24.7: A self-explanatory -Cash Flow Diagram of Down Payment Scheme of 75% Finance:



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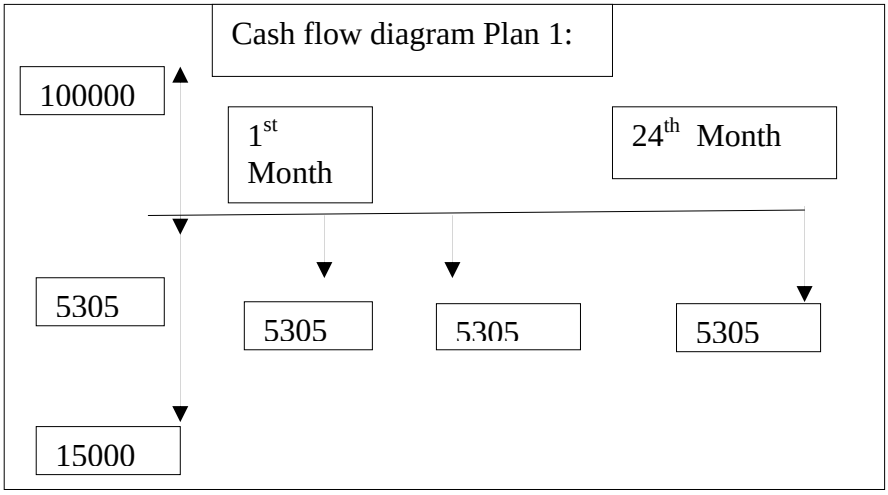
E.g. 3:GE Countrywide Car Finance Scheme:

Under this scheme the company has two plans -

a. Processing fees – 1% of the amount financed,
b. First instalment to be paid in advanced,
c. Prompt payment rebate – 2% per annum (of amount fixed),
d. Security deposit – Payable at 16% Compounded interest annually EMI as per table (For Rs. Per Lac).

Diagram 24.8: Plan Number 1: Cash Flow Diagram: GE-CW:



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Plan number 1: EMI and IRR along with Security Deposited Option:

GE Countrywide: A self explanatory Table 24.7:

Security Deposit in %	Period in months and IRR Calculated					
	12 Months EMI	IRR in %	24 Months EMI	IRR in %	36 Months EMI	IRR in %
10	9460	42.24	5366	38.47	4020	36.86
15	9405	43.57	5305	40.43	3955	38.1
25	9290	49.19	5184	42.3	3825	39.79
30	9233	54.11	5224	44.75	3762	41.08

Diagram 24.9: Plan Number 2: Self-Explanatory Cash Flow Diagram GE countrywide:

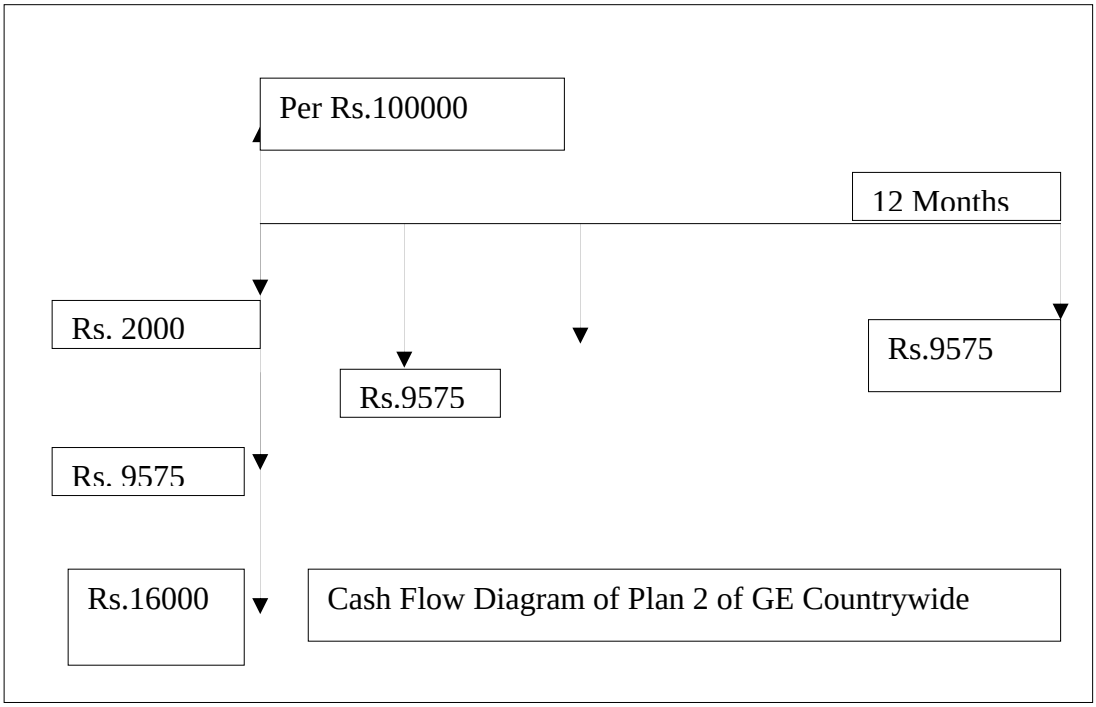

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Table 24.8: Self-explanatory EMI Calculations (Rs Per 100,000/=):

Period in Months	Advanced Equal Monthly Instalments (EMI)		
	1	2	3
12	9575	9380	9207
24	5490	5375	5265
36	4150	4060	3980

11. NEW PLAN SUGGESTED TO THE INDIAN COMPANIES/ PRODUCT DEVELOPMENT:

The Hottest offer among them has been the offer of the Car Finances of Hyundai Santro, Maruti Finance, Cholamandalam Finance, and HDFC car loans up to 80%, along with one or two of the following options:

a. First year Comprehensive Insurance of the Car Free,
b. Free personal accident insurance up to Rs.5 lacs,
c. Co-passenger insurance up to Rs.4 lacs,
d. Free air travel insurance of Rs.15 lacs,
e. Extended 3rd year Warranty,
f. One year Household Insurance free,
g. 0% Interest Rate Scheme,
h. Old vehicle Exchange offer,

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i. Lowest Equal Monthly Instalments,

j. With Lowest possible down payment.

And some other additional offers like free Music system, Free Club membership, etc.

But not a single Financer has offered all these qualities or half of these qualities in their schemes. That is what customers are expecting in the present consumer oriented car market, more benefits at lowest possible and affordable costs. In this segment Indian Finance companies are trying to match the foreign national banks and other financers and the insurance companies.

This scheme is competent enough with the present market, and in return when put into practice can yield us same kind of profit, which other companies are fetching.

It is attractive enough to catch customer attention and competitive as well as profitable.

First Totally New Scheme: *Buy a Car at 7% Interest Rate in Two years:*

a. No Security deposited required,

b. No Processing fees required,

c. No Management fees required,

d. No Service Charges required.

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At 7% Rate, this scheme looks very attractive and is also not given by any financer in the market. This will generate lot of enthusiasm among lot of customers.

