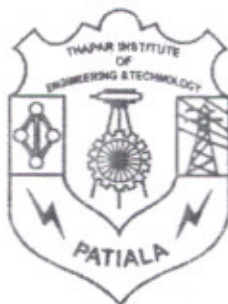


MANAGING SOCIO-TECHNICAL CHANGE FOR COMPETITIVENESS IN INDIAN AUTOMOBILE INDUSTRY

**A THESIS SUBMITTED
IN FULFILMENT OF THE REQUIREMENTS
FOR THE AWARD OF THE DEGREE
OF
DOCTOR OF PHILOSOPHY**

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CERTIFICATE

Certified that the thesis entitled “**MANAGING SOCIO-TECHNICAL CHANGE FOR COMPETITIVENESS IN INDIAN AUTOMOBILE INDUSTRY**” which is being submitted by Mr. Rajiv Kumar Garg, to Department of Mechanical Engineering, Thapar Institute of Engineering and Technology (Deemed University) Patiala, in fulfillment of the requirements for the award of the degree of **DOCTOR OF PHILOSOPHY**, is a record of bonafide research work carried by him under our guidance and supervision. The matter presented in this thesis has not been submitted in part or full to any other University or Institute for the award of any degree.



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ABSTRACT

Prior to globalization and liberalization of Indian economy, Indian automobile industry was protected from any international competition. There were only a few manufacturers in every class of automobiles. These organizations were quite happy continuing with old technology and working practices. In 1990s with the liberalization and globalization, many multinational companies (MNCs) entered the Indian automobile market. MNCs had strong financial background, global markets, advanced technology, higher quality, competitive prices, customer satisfaction, teamwork, and healthy work culture. The automobiles launched by MNC's had advanced features, aesthetics, ergonomic compliance, and reasonable price tag. All this made the traditional Indian manufacturing organizations think and evolve strategies to come to terms with the situation and become competitive. They adopted cost-cutting as a strategy and took various actions like ban on recruitments, VRS, inventory reduction, squeezing profit margins, and improving efficiency and productivity. Improvements were made in various areas like technology, systems, structure, people and culture. With these initiatives, the organizations achieved varying degree of success. Some organizations survived while the others could not.

This brings out the need to study the factors, forces and constraints prevalent in automobile industry with the aim of developing strategies for effective management of change. This study has been taken up with the objective of analyzing various aspects of socio-technical change like organizational systems, structure, culture, technology and people, and formulating a process for effective management of change in Indian automobile industry. The whole work is carried out in four phases: Survey on change management in Indian automobile industry, Case Studies, Modeling and Analysis, and developing strategies for management of change.

A detailed survey on various aspects of change management has been chosen as a means to analyze the automobile industry. From the information collected through the questionnaire survey, the status of various aspects of the industry including the performance indicators and their change over a period of time has been determined and the relationship between them has been established.

In the case studies, the prevailing situation in the organizations at various points of time demanding a change has been recorded in a chronological order over the past

many years. Every time a need was felt by the organization, some action was taken in the area of technology, structure, systems, people or culture, or a combination of them. The actions taken from time to time and the results thereof have also been recorded in the chronological order. The collected information has been analyzed and learnings from the analysis have been recorded. From the case studies and learnings thereof, case organizations have been categorized based on the timings of initiation of actions and level of success in the management of change. For each category, then an attempt has been made to develop future course of action. For this purpose, a technique called 'matrix of change' has been employed. In this technique, employees of the case organizations were involved in devising the change process based on the existing practices and target practices. Further, to generalize the results of the study and the evolved strategies for managing change, experts have been involved in a structured way through a 'Delphi study' and also a qualitative modeling using 'Options Field Methodology' (OFM), 'Options Profile Methodology' (OPM) and 'Fuzzy Set Theory' (FST). In OFM, the ideas of the experts (options) were collected which were later put into categories. Dimensions of the design were decided from categories and clustering of the dimensions was done alongwith their sequencing. In OPM, experts were involved in deciding various courses of action (profiles). In FST, the profiles were weighed quantitatively against the goals set and also ranked by the experts. The generalized results have been given as a set of guidelines to be used by the organizations in future. The evolved strategy depicts that with regard to managing change and becoming competitive, the whole process can be divided into four stages. Competitive level-1 can be defined by a market wrap organization having reducing market share, obsolete product, conventional technology, systems and a hierarchical conventional structure. At competitive level-2, improved technology has been acquired and resultant changes are being incorporated to the areas of systems and procedures to become competitive. Competitive level-3 depicts an organization that has state of art systems, an efficient organization and a reasonably good level of technology. Competitive level-4 is a picture of an efficient, technologically advanced, efficient organization that has matching systems and procedures and a lean management structure.

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NOMENCLATURE

BOG	Board of Governors
CC	Cultural Change
CEO	Chief Executive Officer
CKD	Complete Knocked Down
CM	Overall Change Management
COMP	Competitiveness
CULT	Average score of cultural change
ENTR	Average score of entrepreneurial aspects
EPS	Earning Per Share
EXTN	Extent of change
F	Fast rate of change
FLEX	Flexibility
FST	Fuzzy Set Theory
GM	General manager
GNA	Guru Nanak Axles Limited
GOI	Government of India
HCVs	Heavy Commercial Vehicles
HMT	Hindustan Machine Tools Limited
INNV	Average score of innovativeness
JIT	Just in Time
K	Kludging
LCVs	Light Commercial Vehicles
TRNG	Average score of training
MAL	Majestic Auto Limited
MD	Managing Director
MNC	Multinational Company
MUL	Maruti Udyog Limited
OBJ	Objectives of the organization
OEE	Overall Equipment Effectiveness
OEM	Original Equipment Manufacturer
OFM	Options Field Methodology
OPM	Options Profile Methodology
PDCA	Plan, Do, Check and Act cycle
PERF	Performance
PL	People Change
PPL	Average score of People change
PPM	Parts per million
PTL	Punjab Tractors Limited
RENG	Average score of reengineering
RES	Results of change
S	Slow pace of change
SAP-LAP	Situation, Actor, Process – Learning, Action, Performance analysis
SD	Standard Deviation

SKSSL	Sona Koyo Steering Systems Limited
SM	Systemic Change
SMC	Suzuki Motors Company of Japan
SML	Swaraj Mazda Limited
ST	Structural Change
SWOT	Strengths, Weaknesses, Opportunities, Threats analysis
STR	Average score of structural change
SYS	Average score of systemic change
T	Tinkering
TC	Technological change
TECH	Average score of Technological change
TQM	Total Quality Management
TPM	Total Productive Maintenance
VeeGee	VeeGee Industrial Enterprise Limited
VRS	Voluntary Retirement Scheme
YMC	Yamaha Motors Company Limited
YMI	Yamaha Motors India Limited

List of Publications

International Journal

1. Garg, R.K., and Singh, T. P. (2002), "Managing change for competitiveness", *Global Journal of Flexible Management*, 3(4), pp. 13-22.

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3. Garg, R.K. (2003), "Managing change through Flexible Systems Methodology - A Case Study", 3rd Global Conference on 'Flexible Systems Management' at JMI, New Delhi (March 13-15, 2003).
4. Singh, T. P., and Garg, R.K. (2003), "Achieving organizational success through change management – A Case Study", National Conference on 'Recent Developments in Mechanical Engineering' at TIET Patiala (October 31- November 1, 2003).
5. Garg, R.K., Singh, T.P., and Sushil (2004), "Managing socio-technical change in Indian Automobile Industry - A Case Study", 4th Global Conference on 'Flexible Systems Management' at ITM Moussorie (December 26-29, 2004).

CHAPTER 1

INTRODUCTION

1.1 Introduction

Globalization and liberalization of Indian economy has ushered a new era of competitiveness. Prior to this time, in the protected markets, companies were very happy to serve the local markets. Consumers, on the other hand, did not have much of a choice and had to purchase whatever was available in the market at prevailing prices. Generally, the quality was not very high but the prices, which were set by the sellers, included a hefty profit margin over and above the cost of production that was also quite high because of inefficient working. This was true, to a large extent, for almost all categories of products, viz. consumer goods, engineering materials and components, automobiles and so on and so forth. Organizations adopted their age-old practices or had marginally changed, that is, product innovations, modifications and improvements were not very frequently carried out. In case of automobiles, few manufacturers in each category of vehicles had a kind of monopoly. In case of cars, prior to 1982 mainly two brands were available, i.e. Fiat (Premier Padmini) and Ambassador. The features of these cars remained essentially the same over a period of nearly two decades. Establishment of Maruti Udyog Limited (MUL) in the year 1982-83 spelled a doom for these companies. But, this resulted in a near monopoly of MUL over the next 10-15 years with their share in the market going upto as high as 80 per cent. Similar was the story of other segments of automobile industry like heavy transport vehicles, light commercial vehicles, tractors and two wheelers. In case of tractors, heavy transport vehicles and light commercial vehicles, there was marginally more competition in the market because of more than two established manufacturers operating successfully. In case of two-wheelers, three motorcycles – Rajdoot, Yezdi and Royal Enfield, ruled the roads for over a decade. In case of scooters, situation was so bad (and so comfortable for the manufacturers) that one had to book a scooter to get its delivery after many years, or buy in black at almost double the price. Opening of Indian economy, however, started changing this scene.

1.2 Need of Change

It will not be right in stating that automobile manufacturing organizations did not improve before the onset of globalization and liberalization. They did improve but the

pace of improvement was very slow. Whatever small improvement took place was because of the internal competition. But entry of global organizations into the automobile-manufacturing sector changed the scenario drastically. Suddenly, there was pressure on giving more features, adherence to safety norms and pollution standards, and also on innovations to improve performance and aesthetics of the vehicles. In addition, keeping the cost of the vehicles down and within the competitive range became the most important aspect of an automobile manufacturing organization.

Organizations manufacturing auto-components for the main automobile manufacturers (assemblers) experienced a very difficult situation. Prior to onset of this era, they were getting some percentage rise every year on the prices of the parts supplied by them, but now the parent companies came out with a demand to reduce the price of the components by about 5 per cent every year. They also desired to get the material on the line in direct proportion to the consumption rather than buying in bulk and keeping the inventory in stores. On top of it, the prices of the input resources like materials, energy, manpower and others were escalating all the time. All this posed a big challenge to both, i.e. automobile manufacturers and their component suppliers. Organizations resorted to introspection and realized that over the past many years, they had adopted practices which were not efficient, work culture was not very healthy, technology employed needed further upgradation and adjustments, overstaffing and so on. Multinational companies, which entered the Indian market, came with a rich work culture. Although they had employed people from India at every level, they maintained their work culture by devising rules and regulations to suit them to the extent possible. In addition, they had sound financial background, excellent working systems, competent people and latest technology to back up their pursuits in this country. The traditional Indian companies realized that they had to change drastically. The main problem observed was how to change the work culture, how to involve every employee in this process of change. Some organizations were of the opinion that their employees will not participate in this process because of their mindset, trade unions or because of some kind of a fear and a natural resistance to change. Some companies like MUL worked systematically to effect necessary changes and not only survived but made a distinctive place for themselves in the market, while others could not sustain the pressures and had to bow out of the market.

In the period of turbulence, organizations did whatever they could do to cut costs and become more efficient. They came out with voluntary retirement schemes (VRS), imposed bans on recruitment, cut down inventories across the board and improved the bottom line of the organizations for more efficiency and productivity.

Various organizations have adopted different strategies and met with varying degree of success. The question, therefore, is how should the organization manage the change process to achieve optimal results. It is true that there cannot be one universal strategy to be adopted by every organization. It will rather depend upon their prevailing conditions, the product range, work culture, unions, education level of employees, financial status and constraints, state of technology and so on. This study has been undertaken with the aim to analyze the change process adopted by various organizations and the amount of success achieved and to develop effective strategies to be adopted in future for meeting success.

1.3 Broad Areas of Change

Change in industry has been taken in two perspectives: organizational change and individual change. Organizational change has been associated with visible changes in the organizational performance as a result of efforts made in various areas as mentioned above, whereas individual change represents the change in attitude, vision and targets of an individual in the organization. Organizations are subjected to forces pushing for change on the one hand and forces resisting change by attempting to maintain the status quo on the other. An equilibrium is maintained by driving forces and restraining forces.

Lewin (1958) presented a fundamental description of change. He described change by three steps. First step involves unfreezing the present level of behaviour. In second step, actions are taken to change the organization's social system from its original level of behaviour to a new level. Third step involves a process that ensures the new level of behaviour secured against reversion to prior modes of operation.

In today's competitive world, there has been a shift in the requirements of an organization. On the one side, they demand a change of organizational structure and strategies in the traditional way and on the other side, product demands are rapidly changing, e.g. shortening of product life cycles, swelling choice for products, increasing process capability, and increasing expectations of the customers. Sawhney et al (2001)

have recommended dynamically stable organizations, i.e. firms designed to serve the widest range of customers and changing product demands (dynamic) while building on existing process capabilities, experience, and knowledge (stability).

In the present competitive environment, organizational change is categorized into two types: product change and process change. Product change involves the demand of the new products or services in the market whereas process change requires new technologies and procedures to produce or deliver products or services. Change in an organization can be evolutionary and revolutionary in nature. Evolutionary change is characterized by new developments, which are directly related to and build upon an organization's know-how and experience. Revolutionary change is characterized by new developments, which are unrelated to organization's know-how and experience and makes the organization obsolete. Some observers argue that today's conditions are marked by revolutionary product and process change and thus, require 'invention' or the continuous search for new products and new process solutions. To compete under these conditions, management experts like Abrahamson, Beer, Burnes, Grover, Kanter, Kotter, Nohria and Sushil are calling for new organizational forms that stress networks, reduction of hierarchy, greater decentralization, and shorter size to ensure that the firm can focus on flexibility, adaptability and market responsiveness.

Further, it can be seen that the change process would revolve around five major areas, viz. technology, structure, systems, culture and people (Garg et al, 2002). 'State of technology used' and 'level of automation' has a great bearing on the working of an organization but acquisition or development of latest technology comes at high initial investments. Further, effective technology forecasting and its acquisition are the important issues in this case. 'Structure' aspect of an organization deals with the management levels, layers of management, decision-making hierarchy etc. In the present scenario, organizations have become more horizontal with fewer layers. This kind of structure is now giving way to more empowerment and multi-skilling at ground levels. 'Systems' aspect includes working norms and procedures. They definitely depend upon the kind of technology adopted and the organizational structure. It has been realized that full potential of technology and other resources can be harnessed only through good systems and procedures. 'Culture and people' aspect of organizations are perhaps the

most important in making it efficient, productive and growth oriented. Success in the area of technology, structure and system will come about by building good culture through educated, enlightened and involved people.

An organization successfully employing the process of change will address all these major areas of change, i.e. technology, structure, system, culture and people. However, change can be triggered with any one or a combination of these areas. For example, if technology is taken as a driver of change, people might react in the beginning but slowly with education and changing the working systems and procedures; technology will get diffused into the organization. At this stage, it would be possible to make structural changes. Change can also be triggered by structural changes. If structural changes are made in an organization, initially the work might suffer but slowly parallel changes might have to be made in systems and some automation has to be brought in by making technological changes. In the same way, systemic changes can also trigger the change process in an organization, which will eventually bring changes in technology and structure also. It is assumed that changes in technology, structure and systems slowly change the mindset of people that gradually change the culture of the organization.

1.4 Change Management

Change management represents the processes, tools and techniques to manage people-side of business change to achieve the required business outcomes and also to realize that business changes can be met effectively within the social infrastructure of the workplace (Prosci, 2001). In the absence of proper change management techniques, changes in technology, systems and structure do not achieve the organizational objectives. In the process of change management, the most important aspect is 'resistance to change'. Managing the resistance offered by the human beings has been the major part of a change programme. Resistance of individuals can be dealt with upgrading education and communication, boosting participation and involvement of people at all levels, facilitation and support by top management, negotiation and agreement between employees and management (Kotter and Schlesinger, 1989). Targeted efforts employing effective methods at the planning and execution phases in an organization bring down resistance to change to a low level saving all subsequent efforts.

Further, change management also focuses on pace of change and maintains it at optimal level within the prevailing conditions, constraints and limitations. Today, emphasis is on change with dynamic stability, which entails that bigger changes are followed by many small changes to ensure that the effect of a big change is totally absorbed by the organization before planning another big change (Eric, 2000).

1.5 Purpose of the Study

The purpose of the study is to examine the impact of change management on competitiveness of organizations in Indian automobile industry. The associated objectives are as follows:

- To assess the impact of increased level of competition due to globalization and liberalization on the competitiveness of Indian automobile industry
- To systematically study and analyze the path treaded by various automobile/auto-components manufacturing organizations to change from conventional working to meet the new demands
- To develop guidelines for various segments and levels of organizations for successful management of change for competitiveness.

1.6 Scope of the Study

The scope of the study is limited to automobile and auto-component industry in the region of Punjab, Haryana, Uttar Pradesh, Himachal Pradesh, Union Territory of Chandigarh and Delhi. Further, the study is based on the data and information collected from various organizations through interactions, published reports and expert opinions.

1.7 Overall Methodology of the Study

Study of an area like management of change can be carried out primarily by minutely studying the change process adopted by the organization and the amount of success or failure achieved through a process. Considering this, it was decided to firstly gather information from a large number of automobile and auto-components manufacturing organizations through a survey using a specially designed questionnaire. From the information collected through the questionnaire survey, the status of various aspects of the industry including the performance indicators and their change over a period of time has been determined and the relationship between them has been established. This gives a fairly good idea of the prevailing situation. However, the matter needs to be studied in

more details to know about the factors and forces for the present level, the options available and constraints present in the organizations. For this purpose, case studies of various organizations were carried out.

In the case studies, the prevailing situation in the organizations at various points of time demanding a change have been recorded in a chronological order over the past many years. Every time a need was felt by the case-organizations, some action was taken in the area of technology, structure, systems, people or culture, or a combination of them. The actions taken from time to time and the results thereof have also been recorded in the chronological order. The collected information has been analyzed and learnings from the analysis have been recorded. From the case studies and learnings thereof, case organizations have been categorized based on the timings of initiation of actions and level of success in the management of change. For each category, then an attempt has been made to develop future course of action. For this purpose, a technique called 'matrix of change' has been employed. In this technique, employees of the case organizations were involved in devising the change process based on the existing practices and target practices. Further, to generalize the results of the study and the evolved strategies for managing change, experts have been involved in a structured way through a 'Delphi study' and also a qualitative modeling using 'Options Field Methodology' (OFM), 'Options Profile Methodology' (OPM) and 'Fuzzy Set Theory' (FST). In OFM, the ideas of the experts (options) were collected which were later put into categories. Dimensions of the design were decided from categories and clustering of the dimensions was done alongwith their sequencing. In OPM, experts were involved in deciding various courses of action (profiles). In FST, the profiles were weighed quantitatively against the goals set and also ranked by the experts. The generalized results have been given as a set of guidelines to be used by the organizations in future.

1.8 Organization of the Thesis

The thesis has been organized into ten chapters as follows:

Chapter one brings out general problems and issues confronting the automobile industry, i.e. need of change, level of competition, shrinking profit margins, impact of globalization and liberalization, areas of change and change strategies. Purpose of the

study, scope of the study and overall methodology adopted have also been briefly outlined.

Chapter two covers a literature review of the subject and its closely related areas. Literature has been divided into five categories, i.e. organizational change, facilitators for change management, inhibitors to change, change strategies and major focus areas of change. Within each category, study has been made related to its need and courses of actions. Current state of the research has been assessed and limitations of existing approaches have been outlined.

Design of the study, its phases and procedural steps have been discussed in chapter three. A brief description of overall design of the study, research propositions, methodology, tools and techniques used have been covered in this chapter.

In chapter four, the details regarding the need and objective of the survey, general methodology adopted, design of questionnaire and its pretesting, conduct of survey and its analysis have been covered.

Chapters five to seven cover case studies carried out in nine organizations. Case studies of three organizations manufacturing personal vehicles are described in chapter five. In chapter six, case studies of three organizations manufacturing tractors and light commercial vehicles are described, and in chapter seven, case studies of three organizations manufacturing components/parts for OEMs are presented. Each case study starts from the recognition of need of change in the company as indicated from its performance indicators. This is followed by collection of data indicating need of change, areas of change, actions taken, pace of change and type of change, and then arranging it in chronological order since the inception of the company till the time of case-study. This data is consolidated and various phases of change management and driver(s) of change are identified. This is followed by SWOT and SAP-LAP analysis.

Relative comparison of the case studies of all the nine companies has been tabulated in chapter eight. Based on this comparison, the companies have been placed into four categories. 'Matrices of change' have been formed for these categories. A hierarchical change procedure has been evolved and presented in this chapter.

In chapter nine, broad findings of the survey, case studies, and matrix of change are listed, inferences drawn and a qualitative model developed. A 'Delphi study' included

in the chapter is aimed at generalizing the results of the survey and case studies. The chapter also presents a set of generalized guidelines evolved for management of change.

Conclusions of the study covering its usefulness, work done, areas explored and scope for further work have been presented in chapter ten. Recommendations for continuing research and covering other closely related areas with a view to manage change process from time to time have also been made.

1.9 Concluding Remarks

While every attempt has been made to make this study exhaustive, intensive and broad based as possible, it may be appreciated that covering all the automobile organizations in all parts of a country of the size of India, is a stupendous task. This study has been limited to the automobile organizations of north India only. There have been limitations of time and resources, but still, by and large, this study has not left out any important organization. Review of available literature is the first logical step in a research effort and the next chapter is devoted to the same.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of literature on diverse aspects of management of socio-technical change with an objective to identify the areas to be explored in the study and approaches to be employed during the execution of research work. Thrust area of work and limitations of existing approaches are highlighted.

In recent years, researchers have been concerned with understanding why some organizations perform better than others. According to the resource-based perspective, successful organizations have unique capabilities or resources that give them an advantage over their competitors. Gersick (1994) has found that these resources are valuable when they are rare, inimitable, and non-substitutable. Consistent with resource-based view, the author maintains that the development of social capital within an organization is the source of competitive advantage for a firm. Winning in business today demands innovative culture. According to Kanter (1999), the need of the companies is to serve the social sector and gain competitive advantage. For the success of a business, social acceptance of innovations especially technological changes is a must. He further states that companies should view community needs as opportunities to develop ideas, serve new markets, and solve long-standing business problems. The best way to ensure full commitment is to make parity between corporate and the community.

There are three types of competitiveness in an organization (Canada, 2002): competitiveness in short-term, competitiveness in long-term, dynamic competitiveness. In the long-term, competitiveness depends on the ability to develop the factors that sustain productivity growth. A dynamic process of creation of new resources, technological innovations, development of new markets, new skills and competences leads to long-term competitiveness. Competitiveness in short-term depends on the development of factors that give more profits without new resources. Dynamic competitiveness pertains the continuous improvements and innovations for the growth of organization.

Fink and Schlake (2001) have studied competitiveness of an organization and stated that enterprises must identify upcoming opportunities and threats very early and

integrate them into strategic planning on time. The authors have given the concept of scenario management, which is based on systems thinking, future open thinking and strategic thinking, and result in organization success.

Nohria (2002) has concentrated on leadership, human performance, and corporate renewal for competitive advantage in Indian context. He has emphasized on three things for staying ahead than others, i.e. shareholder value, consolidation, and fast pace of change. Corporate education programme can help the people in reducing resistance to change. Through these techniques, an organization can get success as per expectation.

2.2 Change Management

The content or subject matter of change management has been drawn from psychology, sociology, business administration, economics, industrial engineering, systems engineering, strategy, structure, and the study of human and organizational behavior. For many practitioners, these component bodies of knowledge are linked and integrated by concepts and principles. The literature on change has been characterized as “a few theoretical propositions, repeated without additional data or development; a few bits of advice reiterated without proof or disproof; and a few sturdy empirical observations quoted with reverence but without refinement or explication” (Macy et al, 1993).

The study of change and its development has been one of the greatest themes in the social sciences. Many social science disciplines have developed theoretical literature and empirical findings about the birth, development, transformation, decay, and decline of human and natural systems. A recent tradition of research in the various fields of the organizational science has grappled with organizational change and developments (Woodman, 1989; Van et al, 1995; Quinn, 1995). The development theories of change in the organization studies have been faced with the hurdle of scholarly quality and practical relevance (Pettigrew, 1987). It has not been possible to define the term change accurately owing to the broad spectrum of change and its heterogeneous character. Change management is viewed from two perspectives: implementing change and adapting change. Process of change has been found to vary dramatically if one executive demands the change (i.e. implementing) versus front line operators (adapting) who may be unsure about the need/ adaptation of change (Robbinson, 1995).

Mainly two perspectives of change have been studied: organizational change and individual change (Robbinson, 1996). Organizational change has been associated with the visible changes in the organization. Efforts are made in various areas like technology, structure, system, strategy, culture, etc. On the other hand, individual change represents the change in attitude, vision and target of an individual in the organization. Change management is defined as the effective management of a business-change. Executive leaders, managers and front line employees have to work in team to successfully implement the needed processes and require technology for the organizational change. According to Scott (1997), it is possible for individuals to manage change and develop a greater sense of career focus in the midst of dynamic environment by examining three principles, i.e. firstly, "principle of centeredness" which means that as a centered person, you have a strong mission or purpose in life, values to help you in your decision-making efforts, and a vision to steer your future; secondly, "principle of limits" that means that you can't do everything but must focus on what is important versus what is urgent. Create a greater sense of balance to the physical, mental, social, and spiritual aspects of your life; thirdly, "principle of fun" which means keeping life in its proper perspective by having fun. These principles have been helpful in implementing the change in various areas in an organization. Pettigrew (1997) has critiqued the literature on organizational change as being largely acontextual, ahistorical, and aprocessual. Since considerable advancement has been made in these areas, some writers have acknowledged that context and action are inseparable and that time must be an essential part of investigations of change if processes are to be uncovered (Greenwood et al, 1996; Weick et al, 1999).

From the literature survey, three basic definitions of change management have been obtained (Nickolas, 2002). The first and most obvious definition of "change management" is that it refers to the task of managing change. 'Managing change' has two meanings. One meaning refers to making changes in a planned and systematic fashion. The aim is to effectively implement new methods and systems internally in an organization. These (internal) changes have to be triggered by events originating outside the organization, what is usually termed "the environment." Second meaning of managing change refers to the response of the change over which the organization has to exercise little or no control (e.g. legislation, social and political upheaval, the actions of

competitors, shifting economic tides and currents, and so on). The second definition of change management refers to an area of professional practice. There are a large number of independent consultants around the world who are engaged in planning change for their clients. Stemming from the view of change management as an area of professional practice, there is a third definition of change management. This definition consists of the models, methods and techniques, tools, skills, and other forms of knowledge that goes into making up any practice a body of change.

Another important definition is given by Prosci (2002). He states, “change management represents the processes, tools and techniques to manage the people-side of business change to achieve the required business outcomes, and also to realize that business changes can be met effectively within the social infrastructure of the workplace”. This definition has been commonly used among practitioners and end-users.

2.3 Categorization of Literature Review

The review of literature has been divided into the following categories:

- Organizational change
- Facilitators for change management
- Inhibitors to change
- Change strategies
- Major focus areas of change

All these categories are described in the following sections.

2.4 Organizational Change

Descriptive research by Tichy et al (1990) suggests that transformation of an organization follows a process, which includes a sequence of phases: recognizing the need for change, creating a new vision, and then institutionalizing the change. Saeed et al (1993) have recommended a “focused manufacturing knowledge” in manufacturing area than making many engineering changes. The engineering changes have been the primary means for most mid- to high-volume product-oriented organizations to modify existing product designs in a controllable, coordinated, and methodical manner. In this way, the organization can save substantial amount of engineering time while simultaneously developing higher quality, reducing cost, and reducing product time. To accomplish change in an organization, traditional measures need to be controlled with an empowered workforce that is more self-directed, self-managed and self-controlled. Special

considerations are needed for bringing changes in a matured organization like increasing their capacity, altering the hardware (strategy, structure and system) and software (employees' behavior and mindset) within the organization and by creating empowered employees who act as leaders at all levels of the organization (Beatty et al, 1996)

Areas of organizational change have been related to its dynamics and effects of time, process, discontinuity, and context. Change management cannot be merely limited to technological aspects like replacement of machines, equipments, instruments and practicing new manufacturing processes. However, it has been commonly aimed to make the processes and products more effective in an organization. Managing change has comprised of various interconnected and interdependent areas (Garg et al, 2002). Each of these areas need to be recognized both individually and also in terms of its multilateral linkages with other areas. These areas are described as under:

- i. *Technology*: Technology is concerned with design and layout of production facilities, type and mix of machines and equipments, product mix, flow of data and sharing of information, inventing new materials, automation, using computer softwares and hardware, monitoring and control of production processes, maintenance and simulation of operations and facilities, etc.
- ii. *Organizational systems*: This area is concerned with working practices related to production, maintenance, marketing, sales, information technology, material procurement, inspection, quality, etc. on the one hand and their interconnection on the other. Both technology and systems can be made/changed simultaneously in "reengineering" to get success.
- iii. *Organizational structure*: Structure is related to organizational support system that facilitates change process in an organization. The area includes hierarchical levels, cadres, span of control, manpower utilization, administration, communication, integration, coordination, learning, etc.
- iv. *People*: This area is related to management attitude, vision, objectives, resistance to change, motivation, developing skills, coordination, mindset of individual, and impact of group dynamics on change process.

- v. *Culture*: Culture includes flexibility, work environment, team spirit, and behavior of individuals, group behavior, management commitment, belongingness, leadership and interpersonal relationship in an organization.

2.5 Facilitators for Change Management

Facilitators for change management include suitable change agents, their capabilities, role of management, information technology and organizational targets. An individual in the organization who is familiar with the process of change is assigned the responsibility of change programme and is called as 'change agent'. This person facilitates all the essential events and also intervenes whenever feels so. Skill and knowledge of the change agent decide the extent of the organizational change. An important aspect of the change process is 'change target'. Target includes vision, objectives, knowledge, values, beliefs, assumptions and emotions. . Leadership plays an important role in the change process. Various facilitators for managing change in an organization are discussed below.

Change Agents: Change agents influence employees' readiness for adapting change. Readiness is described in terms of organizational members' beliefs, attitudes, and intentions (Kavanagh, 1999). A typology of readiness programme is offered taking urgency of change and employee readiness. Change agent can contribute a lot in achieving various aspects like increase of morale of employees of the organization, increase of retention (reduce attrition), instill high organizational commitment, allow for greater creativity and innovation through HR alignment, develop a culture that is proactive and receptive to change. All these aspects result in achieving success in an organization.

Transition Management Teams: Beckhard et al (1987) have recommended a transition management team (TMT) composed of leaders who are influential in the organization and have wisdom, objectivity and effective interpersonal skills. This team must also have the resources and clout to manage change process. Duck (1993) expanded on Beckhard and Harris approach, highlighting the dynamic nature of change and the importance of an effective transition management team (TMT) composed of people who report directly to the CEO and can commit all their time and effort to manage change process. From Duck's perspective, it is critical for TMT to manage the 'dynamic' aspects of change. The cornerstone of this process is effective communication throughout the organization. TMT

are also responsible for managing emotional connections that are essential for successful completion of the transformation.

Leadership: Armenakis et al (1993) have defined the role of various persons in the organizations for change programme. The facilitation works between the social and mythic realities enable the emergence of new symbols as the success of change programme. According to Nohria et al (1994), decision-leadership of managers in a company keeps them competitive. The authors have stated that effective managers play with the possibilities of change, tinker with systems, and use all the resources to find workable solutions. By frequently changing, it becomes a tool that creates a balance of needs of organization and conflicting modes of organizational behavior, such as flexibility and consistency. When the leader takes as given his mythic reality, the facilitation gains acceptance in the community for the new symbol. The leader charms the members into the feeling of 'co-ownership' in the symbol's creation and propagation (Pawar et al, 1997).

External Agents: Kronenberg (1989) has emphasized the close co-operation between universities and industry and considered it as the key requirement to intensify dialogue that can result in accomplishing change in the organizations. Spann et al (1995) have considered the role of sponsors, developers and adopters as external agents for the effective technology transfer in a change programme.

Organizational Learning: Kanter (1999) has recommended "learning in the organizations" for change successfully. He has stated that traditionally business view the social sector as a dumping ground for spare-cash, obsolete-equipment and fired-executives. But today, smart companies are approaching it as a learning laboratory where they can stretch their thinking, extend their capabilities, experimentation with new technology, get feedback from early users about product potentials, and gain experience working with underserved and emerging markets. He adds that a company has a better chance of making a change if it knows how its business agenda relates to specific social needs.

Information System: Role of information system has been found crucial in change process (Stenzel et al, 1997). After laying the foundation of strategic vision, constructing a robust set of measures, and ensuring a consistent leadership, an efficient and effective

information system help to facilitate communication, understanding, and organizational intelligence. An effective information system creates a sense of organizational community and facilitates in organizational change.

Advisory Board: An advisory board consisting of various cadres has been proposed to allocate the duties and responsibilities (Lijnse, 2002). The amount of work for a change manager is staggering. He has to approve changes, record changes, manage meetings, control the process, improve the processes, and lots more. The best way to cope with this challenge is to introduce different cadres within change process like the 'process owner' owns the process and supporting documentation for the processes, oversees the process, and ensures that the process is followed by the organization. 'Change manager' is responsible for ensuring that all changes are reviewed. He can approve minor changes if found necessary. 'Change Coordinator' ensures that all changes are recorded, scheduled, and that all parties involved with the change have the information that is needed through the process. The role of the 'change owner' is to make a change through its lifecycle. The 'change sponsor' is the individual that approves the change from business perspective.

2.6 Inhibitors to Change

It is a universal truth that people do not like/ favour change. Any change has been found to disturb the status quo, adds problems and fear into the daily lives and requires changes in 'overall behavior'. As a result, a poorly managed organization results in a 'force' that slows down or in some cases even stops the change process.

Ford et al (1994) have used logical models to provide different understandings of the hindrances to the change process. They have found that change has been dependent upon conflict or struggle. The conflict between the forces for or against change have been two opposing actions that work at each other until one dominates, and the resulting outcome has been a synthesis that is distinct but contains elements of the forces for and against change. This model has been based upon the assumption that dissatisfaction with status quo has been necessary before change can occur. They have further added that changes do not result from "pushes" or pressure to move away from the present situation, but instead result from being "pulled" towards or attracted to different possibilities.

There are strong arguments as to why resistance to change occur (Kavanagh, 1999). Political arguments are connected with the interests of individuals/ groups against

the changes of losing status or power. Emotional arguments relate to personal fear of individuals into account that result in reduced feeling of involvement in the change. Rational arguments are concerned with the role of specific organization for change (Kavanagh, 1999). Managing the resistance by human beings has been the major part of any change process. Chakravarty (2000) is of the opinion that change can be initiated, planned, directed and controlled. He adds, "Bureaucracy is generally regarded as biggest resistance to change". Management of change, therefore, involves identification of winners and losers and developing strategies for building and managing coalitions.

Dasgupta (2002) has studied the cultural change with respect to the revolution in information technology. She has found people itself as the biggest problems encountered in the global change. Employees are dealing with attitude, behavior and expectations that are extremely different from their routine. The revolution in telecommunication, banking, postal delivery and information technology has demanded a permanent cultural change.

2.7 Change Strategies, Tools and Techniques

For making a successful change in an organization, various types of changes, e.g. incremental, episodic, discontinuous and continuous have been suggested by many researchers. According to Quinn (1985), incremental change should be preferred for making change. Successful managers in a company act logically and incrementally to improve the quality of the information used in key decisions to overcome the personal and political pressures giving resistance to build organizational awareness, understanding and psychological commitment essential to effective strategies to make the organizations successful. Episodic changes are organizational changes that tend to be infrequent, discontinuous and intentional changes. Episodic changes occur as organization moves away from equilibrium stage, or change as a result of misalignment or environmental encroachment (Miller, 1994). Continuous changes are those changes, which are ongoing, evolving, and cumulative in nature (Orlikowski, 1996). Any equilibrium of change emphasizes the discontinuous nature of changes (Greenwood et al, 1996). Further, long periods of small incremental change need to be interrupted by brief periods of discontinuous and radical changes. Brown et al (1997) have found that organizational survival depends on the firm's ability to make rapid and continuous change in contrast to

episodic change. The occasional dramatic revolutions or punctuations overcome organizational inertia that alters the organization frame (Beer et al, 2000).

Kotter et al (1989) have discussed several strategies to deal with resistance of individuals in the organizations, e.g. upgrading education and communication, boosting participation and involvement of individuals at all levels, facilitation and support by top management, negotiation and agreement between employees and management. According to Kronenberg (1989), continuous improvement helps an organization in doing better and gaining an edge. Continuous improvement requires a commitment to learning. In the absence of learning, companies and individuals may repeat old practices and change remain cosmetic only. It is further stated that learning organizations cultivate the art of open and attentive listening. A learning organization takes account of carefully cultivated attitudes, commitments and management processes that have accrued slowly and steadily over time.

A systematic method for promoting climate for innovation by designed interactions and preparing a summary of best ideas for innovations was suggested by Humble et al (1989). Their argument about the incremental innovation also seems quite plausible, since radical innovations or technological breakthroughs can be realized once in a while but incremental innovation in the existing products can go on almost on a regular basis. Many a times, it is not possible to realize radical innovations within the existing firm's setup. In such cases, contract research consultants and universities can be funded for specific research projects or long-term contract may be signed with any of the above or with any combination of the above organizations.

Hatch (1993) and Gersick (1994) have offered two distinct mechanisms – temporal pacing and event pacing that modulate the speed and course of organizational change. They further say that temporal pacing is well suited to the non-routine situations. In contrast, event based pacing is shown to be well suited to fostering incremental change. Here the focus is on the specific events that signal when actions should be initiated or corrections made. Its focus is on keeping on a given track and is motivated by the desire to achieve specific outcomes.

Some researchers have discussed 'readiness for change' as a strategy to change process. Beer et al (1987) and Armenakis et al (1993) have examined the influence of

change agents on organizational members for change. The authors find that the primary mechanism for creating readiness in an organization is the message, which incorporates organizational needs and its ability to change. They add that management of information, internally and externally, is very important and needs to be controlled by top management.

Kotter (1995) after studying many successful as well as unsuccessful organizations concluded that change process goes through a series of phases that in total, require a considerable length of time. He adds that skipping steps creates only the illusion of speed and never produces a satisfying result. He has offered eight steps to transform an organization in a phased manner. These steps are: establishing a sense of urgency, forming a guiding coalition, creating a vision, communicating the vision, empowering others to act on the vision, planning for and creating short-term wins, consolidating improvements and producing still more changes, and lastly institutionalizing new approaches. He further adds that transformation of an organization is dependent upon a good leader who looks the need for a major change.

Porter (1996) has considered 'operational effectiveness' as a change strategy to get superior performance, which is the primary goal of any enterprise. Operational effectiveness means, "performing similar activities better than rivals perform them". He added that a company might have to change its strategy if there are dramatic changes desired in it.

Brynjolfsson et al (1997) introduced a new tool "the matrix of change" that can help managers anticipate the complex relationships surrounding change. It is found that the matrix can help managers determine how quickly change should proceed, in what order changes should take place, whether to start a new site, or whether the proposed systems are stable and coherent. Specifically, "the tool helps manage concerns about feasibility (stability of a new system of practices), sequence (which practices to change first), location (Greenfield or Brownfield sites), pace (slow or fast), and stakeholder interests (sources of value added)". The tool involves four steps. "First, managers determine which business practices matter most for their business objectives. Second, the matrix highlights interactions among these practices and possible transition difficulties from one set of practices to other. Third, it encourages various stakeholders to provide

feedback on proposed changes. Finally, it reveals process interactions that can provide guidelines for the pace, sequence, feasibility, and location of change”.

The need for flexibility in management has been emphasized by researchers as well as practitioners. A ‘flexible managerial approach’ has been reported by Baker (1985) with long-term financial planning having a full understanding of the dynamic nature of business environment. The concept of ‘flexibility management’ has been outlined by Armstrong (1993) as a flexible approach to organization management to ensure that the organization will be able to adapt to change, respond quickly to new threats and opportunities, and manage diverse and decentralized operations. Mintzberg (1994) has suggested that managers need not always program their strategies formally; sometimes strategies must remain flexible, as broad visions, to adapt to a changing environment. A flexible system methodology (SAP-LAP) has been developed by Sushil (1997). This methodology tries to resolve the end of continuum paradoxes, by treating all the system based methodologies, and techniques as lying on a continuum ranging from well structured to unstructured. The three basic components in flexible systems management paradigm are situation, actor and process. The situation is to be managed to an organic order by an actor through flexibility evolved self-organizing management process, which recreates the situation. The actor exercises the freedom of choice to flexibly and systemically evolve a management process in an interactive and innovative manner.

Grover (1999) has developed “business process change management” for the success of the organization. According to him, reengineering focuses radical changes over broad core entities and is related to organizational processes whereas process change management involves the management of the multiple facets of process change. He adds that global economy has mandated greater operational effectiveness and efficiency, and imposed tremendous pressures for cost reduction. The conclusion is to go for strategic changes for the firm to survive and prosper for the success of reengineering phenomenon.

Eric (2000) has developed a theory for changing the organizations without ‘pain’. The author states that to change successfully, companies should impress major change initiatives among carefully paced periods of smaller change, using “tinkering and kludging”. He adds that company can manage change with an approach called dynamic stability. Dynamic stability is a process of continual small change efforts that involve the

reconfiguration of existing practices and business models rather than the creation of the new ones. Tinkering is concerned with the minor changes in the products at consumers, motivating the existing manpower of the organization. Kludging is tinkering but with a college (formal) education. It takes place on a large scale and involves many more parts. Organizations that have consistently avoided changes may need to undergo rapid, destructive change. He adds that the companies already changing rapidly face a different challenge, i.e. they must learn to shift down from highly destabilizing and disruptive change to tinkering and kludging. This thinking helps an organization to change without pain.

Pattanayak (2000) thinks that with the changing business environment, organizations must focus on their employees in order to ensure that they move ahead together. He states that focus today is on becoming learning organization where new concepts like BPR, TQM, Benchmarking etc. are practiced. He found that “reengineering of organization behaviour can be achieved by a thorough understanding of an organizational culture, its effect on organizational change, employee empowerment and by integrating HRM with corporate strategy”.

The decades-old paradox of great software promise and its disappointing practice in organizations has been recently increased by the appearance of enterprise-wide systems often called “enterprise resource planning or ERP” (Taylor, 2002). Obtaining effective user involvement has been problematic in the past and it promises to become worse in the future with larger, more comprehensive software applications. Business process re-engineering (BPR) adds to this significant problem by exhorting managers to undertake massive change - including new information systems - using autocratic methods whereas socio-technical systems (STS) design combines user-involvement in design with structural change and the effective use of technology. The author explores the successful application of STS with its local participation in organization design to a centralized and autocratic application of BPR and SAP enterprise-wide software.

2.8 Major Focus Areas of Change

Technological Change: Need of technological change for organizational development was analyzed by Ramo (1989). He has commented that twenty first century would be totally dominated by technological change. Also, the global characteristics and fast

changing nature of the world economy has demanded sophisticated and conscious technological changes (Greis, 1995). The factors affecting technology change have been availability of resources, availability of data, credibility of sources of data, similarity in present and future technologies, and variables affecting the development of new technology.

Managing a technological change pro-actively has always been a big challenge for any firm. Hayes (1991), Langowitz (1992) and Katz et al (1996) have studied the technology transfer in a multinational cooperative joint venture and concluded that technology change depends upon type of technologies, methods used to transfer them, their degree of success, and the organizational, national and cultural differences. Developing countries have been relying heavily on technology transfer from abroad. Indigenous technological innovations are based on local needs and availability of resources whereas the developed countries have been emphasizing exploitation of technology and introduction of new products and processes. They have given high priority to management of research and development and commercialization of new technologies (Khurshid et al, 1998).

Malthus (1978), Marx (1987), and Ricardo (1995) have expressed concern about the effects of innovation, especially in the form of new technology machinery, on the displacement of labor. According to them, new technology is concerned with labor saving and quality-enhancing innovations, such as computer-aided design/computer-aided manufacturing systems, computer numerically controlled machines, just-in-time inventory systems, flexible manufacturing systems and robotics. Technology change has been derived as a two-stage process. In the first stage, the firm is found to make a decision to adopt a new advanced manufacturing technology. This is followed by adjustment of the labor force in the second stage. Much technical advancement has been found as labor-saving innovations enabling companies to eliminate less-skilled positions. This has led to a shift in labor composition in favor of more highly educated workers. Furthermore, technology change has increased the wage premium associated with additional investment in education or skill acquisition. Indeed, as noted by Berman et al (1998), numerous studies have attributed both the greater wage premium for skill and recent increases in unemployment in "Organization for Economic Cooperation and

Development (OECD) countries” to skill-biased technological change. It is essential to see the needs of the organization before changing technology. This can be possible by establishing a meaningful dialogue, preferably with a group of three or four persons at different hierarchical levels (Misra, 2002).