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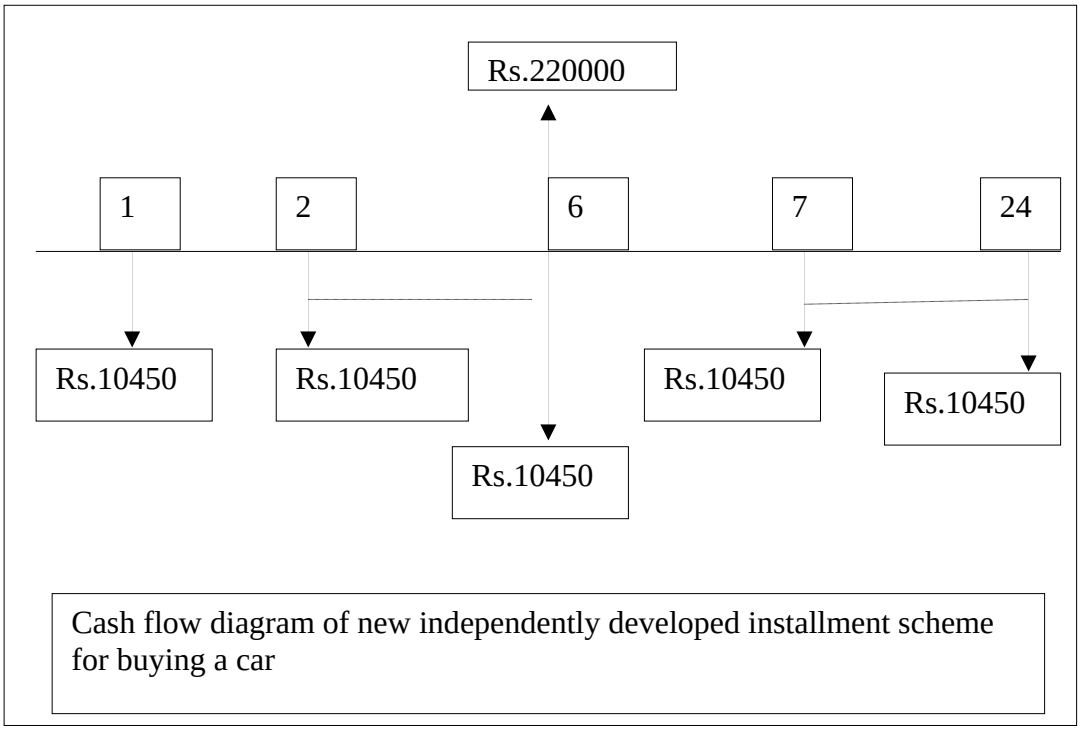
How the scheme will work?

It is as easy as any other scheme.

If customer is striving for Rs. 2,20,000/= loan for buying a car, he'll be paying Rs.10450/= per month for only 2 years.

The self-explanatory **cash flow diagram** for this kind of scheme can be shown like below:

Diagram 24.10: First totally New developed Car Finance Scheme:



Cash flow diagram of new independently developed installment scheme for buying a car

Now thorough studies will reveal that the calculation of 7% interest gives actually 30% earning approximately

Alternatively, if customer does not want to pay instalment every months he can pay 7 instalments in advanced and can take away his car at home.

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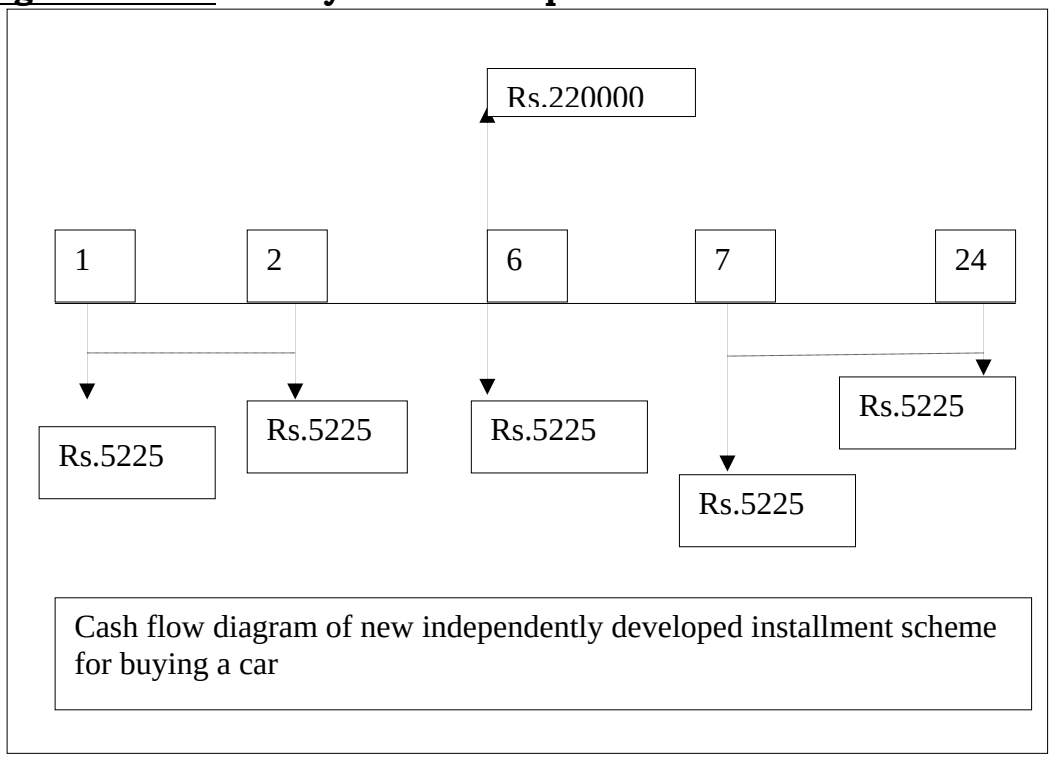
Second Totally new scheme*: Buy a car at 7% rate in Four years:*