Structural Change: Organizations have various structures based on the optimal coordination of interactions amongst various activities. Many structures are designed in the organizations based on number of levels, authorities and responsibilities of individuals. There are six elements of structures: work specialization, chain of command, span of control, authority and responsibility, centralization and decentralization, and departmentalization (Robbins, 2001). Based upon the elements, the organizational structure has been categorized into six types. An organization with ‘simple structure’ is low in specialization and formalization, but high in centralization. In ‘functional structure’, activities pertaining to a particular function are organized into various departments, e.g. departments dealing with distribution, styling, engineering, manufacturing, research, public relations, and personnel relations (Harris et al, 2002). In divisional structure, all the activities pertaining to a single product, set of products, or types of customers are grouped into a division/ department/ section. An organization, in which specialists from functional departments are assigned to the work on one or more projects led by a project manager, represents a matrix structure. In a team-based structure, the entire organization consists of work groups or teams that perform the organization’s work. Such organization is also termed as flat organization.

A process focused organization is usually characterized by a large central staff coordinating the plants throughout the functional areas, whereas a product focused organization is highly decentralized, flexible, and has a large number of staff functions in each plant. The later structure is needed when the firm’s strategy emphasizes product innovations rather than efficiency (Haynes and Schmenner, 1982). Kanter (1985) has studied the impact of organizational structure change on innovative abilities. The author has indicated that most of the best innovative ideas in an engineering organization are interdisciplinary and inter-functional. He has indicated that an innovative company needs to assemble a group of talented people who are eager to do new things and put them in an environment where innovation is expected.

Changing structure in a company includes alteration in any authority relationships, coordination mechanisms, degree of centralization, job design, or similar other structural variables. Process reengineering, restructuring, downsizing and empowering have resulted in more decentralization, wider spans of control, reduced work specialization, and cross functional teams. These structural components have given employees the authoritative flexibility and ease to implement process improvements (Robbins, 2001).

The need of structural change of a high technology firm is reflected directly from the environment of the firm and the characteristics of the technology (Moharman et al, 1990). New technology can have different levels of impact depending on their pervasiveness and the structure of the organization and society (Rao, 1990). The interpersonal behavior in an organization has been taken as the 'momentum' for change (Clarke, 1994; Dawson, 1994). Therefore, an appropriate organization structure can be an important lever for making the change. However, its effectiveness has been dependent upon the recognition of its informal as well as formal aspects. Barelett et al (1995) expressed that formal business structures create barriers between themselves and their customers, take initiative away from those who need to exercise it and promote the people who operate well in that environment. They emphasized for need of an organizational structure with the opposite characteristics. The changing scenario requires a new management philosophy on organizational structure that is based on purpose, process, and people. Calori et al (2000) gave a different meaning to the concept of structural change and its effect on competitiveness. The authors have shown that structure of a company is changed by changing manpower strength, layers and levels, and their skill.

Structural changes in global firms have been discussed by Birkinshaw (1988). He has expressed that the strategic and structural changes are being manifested in large multinational corporations (MNCs) to locate more and more value-added activities outside the home country. Further, 'subsidiary development' initiative is an important driver of the process of structural change - through which the subsidiaries expand their scope of activities and responsibilities within MNCs.

Drucker (1990) has stated, "Structure is a means for attaining the objectives and goals of an organization. Any change in structure must start with objectives and strategy". Organizations are composed of informal structures, rules and norms as well as formal practices and procedures. These informal rules, patterns of behavior and communication norms and friendships are created by people to meet their own emotional needs. Because of this, they can have more influence on individual behavior and performance, and ultimately on overall organizational performance than the formal structure and control mechanisms laid down by management.

Mitchell et al (1996) and Mulherin et al (2000) have pointed out broad economic shocks in restructuring at industry level. Industries are affected by specific shocks (rapid changes) in terms of deregulation by government policies, technology transfer, foreign competition and energy price volatility. Shocks have been studied with respect to various factors like growth, opportunities, profitability, availability of cash, and industry concentration (Jensen and Ruback, 1989; Jensen, 1989; Jensen, 1993) and also technology, industry deregulation and foreign competition (Mitchell and Mulherin, 1996; Mulherin and Boone, 2000). Powell (1997) have studied the restructuring at the industry level for a sample of U.K. firms over a period of 10 years and concluded that deregulation is very much significant in explaining takeover activity for 1990s period. Pattnayak (2000) has advocated downsizing and delayering for reengineering in the companies. He has emphasized that successful reengineering requires a change in the company's whole structure.

Role of management style on structural change has been studied by Covin and Slevin (1998). They have offered that an entrepreneurial management style will have a positive effect on the performance of organically structured firms and negative effects on the performance of mechanistically structured firms. They further commented that an organic structure can facilitate innovation through its flexibility and ability to respond to a turbulent environment.

Michael (2001) popularized the concept of business process reengineering (BPR). According to him, BPR refers to fundamental rethinking and radical redesign of work processes so that the company becomes lean and develops quick response capabilities, to face competition and to exploit new opportunities. Abrahamson et al (1999) have given

the steps for designing a new logistics structure: calculate the total cost and delivery service of the existing structure, making calculations for alternative structures, and make calculations on dimensions and size of facilities. First two steps directly deal with the organizational structure whereas the third one deals with operational part.

Kohn (2002) has described the changes in the logistical concept and studied its impact on the environment. In a model developed, he has illustrated the creation of opportunities and limitations on account of structural changes in an organization. He has concluded that changes on a structural level surely influence time, cost and environment.

Systemic Change: Mumford (1983) and Pava (1983) developed socio-technical systems design approach for process redesign. They have stated that performance of the organizations is dependent upon technical and social dimensions. They further considered that technology dimension is concerned with its technology and procedures, and social dimension denote people who work for the organization and focuses on their psychological needs for fulfilling and satisfying work. They have concluded that socio-technical systems involve the joint design of the technical subsystem (optimized for efficiency) and the social subsystem (optimized for job satisfaction and motivation) in such a way that they support each other.

Van et al (1992) have stated that process (system) has been used in three ways in literature: as a logic used to explain a casual relationship in a variance theory, as a category of concepts that refers to individuals or organizations, as a sequence of events that describe how things change over time. Out of these three, only the third permits explicit and direct observation of the process in action, and thereby allows describing and accounting for how some entity or issue develops and changes over time. Thus, the definition of process used in change management should refer to the sequences of individual and collective events, actions, and activities. Wastell et al (1994) have been of the opinion that efficiency, effectiveness and adaptability of business processes (systems) improve the organizational performance. Also, processes are argued to be inherently vulnerable because they flow horizontally, cutting across vertical functions and are prone to atrophy due to departmental rivalries, bureaucracy, lack of coordination and loss of customer focus.

Ghoshal and Bartlett (1995) have classified the company's core organizational systemic processes into three parts: the entrepreneurial process, the competence building process, and the renewal process. An entrepreneurial process deals with the changes in organizational structures, relationships, and values to create an environment of innovation and risk taking. The competence building considers flexibility, responsiveness, learning, skill, information sharing, cost reduction, increasing overall equipment effectiveness, openness in decision-making, technological changes, and culture. The renewal process includes data processing, system support process, new strategies, motivation, and building core competencies. The authors have considered that systems help companies to decide strategies for their competitive strengths. Managers are expected to design systems, procedures, and policies that ensure all the employees conformed to the company way.

Hicks et al (2000) have classified processes into three categories: nonphysical, physical and support processes. The first category relates to information and knowledge-based processes, second group involves the physical realization of the product through manufacturing, assembly, and construction, and the third category includes staff functions such as finance and human resource management. They have concluded that in addition to coordinating marketing and supply, systems related to procurement, product development, and manufacturing activities need to be changed for success in a business.

French (2000) has found the impact of the new processes on the survival of the organization. Further, he has demanded new processes to be developed for cost reduction through value engineering activities, also reduction in product-life cycle through research and development, and improving confidence of its vendors through revitalization of the company. Carr et al (2001) have considered the systemic change responsible for competitiveness of an organization. He has demanded a shift from crisis management to long-term process of stabilizing the organization, sustaining progress and ensuring the success of the company in a rapidly changing environment.

Adrian and Yiannis (2001) have considered three subsystems in a system namely technical, social and power. They found that no change could convert an entire system instantaneously. They portrayed reorganizations as beginning with a nucleus where the change must first become established firmly before it propagates to rest of the system.

They also found that if communication mechanism gets more efficient, then nucleus become larger and stronger resulting in a systemic change, instead of being damped by its surroundings.

Pattanayak et al (2002) has considered reengineering responsible for a successful change in an organization. According to the author, reengineering represents rapid and radical redesign of strategic, value added business processes and the systems, policies and organizational structure that support them. He has emphasized that dramatic changes and dramatic results are possible through systemic changes in an organization.

Chaudron (2002) studied the impact of various change efforts in various organizations. Based on this study, he determined several causes to organization's change efforts to stumble or stagnate. One of the important causes has been lack of systemic changes. He has stressed that management must focus on customer satisfaction, and should promote teamwork in the entire organization. Profit sharing may be introduced; individual performance appraisals may be radically changed or eliminated; organizational structure may be realigned away from functions (production, quality, engineering) to a customer-, process- or geographic-based; information may be disseminated to all the employees than to reserve it for senior management. Significantly, more authority must also be extended to the line employees. If management does not align these systems, the effect will be like "Dr. Doolittle's Pushme-Pullyou" animal (a horse with two heads, each pulling in the opposite direction).

Garg and Singh (2002) are of the opinion that system pertains to the existing practices in an organization. In making systemic changes, the efforts are needed to eliminate the unnecessary procedures, complicated reports, formal approvals, formal meetings, enforced policies, or other formal activities, which generally create backlogs/bottlenecks. Red tapism and other bureaucratic procedures also need to be changed which cause frustration amongst employees as their capabilities and role are not judged significantly. Proper training needs to be given to the organizational members as a team so that they can become self-managed. Simulation based guidance can add more value to it. The authors have stated that systemic changes result in saving of power, time, cost and effort leading to increased competitiveness. This is further added that systemic changes in

an organization can be made through bold leadership and commitment from top authority.

Manfred and Elizabeth (2002) have emphasized upon the need of the employees to match the desired changes in the organizational systems. They have indicated that by soft process changes like training, transfers, teamwork and travel, hard results can be easily met out in an organization for global leadership. Role of change agents, cheerleaders, coaches, teachers, mentors, process consultants and integrators has been very important in selecting the new systems for motivating the manpower to reframe their mindset.

Lamb and Leisch (2002) have offered an approach to reframe the relationships between three constructs – market commitment, market knowledge and market involvement, in the process of internationalization of a small firm. They have added that as the firm grows, organizational resources become a great issue requiring increased management attention and coordination. This situation requires a change in its existing systems and structure. Kampas (2003) has found that it is the necessity of the present industry to orchestrate transition from product-innovation culture to process-innovation culture, which focuses on systems change like product development, procurement, manufacturing, sales, distribution, and marketing.

People Change: Change in people refers to changes in employee attitudes, expectations, perceptions, or behavior. The human dimension of change requires a workplace committed to the organization's objectives, targets, and vision. This dimension has necessitated proper education and training for the manpower. It has also demanded a performance evaluation and reward system that supports and encourages continuous improvements.

Van (1986) has considered people for the development and implementation of technological innovations at various stages. He has concentrated on four factors namely new ideas, people, transactions, and organizational context, and problem related to them. According to Bardwick (1991), many organizations and their employees are mired in the mentality of entitlement. As a result, there is low performance, lack of commitment and accountability, little risk-taking, and scant enthusiasm. The opposite of entitlement is fear. Duck (1993) has described the need to take people into confidence while

introducing change in any area. The author has emphasized the change paradoxes and mentioned that trust is hardest to develop and achieve when you need it most. Hazen (1994) explains how to overcome both the lethargy of entitlement and the paralysis of fear and to move into the energy of earning in order to create a work environment of high confidence and high performance.

According to Beatty and Ulrich (1996), the greatest effort involved in making the change in an organization is to change the mindset of employees at all levels. The mindset represents a shared way of thinking and behaving within an organization. Further, they added that mindset is institutionalized in vision, value and mission. As an organization becomes mature, it has a relatively fixed mindset, and becomes a liability. With time, its intensity may hinder the ability to change.

In an interview with Jaques Naseer, CEO of Ford Motor Company, Wetlaufer (1999) has discovered that no company driven by rapid changing customer needs and tastes can survive without having competent leaders capable of fast decision making. It has been emphasized by CEO that need of the organization is to make quick changes in the fundamental approach. Employees should think like shareholders, and the company as a whole must be able to respond swiftly to customers needs. All this is possible through a change in the mindset of people. This is further added that change in mindset is possible by involvement and commitment of top management, sharing their views and vision with the people of the organization.

Carr and Gabriel (2001) have referred the notion of unconsciousness contextualized as psychodynamics relevant to managing people. According to the authors, the concepts of identity (individual, group and organizational), groups, culture, motivation, emotion, rationality, ethics, leadership, commitment, psychological contract, role, power, and conflict acquire a deeper meaning when enriched with psychoanalytic insights and help in getting success in an organization.

Friedman (2002) has studied the role of individual in organizational change. Organization learning occurs when individuals within an organization experiences a problematic situation and enquire about it on organization's behalf. Further, involvement of people results in change of individuals' mindsets as well as organization culture. He

has further stated that programmes like TQM and reengineering transform people at all levels into agents of organization change.

Bogley and Boyd (2003) have felt the importance of developing a global mindset requiring changes of organizational structure, process and systems. It requires a balanced formalization with flexibility through modular networks and communities of practice, balancing standardization with customerization through disruptive management, centers of excellence and corporate vision.

Cultural Change: Organizational culture denotes a system of shared meaning within an organization that determines to a large degree how employees behave. New systems or patterns of values, symbols, rituals, myths, and practices have evolved over time in the industry. Organizations around the world are experiencing changes in the culture, and the trend is towards even more changes as countries continue to undergo changes in the cultural composition of their general populations (Erez and Somech, 1996; Hambrick, et al, 1998; Johnson, 1991; Wenting and Palma, 2000).

Cultural orientation can be assessed by collecting data on issues relating fear/ risk taking, communication/ feedback, flexibility/ structure, stress/ peer support, learning, continuous improvement, managing orientation and involvement, and operating norms. Dance (1991) has related total quality with the process of cultural change. He has stated that cultural change process is developed by a management style based on clear objectives, effective organization structure, clear and simple cultural values, and efficient management and procedures.

There are basically two types of approaches for cultural change in an organization, i.e. the team approach (Heavens, 1993) and the committee approach (Quinn and Brian, 1995). Participation on committees means to bring people together to share ideas on a particular project. The committee approach has been superseded by the concept of shared management. Teams have been encouraged in order to work collaboratively using team problem-solving techniques. Teams tend to have more responsibility, more authority, and the team approach tends to be more proactive than the committee approach. Impact of information technology on cultural change was studied by Davenport and Thomas (1994). According to the authors, by paying attention to how people share information, management can use all the resources to its fullest potential.

The authors have spoken of integrating human behavior into information systems and at the same time, changing employee behavior to meet technology halfway.

Pascale et al (1997) and Meek (1998) have stressed on a fundamental change in the companies operations. Earlier the tendency was to improve functions and process to meet the objectives. With the accelerating pace of change, companies are pouring executive energy for higher levels of quality, service and overall business agility. Companies achieve real agility only when every person makes efforts to rise to every challenge. This type of fundamental change is called “revitalization or transformation”.

Jick (1998) has stated that despite the entire corporate benchmarking and academic wisdom, companies are not happy with the prospect of 5-7 years time frame. He states that “the quicker a company adapts a new culture based on the competitive needs, the greater is the likelihood of its succeeding”. He has found people of the organization as the bottlenecks and tollgates in an organization to change. Thus, challenge involves changing the hearts called “Software of the company”. A cultural change is very much comparable to a product launch. A new product is launched based on what customers want now, not later. If it arrives too late, it may no longer serve its purpose, or customers may be lost to a competitor. A cultural change has the same sense of urgency. If it arrives too late, an enterprise business may be lost to a competitor (Jick, 1998).

Morrison et al (1999) have studied factors to motivate employees for cultural change. They have found an important factor called “taking charge” which in turn effects organization functions. As reported by coworkers, taking charge is related to feel responsibility, self-efficacy, and perceptions of top management. It entails voluntary and constructive efforts, by individual employees, to effect change with respect to how work is executed within the context of their jobs, work units, or organizations. They have concluded that employees can be motivated to go beyond the boundaries of their jobs for cultural change. Also, the employees are likely to be motivated when they perceive top management as open to employee.

Kozan (2002) goes beyond the current practice of treating cultures as uniform entities, and investigates the influence of sub-cultures on the styles used during conflicts. He has identified three distinct subculture clusters in addition to the main culture of an

organization. The traditional culture preferred avoiding, while power seekers preferred competing, and egalitarians preferred accommodation in comparison to other subcultures. It has been emphasized that an organization practicing these subcultures can acquire success. Hopkins et al (2002) further emphasized that employees should be engaged as meaningful contributors to cultural change.

Entrepreneurial Aspects: Covin and Slevin (1988) have indicated that an entrepreneurial management style will have a positive effect on the performance of organically structured firms and a negative effect on the performance of mechanistically structured firms. An organic structure is expected to facilitate innovations through its flexibility and ability to respond to a fast- changing and turbulent environment. It has been emphasized that the synthesis of skills and collaborative efforts for team building along horizontal and vertical levels would be effective.

Lee and Peterson (2000) have evolved a cultural model of entrepreneurship. They have proposed that a society's prosperity to generate autonomous, risk taking, innovative, competitively aggressive and proactive entrepreneurs depend on its cultured foundation. Role of economic, political/legal, and social factors are moderators in the relationship between culture and entrepreneurial orientation. Finally they have concluded that a strong entrepreneurial orientation will ultimately lead to increased competitiveness.

Michael et al (2001) have defined entrepreneurship as the process of storytelling that mediates between extant stocks of entrepreneurial resources and subsequent capital acquisition and wealth creation. The authors have proposed a framework that focuses on how entrepreneurial stories facilitate the crafting of a new venture identity that serves as a touchstone upon which legitimacy may be conferred by investors, competitors, and consumers, opening up access to new capital and market opportunities.

Flexibility: A flexible system is one that is able to respond to changes, and flexibility is the ability of the system to respond effectively to change. The ability of the organization to cope with the internal changes require a degree of redundancy in the system, whereas the ability to cope with the external change require that the systems be versatile and capable of producing wide variety of parts with minimal change over times and costs (Buzacott, 1982 and Chung et al, 1990).

The concept of systemic flexibility was introduced by Sushil (1994). Systemic flexibility is the exercise of free will or freedom of choice on the continuum to synthesize the dynamic interplay of thesis and antithesis in an interactive and innovative manner, capturing the ambiguity in systems, and expanding the continuum with little penalty in time and effort. Such a systemic concept of flexibility will have major attributes of spectral, integrative, interactive, innovative and fuzziness character, and lead success to the organization.

Technology flexibility is the technology characteristics that allows or enables adjustments or other changes to the business process. Technology flexibility has two dimensions, structural and process flexibility. The flexibility of technology that supports business processes can greatly influence the organization's capacity for change. Existing technology can present opportunities for or barriers to business process flexibility through structural characteristics such as language, platform, and design. Technology can also indirectly affect flexibility through the relationship between the technology maintenance organization and the business process owners and other response characteristics. These indirect effects reflect a more organizational perspective of flexibility (Nelson et al, 1997).

Dixon (1997) feels that there is a linkage between flexibility and competitiveness of an organization. With respect to avoiding product changes, the ultimate level of flexibility is achieved when the need for change itself has been eliminated. Three strategies have been evolved for improving flexibility- choosing flexible technologies, lower the cost of change, and product architectural choices that allow the product to easily accommodate change.

2.9 Present Status and Limitations of Existing Approaches

There is a good amount of literature available on the issues related to socio-technical management in context of technology, system and culture in developed countries. The various prominent authors in the areas have tried to capture the different problems faced by technology based firms and have thrown light on various aspects of change management function. In fact, it has become very difficult to find out a firm that has not undergone any change and, therefore, not faced with the task of managing it in the world.

Today, technology change is a buzzword. A good deal of work has been reported to develop technologically advanced machines, CAD/CAM practices, CNC machines, robotics, FMS, new tools, dies and fixtures, etc. Emphasis has been given to enhance quality, minimize waste, customer delight and increasing productivity by replacing manpower by machines.

It is learnt that systemic changes have been adopted even by the companies, which are technologically poor. One or more amendments in systems like JIT inventory to reduce investment on inventory, 5S for better house-keeping, ISO9000 for international process standards, QS9000 for automobile industry, Kaizen teams, Quality Circles, TQM and TPM have been adopted by most of the companies and have added success to them.

Structural change has been crucial in recent times. With developed technology and multi-skilled manpower, most of the Indian companies have extra manpower and are finding it difficult to reduce it. Many joint ventures and public sector units have offered voluntary retirement scheme (VRS) and early separation schemes to get rid of excessive manpower. A virtual ban on recruitments has been imposed in a number of organizations. For new systems and culture, delaying is desired in the Indian context. Efforts have been made to enlarge vendor base, suppliers and ancillaries for quality improvement and cost reduction. This aspect is also adequately covered in literature.

Mindset of people and culture change is considered critical for a successful change management programme. At international level, various theories have been developed for group dynamics, teamwork, belongingness, ownership and rich work culture. Literature pertaining to these studies is readily available.

Change management publications at national and international level mostly deal with technology, system, and culture. Publications dealing with highlighting technological change, systemic improvement, restructuring, and cultural modification of Indian industries are rare. A lot is said about motivation, labor unrest, time standards, labor laws, technology adaptation, market competition and similar aspects but, it is seen that each of these aspects is described in isolation. Studies aimed at finding out the interplay of all the factors and forces involved in the change process are scant.

Some of the major limitations of the existing approaches towards management of change in Indian automobile industry are highlighted as follows:

- There is a heavy emphasis on technology management and systemic improvement. However, organizational structure, mindsets of people, attitude and culture have not been adequately considered.
- In technological change, emphasis is on technical collaboration or technology-acquisition from MNCs. Innovation and technology development aspects have not been fully addressed.
- The aspects of supporting change in the systems and structure required as a result of major technological change have not been adequately analyzed with regards to the extent of efforts required and the results thereof.
- In case of manpower utilization, various techniques have been developed for manpower-optimization, but no model or methodology has been devised which relates the manpower with organizational change.
- The research on change management is concentrated on quality improvement, increasing production rate, reducing scrap rate etc. Literature on interactions of various areas of change management is scant.
- Literature on Indian automobile manufacturing sector, in general, deals with financial aspects, market share, profitability and launch of models/variants. Research on management of change has been inadequate in the Indian context.
- Research work taking individual aspects of change is available in abundance but it does not present a realistic solution for organizational change. Literature related to change management considering various aspects of change together and its impact on competitiveness is rare.