The cash flow diagram for this kind of scheme can be shown like below:

Diagram 24.11: Totally New Developed Finance Scheme:



Here, thorough studies will reveal that the calculation of 7% interest gives actually 15% earning approximately may less by 2 % to 3% than the market rate. But the scheme seems to be so attractive that the customers will jump on this scheme and those will be mainly Managers and other professionals who get around Rs.5000/= almost per month as Petrol or Vehicle allowances, which is significant in number in India.

Third Totally New scheme*: Avail Insurance Coverage with Car Finance:*

In this very attractive scheme there is an added advantage of covering accident claim insurance premium along with the car finance.

It is obviously a security deposited scheme.

It works like this:

a. Management Fees: 2% of the amount,
b. Security Deposit: 25% of the cost of the Car,
c. Interest payable to security deposit: @14% compounded interest annually,
d. First Instalment payable in advanced,
e. 12% flat rate interest,
f. EMI is calculated per lac.
g. Payment extension up to 36 months.
h. Can claim: Pay just Rs.56000/= and take the car home.

Table 24.9: EMI/ Month of Third totally new developed car finance scheme:

Period in Months	EMI (Rs) paid / Month
12 months	Rs. 9333/=
24 months	Rs. 5166/=
36 months	Rs. 3777/=

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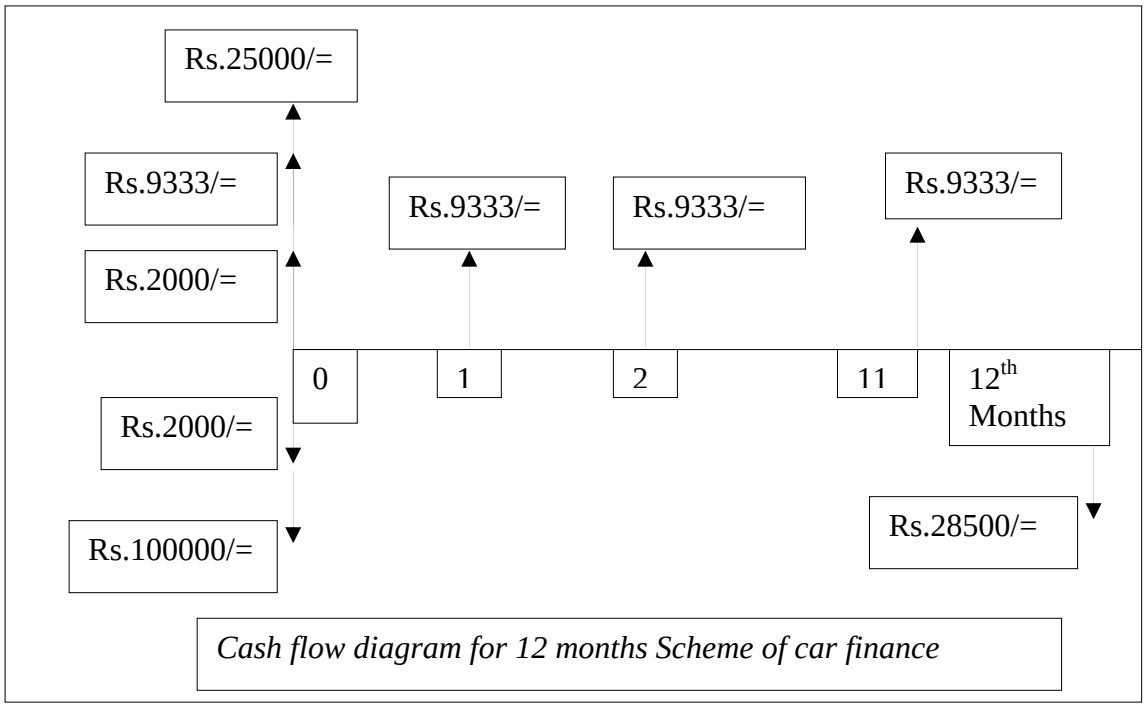
Diagram 24.12: CFD of third totally new designed scheme for 12 months period of time:



It seems from the scheme that it is not a special scheme as compaired to other schemes in the market but it the variable which covering the insurance as well, which has hidden cost. Thus a profit generation is a match with the other schemes.

The trick in this scheme is benefit to the Financer as well as the Customers. If by chance the customer dies due to the accident. Then the financer will automatically claim the finance instalments left from the customer as per the pre planned agreement with the customer and the Insurance Company thus benefiting both the sides.

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These all were suggested at the time of PhD and were implemented by few organisations.

Part 2:

Analysis and Suggestions in the Present Finance Schemes:

Presently all the car financers have brought their instalment payments to 8% interest rate. It is applicable to 1-year period of loan. Interest rate of 9% is applicable to loan amount payable in equal monthly instalment in the span of 2 to 3 years of loan payment. 10% interest rate is applicable to 5 years of loan payment.

Table 24.10: Analysis of present finance schemes:

SN	Rate Of Interest	Years of Loan	No Advance + MF+ EMI/ Rs. One Lac
1	8%	1 to 1 year 11 month	a. MF+ Rs. 9000/= to b.MF+ Rs. 4695/=
2	9%	2 to 2 years 11 month	a. MF+ Rs. 4740/= to b. MF+ Rs. 3114/=
3	10%	3 to 5 years	a. MF+ Rs. 3056/= to b. MF+ Rs. 1834/=

Table Description:

SN= Serial Number,

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MF= Management Fees => It differs from company to company and type of cars.

EMI= Equal Monthly Instalment => It is a pure calculation with flat rate of interest.

Table 24.11: Major Differences in Car Finance schemes prior to 2001 and the Present ones:

SN	Prior to 2001 Car Finance Schemes	Present Car Finance Schemes
1	There was huge Management Fees.	Presently nominal Management Fees.
2	There was more than 10% flat interest.	Two digit Finance schemes got reduced to single digit rate of interest.
3	There was huge down payment.	No down payment except first monthly equal instalment.
4	There was huge advance to be paid.	No huge advance to be paid.
5	Various companies dictated the terms and the conditions	Customer oriented market as number of players increased.
6	Domestic players were less	Almost every bank has this scheme for every type of customer.
7	Customer had little say.	Customers are dictating the rate of interest. Thus rate of interest is

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		reducing day by day.

Revolutionary Suggestions:

1. If interest rate of the banks have reduced to 6% on bank deposits. Then how can these finance companies collect more than 6% on these car finance schemes? No need. Consumers are demanding 0% Finance Schemes.

2.On 0% finance schemes also many two-wheeler financers are doing business. Consumers are expecting similar Finance schemes in the Car sector. Financers can do the same kind of business as those of the two wheelers are doing at present. The internal aspect of this is the financer earns 30% from the manufacturers.

3.At least indigenous financers must start this business in the Second hand Car market first and see the result.

4. There must be finance for maintenance of car in the country like India.

----------Up coming volume 4----------