2.10 Concluding Remarks

A selective review of available literature in the field brings out a few points relating to management of socio-technical change quite cogently. They include lack of understanding of what to expect and what not to expect from change management, and the knowledge of competitiveness for a given organization. Related technical, social, structural, systemic, people and cultural aspects of change management have not been thoroughly explored in the context of a developing country like India.

The present work is an attempt in this direction to cover a few of these points, particularly those relating to the organizational issues of socio-technical change in the Indian automobile industry.

CHAPTER 3

DESIGN OF THE STUDY

3.1 Introduction

The study has been carried out with the purpose of developing effective strategies for management of change in Indian automobile industry. Considering the complexity of the theme and also taking into view the fact that such studies can be carried out primarily by closely treading and analyzing the approaches adopted by various organizations and results thereof, it was thought appropriate to carry out the study under the overall framework of 'flexible systems methodology'. The three basic components of flexible systems methodology (FSM) are situation, actor and process (Sushil, 2000). The 'situation' is to be managed by an 'actor' through a flexibly evolved management 'process', which recreates the situation. The 'actor' forms a part of the 'situation' as well as the 'process'. Four major steps of flexible systems methodology are:

- i. Clarifying the context,
- ii. Understanding and assessing the situation,
- iii. Assessing the actors capability, and
- iv. Evolving a management process.

Flexible systems methodology has been widely applied to research problems, particularly in those cases where a new system has to be evolved by critically analyzing the present situation and constraints and limitations of the organizations (actors). The first phase 'clarifying the context' entails review of existing information available in the literature and specially collected by undertaking some preliminary studies with an aim to be clear about the need and purpose of undertaking the work and defining its boundaries. The second phase 'understanding and assessing the situation' is generally carried out by undertaking a broader survey of the selected area and also by visiting the area and collecting information about the present status, the reasons thereof, the efforts made and results achieved. To go into further details of the selected area, the third phase of study 'assessing the actor's capability' is taken up. The emphasis in this phase is on the organization, their characteristics and features, capabilities, strengths and weaknesses, constraints and limitations. In this phase, every action taken by the organization is recorded and analyzed in details, not only to further assess the situation but also to

change achieved, and this categorization will be affecting the maturity level of competitiveness in an order.

3.3 Overall Design of the Study

Based on the flexible system methodology framework (Sushil, 1997), the overall design of the study is depicted in Figure 3.1. The study has been divided into two major parts namely 'analysis' and 'design'. As shown in the Figure 3.1, analysis includes the first three phases of the flexible system methodology (FSM). Design includes the fourth phase wherein the new system has been evolved. These four phases of the study under the flexible systems methodology framework are described below:

<i>Phase</i>	<i>Nomenclature under FSM</i>	<i>Work undertaken in the present study</i>
Phase 1	Clarifying the context.	Detailed review of literature of areas related with management of change.
Phase 2	Understanding and assessing the situation.	Questionnaire survey of the automobile manufacturers and auto-components manufacturing firms conducted through personal visits as well as mail. This phase covers research propositions R1 to R4.
Phase 3	Assessing the actor's capability	Detailed case studies of the selected automobile manufacturing and auto-components manufacturing organizations. This phase covers research propositions R5 and R6.
Phase 4	Evolving a management process.	Synthesis and design of strategies using information collected in phases 1 to 3, its analyses and by incorporation of expert opinion.

Research studies in the area of management, psychology, education and other such subjects can also be conducted by making some hypotheses in the beginning, which would be supported or otherwise through the findings of the study. In the present study, however, it was found that the information available in the literature about such studies and their outcomes was not substantial for the formulation of hypotheses. It was, thus, decided to develop research propositions and conduct the study under the framework of FSM. Once the outcomes of this study are documented, the areas and issues pointed out by this study would make it possible to frame hypotheses in further studies aimed at further exploration at micro-level.

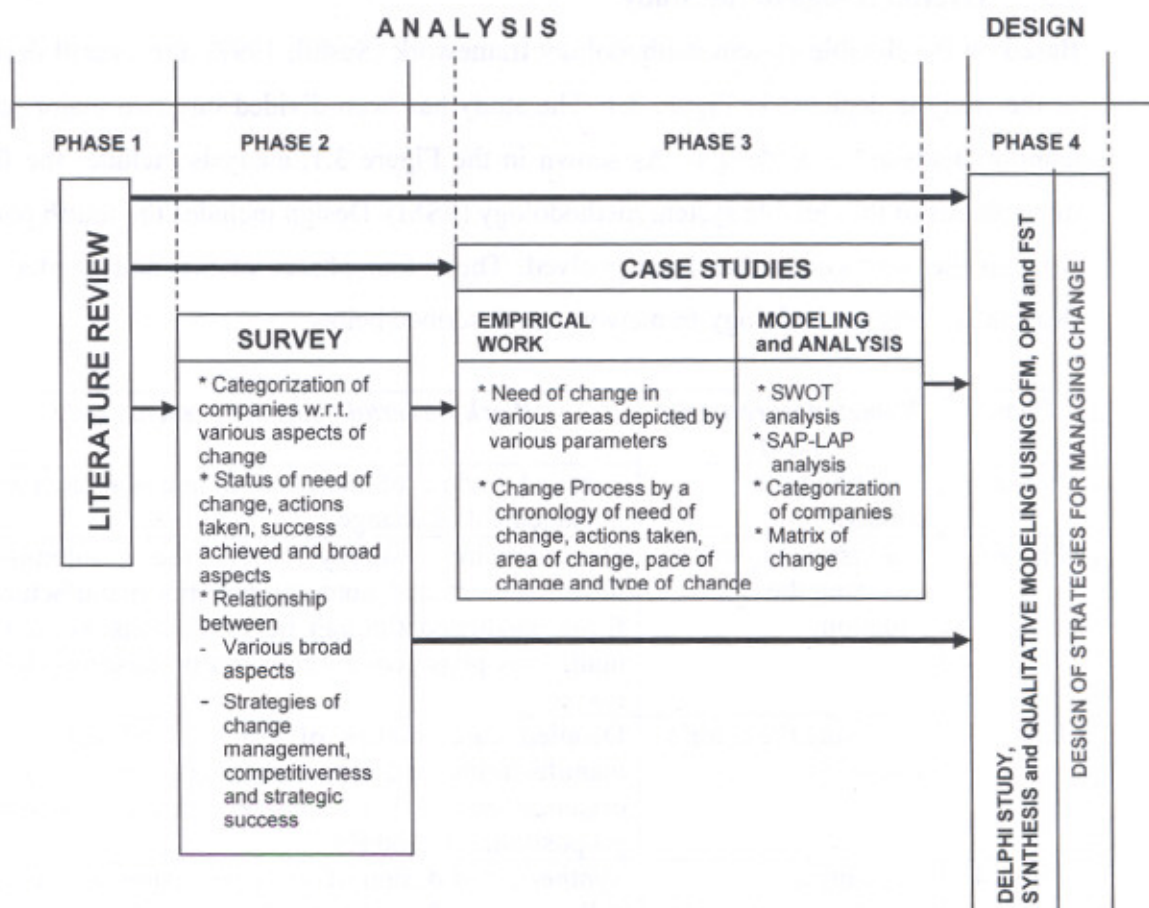


Figure 3.1: Design of the Study

3.4 Methodology, Tools and Techniques

A brief description of methodology including steps of analysis and design and tools and techniques employed is given below. For each tool and technique, an explanation of need and place in the overall work has been briefly given.

3.4.1 Phase 1: Clarifying the Context

Under this phase, a detailed review of literature has been carried out. The details are given in Chapter two alongwith the limitations of the existing research work.

3.4.2 Phase 2: Understanding and Assessing the Situation

In this phase, a survey of the automobile manufacturers and auto-components manufacturers has been carried out using a specially designed questionnaire (Appendix A1). The parameters considered in the survey include need of change, drivers of change,

change agents, major areas of change like technology, structure, systems, culture and people, inhibitors to change, organizational learning and others, which include flexibility, reengineering, innovation and entrepreneurial aspects (Appendix A2). The work carried out involves the following steps:

- i. Design of a suitable questionnaire, its pretesting and validation, and collecting information through personal visits and mail.
- ii. Analysis of collected information to find out the following:
 - Categorization of the companies into various classes such as very good, good, fair and poor from the point of view of management of change.
 - Determination of status of various aspects/parameters of management of change as represented by individual questions by working out mean values and standard deviation.
 - Determination of status of broader aspects represented by the aggregate score of sets of questions taken together.
 - Determination of relationship between the following by working out the coefficient of correlation:
 - Interrelationship within various parameters of management of change
 - Relationship between various change agents and effectiveness of change management programme
 - Relationship between various strategies and effectiveness of change management programme

3.4.3 Phase 3: Assessing the Actor's Capability

In this phase, multiple-descriptive case study method has been used (Yin, 2003). Descriptive case studies were carried out in the following nine organizations:

<i>S.No.</i>	<i>Name of the organization</i>	<i>Products</i>
1	Maruti Udyog Limited (MUL), Gurgaon	Passenger cars
2	Punjab Tractors Limited (PTL), Mohali	Tractors and farming machinery
3	Swaraj Mazda Limited (SML), Ropar	Light commercial vehicles (LCV)
4	HMT Tractors Division (HMT), Pinjore	Tractors and agricultural equipments

5	Yamaha Motors India Limited (YMI), Faridabad	Motorcycles
6	Majestic Auto Limited (MAL), Ludhiana	Mopeds
7	Sona Koyo Steering Systems Limited (SKSSL), Gurgaon	Steering Systems for automobile manufacturers
8	Guru Nanak Axles Limited (GNA), Mehtiana	Axles for automobile manufacturers
9	VeeGee Industrial Enterprise (VeeGee), Faridabad	Sheet metal and other components for automobile manufacturers

In the study, case study method has been preferred due to the following reasons (Yin, 2003):

- i. The study will likely have more variables than data points mentioned in Phase-II.
- ii. The study cannot rely on a single data collection method but will likely need to use multiple sources of evidence.
- iii. Distinctive strategies will be needed for research design and analysis.

While selecting the organizations for detailed study, the factors kept in mind were as follows:

- i. The selected set of organizations should represent the automobile sector in terms of competition; complexity, need of change and other aspects need to be included in the study.
- ii. The selected set should include the units, which have made efforts at managing change and met with varying degree of success.
- iii. The feasibility and ease of getting authentic information from the units through personal interactions, observations and published data.

Further, the studied organizations represent three distinctive segments of automobile sector, i.e. personal vehicles (MUL, YMI and MAL), tractors and light commercial vehicles (PTL, HMT and SML) and auto-components manufacturers for original equipments manufacturers (SKSSL, GNA and VeeGee). Steps of the detailed studies of various organizations, the techniques used alongwith the justification can be divided into two major parts:

- i. Individual case studies and analysis
- ii. Combined results of case studies and analysis

Details of these steps, techniques and their justification are given below as described in Table 3.1 and Table 3.2.

Table 3.1
Individual Case Studies and Analysis

S. No	Steps of analysis and Technique(s) used	Justification of the techniques
1	Step-I: Collection of data and information from the company regarding various performance indicators and the measures undertaken from time to time. Techniques used: Personal interactions, Observations, Scanning the published annual reports and other printed material	This information is necessary for such studies and all the three techniques used are the proven effective methods.
2	Step-II: Review of performance indicators like turnover, profit margins, market share, vehicles produced per employee, earning per share, inventory turnover ratio, scrap rate, profit turnover ratio and manhours per vehicle. Technique used: Plotting the trends over past many years	The trends depict the need of change and also the effect of various actions taken from time to time.
3	Step-III: Analysis of the measures taken by the organization to manage change. Techniques used: Tabulating all change-initiatives in a chronological order beginning with the pre-globalization era against realization of need from time to time; Classifying the change initiatives into categories of technological, structural, systemic, cultural or people related changes; Classifying the changes as major/minor and slow/fast; Consolidating the change initiatives and assessing the strategy adopted by the organization in three distinct time phases of pre-globalization, on-set of globalization and maturation of globalization.	Chronological representation of change initiatives and their consolidation in three time phases depict the strategies adopted by the organization from time to time. This, when related to the amount of success achieved, would demonstrate the effectiveness of strategies under various conditions and phases of management of change.
4	Step-IV: Learnings from the case studies Techniques used: SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis, SAP (Situation, Actor, Process) analysis, LAP (Learning, Action, Performance) Synthesis	Strategies adopted by the organizations for management of change need to be seen in the light of their strengths, weaknesses, opportunities and threats (SWOT). This is because the strategies should be evolved within the constraints and limitations. SAP analysis consolidates the processes adopted by the actors under various situations while LAP synthesis brings out learnings from the approaches, actions and performance.

S. No	Steps of analysis and Technique(s) used	Justification of the techniques
1	Step-I: Categorization of analyzed organizations into four groups based on the level of success achieved in the management of change as a result of various strategies adopted from time to time, and naming the categories (Table 8.1) as Group-1: Market Leaders; Group -2: Market Challengers; Group -3: Market Followers; and Group -4: Market Wraps. Also naming the levels of competitiveness as level-1, level-2, level-3 and level-4 in the ascending order (Table 8.2). Technique used: Making comparison of studied companies with regard to the following aspects: • Timing of major technological changes • Timing of implementation of ISO9000/ QS9000/ IS 14000, TQM, TPM etc. • Timing of implementation of waste reduction, cost cutting, inventory reduction • Timing of introducing Voluntary Retirement Scheme (VRS) • Timing of introducing delayering, ban on recruitment, vendor consolidation, expanding sales and service network • Timing of starting extensive training and education for the employees • Timing of adopting Japanese ways of working • Timing of making cultural change and flexibility • Level of success (Competitiveness) <i>Timing may be early, in time, late, very late or not implemented (Appendix C1).</i>	This categorization is necessary to evolve effective strategies, which must be adopted by organizations of various levels to go to the next level and complete the progression from one level to another and become successful.
2	Step-II: Evolving a set of actions and their sequence to be taken up by the groups of organizations to achieve a higher competitiveness level considering the target practices of prevailing level as the existing practices of the next higher level. Technique used: Using Matrix of change with the following actions: • Determining critical practices needing change in the company • Listing the existing practices and the target practices • Forming a transition matrix from the existing and target practices • Getting evaluation regarding importance of the jobs from the people in the company • Drawing inferences related to feasibility, sequence of execution, pace and nature of change and stake holder evaluation • Drawing Tornado plot to find the sequence of actions taken as change strategies	Matrix of change is an effective tool to evolve a set of actions and their sequence for effecting successful change. Using this tool, change strategies can be planned effectively considering the existing practices and target practices. The necessity of this tool stems from the fact that the case companies could be grouped into various levels based on their standing with regard to management of change. The concept, which evolves is that companies will adopt a stepwise approach, moving from one level to another (higher) and at every level, strategy would be evolved using matrix of change.

Table 3.3
Strategies of Management of Change

S. No	Steps of analysis and Technique(s) used	Justification of the techniques
1	Step-I: Generalization and authentication and supplementation of results of survey, case studies and matrix of change. Technique used: Using Delphi Study as mentioned below: • Identification of experts and seeking their consent • Preparation of questionnaire based on the results of the study, pretesting the questionnaire and mailing to experts • Analysis of response and preparation of second questionnaire and completing round-2	The need of Delphi study was that the results of case studies and matrix of change were specific to the nine organizations studied in details. In matrix of change also, people only from the case companies were involved in developing strategies. Although detailed studies in nine organizations was a substantial number to get fairly general view, still it was thought worth-while to substantiate and supplement the already obtained results with expert opinion obtained through Delphi study.
2	Step-II: Evolving a management process, i.e. developing strategies of management of change based on the present status, type and other constraints and limitations of the organizations. Techniques used: Qualitative modeling using Options Field Methodology (OFM), Options Profile Methodology (OPM) and Fuzzy Set Theory (FST). OFM: • Listing the finding of survey, learning from case studies and expert opinions as options for management of change • Categorization of the options and putting them in various dimensions of management of change • Clustering the dimensions, and ordering the clusters and dimensions within the clusters. For sequencing of the dimensions, following factors were considered: • Ease of data collection • Ease of potential implementation • Impact and urgency • Speed of solution OPM: • Making various profiles or courses of actions as solution to the problem • Allocating various options from the already prepared polystructure to various profiles • Deciding the goals of various levels of organizations with regard to management of change FST: • From expert opinion, finding out the qualitative figure of expected contribution of each course of action (profile) to each goal as formulated above. • Formulating position matrices and optimistic, pessimistic and average position matrices and also the position matrix for cautious optimism	Qualitative modeling was necessary to synthesize the findings of questionnaire survey, learnings from case studies, matrix of change and opinion of experts to evolve a strategy aimed at effective management of change. Many options and actions have emerged from various phases of the study. OFM presents these options in a systematic manner in the form of a polystructure consisting of clusters, dimensions and sequenced options. OPM develops various courses of action (profiles) through expert opinion. The experts then choose each profile for each option from the polystructure. With this exercise, the complete strategy and activities of a course of action are formulated. FST is applied to those areas where the answer to an entity being a member of a set is not in 'yes' or 'no'. Here, FST is necessary because each developed course of action (profile) may have different contribution to each goal of the organization. This contribution is got from the experts in a structured way and converted into quantitative score.

3.4.4 Phase 4: Evolving a Management Process

In this phase, results of survey, case studies and matrix of change have been generalized using Delphi study technique, and strategies of management of change in the organizations have been developed. For synthesizing the findings of survey, case studies, matrix of change and opinions of experts obtained during Delphi study, qualitative modeling has been done using Options Field Methodology (OFM), Options Profile Methodology (OPM) and Fuzzy Set Theory (FST) as described in Table 3.3.

3.5 Limitations of Methodology

The methodology for the study has the following limitations:

- i. Automobile manufacturers and component manufacturers have been treated alike irrespective of their products and levels. In all, nine case studies have been performed out of which six case organizations are automobile manufacturers and remaining three as component manufacturers.
- ii. Nine case organizations have been grouped into four groups namely successful companies, unsuccessful companies, survived companies and primitive companies considering their time of initiation of actions for change and success achieved. Guidelines depicting strategies of management of change for competitiveness have been laid for these four groups only.
- iii. No clear-cut hypotheses have been identified for the study because no similar comprehensive case study was reported. However, broad research propositions have been formed which have been properly studied.

3.6 Concluding Remarks

Research methodology has been described in this chapter. For the study of the research propositions, a detailed survey and case studies have been carried out. The details of the survey, response obtained and correlations established between various variables have been described in the next chapter while case studies have been described in the subsequent chapters.

CHAPTER 4

SURVEY OF INDIAN AUTOMOBILE INDUSTRY

4.1 Introduction

This chapter presents a detailed survey conducted in various automobile industrial units in the northern region of India covering the states of Punjab, Haryana, Himachal Pradesh, Uttar Pradesh, Delhi and Union Territory of Chandigarh. The objective of the survey has been to study the current status of change management in the Indian automobile industry. Further, it is envisaged to assess the need of change, initiatives taken for making change, role of change agents and selection of drivers of change in the process of change management. Also, it is planned to study the effect of flexibility and innovations on change management, relevance of organizational learning on organizational change, extent of change made in the organizations and competitiveness achieved by the industry in the process of change management.

4.2 Methodology

For conducting the survey, the first task has been to design a questionnaire for seeking information related to change management from various automobile units. The questions have been designed on various aspects of socio-technical change management. Special consideration has been given to seek information related to technology, systems, structure, people, culture, innovations, education and training, and flexibility.

Before using the questionnaire for survey, it was pretested (Annexure A3). The survey has been conducted by mail as well as by undertaking personal visits to various organizations. The response has been compiled and analyzed to find out information related to various aspects of change management. The coefficients of correlation between change management, competitiveness, accomplishment of objectives, extent of change and inhibitors to change have been established.

4.2.1 Design of Questionnaire

A questionnaire comprising of simple and relevant questions relating to various aspects of change management has been designed. A copy of the questionnaire is enclosed in Appendix A1. The questionnaire has been divided into two broad sections.

Section A has been designed to obtain general information of the responding organization, e.g. type of company, details of collaborations, products manufactured,

organizational objectives like market leadership, percentage of market share, profitability, volume and quality of output, and the extent of accomplishment of the objectives.

Section B seeks detailed information related to change management. The overall process of change management has been divided into 15 segments, namely need of change, selection of driver of change, choosing a change agent, visualizing inhibitors to change process, technological changes, systemic changes, changes in organizational structure, change in mindset of people, cultural change, impact of organizational learning, need of flexibility, impact of reengineering, achievements of benchmarking, innovations, continuous improvement and strategic changes. Mostly close-ended multiple-answer type questions have been framed and four alternatives have been provided for giving response. Response has also been used to find extent of change by comparing the status of companies before and after the change process.

4.2.2 Pre-testing and Validation of Questionnaire

To ensure its relevance and effectiveness, the questionnaire has been pretested on a representative sample of industry. Feedback and suggestions by senior executives and academicians were sought and the questionnaire suitably modified before conducting the survey. The details of pretesting including the random sample of industries chosen are given in Appendix A3.

Validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure (Kothari, 2000). Validity tries to measure the conformance to whether what is being measured is what is to be measured. There are many measures for validation but the important ones shown below have been considered for the validation of the questionnaire. The questionnaire focuses on the managerial perception of change management for increasing competitiveness as expressed in terms of various aspects of change management and critical success factors for improved results.

Face Validity: Efforts were made to design questions with least jargons and use of common prevalent industry terminology ensuring a simple construction suitable for the target population without which it would not have been possible for greater participation.

Content Validity: The other names to this validity are logical validity, expert judgment validity and definitional validity (Benz and Newman, 1998). Content validity refers to the

representativeness of sampling adequacy of the content (Kerlinger, 1998). Support for content validity is provided for the theoretical basis for the development of the items through operationalization that have been widely adopted by other researchers and through evaluation of the content by field specialist (Nunnally 1978).

In the study, contents were identified by extensive literature review and were also referred from previously reported instruments. While selecting the items, inputs from perception survey, feedback from experts from industry and academics were used. Experts also helped in sequencing and rephrasing the questions so that they represent logically cohesive instrument with natural flow of thought. The practitioners and experts included six experts from industry and three professors from academics (Appendix A3). Thus, the content validity is supported by the fact that the process used to select items was based on extensive literature survey and experts from industry as well as academics.

External and Internal Validity: External validity of research findings is their generalizability to populations, settings, treatment variables and measurement variables, while internal validity of a research design is its ability to measure what it aims to measure (Kothari, 2000). The external and internal validity are supported by the fact that the questionnaire has been pretested on a representative sample (population) of industry, suggestions by experts from industry and academicians were sought and the questionnaire suitably modified before conducting the survey to ensure its intended purpose.

4.2.3 Industry Surveyed

Automobile industry in the northern region of India covering the states of Punjab, Haryana, Himachal Pradesh, Uttar Pradesh, Delhi and Union Territory of Chandigarh has been surveyed. Units covered are manufacturing one or more types of vehicles like cars, light commercial vehicles (LCVs), tractors, farm machinery, scooters, motorcycles, mopeds etc. or are engaged in manufacturing of auto-components, e.g. steering systems, axles, filters, brake drums, shock absorbers, casting of engine housings, sheet metal components etc.

A list of automobile organizations in the region was prepared by referring to the directory of PHD Chamber of Commerce and Industry, directories of Association of

Automobile manufacturers of Haryana and Punjab, relevant auto-magazines and other regional automobile associations. A total of 252 industrial enterprises were surveyed.

4.2.4 Conducting the Survey and Response

Initially, the questionnaires were mailed to all 252 organizations along with a covering letter stating the objective of the study with a request to send an early reply. After about 15 days, reminders were sent to expedite the matter. Information from some of the organizations was received in this way. Personal visits were made to many organizations to collect the response in an interactive manner.

A total of 83 firms out of selected 252 responded to the questionnaire. The response to the survey has been given in Table 4.1.

Table 4.1
Response to the survey

Type of organization	Number of organizations		Response ratio in percent (%)
	Questionnaire sent to	Response given by	
Total selected organizations	252	83	33%
Automobile manufacturers	52	18	35%
Component manufacturers	200	65	33%

4.3 Scoring and Statistical Analysis

In section A of the questionnaire, most of the questions seek qualitative information in the form of 'Yes' or 'No'. This information has not been used to find out the total score of the company rather it has been compiled to give some useful qualitative information. Some questions in section A and almost all questions in section B have a scale of 1 to 4. The score of 4 was assigned to the best choice, 3 to the second best, 2 to the next in order and 1 to the lowest choice. The raw scores received from filled up questionnaires by various companies were compiled and analyzed. The analysis of response was carried out statistically from three viewpoints:

- i. To assess as to how each aspect as represented by a question or a group of questions is being looked after in industry by working out the central tendency and standard deviation of each.
- ii. To assess overall standing of each company leading to categorization or classification of companies into very good, good, average and poor classes based on the total score

received by the company in each major aspect as well as all the aspects taken together.

- iii. Relationship of various strategies used with overall change achieved as well as with the change achieved in major areas.

4.4 Status of Individual Aspects of Management of Change

Section B of the questionnaire contains questions on specific aspects of change management. Status of all these aspects has been described in the following sections.

Need of Change: Regarding realization of need of change, it is responded that 45% organizations have felt a dire need of change, 39% a moderate need, 12% a marginal need and 2% no need. Various determinants of need of change in the organizations are indicated in the second column of Table 4.2. Average scores for each reason for change cited by the industry has been calculated as indicated in last column of Table 4.2. The average scores depict that 'increasing cost of production' and 'growing competition' have emerged to be the major reasons for growing realization about the need of change. These are followed in order by 'higher quality requirements', 'development in technology and better ways of working', 'shrinking profit margins', 'need to produce higher volumes', 'higher turnovers', 'low productivity ratios', and 'labor unrest'.

Table 4.2
Determinants of need of change

S. No.	Determinants of need of change	Number of responses (Ni) with each score choice (Si)				Average Score ($\Sigma Ni * Si$) / (ΣNi)
		Si				
		4	3	2	1	
1	Increasing cost of inputs	58	20	3	2	3.61
2	Growing stiff competition	56	22	4	1	3.60
3	Increased Quality requirement	52	25	4	2	3.53
4	Availability of better ways of working	43	31	7	2	3.39
5	Shrinking profit margins	31	34	8	10	3.04
6	Need of higher turnover	13	54	12	4	2.92
7	Low productivity levels	11	34	27	11	2.54
8	Labor unrest	10	10	25	38	1.90

Drivers of Change: ‘Technology’ has emerged as the main driver of change in the Indian automobile industry. This is followed in order by ‘system’, ‘culture’, ‘people’, ‘structure’ and ‘strategy’ as depicted by the average scores (Table 4.3).

Table 4.3
Drivers of change in the organizations

S. No.	Drivers of change	Number of responses (Ni) with each score choice (Si)				Average Score ($\Sigma Ni * Si$) / (ΣNi)
		Si				
		4	3	2	1	
1	Technology	56	25	2	0	3.65
2	System	42	35	6	0	3.43
3	Culture	26	31	26	0	3.00
4	People	21	34	25	3	2.88
5	Structure	20	25	33	5	2.72
6	Strategy	13	26	22	22	2.36

Change Agents: Change agents are individuals or group of individuals, who are influential in the organization(s), understand the need of change, facilitate all the essential information and intervene whenever felt necessary. A change agent is chosen from within the company as well as from outside.

Table 4.4
Change agents in the organizations

S. No.	Change Agents	Number of responses (Ni) with each score choice (Si)				Average Score ($\sum Ni * Si$) / ($\sum Ni$)
		Si				
		4	3	2	1	
1	Managing Director (MD)	61	18	2	2	3.66
2	General Manager (GM)	44	31	6	2	3.41
3	Board of Governors/ Directors (BOG)	43	29	4	7	3.30
4	Consultants	19	34	15	15	2.69
5	Outside experts	6	25	22	30	2.08
6	Trade Union Leaders	7	18	21	37	1.94

From average score (Table 4.4), it is seen that executives at top level within the organizations, i.e. ‘MD’, ‘GM’ and ‘BOG’ in order have been the effective change agents

in most of the companies whereas support from ‘consultants’, ‘outside experts’ and ‘trade union leaders’ have been taken in a few companies.

Inhibitors to Change Process: Recognizing inhibitors to change process have been very important in an organization. Various inhibitors to change are mentioned in the second column of Table 4.5. About 35% companies have felt ‘old working culture’ as major inhibitor. Nearly one-third companies have faced the problem related to ‘availability of multi skilled-labor’, about one-fifth companies have found ‘attitude of management’ as the main hindrance in forming change strategy, nearly 25% companies have identified the ‘state of technology and lack of automation’ as the main inhibitor to change. As far as ‘availability of skilled and unskilled manpower’ is concerned, nearly one-third companies have considered this as the main inhibitor to change process. In nearly one-fifth companies, the ‘existing organizational structure’ is considered as the prime obstacle in making change. Nearly 20% companies have identified the ‘lack of education and awareness at various levels’ as an inhibitor to change. ‘Feeling of insecurity’ at various levels have also been identified as important inhibitor in a few companies (8%). ‘Resistance to change’ has been observed from senior executives in a few companies. Average scores (Table 4.5) depict that ‘existing culture in old organizations’ has emerged as the prime inhibitor to organizational change which has been followed in order by ‘lack of availability of multi- skilled labor’, ‘management attitude’, ‘present state of technology and automation’, ‘lack of skilled and unskilled labor’, ‘mindset of people’, ‘organizational structure’, ‘lack of education and awareness’, ‘feeling of insecurity’, and ‘resistance by executives and trade union leaders’.

Technological Change: For achieving competitiveness, Indian automobile companies have made considerable technological changes. More than 40% of the respondents have completely modified/replaced existing tools, dies and fixtures to meet technological requirements. As far as competency of manpower is concerned, considerable efforts have been put in by the responding organizations. Machinery and equipments have been upgraded by most of the organizations to varying degree as shown in Table 4.6. Only a few companies have made requisite amount of efforts to bring in automation.

To find relative importance of various efforts made for technological change, average scores were calculated from the response of survey. As indicated in Table 4.6, maximum efforts have been put on replacing tools, dies, fixtures, machinery and equipment, and upgrading skill level of operators in Indian companies. This has been followed in order by changing workstations, increasing flexibility and level of automation.

Table 4.5
Inhibitors in managing change

S. No.	Inhibitors to change in an organization	Number of responses (Ni) with each score choice (Si)				Average Score ($\sum Ni * Si$) / ($\sum Ni$)
		Si				
		4	3	2	1	
1	Existing culture in old organizations	30	22	26	5	2.93
2	Lack of availability of multi-skilled labor	32	24	15	12	2.92
3	Attitude of management towards employees	20	34	20	9	2.78
4	Present state of technology and automation	21	32	20	10	2.77
5	Lack of skilled and unskilled labor	27	25	14	17	2.75
6	Mindset of workmen	26	18	24	15	2.66
7	Typical line organizational structure	17	28	28	10	2.63
8	Lack of education and awareness at all levels	17	30	21	15	2.59
9	Feeling of insecurity at various levels	7	36	16	24	2.31
10	Resistance to change by executives	9	16	34	24	2.12
11	Domination of trade union culture	6	4	16	57	1.51

Table 4.6
Technological change

S. No.	Aspects of Technological Changes	Number of responses (Ni) with each score choice (Si)				Average Score ($\sum Ni * Si$) / ($\sum Ni$)
		Si				
		4	3	2	1	
1	Tools, dies, fixtures	45	36	1	1	3.51
2	Skill levels of man power	39	38	6	0	3.40
3	Machinery and equipments	35	37	8	3	3.25
4	Work stations	29	36	14	4	3.08
5	Flexibility	29	30	24	0	3.06
6	Automation	24	37	17	5	2.96

Systemic Change: From Table 4.7, it can be concluded that although various reasons of systemic changes are relevant to the Indian automobile industry, yet ‘emergence of new technology’ has come out as the main reason of making systemic change, which has been followed in order by ‘existing old and inefficient manufacturing practices’, ‘inefficient information system’ and ‘prevailing wage and incentive systems’.

Table 4.7
Systemic change

S. No.	Reasons of systemic changes	Number of responses (Ni) with each score choice (Si)				Average Score (ΣNi * Si) / (ΣNi)
		Si				
		4	3	2	1	
1	Emergence of new technology	33	35	12	3	3.18
2	Old and inefficient manufacturing practices	32	27	12	12	2.95
3	Ineffective Information system	18	37	18	10	2.76
4	Non-motivating wage and incentive system	10	26	27	20	2.31
5	Flexibility	29	30	24	0	3.06
6	Automation	24	37	17	5	2.96

Structural Change: Various techniques have been applied in the Indian automobile companies for restructuring. Some prominent techniques are downsizing, delayering, regrouping of units, horizontal expansion, and making organization more process based. Almost all these techniques have been implemented in various companies to varying extent. It is revealed that ‘horizontal expansion’ and ‘process-based approach’ have been considered as the main techniques of structural changes in the Indian automobile industry. This has been followed in order by ‘downsizing’, ‘regrouping of units’, and ‘delayering’ (Table 4.8).

The survey further shows that organizations have been adopting a structure in which the overall activities are divided into various functions like marketing, operations, engineering etc., but at the same time teams are formed for projects and innovations. It is found that before change process, 35% companies out of the respondents were having ‘functional’ structure, 14% companies as ‘team’ structure and 33% companies as ‘functional cum team’ structure. Whereas during and after change process, 37%

companies have adopted 'functional' structure and 46 companies (55%) adopted 'functional cum team' structure.

Table 4.8
Structural change

S. No.	Techniques of structural changes	Number of responses (Ni) with each score choice (Si)				Average Score ($\Sigma Ni * Si$) / (ΣNi)
		Si				
		4	3	2	1	
1	Horizontal communication	36	30	16	1	3.22
2	Making organization more process based	26	40	14	3	3.07
3	Down sizing	28	29	17	9	2.95
4	Regrouping of units	30	22	18	13	2.83
5	Delayering	25	24	16	18	2.67

Cultural Change: Culture of an organization has been important for accomplishment of its goals and objectives. With the entry of multi-national companies (MNCs) in Indian industry, a need to change working culture in Indian companies has been felt. 'Self-organized teams' and 'self-supervision' have emerged as the main techniques of cultural modification in Indian companies. This has been followed in order by 'decentralization of decision-making' and 'total ownership of employees' as shown in Table 4.9.

Table 4.9
Cultural change

S. No.	Techniques of cultural change	Number of responses (Ni) with each score choice (Si)				Average Score ($\Sigma Ni * Si$) / (ΣNi)
		Si				
		4	3	2	1	
1	Formation of self-organized teams	26	37	16	4	3.02
2	Self supervision	21	40	20	2	2.96
3	Decentralization of decision-making	20	31	22	10	2.73
4	Total ownership by the employees	15	19	31	18	2.37

Organizational Learning: Need of organization learning has been felt in the Indian organizations for competitiveness. The purpose of this aspect is to orient the people

towards organizational goals and objectives. 43% companies have started regular awareness and training programmes for their manpower while remaining companies have done it to some extent. Executive development programmes are being organized in 30% organizations. Hiring of consultants for conduct of awareness/ training programmes for organization learning has been resorted to by many companies. 'Conduct of awareness and training programs for workers and supervisors' have emerged as the most recommended techniques for organizational learning and knowledge management. This has been followed in order by 'EDPs', 'observation of MNCs', 'engaging consultants for conduct of training programmes' and 'subscribing to magazines/literature reviews' (Table 4.10).

From the survey, it is further found that in 19% companies out of the respondents, education and training has been enforced as a 'compulsory activity' for the people at all levels. 6% companies have offered 'flexible timings' for training programs based on the convenience of workers and executives. 6% companies have offered 'incentives' to the people for specialized trainings. However, most of companies have put special efforts to 'motivate' their employees for regular education and training programs. A few companies have opted 'mixed' strategies like enforcement and motivation, flexible times and motivation, and incentives and motivation.

Table 4.10
Status of education and training

S. No.	Techniques of organizational learning	Number of responses (Ni) with each score choice (Si)				Average Score ($\Sigma Ni * Si$) / (ΣNi)
		Si				
		4	3	2	1	
1	Awareness and training programs for workers and supervisors	37	27	14	5	3.16
2	Executive Development Programmes	25	39	15	4	3.02
3	Observation of MNCs	11	37	24	11	2.58
4	Consultants	16	34	15	18	2.58
5	Literature reviews	8	35	30	10	2.49

Flexibility: Response of the industry to various questions on flexibility as depicted in the second column of Table 4.11 shows that nearly 50% companies consider manpower flexibility necessary for achieving success. 40% companies consider managerial flexibility the most desired. 37% companies prefer product mix flexibility in the prevailing market conditions. Nearly one-third companies have desired to have process flexibility, organizational flexibility, volume flexibility, product flexibility and also total flexibility. As shown in Table 4.11, 'manpower flexibility' has emerged as the most desired flexibility followed in order by other flexibilities, i.e. 'managerial flexibility', 'product mix flexibility', 'process flexibility', 'organizational flexibility', 'volume flexibility', 'total flexibility', 'product flexibility' and 'routing flexibility'.

Table 4.11
Analysis of need of organizational flexibilities

S. No.	Types of flexibilities	Number of responses (Ni) with each score choice (Si)				Average Score ($\Sigma Ni * Si$) / (ΣNi)
		Si				
		4	3	2	1	
1	Manpower flexibility	40	32	11	0	3.35
2	Managerial flexibility	36	34	10	3	3.24
3	Product mix flexibility	32	38	12	1	3.22
4	Process flexibility	26	46	11	0	3.18
5	Organizational flexibility	26	46	10	1	3.17
6	Volume flexibility	28	40	15	0	3.16
7	Product flexibility	23	34	21	5	2.90
8	Routing flexibility	11	42	25	5	2.71
9	Total flexibility	26	44	11	2	3.13

Reengineering: Reengineering involves many activities like designing, manufacturing, sequencing, layout improvement etc. From the response, it is found that 52% companies have practiced reengineering and have achieved higher efficiency, increased production rate, more responsiveness, and enhanced quality level. Response of the companies in the survey has been used for analysis as shown in Table 4.12.

It is indicated that reengineering has resulted in many achievements in order of importance as enhanced quality levels, more responsiveness, better work environment, more efficiency and increase in production rate.

Table 4.12
Achievements of reengineering

S. No.	Achievement of reengineering	Number of responses (Ni) with each score choice (Si)				Average Score ($\Sigma Ni * Si$) / (ΣNi)
		Si				
		4	3	2	1	
1	Enhanced quality levels	29	13	1	0	3.65
2	More responsiveness to market demands	24	17	1	1	3.49
3	Better work environment	22	16	5	0	3.39
4	More efficiency and production	21	13	6	3	3.21

Benchmarking: Benchmarking sets a goal for which the organization has to strive on continuous basis. Also the working of organization is aligned to achieve the goal by making suitable changes in its systems, structure, people, culture, technology etc. It is seen that 42% respondents have already set their benchmarks while others are putting in some efforts in this direction.

Innovations: Innovations have been made in automobile companies to reduce manufacturing costs and to increase customer satisfaction. Use of new technology has emerged as the main area of innovation, which has been followed in order by use of information technology, new models, new features and new materials (Table 4.13).

Continuous Improvement: It is revealed from the central tendency that the Indian automobile industry is aware of continuous improvement techniques mentioned in Table 4.14 and is using them to advantage. 'Setting of working groups' has been ranked first, followed in order by 'kaizen teams', 'quality circles', 'TQM', and 'benchmarking'.

Table 4.13
Various aspects of innovation

S. No.	Techniques of innovation	Number of responses (Ni) with each score choice (Si)				Average Score ($\Sigma Ni * Si$) / (ΣNi)
		Si				
		4	3	2	1	
1	Use of new technology	40	38	5	0	3.42
2	Use of Information technology	27	43	12	1	3.16
3	Introduction of new models	37	25	16	5	3.13
4	Incorporating new features	24	40	17	2	3.04
5	Use of new materials	12	38	24	9	2.64

Table 4.14
Tools of continuous improvement

S. No.	Tools of continuous improvement	Number of responses (Ni) with each score choice (Si)				Average Score ($\Sigma Ni * Si$) / (ΣNi)
		Si				
		4	3	2	1	
1	Working groups	33	33	11	6	3.12
2	Kaizen teams	35	28	13	7	3.10
3	Quality circles	27	34	17	5	3.00
4	Total Quality Management	23	40	12	8	2.94
5	Benchmarking	28	30	16	9	2.93

Strategic Change: Need of strategic change has been felt in the current scenario for competitiveness. As mentioned in Table 4.15, nine companies out of the respondents have formed 'joint ventures' while nine have 'alliances' with MNCs. Seven companies have preferred 'spinoff'. As far as government participation in public-sector automobile undertakings is concerned, 'disinvestment' has been made in five companies. From the survey, it is found that four companies have 'merged' with bigger companies. Also, 'acquisition' has been made in two companies by other Indian companies.

Also, it is noticed that Indian automobile industry has adopted new marketing strategies, e.g. 'full financing' and 'partial financing' of vehicles. 35% companies out of the respondents have recorded an increase in their sales by full financing schemes and

38% companies through partial financing schemes. Some 'lucrative offers' like free comprehensive insurance, free accessories, lucky scratch offers and festival offers have also been useful in improving sales.

Table 4.15
Strategic change

S. No.	Strategies employed	Number of responses (Ni) with each score choice (Si)				Average Score ($\Sigma Ni * Si$) / (ΣNi)
		Si				
		4	3	2	1	
1	Joint ventures	9	3	1	70	1.410
2	Alliances	9	1	5	68	1.410
3	Spin offs	7	0	0	76	1.253
4	Divestment	5	0	3	75	1.217
5	Mergers	4	0	0	79	1.145
6	Acquisitions	2	0	0	81	1.072

4.5 Status of Major Aspects of Management of Change

From the data of Tables 4.2 to 4.15, the score for each major area has been consolidated and converted to percentage. The average scores on a scale of 4 as well as the percentage scores are given in Table 4.16. Further, the mean value of the scores of these major aspects and the standard deviation have been calculated. Following this, the major aspects have been categorized on the basis of their percentage scores. For categorization, the logic used has been the difference of the scores of major aspects from the mean and by using the properties of the normal curve. After applying this logic, the aspects have been listed in the order of reducing score as shown in Table 4.16.

Very good:	Score above (mean+SD)	:	83.5% and above
Good:	Score between (mean) and (mean+SD):		71.2 to 83.4%
Fair:	Score between mean and (mean-SD) :		58.9 to 71.1%
Poor:	Score below (mean-SD)	:	Below 58.9%

Table 4.16
Status of major aspects of change in Indian automobile industry

S.No	Major aspects of change management	Mean value of average score of various aspects	Mean value in terms of percentage = 100* Mean value/ 4	Category
1	Technological change	3.21	80.25%	Good
2	Flexibilities	3.117	77.92%	Good
3	Innovations	3.078	76.95%	Good
4	Need of change	3.066	76.65%	Good
5	Continuous improvement	3.018	75.45%	Good
6	Driver of change	3.007	75.17%	Good
7	Structural changes	2.948	73.70%	Good
8	Benchmarking	2.867	71.67%	Good
9	Change agent	2.846	71.15%	Fair
10	Systemic changes	2.8	70.00%	Fair
11	Cultural change	2.77	69.25%	Fair
12	Organizational learning	2.766	69.15%	Fair
13	Inhibitors to change	2.542	63.55%	Fair
14	Reengineering	-	51.8%	Poor
15	Strategic change	1.251	31.27%	Poor
		Mean value	71.20%	
		Standard deviation (S D)	12.3%	

4.5.1 Discussion on Research Proposition (R1)

As shown in Table 4.16, no aspect of change management falls in 'very good' category. Status of need of change, technological change, structural change, flexibility, innovation, continuous improvement, driver of change and benchmarking is 'good'. Status of change agent, systemic change, cultural change, organizational learning and inhibitors to change is 'fair' while that of reengineering and strategic change is 'poor'. From the score, it can be concluded that Indian automobile industry has definitely felt a need of change and has initiated the change process, mostly in a systemic way. However, none of the aspects of

change management is accomplished to a large extent as a whole satisfying R1. Figure 4.1 gives an at-a-glance picture of the comparative standing of each major aspect.

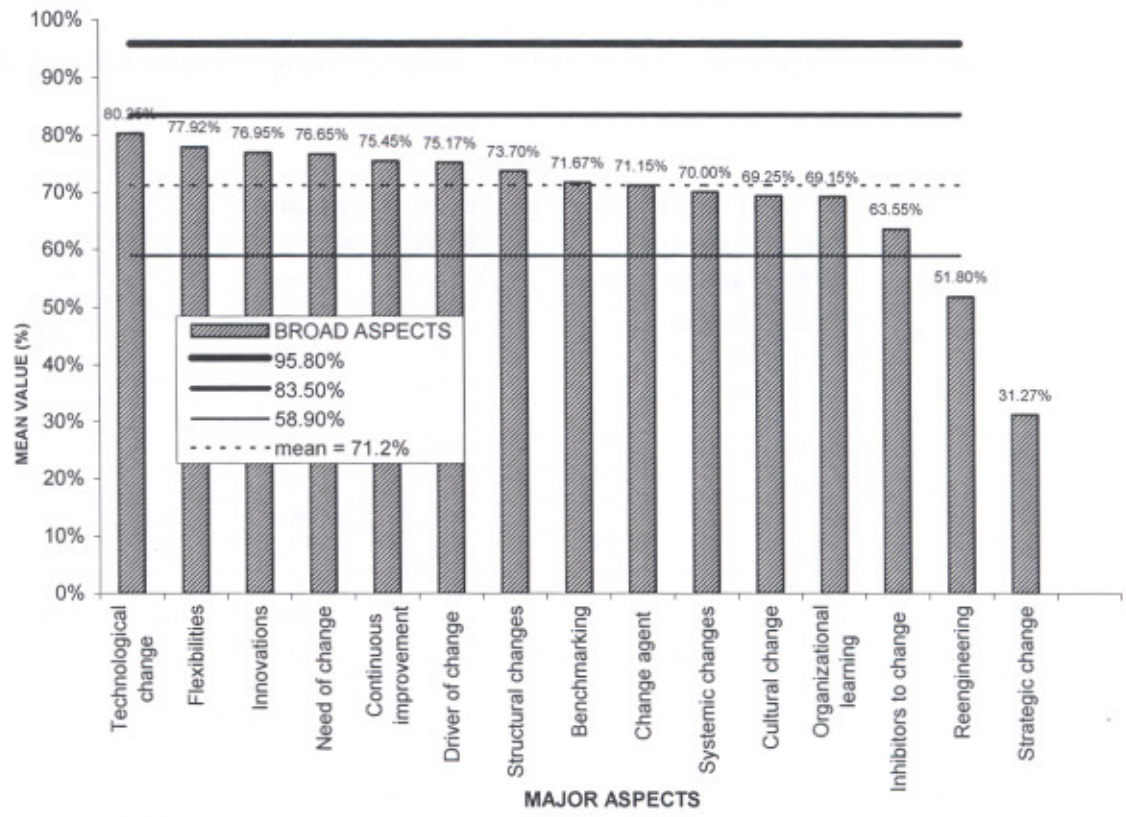


Figure 4.1: Status of broad aspects of change management

4.6 Classification of Companies

From the raw scores, total score of each company has been worked out separately for each major aspect as well as for all the aspects taken together. Total score of the company for all the areas taken together represents the overall status of the company with regard to management of change and is represented by ‘CM’. Subsequently, this measure will be used to find out the relationship of change management with other variables. The details of questions, whose scores were compiled for calculation of score of company in major aspects, are given in Appendix A4.

For categorization of companies, the average score and standard deviation of all the companies taken together in each major area as well as for all the areas taken together were calculated. Then, using the property of the normal curve, following limits for various categories were used:

$> x+a$	V.Good
x to $x+a$	Good
$x-a$ to x	Fair
$< x-a$	Poor

where 'x' is the average and 'a' is the standard deviation of each category as given in Appendix A5.

Table 4.17
Status of organizations in change management

S.No.	Major Areas of Change Management	% Organizations in various categories			
		V.Good	Good	Fair	Poor
1	Technological change	16%	37%	33%	14%
2	Systemic change	18%	34%	31%	17%
3	Structural change	14%	34%	41%	11%
4	People change	16%	34%	37%	13%
5	Culture change	20%	22%	43%	14%
6	Flexibility	17%	27%	42%	14%
7	Reengineering	19%	53%	9%	19%
8	Innovativeness	23%	33%	33%	12%
9	Entrepreneurship	17%	33%	31%	19%
10	Organizational learning	18%	37%	28%	17%
11	Overall change management	01%	16%	81%	2%

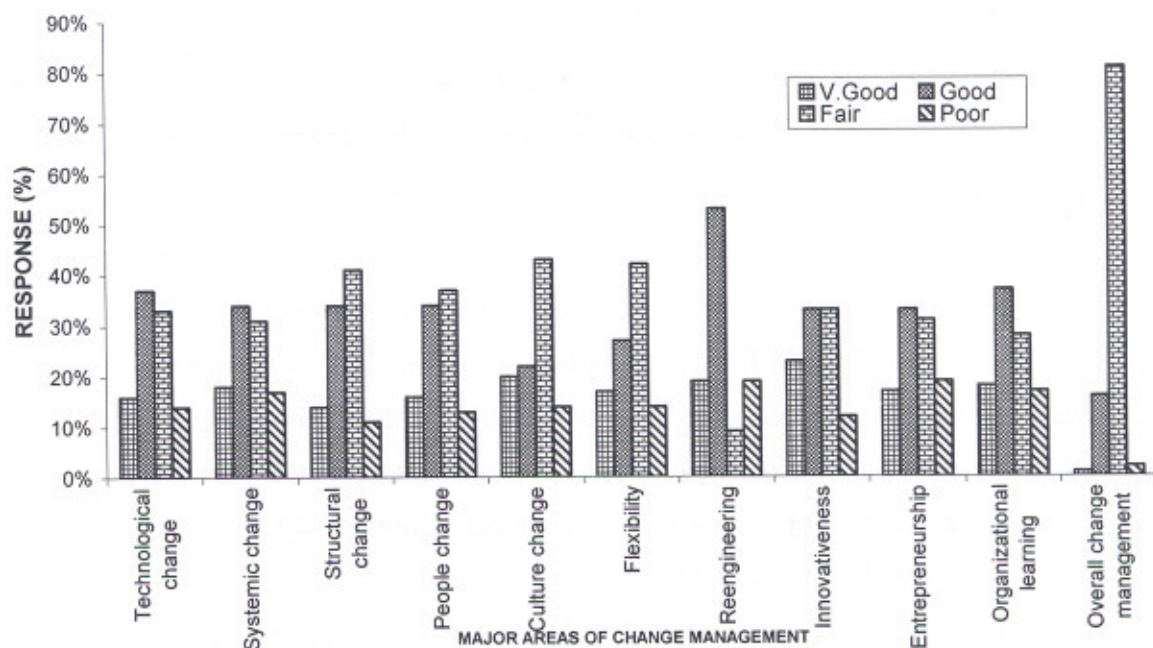


Figure 4.2: Status of organizations in change management

Table 4.17 shows the percentage of companies falling into various categories of change management in various heads (major areas). This has been pictorially depicted in

Figure 4.2. In the aspect of technological change, 53% companies fall in the category of 'good' and 'very good'. The average score of all the companies taken together is 0.777 with a standard deviation of 0.113. This shows that the companies have paid attention towards this aspect but large standard deviation points towards large variation amongst companies. In systemic change, 52% companies get a place in 'very good' and 'good' categories. Average score of 0.78 depicts a good status and high value of standard deviation 0.109 points towards the disparities. As far as structural change is concerned, only 48% companies occupy a place in 'very good' and 'good' bracket. Main difficulty in making structural change has been the resistance offered from the employees. Structural change in the Indian automobile industry has been made by various techniques, e.g. downsizing, delayering, vendor consolidation, and increase of dealers/service centers. In this area, the overall score (0.689) is lesser than technological and systemic changes but wide variation among companies do exist as depicted by high value of standard deviation (0.107).

Change in any organization has been dependent upon people, their mindset, attitude, level of resistance, sense of belongingness and the mutual relationships. In this major area, 50% companies have been in the range of 'good' and 'very good'. The average score of this major area 0.721 is quite good, and standard deviation of 0.097 though on the higher side but lesser than the aspects discussed above points towards reasonable level of uniformity of efforts in all the organizations. Also, the average score of the major aspect of cultural change (0.726) is good but the standard deviation (0.124) is very high. This depicts that wide difference in cultures exist among the respondents. The main reasons for the large variation in cultural aspects have been lack of transparency, formal organizational structure, management styles and insecurity amongst employees. For flexibility, the average score has been good with a value of .778 and standard deviation of 0.116. 17% companies of the respondents are found to be in 'very good' bracket and 27% in 'good' bracket.

Reengineering has been tried in many organizations. The average score for reengineering is 0.73 and standard deviation 0.288. Exceptionally high value of standard deviation is due to the fact that some companies have gone for it in a big way while others have not tried it at all. To remain competitive, innovations are needed in the

organizations. The overall situation in this aspect has been encouraging as 56% organizations are found to be in 'good' and 'very good' range. The average score of 0.769 reflects a fairly good status of attempts at innovations in the Indian automobile industry. However, a large value of standard deviation (0.119) shows that variability of efforts made between the organizations is very large. Some companies are investing on research and development to make innovations; others have not paid much attention in this regard. Entrepreneurship abilities have been found effective to meet the challenges in the growth of an organization and achieving its targets. Important aspects of entrepreneurship are managing affairs of the organization, inculcating innovative culture and cordial work environment, arranging funds for further investments, interaction with other organizations, finding new avenues, expansion and diversification. 50% of the responding organizations are in 'good' and 'very good' range. The average value has been found as 0.483, which is quite low. Also, the standard deviation has been low (0.090). Low value of average score has been due to lack of awareness, lack of investment, shortage of funds, conservative culture, and resistance to change at all levels in the companies. Further, low value of standard deviation indicates that situation is similar in all companies in general. Educating people about company policies, organizational objectives, competitors, their strengths and weaknesses, customer needs and business strategies have been useful in organizational development. Change process in an organization can be successful by involving people and making them more and more knowledgeable by imparting education and training. The overall average score of organizational learning has been 0.703 and standard deviation 0.128. Though the status is good in general, but company-to-company variations are large.

Status of overall change management is depicted by a grand score of all the aspects taken together of each company, which has an average value of 0.713 and a standard deviation of 0.080. The level is satisfactory and company-to-company variation is moderate. Only 1% companies fall in 'very good' class, 16% in 'good' class, 81% in 'fair' and 2% in 'poor' class with regard to overall change management.

4.7 Organizational Competitiveness

Competitiveness is a useful indicator of the success and prosperity of an organization (Porter, 1998). Competitive advantage of the firms is based upon the simple principle,

“the more in-time and aware of market a company is, the more competitive it can be (through lower prices and increased market share)” (Porter, 1980). Further, Porter advocated the use of a ‘value chain’ analysis of a company’s internal processes. Value chain of an organization is composed of nine generic activities. The activities can be divided into two broad types: primary activities which involve the physical creation of the product, its sale and transfer to the customers; and support activities which support the primary activities by providing material inputs, technology, human resources and other firmwide functions. Everything that a firm does must be captured in a primary or support activity through a process that requires some ‘judgment’ (Porter, 1985). In short, a firm derives its internal competitiveness from these activities.

According to Momaya (2000), the asset-process-performance framework (APP framework) can be used to capture importance of different factors of competitiveness in an organization. In APP framework, ‘competitive performance’ of a company is obtained through its ‘competitive processes’ using ‘competitive assets’. Competitive performance of a firm can be measured by many criteria such as market leadership, market share, return on investment, profitability, growth of organization, productivity, quality standard, etc. Similarly, competitive processes can be assessed by various criteria such as processes for value addition, product type, volume of production, product mix, financial management, etc.; and competitive assets by criteria like machines and equipments, technology, human resources, competitors, etc.

In an organization, the activities are to be planned so that its performance remains good on short term as well as long term basis. According to Porter (1980), “primary and support activities decide the approach of the organization towards short term and long term performance respectively”. For short term performance, ‘primary activities’ have been considered in Section-B of the questionnaire (Appendix A1) whereas for long term performance, ‘support activities’ have been considered in Section A in the form of objectives set by the organization and their level of accomplishment. A relative weightage has been assigned to the objectives while assessing their long term fulfillment. The measure of short term and long term performance indicators depict ‘competitive performance’ and ‘competitive processes’ respectively (Momaya, 2000) and have been

considered as a measure of ‘overall competitiveness’ of the organization as indicated below:

$$\text{Competitiveness score} = \sum Si * Wi + \sum Pi.....(4.1)$$

where Si is the score of a company in accomplishing competitive processes, Wi the weightage of the objectives and Pi is the performance measure.

Various objectives included in the questionnaire are given in Appendix A6. This appendix also shows the calculation of weightage factor of various objectives. Calculations of competitiveness score for each of the 83 organizations using Equation 4.1 is shown in Appendix A7. From the competitiveness score of all 83 organizations, mean score and the standard deviation have been worked out as 0.35 (where 1.00 can be the highest) and 0.194 respectively. Both statistics depict a low score in general and wide variation among the scores of various companies.

4.8 Extent of Change

Response of the organizations has been used to find out the extent of change by ascertaining difference of the central tendencies (average values) of the indicators before and after the change process. Further, the analysis of determining extent of change has been carried out from two viewpoints:

- i. Extent of change achieved in each of the 18 aspects, as listed in Table 4.18, by finding out difference of average scores measured before and after the change process in all the organizations taken together.
- ii. Extent of change achieved by each organization by working out the before and after difference of the scores of each company in all 18 aspects taken together.

4.8.1 Extent of Change in Each Aspect

Table 4.18 shows the analysis carried out to determine the extent of change achieved by all the companies taken together in each of the 18 aspects listed in the first column. For each aspect, number of responses to various choices have been multiplied with the corresponding score of the choice and summed up to arrive at the cumulative score. This has been done for both, before and after the change process. Then the difference has been worked out to find out the extent of change. These differences have been put into various ranges or classes for pictorial representation and discussion.

Figure 4.3 shows the number of aspects achieving a specific range of extent of change. Maximum number of aspects (08) achieved an extent of change of 21-25% (Table 4.18). The results reflect that as a result of the efforts made, there has been 21% to 25% improvement in the areas of accountability of each individual, definition and documentation of responsibility and authority, transparency, use of small group activity, use of computerized machines, information technology, team work and continuous improvement. There has been 25% to 30% improvement in another four aspects. Customer focus, use of computers in management information systems and design and manufacturing, and reduction in layers of management fall in this category. Three vital aspects like organizational structure and set up, participation of people at all levels in decision making and sense of belongingness have achieved only 16% to 20% change over the pre-efforts periods. Two aspects namely voluntary participation of employees in education and training and government rules and regulations have changed only to the extent of 10% to 15%. The highest extent of change has been achieved in use of computers in office work (33%).

From the above discussion, it is concluded that the results of efforts made by the organizations for management of change although not substantial, are still encouraging. There is, however, a need to sustain these efforts.

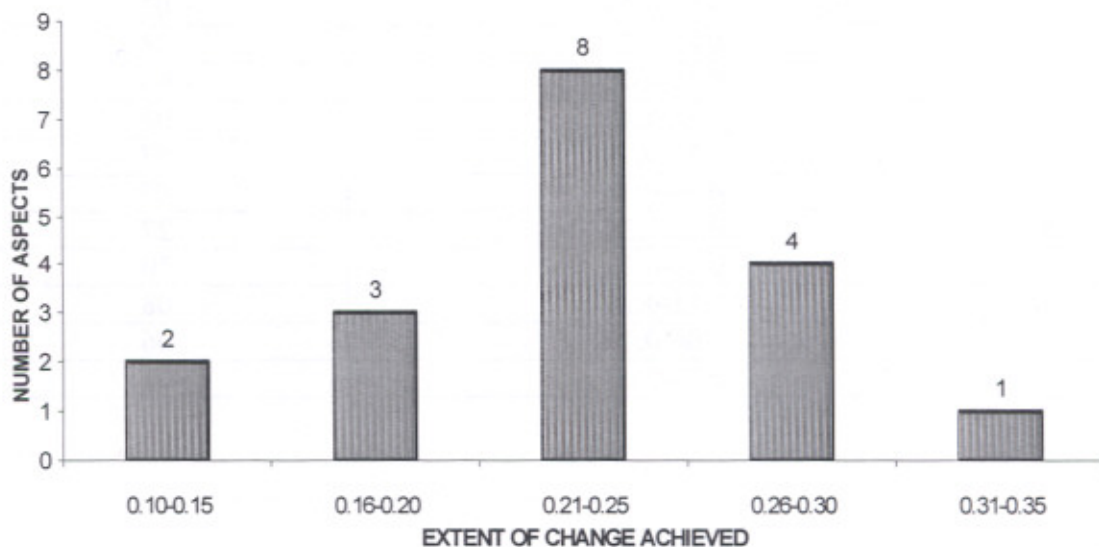


Figure 4.3: Level of extent of change achieved (EXTN)

4.8.2 Extent of Change Achieved in Aspects Taken Together in the Organizations

To categorize the companies based upon the extent of change, the scores for various indicators of change before and after change process as responded by the companies have been calculated. The difference of these scores (score after change – score before change) has been taken as extent of change for a company (Appendix A8). Extent of change has been classified into 12 categories as shown in Table 4.19 and number of companies in each category has also been found.

Table 4.19 shows 27 companies (32%) achieving 21%-25% change after change process, whereas 29 companies have succeeded from 0 to 20% and 27 companies from 26% to 60%. For the response obtained from 83 companies, average score of extent of change has been calculated as 0.24 and standard deviation as 0.12. The average score of 24% is really very low while standard deviation of 0.12 indicates a large variability between the companies. 42 companies (51%) are falling below the average score of 0.24, which is a matter of great concern for Indian automobile industry. Highest value of extent of change achieved has been 0.57 by only one company.

Table 4.19
Classification of companies based upon extent of change

S.No	Range of extent of change	No of companies
1	0.56-0.60	01
2	0.51-0.55	02
3	0.46-0.50	04
4	0.41-0.45	00
5	0.36-0.40	06
6	0.31-0.35	07
7	0.26-0.30	07
8	0.21-0.25	27
9	0.16-0.20	10
10	0.11-0.15	08
11	0.06-0.10	06
12	0.00-0.05	05

Table 4.18
Extent of change (EXTN) in various aspects

S. No.	INDICATORS OF CHANGE	No of response (Ni) with score points (Si) on 4-point scale before change process					No of response (Ni) with score points (Si) on 4-point scale during or after change process					EXTN=(C2-C1)/4
		Si				C1= (ΣNi* Si)/Σ Ni	Si				C2= (ΣNi *Si)/ ΣNi	
		4	3	2	1		4	3	2	1		
1	Extent of use of computers in office	4	23	33	23	2.096	43	31	9	0	3.410	0.33
2	Customer focus	9	28	37	9	2.446	56	20	6	1	3.578	0.28
3	Extent of use of computers in MIS	4	19	25	35	1.904	30	29	19	5	3.012	0.28
4	Extent of use of CAD/ CAM	5	17	20	41	1.831	31	31	6	15	2.940	0.28
5	Layers of management	0	12	37	34	1.735	16	40	23	4	2.819	0.27
6	Accountability	5	16	39	23	2.036	25	40	13	5	3.024	0.25
7	Definition and documentation of individual's authority & responsibilities	5	16	32	30	1.952	22	45	6	10	2.952	0.25
8	Transparency	0	22	43	18	2.048	20	49	10	4	3.024	0.24
9	Extent of use of quality circles	2	22	30	29	1.964	22	39	12	10	2.880	0.23
10	Extent of use of CNC Machines	7	17	20	39	1.904	26	30	13	14	2.819	0.23
11	Team work	5	29	36	13	2.313	30	40	13	0	3.205	0.22
12	Reactive and proactive improvement	1	18	28	36	1.807	23	26	20	14	2.699	0.22
13	Use of information technology	3	17	21	42	1.771	21	25	24	13	2.651	0.22
14	Organizational setup	6	18	46	13	2.205	17	53	8	5	2.988	0.20
15	Participation of all cadres in decision making	1	22	36	24	2.000	11	50	14	8	2.771	0.19
16	Sense of belongingness at all levels	9	24	25	25	2.205	17	43	17	6	2.855	0.16
17	Voluntary participation of employees for education and training	3	21	32	27	2.000	14	34	23	12	2.602	0.15
18	Government rules and regulations	10	30	26	17	2.398	24	31	25	3	2.916	0.13

4.9 Relationship of Strategies of Change Management with Change Achieved and Competitiveness

In the preceding section, the analysis has revealed the status of various major aspects of change management, the strategies used, the drivers of change, enablers employed, standing of the companies with regard to various aspects of change management and the level of success achieved in managing change. This section is devoted to finding out the relationships between various courses of action employed and the success achieved, so that suitable strategies can be developed for future. Following analysis has been carried out to determine these relationships:

- a. Calculation of average scores in the areas of change management, extent of change achieved, level of competitiveness, choice for change agents and drivers of change.
- b. Determining correlation between various strategies and change in various areas with competitiveness, and extent of change achieved etc.

4.9.1 Calculation of Average Scores

Table 4.20 depicts the average score of various change agents and drivers of change with regard to major areas of change management, overall change management, competitiveness and extent of change. The entries in the table have been arrived at from the score of the responding organizations for various change agents and drivers of change.

It is seen that overall score of change (CM) is maximum for the companies with MD as the main choice of change agent. This has been followed in order by the companies with choice of BOG, trade union leader, GM, outside expert and consultant as change agents. Further, score of competitiveness (COMP) has been maximum for the companies with consultants as their change agents, which has been followed in order by the companies with the choice of MD, outside expert, BOG, trade union leader and GM as change agents. Regarding maximum extent of change achieved, the choice of change agents in order has been GM, BOG, trade union leader, MD, outside expert and consultant.

From the choice of drivers of change, it is found that overall score of change management (CM) is maximum with the companies choosing technology as the main

driver of change, followed in order by the companies with choice of society, people, structure, culture and systems as drivers of change. Competitiveness has been maximum for the companies with the choice of society as the main driver of change, which has been followed in order by the companies with the choice of people, culture, system, structure and technology as drivers of change. Regarding extent of change, the companies with technology as the driver of change has achieved maximum notable change which has been followed by companies opting people, structure, society, culture and system as drivers of change in order.

Table 4.20
Calculated average scores for various options

	TECH	SYS	STR	PPL	CULT	FLEX	RENG	INNV	ENTR	LRNG	CM	COMP	EXTN
Change Agents													
BOG	0.721	0.735	0.631	0.676	0.669	0.755	0.737	0.711	0.445	0.653	0.667	0.360	0.207
MD	0.727	0.754	0.649	0.684	0.681	0.758	0.751	0.737	0.464	0.675	0.682	0.370	0.205
GM	0.714	0.723	0.621	0.669	0.656	0.750	0.698	0.702	0.448	0.634	0.643	0.345	0.209
Consultant	0.562	0.620	0.517	0.602	0.604	0.648	0.528	0.597	0.475	0.419	0.375	0.383	0.111
Trade union leader	0.721	0.739	0.635	0.677	0.669	0.754	0.724	0.720	0.456	0.654	0.663	0.357	0.207
Outside expert	0.638	0.672	0.569	0.636	0.630	0.699	0.613	0.650	0.461	0.526	0.509	0.364	0.160
Drivers of change													
Technology	0.702	0.716	0.624	0.676	0.659	0.743	0.656	0.690	0.464	0.603	0.591	0.345	0.209
Society	0.681	0.707	0.604	0.657	0.652	0.727	0.675	0.686	0.458	0.593	0.590	0.363	0.183
People	0.684	0.708	0.607	0.660	0.653	0.730	0.672	0.687	0.459	0.595	0.590	0.361	0.187
System	0.660	0.693	0.605	0.679	0.646	0.698	0.507	0.639	0.505	0.469	0.402	0.359	0.163
Structure	0.676	0.701	0.601	0.657	0.648	0.725	0.654	0.678	0.461	0.579	0.570	0.358	0.185
Culture	0.670	0.697	0.598	0.657	0.646	0.719	0.634	0.671	0.466	0.562	0.545	0.360	0.178

From the above discussion, it can be concluded that BOG, MD, GM and trade union leaders have a definite impact in the Indian companies. Choosing a suitable change agent out of them definitely increases competitiveness and makes the change process easy. However, impact of various drivers of change has not been appreciable on the competitiveness of organizations. Extent of change has been invariably high with technology as the main driver of change followed in order by people, structure, society, culture and system.

4.9.2 Relationship of Strategies Adopted with Change Management

Table 4.21 shows the values of coefficients of correlation between various areas and strategies of change management and the extent of change achieved and competitiveness.

The values of coefficients of correlation show that there are significant relationships (at confidence level=0.01) between various major areas of change management like technology, structure, systems, people and culture. This depicts the complementary nature of changes in one area with the changes in other areas. Flexibility has a significant relationship at 0.01 level with all these areas except with technology with which the relationship although positive is not significant. Reengineering has not emerged to be a strategy, which is complementary with other strategies. It does not have significant relationships with any other strategy or major areas of change management. Innovations have significant relationships at 0.01 level with all the major areas of change and strategies except with reengineering. Entrepreneurship has significant relationships with all other areas and strategies at 0.01 level except with flexibility and reengineering. Organizational learning has come out to be a strategy, which has a bearing on all other areas and strategies. It has significant relationships at 0.01 level with all except reengineering.

As far as overall change management is concerned, it is seen that all major areas and strategies have significant relationships with it at 0.01 level. People change with coefficients of correlation $r = 0.784$ has the strongest relationship with overall change management, followed in order by culture ($r=0.778$), systems ($r=0.725$), structure ($r=0.723$), innovations ($r=0.709$), organizational learning and knowledge management ($r=0.681$), entrepreneurship ($r=0.651$), flexibility ($r=0.539$), technology ($r=0.532$) and reengineering ($r=0.524$).

Meeting of objectives set by the organizations, however, tells a slightly different story. It is seen that innovations are strongly correlated with meeting of objectives and level of competitiveness. No other area has a significant relationship with meeting of objectives. It indicates that the objectives set in the organizations are perhaps not in line with the strategies employed. However, each strategy is contributing towards change management but not to meeting of objectives. Similarly people change, innovations and change management have significant relationships with competitiveness at 0.01 level. Culture and organizational learning and knowledge management also have significant relationships with competitiveness but at 0.05 level. Meeting the objectives also has a significant relationship at 0.01 level with competitiveness. Extent of change achieved has

a significant relationship at 0.01 level with structure, people, culture, entrepreneurship, organizational learning and overall change management. Accomplishment of objectives has a significant relationship at 0.01 level with extent of change. Technology has a significant relationship with extent of change but at 0.05 level of confidence. Results of change have been significantly correlated at 0.01 level with technology, system, structure, people, culture, innovations, entrepreneurship, organizational learning, overall change management and extent of change.

Table 4.21
Correlations between overall change management, change strategies, accomplishment of objectives and competitiveness

	TECH	SYS	STR	PPL	CULT	FLEX	RENG	INNV	ENTR	LRNG	CM	OBJ	COMP	EXTN
TECH	1													
SYS	0.375**	1												
STR	0.395**	0.385**	1											
PPL	0.449**	0.629**	0.558**	1										
CULT	0.449**	0.564**	0.642**	0.753**	1									
FLEX	0.206	0.317**	0.292**	0.368**	0.318**	1								
RENG	-0.21	0.155	0.262	0.0556	0.054	0.268	1							
INNV	0.388**	0.513**	0.476**	0.487**	0.541**	0.346**	0.142	1						
ENTR	0.338**	0.424**	0.483**	0.596**	0.481**	0.14	0.2017	0.429**	1					
LRNG	0.372**	0.533**	0.381**	0.53**	0.475**	0.256**	0.1621	0.397**	0.451**	1				
CM	0.532**	0.725**	0.723**	0.784**	0.778**	0.539**	0.524**	0.709**	0.651**	0.681**	1			
OBJ	0.179	0.178	0	0.1333	0.151	0.138	-0.054	0.301**	0.0215	0.20628	0.1906	1		
COMP	0.068	0.204	0.046	0.298**	0.269*	0.172	0.1073	0.394**	0.2058	0.276*	0.317**	0.526**	1	
EXTN	0.225*	0.126	0.374**	0.46**	0.43**	0.053	0.178	0.070	0.296**	0.265**	0.366**	0.31**	-0.175	1
RESULTS	0.283**	0.51**	0.373**	0.707**	0.622**	0.197	0.016	0.394**	0.304**	0.461**	0.565**	0.068	0.128	0.467**

** - Correlation is significant at 0.01 level,

* - Correlation is significant at 0.05 level.

4.9.3 Relationship between Various Inhibitors and Change Management

Table 4.22 shows the values of coefficients of correlation between various inhibitors to change, overall change management, accomplishment of objectives, competitiveness, extent of change and results of change achieved. It is indicated that overall change management has been significantly correlated with the attitude of executives at a significance level of 0.05. On the other hand, a negative correlation exists between overall change management and reactions of workers. As far as accomplishment of objectives is concerned, it is found to decrease with the resistance posed by workmen, shortage of skilled manpower and multiskilled operators as indicated by the negative correlations at 0.01 level. Further, negative correlation of competitiveness with indicators

of inhibitors shows that competitiveness decreases as resistance by workmen increases, state of technology becomes obsolete, availability of skilled manpower and multiskilled operators become scarce (at 0.01 level). Feeling of insecurity also reduces the competitiveness of a company (at 0.05 level). Competitiveness has been significantly correlated with overall change management and accomplishment of objectives at 0.01 level. For extent of change, significant correlation has been obtained with education and training, skilled and multiskilled manpower, and overall change management at a confidence level of 0.01. Further, the correlation of extent of change has been negative with union culture. Results of change have been significantly correlated with culture, overall change management and extent of change at a confidence level of 0.01 while negatively correlated to trade union's influence at 0.05 level.

Table 4.22

Correlation matrix between various inhibitors, overall change management, accomplishment of objectives, competitiveness, extent of change and results of change

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	CM	OBJ	COMP	EXTN
R1	1.000														
R2	0.396**	1.000													
R3	0.127	0.223*	1.000												
R4	0.083	0.337**	0.488**	1.000											
R5	0.293**	0.204	0.322**	0.452**	1.000										
R6	0.302**	0.222*	0.214	0.24*	0.609**	1.000									
R7	0.017	0.401**	0.518**	0.440**	0.323**	0.306**	1.000								
R8	0.093	0.520**	0.417**	0.522**	0.197	0.176	0.781**	1.000							
R9	0.289**	0.482**	0.145	0.218*	0.400**	0.443**	0.423**	0.43**	1.000						
R10	0.272*	0.114	0.071	0.122	0.126	0.192	0.081	0.058	-0.071	1.000					
R11	0.037	0.265*	0.142	0.229*	0.153	0.127	0.116	0.210	0.089	0.289**	1.00				
CM	0.236*	-0.124	-0.164	-0.210	-0.120	-0.046	-0.103	-0.049	0.114	-0.093	-0.19	1.000			
OBJ	-0.080	-0.35**	-0.098	-0.182	-0.079	-0.157	-0.35**	-0.33**	-0.174	-0.038	-0.13	0.19	1.000		
COMP	0.044	-0.49**	-0.161	-0.35**	0.028	-0.050	-0.32**	-0.33**	-0.065	-0.118	-0.21*	0.32**	0.53**	1.000	
EXTN	0.065	0.103	0.277**	0.132	0.172	-0.034	0.391**	0.334**	0.147	-0.232*	-0.14	0.36**	0.31**	-0.176	1.000
RES	0.161	-0.021	0.032	0.066	0.175	0.054	0.124	0.181	0.343**	-0.259*	-0.03	0.56**	0.068	0.128	0.467**

** - Correlation is significant at 0.01 level,

* - Correlation is significant at 0.05 level.

{R1= Resistance by executives, R2: Resistance by workers, R3: Resistance due To lack of education and training, R4: Resistance due to state of technology and automation, R5: Resistance due to organizational structure, R6: Resistance by management, R7: Resistance due to scarcity of skilled manpower, R8: Resistance due to scarcity of multi-skilled manpower, R9: Resistance due to Culture, R10: Resistance by trade unions, R11: Resistance due to insecurity at various levels}

4.9.4 Discussion on Research Propositions (R2 to R4)

As depicted in Table 4.20, mean value of competitiveness of the organizations surveyed is found to depend upon the selection of change agents. Effect of 'consultants' is found maximum that is followed by 'MD', 'outside expert', 'BOG', 'trade union leaders' and

'GM', in order. Thus, it is concluded that change agents (internal as well as external) play an important role in increasing competitiveness of an organization (R2).

Table 4.21 depicts the correlations between competitiveness and various aspects of change management as well as overall change management. People change, innovation and overall change management have significant relationship with competitiveness at 0.01 level, while cultural change and organizational learning at 0.05 level of significance. Also various aspects of change management and overall change management are strongly correlated. Thus research proposition R3 is satisfied.

Correlations between various inhibitors to change and competitiveness are shown in Table 4.22. It is demonstrated that competitiveness is significantly correlated at 0.01 level with resistance offered by workers, scarcity of skilled/ multi-skilled manpower, and state of technology and automation and at 0.05 level with insecurity at all levels. These correlations fully satisfy the research proposition R4, i.e. various inhibitors of change management affect competitiveness with a varying degree of impact.

4.10 Success of Change Management

As a result of efforts made in various automobile companies, an appreciable change has been noticed in socio-technical aspects. There has been a visible change in the areas like ways of doing works, mindset of people, teamwork, implementation of ISO9000, ISO14000, QS9000, 5S, TQM, TPM, status of automation, education and training.

Table 4.23 shows the data regarding the success of change process in Indian automobile industry. The respondents were asked to give information on various indicators listed in the second column of the table. The information sought was as to how much change could be achieved in all these indicators as a result of the efforts made. The table also lists the number of responses given to 'appreciable' change, 'some' change, 'small' change and 'no' change achieved. From these figures, an average score has been worked out which is a measure of success achieved in each indicator area. These areas are listed in the order of success achieved.

Table 4.23
Success of change management in the organizations

S. No.	Indicators of success of change management in the organization	Number of responses (Ni) with each score choice (Si)				Average Score ($\Sigma Ni * Si$) / 83
		Si				
		4	3	2	1	
1	Ways of doing work	38	38	7	0	3.37
2	Working environment	38	34	9	2	3.30
3	Documentation of ways of work and standard data	31	44	8	0	3.28
4	Team work	29	43	9	2	3.19
5	Up gradation in state of technology and level of automation	29	39	13	2	3.14
6	Work content and standard time for employees	20	49	14	0	3.07
7	Education and training to the employees	23	37	21	2	2.98
8	Total and actual working hours	12	36	19	16	2.53
9	Emoluments and other fringe benefits	3	34	37	9	2.37

4.11 Concluding Remarks

The status, trends and relationships of various research variables have been established in this chapter. It is felt necessary to make a detailed study of these variables in various organizations and synthesize the results. In the next three chapters, case studies have been described with the objective of detailed study of research variables.

CASE STUDIES IN ORGANIZATIONS MANUFACTURING PERSONAL VEHICLES

5.1 Introduction

This chapter describes the detailed case studies carried out in various organizations manufacturing personal vehicles. The objective of the case studies has been to look into and critically analyze various facets of working of the organizations including the need of change felt by the organizations and process of change adopted by them. Three organizations namely Maruti Udyog Limited, Yamaha Motors India Limited and Majestic Auto Limited have been taken up for detailed study.

5.2 Case Study- I (Maruti Udyog Limited)

M/S Maruti Udyog Limited (MUL), a subsidiary of M/S Suzuki Motors Company (SMC) of Japan is a manufacturer of passenger cars. The factory is located at Gurgaon, Haryana. A Board of Directors with Chairman from M/S Suzuki Motors Company (SMC) of Japan manage the affairs of the company. Managing Director looks after the day-to-day affairs of the company. MUL has been a fast growing company and over the years has expanded its product range to suit a large spectrum of customers in and outside India.

5.2.1 Background of the Company

The company became operational in 1982 and the first car rolled out from the company on 14th December 1983. MUL was formed as a public sector in 1981 with the equity of Government of India at 51% and of SMC at 26%. As per the agreement, SMC increased its equity to 40% in 1989, and further to 50% in 1992. As a result, MUL ceased to be a government company. In 2002 after disinvestments plan of the Government of India, SMC's share in MUL has been increased to 54%, and MUL has become a subsidiary of SMC. The Government of India holds now 46% equity in MUL.

Indian car market remained stagnant at a volume of 30,000 to 40,000 cars per annum during the decade ending 1983. In the year 1983, this figure reached a number of 1,96,820. With the growing demand of Maruti vehicles in Indian market, the organization has constantly increased production capacity. MUL achieved its production mark of one-millionth vehicle in March 1994 and became the first Indian automobile company to

achieve this mark. In 1997, MUL achieved another mark of 2 million vehicles and in 2003, 4 million vehicles.

5.2.2 Need for Change

MUL captured a large market share soon after its inception, as there was no strong competitor at that time. Till 1983, owning a car was a luxury in Indian families. Purchasing power of the people was low and only a few brands like Ambassador and Fiat were available. The very first model introduced by MUL, Maruti-800, was accepted very well due to its sleek looks, affordable price as well as fuel economy. The company has introduced numerous models with additional features of technology, aesthetics and ergonomics during the last 20 years. To meet the growing demand, MUL increased its manufacturing capacity from 20,000 in 1983 to 100,000 in 1990, 240,000 in 1996 and 350,000 in 1998.

After liberalization of economy and globalization of market in 1991, many MNCs were attracted towards India, the major ones' being Hyundai, Mitsubishi, Hindustan Motors, Fiat etc. Slowly these manufacturers established themselves and captured some market share. Thus, monopoly of MUL vehicles was challenged. Appendix B1 depicts some of the performance parameters of MUL over the years. Performance of the company and trends in various performance indicators are described below.

Market Share: Figure 5.1 depicts the trends in the market share from the year 1995 to 2002. It is indicated that the market share increased continuously till the year 1998 (82.8%). After that, a decreasing trend is observed. By the year 1998, many new automakers got established in India and captured some market. In the wake of competition, reduction in market share of MUL was inevitable. By developing a countrywide network of dealers and service centers, and choosing customer delight as the prime objective, the company has maintained its market leadership, i.e. sales of MUL are more than the other manufacturers taken together. The decreasing trend continued till the year 2001 and since then has been almost stable. The market share of MUL has stabilized around 58%.

Average Daily Production: Figure 5.2 depicts the trends of average daily production of vehicles at MUL from the year 1995 to 2002. It is depicted that average daily production continuously increased over the years till the year 1998. Demand of cars in

India increased rapidly after globalization and liberalization of economy. However in the year 1999, sale of MUL vehicles in the market was low, due to buyers' fascination towards new vehicles introduced by other manufacturers. Realizing the adverse market trend and customers' needs and expectations, MUL introduced new models, equipped with new engine technology, meeting new emission norms, and also controlled the prices. As a result, average daily production of MUL increased to 1405 in the year 2000. Next, due to industrial recession and growing competition amongst manufacturers, average daily production of MUL dropped to 1235 in the year 2001, and 1208 in the year 2002.

Vehicles Produced per Employee: Figure 5.3 shows the trends of average number of vehicles produced per employee from the year 1995 to 2002. It is indicated that the average production per employee increased continuously till the year 1999, directly in proportion to the rising market share. During the year 1999-2000, because of the competition faced from the new automakers, impending launch of MUL's new models in the 'small car' and 'mid-size' segments and ambiguity of their estimated price led to a pronounced 'wait-and-watch' attitude by the customers, and the general recession in Indian economy resulted in a sudden drop in its sales. The number of vehicles produced per employee dropped to 59 against 61 in the previous year. Through timely strategies like reduction in cost and reduced profit margins, MUL controlled its market share. Average daily production per employee increased to 69 in the year 2000. However, during the year 2000-2001, the conflict between GOI and SMC regarding the appointment of MD resulted in a drop of production level (60 per employee). Due to price reduction strategy adopted by all auto majors, MUL accumulated a huge loss during the year 2001. To make up for the losses and for its survival, the company reduced the number of employees by about 19% through voluntary retirement scheme (VRS) in 2001-2002. As a result average vehicles produced per employee increased during the year 2002 (77 per employee).

Earning per Share: Figure 5.4 shows the trends of earning per share (EPS) from the year 1995 to 2002. It is shown that EPS increased continuously till the year 1998, and after that it has been decreasing. In 2001, the company recorded a huge net loss. Till 1998, MUL was enjoying monopoly because of practically no competition from the existing manufacturers and it appears that some complacency crept in whereby the prices

increased continuously almost in direct proportion to the increase in manufacturing cost. After the year 1998, because of the competition faced from other manufacturers, monopoly of MUL was challenged. Market share of the company reduced and EPS dropped as indicated in the figure. In the year 2000, as per the directions of Supreme Court of India, the new emission norms were made mandatory. During the year 2000-2001, MUL made a huge investment on research and development to develop new engine technology. Further, new regulation of Government of India to introduce uniform sales tax policy resulted in increase of sales price.

In the competitive market, MUL has been bearing this extra financial burden instead of transferring it to the customers particularly in the 'small car segment'. EPS dropped drastically to (-248) during the year 2001. The company took new initiatives like dealing in preowned cars, N2N fleet management, insurance of vehicles, finance for customers, Genuine Spares and Genuine Accessories, and earned large profits in the year 2002. As a result, EPS increased to 79 in the year 2002.

Net Profit per Employee: Figure 5.5 shows the trends of net profit earned per employee at MUL from the year 1995 to 2002. It is depicted that net profit per employee increased continuously from the year 1995 to 1998. After that a decreasing trend is noticed. With the decrease in market share and reduction of profit margins, net profit per employee at MUL reduced from the year 1999 onwards. In 2001, the company suffered huge losses. Taking timely new strategies as mentioned earlier, the company made net profits from the year 2002. Further, the company reduced the number of employees through voluntary retirement scheme in this year, which enhanced net profits per employee to Rs. 0.22 millions per employee.

Operating Profit per Vehicle: Figure 5.6 shows the trends of operating profit per vehicle from the year 1998 to 2002. It is depicted that operating profit per vehicle decreased from the year 1998 to 2001. The company realized that the selling price of the vehicles couldn't be increased further due to presence of other brand alternatives in the market, even if the material cost has been increasing. The company has been bearing the material price increase and as a result, profit per vehicle reduced. The decreasing trend continued till the year 2001, when the company suffered a huge loss. Afterwards, new business

strategies have been practiced and operating profits per unit raised to Rs. 0.014 million in the year 2002.

Return on Capital Employed: Figure 5.7 shows the trends of return on average capital employed from the year 1995 to 2002. It is depicted that return on capital decreased from the year 1996 onwards. During 1996-97, the company made a lot of capital investment to increase capacity of the plant. Profit margin reduced continuously. During the year 2000, the company made a huge investment on research and development to develop new engine technology to meet new emission norms. The return on investment reduced due to tight market conditions and reduced profit margins. After the year 2001, the company diverted manufacturing of large components to vendors as a strategy and saved further expenditure on machinery. The return on capital increased to 4.93% during the year 2001-2002 as a result.

Inventory Turnover Ratio: Figure 5.8 shows the trends of inventory turnover ratio from the year 1997 to 2002. It is indicated that the ratio increased from 15.16 in the year 1997 to 16.72 in the year 1998. As already explained, MUL at that time was enjoying monopoly in Indian market and its market share was increasing continuously. By proper material management, inventory turnover ratio was increased. After the year 1998, there was a drop in the sales of Maruti vehicles. As a result, inventory turnover ratio reduced to 12.08 during the year 2000. Further, in the year 2001, sales of Maruti vehicles suddenly increased due to price competitiveness and the inventory turnover ratio increased to 13.23. During the year 2002, MUL excelled in “midsize” segment due to enhanced popularity. Close contacts were developed with the vendors through Internet to control the stock level as per shift requirements. Thus inventory turnover ratio increased to 19.27 in the year 2002 as depicted in the Figure 5.8.

From the above discussion, it is indicated that market share of MUL started sliding down after the year 1998 as other competitors started registering their sales and captured some market share. With the increasing cost of materials and growing competition, operating profits per vehicle reduced continuously. After the enforcement of stringent norms of emission in India and provision of these norms by other manufacturers in their cars, the interest of the customer shifted to other brands. Thus, MUL felt a dire need of technological change. Considerable investment was made subsequently for



Figure 5.1: Trends in the market share for MUL

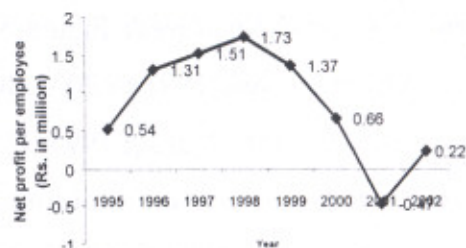


Figure 5.5: Trends of net profit per employee per annum for MUL



Figure 5.2: Trends in average daily production for MUL

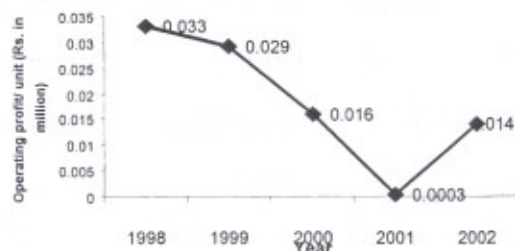


Figure 5.6: Trends of operating profit per vehicle for MUL



Figure 5.3: Trends in vehicles produced per employee per annum for MUL



Figure 5.7: Trends of return on average capital employed for MUL

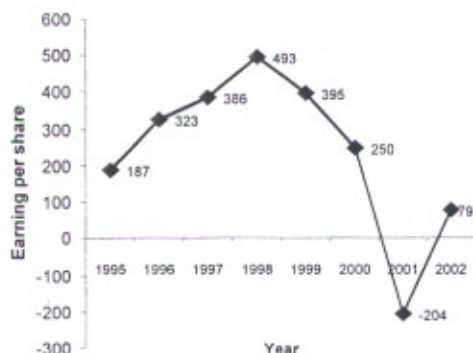


Figure 5.4: Trends of earning per share for MUL



Figure 5.8: Trends of inventory turnover ratio for MUL

technological upgradation. This resulted in reduction of returns on investment. To offset this as well as to make full use of technology, structural and systemic changes were made. Although the company had, right from inception, a rich work culture, advanced technology, and Japanese concepts, yet with the changing market, further strengthening of the original culture became a necessity. Structural changes like VRS, delayering, down sizing, outsourcing, widening sales and service network etc. have been undertaken. Similarly, systemic changes like Just in time, vendor consolidation, on-line contact with the vendors, transparency, adapting to TPM, TQM, 5S, WCM, ISO 9001, QS 9000, ISO 14000, etc. have been implemented. The trends in parameters as dictated above shows that in the year 1998, the company felt a need of change. The company rose to the occasion and successfully implemented changes in the period 1998 to 2002. During this period, because of the change efforts and investments, the downward trend in indicators continued. But in the year 2002, the company emerged successful and probably stronger than before.

5.2.3 *Change Process at MUL*

To gain competitive edge in the market, many change initiatives have been taken from time to time at MUL. Table 5.1 depicts details of the major changes since the inception of the company. Against every need of change, action has been taken in one or more major areas like technology (TC), system (SM), structure (ST), people (PL), and culture (CC). The appropriate area considered from time to time and the actions taken are indicated in the table. Major strategies used for making change have been tinkering or kludging. Tinkering (T) indicates the adjustments, initiatives, policies, and other systemic changes made in the organization within the available resources. And kludging (K) shows the changes made in the organization with investment in resources, e.g. technology change, increasing production capacity, diversification into new segments etc. (Eric, 2000). The rate of change has been slow (S) or fast (F) depending upon its type and requirements.

As shown in Table 5.1, the company has been making changes in one or more areas of technology, structure, systems, people and culture, without which the company would have landed in a very precarious situation. The changes made by MUL from time to time, as depicted above, have been consolidated and put in Table 5.2 to depict the sequence of all measures.

Table 5.1
Change Process at MUL

Year	Need of change	Ar -ea	T / K	S / F	Action taken
1983	Establishment of new company.				Production started with Japanese technology, and a mix of Indian and Japanese culture.
	Lack of mutual trust and teamwork amongst Indian workers.	PL	T	S	Educating and training the employees to adapt to Japanese way of working.
1984	Production rate very less to meet the growing demands of Maruti vehicles.	SM	T	F	Increased imports of CKD and raw material for manufacturing of more quantity.
		ST	K	F	Recruitment of more manpower with required skill and capability.
		SM	T	S	Adapting to Japanese systems eliminating delays of bureaucratic decision-making.
		CC	T	F	Adapting Japanese concepts like openness, transparency, teamwork and mutual trust.
1985	Growing demand of utility vehicles in the market.	TC	T	S	Technology adaptation for production of multi-utility vehicles (MUVs).
1986	Plant capacity quite less to meet the demand.	TC	K	S	Increased plant capacity by robots and automation so as to reduce cycle time/unit.
	Shortage of vendors to supply the parts with desired level of quality.	SM	K	F	Developed vendors by setting Joint Ventures meant for exclusive supply to MUL
1987	Lack of availability of spares at service centers.	TC	T	F	Technology development for cheap Indian alternatives for imported spares.
1988	Growing demand of the vehicles in the market.	ST	K	F	Enlarged dealers' network for quick delivery to the customers.
		ST	K	F	Widened service network for customer satisfaction and after sales services.
		SM	K	F	Developed vendors locally for prompt supply of material and components.
		SM	T	S	Enhanced skill and knowledge of the plant employees through inhouse training.
	Skill level of mechanics at service stations across the country inadequate.	SM	T	S	Imparted training to the mechanics of various service stations across the country at MUL free of cost.
	Lack of team spirit, and inadequate congenial environment.	CC	T	S	Started recognizing to employees, sections, and departments based upon their performances.
		SM	T	S	Started job rotation, job enlargement and enrichment for motivation of employees.
1993	Growing market for mid-size car.	TC	T	S	Technology adaptation for expansion into mid-segment (Zen).
		CC	K	F	Started new Zen assembly line isolated from earlier M800 line with new employees for a new rich work culture.
		SM	T	S	Adaptation of suggestion scheme, Quality circles, TQM, 5S, and ISO 9000.

1994	Production capacity less to satisfy the demand.	TC	K	S	Setting up of second plant to enhance capacity with more automation.
1995	Entry of new manufacturers (MNCs) in small car segment.	TC	T	S	Technology transfer and adaptation for new variants with aesthetics improvement.
		SM	K	F	Made wide publicity of organizational strengths by advertisements in newspapers, magazines and television.
1998	Recession in economy and increase in petrol prices.	TC	T	S	Adaptation of new technology for diesel vehicle.
		CC	T	S	Quality improvement by strengthening TQM.
1999	Reduction in market share, and shrinking profits in the competitive environment.	TC	T	S	Increased capacity of plant by addition of new technology machines.
		SM	T	S	Gave large volumes to less number of vendors, and demanded annual price reduction/ unit in lieu of large orders.
		SM	T	S	Thrust on reducing in-process inventory.
	Increase in petrol prices and recession in the car industry.	TC	K	F	Started with CNG vehicles satisfying EURO I/II norms.
	Reduced profit margin due to drop in sale of MUL vehicles.	SM	T	S	Imparted technology help to vendors, and educated employees about FMEA, SPC, and TPM.
		PL	T	S	Motivated employees by awards and recognition for increasing productivity.
		PL	T	S	New strategies like free check up of vehicle, customer awareness program for preventive maintenance.
		SM	T	S	Developed on-the-line link between vendors, MUL and SMC for suggestions of cost saving in the components.
	Compulsion of new emission norms in India.	TC	K	F	Technology upgradation from 2valve/ 1 camshaft to 4valves/1camshaft design
		SM	T	F	Started on-line connectivity between the factory and vendors for JIT.
		SM	T	F	Development and marketing of Maruti Genuine Accessories and Spares.
		ST	K	F	Reduced number of layers of employees to achieve a lean structure.
		SM	T	F	Making use of effective advertisements to change the perception of customers.
		CC	T	S	Strengthening of performance management and development of systems.
2000	Shrinking profit margins, reduced market share, and stiff competition from other manufacturers.	TC	K	F	Technology upgradation from 2valve/ 1 camshaft to 4valves/1camshaft design
		SM	T	F	Started on-line connectivity between the factory and vendors for JIT.
		SM	T	F	Development and marketing of Maruti Genuine Accessories and Spares.
		ST	K	F	Reduced number of layers of employees to achieve a lean structure.
		SM	T	F	Making use of effective advertisements to change the perception of customers.
		CC	T	S	Strengthening of performance management and development of systems.
2001	Reduced profit margins in small car segments.	TC	K	S	Introduction of new models in midsize and luxury range.
		TC	K	S	Localization of CR steel
		TC	K	S	Developed new technology using alternative fuels like CNG, LPG and diesel.
		TC	K	F	Improved production processes to decrease inhouse warranty costs per vehicle
		TC	K	F	Automated inspection for eliminating human errors.

		SM	K	F	Started e-buying for competitive pricing.
	Excess manpower and large recurring expenditure.	ST	T	F	Reduced manpower (19%) by offering Voluntary retirement scheme.
	Huge net losses, decreasing market share, and tight profit margins.	SM	T	F	Took new initiatives like Maruti finance, pre-owned cars and N2N fleet management.
	Large inventory level in the company.	SM	T	F	Started vendor rating system for timely supply of material without overstocks & delays.
		SM	K	F	Consolidation of steel and aluminum requirement of various vendors, and getting price negotiations thro' e-business.
	Low productivity levels.	SM	K	S	Enhancement of OEE through efficiency of machines and equipments.
	Inadequate discipline among operators in the plant.	CC	T	F	Obtained an undertaking from employees for discipline and good conduct.
		SM	T	F	Checking absenteeism and absence from working area through card punching system.
		PL	T	F	Changing the designation of operator to 'Operating Engineer'.
2002	Low inventory turnover ratio.	SM	T	F	Reduction of inventory through improvement in the supply chain management.
	Large idle time and unnecessary manpower movements on shop floor.	PL	T	S	Use of Industrial Engineering techniques to eliminate idle time and undesired movements of the operators.

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture, K: Kludging, T: Tinkering, F: Fast, S: Slow)

Table 5.2 depicts three phases of change at MUL. First phase has been depicting "stable market". During this phase, there was no major threat to the company from any competition. After 1998, with the liberalization of economy and globalization of market, many multi-national companies entered in Indian automobile sector and captured some market share. As a result, market share of MUL suffered a great deal. This phase has been labeled as "tough market". During third phase i.e. "turbulent market", profit margins of MUL were drastically reduced along with market share.

In the first phase, the company made small changes through tinkering. There was practically no competition. No additional investment was made on major resources. The company made some planned changes resulting in new models with aesthetics and ergonomic changes. 'Systems' was the driver of change in this phase for sustaining in practically stable and growing market. In the second phase, other manufacturers gave a competition to MUL and its market share reduced. The company avoided any big investment to manage the situation. To continue with its leadership in the market, 'structure' was chosen as the driver of change. Changes were made to reduce recurring

expenditure. There was reduction in the number of employees, layers, shifting of manufacture of more parts to vendors so as to reduce further investment and improvements in service network. The third phase is depicting “emergent phase” when the market share, and profits margins reduced substantially. The market turned into a customers’ market. In order to remain competitive, the company spent huge money to introduce new technology and make it available to the customer at affordable price. In this phase, ‘technology’ as a driver of change has helped the company in getting success.

Table 5.2
Areas of change considered during change process at MUL

S No	Year	Areas of change	Phases	Change Strategies	Driver of change
1	1983	PL	<i>Stable market conditions, monopolist market, practically no competitor, large profit margin.</i>	a. Planned change based on long-term basis b. Using tinkering c. Avoid major investments	Systems
2	1984	SM-ST-SM-CC			
3	1985	TC			
4	1986	TC-SM			
5	1987	TC			
6	1988	ST-ST-SM-SM-SM-CC-SM			
7	1993	TC-CC-SM			
8	1994	TC			
9	1995	TC-SM			
10	1998	TC-CC			
11	1999	TC-SM-SM-TC-SM-PL-SM	<i>Tough market competition, rising material price, reduction in market share.</i>	a. Need based change b. Using tinkering c. Making small expenditure for required changes.	Structure
12	2000	SM-SM-ST-SM-CC			
13	2001	TC-TC-TC-TC-TC-SM-ST-SM-SM-SM-SM-CC-SM-PL	<i>Turbulent market conditions, Reduction in profit margin, Customer’s market.</i>	a. Emergent change b. Using kludging c. Large investment on additional resources	Technology
14	2002	SM-PL			

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture)

5.2.4 SWOT (Strength, Weakness, Opportunity, Threat) Analysis at MUL

Table 5.3 shows the SWOT analysis at MUL.

Table 5.3
SWOT Analysis at MUL

<i>Strengths</i>	<i>Weaknesses</i>
• Full technological support from SMC • Japanese philosophy of manufacturing • International reputation of SMC and global sales avenues for the vehicles • Wide range of cars to satisfy various segments of customers • In house R & D center for validating the designs and developments in Indian context • Support of Government of India through its stake (46%) in the company • Committed manpower and spirit of teamwork • High level of flexibility in manpower, products and processes • High level of commitment from top management • Large distribution and service network • Strong relationship with customers • Positive customers' feedback about performance and durability of various models	• Mainly two partners in the business creating strategic problems • Some costly imported component of the vehicles • Indian road conditions not favorable in rural areas • Rules and regulations related to tax structure not favorable • A big unorganized sector producing non-genuine spares parts for Maruti vehicles
<i>Opportunities</i>	<i>Threats</i>
• Rising demand of personal vehicles in India • Increasing standard of living of the middle class families • Availability of risk taking vendors, suppliers, dealers and service centers • Exports avenues in the neighboring countries • Developing new vehicles using alternative fuel such as CNG, LPG, etc. • Potential business by "True Value" program dealing with preowned cars • Growing need of fleets for corporate houses through N2N fleet management program • New avenues with Maruti finance and Maruti insurance • Wide business opportunity through Maruti Genuine Spares and Maruti Genuine Accessories	• Growing competition in the market after entry of many MNC in car industry • Reducing profit margins due to increased competition • Accumulation of inventory as a result of market conditions, transport and others • Increasing prices of petrol at international level and also reducing petrol reserves in the world • Dominance of SMC as a result of majority stake with them

5.2.5 SAP-LAP (Situation, Actor, Process – Learning, Action, Performance) Analysis at MUL

Table 5.4 shows the SAP analysis of MUL while LAP synthesis is described.

Table 5.4
SAP analysis at MUL

<i>Situation</i>	<i>Process</i>
- MUL obtained its technology from Suzuki Motors Company (SMC) of Japan. - The company is manufacturing a large variety of cars and utility vehicles to suit various segments of the society. - Many MNCs have entered in the Indian automobile market manufacturing vehicles employing advanced technology. - Manufacturers are offering various models/variants at competitive prices. - MUL noticed a continuous decrease in its market share after 1998. - There was a decrease in profit margins and dividends after 1998. - Total demand of cars in the market has increased. - Production capacity of the company has increased over the years. - Increase in purchasing power of people and availability of soft loans has made the cars within easy reach of people. - MUL has upgraded its engine technology by introducing MPFI system in compliance to emission norms (EURO I and EURO II). - MUL has gone in for structural changes like restricted employment, voluntary retirement scheme, and delayering. - MUL has been striving for full indigenization of its vehicles. - Involvement of people in management decision-making has increased in the past years. - Government of India is taking steps to uplift the industrial growth by new economic policies. - Govt. of India has ceased to be the operational head of MUL as the share of SMC in MUL increased to 54% in 2002.	Technological aspects - Optimal use of local manufacturing facilities, skill and raw material through a strong base of vendors - Reducing the product development time through local research and development facilities - Getting technology upgradation by addition of automation, mechanization and robotics - Increasing indigenization of vehicles for substitution of imported components - Introducing new features in the vehicles as and when required - Developing new engine technology (MPFI) to meet Euro I/II norms Systemic aspects - Categorization of vendors as tier-1, tier-2 and tier-3 for vendor consolidation - Direct dealing of MUL with tier-1 vendor to promote supply from single source - Getting a yearly price reduction of 5-10% on large quantity orders with single vendor - Encouraging vendors to offer suggestions for technological improvements and price reduction of the components - Reducing inventory levels through J-I-T - Shortening of procurement time from the vendors through on-line link - Getting supply from the vendors in the assembly area directly - Strengthening quality standards by accreditation to ISO 9001:2000, ISO 14001, QS 9000 and TS 16949 - Increased and more effective advertisements - Making available Maruti Genuine Spares (MGS) and Maruti Genuine Accessories (MGA) for customer delight - Providing fleet management to business houses through N2N fleet management - Financing the vehicles to the customers with minimum formalities

Contd.....

<i>Actors</i>	<i>Process</i>
• Chairman, Board of Directors as the key policy maker • Managing Director to manage day-to-day operational affairs and a change agent at MUL • Participation of all the employees in organizational goals and objectives by Kaizen teams and suggestion scheme • Vendors to MUL for their suggestions and participation in cost saving and other improvements • All the customers for their feedback and suggestions	Structural aspects • Introducing flat organizational structure to add to the transparency, belongingness and quick decisions • Reducing number of employees through voluntary retirement scheme • Reducing number of layers in the organization • Developing service network all over India through Maruti authorized service stations People and culture • Education and training to employees for accomplishment of organizational objectives • Involving all employees in decision making through suggestions scheme • Motivating people through rewards and recognition • Cost reduction by reducing waste, minimizing down time and increasing OEE • Enlarging the customer base by selling preowned cars after proper reconditioning • Giving more participation to the employees by effective implementation of TPM and TQM programmes

Learning Issues

Based on the detailed study and analysis of the initiatives taken by MUL to fight competition, survive in the era of globalization and continue to make profits, following learning issues have emerged.

- ***Growing Competition:*** Globalization and liberalization has resulted in an alarmingly high degree of competition, which has demanded the organizations to be managed with utmost professionalism. Any company not adopting systematic and effective change process may face decline in its market share and ultimately land into a difficult situation.
 - For an organization, which has been facing reduction in market share and profit margins because of competition with new manufacturers equipped with new/better technology, immediate upgradation of the technology is a must.
 - The case of MUL has amply demonstrated that when it came to an intense fight with the competitors, it was mainly systemic changes, which took the company out of the blue. These were of course backed by technological and structural changes.

- For a company, which is already a leader and possesses a reasonably good culture, technology, systems and structure, more improvements can take place through tinkering of systems already in place.
- **Cost cutting:** The era has been over when the prices used to be solely determined by the manufacturers by compiling all costs and adding handsome profit margin to it. Now the prices are determined in the market by the customers. For this, every organization has to adopt cost cutting in a big way to control selling prices. In this regard:
 - It is seen that there has been a lot of scope for cost cutting through strategies like reducing number of suppliers and giving large volume of orders to them, improving supply chain management, reducing inventory, reducing waste and scrap, increasing productivity, increasing automation, reducing manpower, and using better technology.
 - For effective cost cutting, an appropriate mix and sequence of changes related to major areas like technology, systems, structure, people and culture have been adopted for both: long term and short term gains.
 - Cost cutting cannot be achieved solely by treating it as a strategy to put pressure on employees. Rather as demonstrated by MUL, cost cutting can be achieved by the use of better technology, systemic changes and improving other areas as well. Structural changes, alone aimed at delayering or lean management cannot achieve cost cutting.
- **Customer Focus:** Customer focus is very important especially in tight situations. MUL, in the period of intense competition has not buckled under pressure, rather it has faced competition by giving more features, reducing prices, giving finance facility and others. Making the customer aware about these initiatives and the dealers network (along with dealers education, training etc.), are some of the strategies adopted by MUL, which have prevented the manufacturers of other technologically advanced vehicles to grab a large share of the market.
 - After sales service, availability of spares and the excellent dealers network assuring quality service even in remote areas, and the customers' faith in all these

have been among the major factors of organizational competitiveness. MUL has used these aspects very well.

- **Strategy adopted:** If change has to be successful, it will not only come by measures listed above. Rather it requires their strict enforcement, a disciplined approach, total commitment and involvement.
 - Advertisements in all medias using prominent personalities and film stars have been having a great effect on the masses and their perception about the company. Highlighting the strengths of the organization in these advertisements has helped MUL, a great deal.
 - To give a fight to the new entrants in the market, it has been very important to go all the way with measures even with temporary losses and borrowings so that they are not able to establish.
 - Employees in the organization do resist some of the initiatives on change but proper education, training, expert demonstrations, strict following of rules and regulations, and other such measures have been able to considerably subside such reactions and have achieved a great deal of employee involvement.
- **Pace of change:** For a successful change process, big change (kludging) must be spaced and intercepted by many small changes (tinkering) to provide a dynamic stability to the company during the change process.
- **Relationship with other areas of change:** Structural changes should be carried out with a very clear objective and after a lot of planning. VRS, down sizing and other means mainly aimed at reducing manpower may not help. MUL did go in for one round of VRS but the main structural change made by them has been creation of vendors network for some components and assemblies which were earlier manufactured by the company itself. This was backed by matching changes in systems and other areas and has really proved successful.

Action

The change initiatives taken up by MUL depict their successful fight against competition. The reduction of the market share was inevitable. But still MUL has been a market leader and selling more cars than all other manufacturers taken together. If this preminent position is to be maintained, MUL has to continue the change process. Like the famous

PDCA cycle, they should plan new change initiatives and implement them, check their results and act again. All the initiatives taken by MUL have been quite effective, and must be continued. These actions must be backed up by strong and frequent technological changes and innovations. Costs must be reduced further. For that, technological and systemic changes at vendors end are a must. The company must try to continue with its strategy of having fewer vendors who have the state of the art processes, equipment, system and other factors. MUL must provide assistance to vendors in this regard. Cost cutting must be achieved by better use of resources, rather than by unmindful laying off the employees which might create problems.

Performance

Major factors of competitiveness that need to be closely monitored in order of importance for assessing the implementation of change management in this case are: customers' reaction and response, profitability, turnover, market share, competitors, price competitiveness

5.3 Case Study – II (Yamaha Motors India Limited)

M/S Yamaha Motors India Limited, manufacturers of motorcycles is situated at Faridabad, near Delhi. The organization was earlier known as M/S Escorts Yamaha Ltd Faridabad, a joint venture of M/s Escorts India Limited and M/S Yamaha Motors Company of Japan (YMI). In 2001, it became a subsidiary of Yamaha Motors Company (YMC) of Japan.

5.3.1 About the Company

The company came into being in the year 1964 as M/S Escorts Motors India Limited. In the year 1985, a technical agreement between Escorts Motors and Yamaha Motors Company of Japan (YMC) was signed for technology transfer for motorcycle manufacturing. In November 1995, a joint venture 'Escorts Yamaha Motor Limited' was established based on a 50:50 partnership. In June 2000, the equity increased to 74% for YMC and share of Escorts Limited reduced to 26%, and eventually YMC assumed the managerial control of the company. Later, in 2001, YMC acquired the stake held by Escorts Limited, and was renamed as Yamaha Motor Escorts Ltd. (YMEL). The name of the company was subsequently changed to Yamaha Motor India Private Limited (YMI).

Various models of the motorcycles like Rajdoot, RXZ, RX135 and Crux are manufactured at Faridabad plant. Another plant was set up at Surajpur in 1985, at a distance of 45km from Faridabad. Models like Libero, Enticer, Crux/ Crux-R, YBX and RX 100 are manufactured in this plant.

5.3.2 Need of Change

Escorts Motors India Limited started manufacturing motorcycles in 1972 in technical collaboration with CEKOP, Poland under brand “GTS”. During that time, trend of market was towards scooters. Because of not so good looks and less mileage, ‘GTS’ could not do well in the market. After research and development, in 1978 Escorts introduced another motorcycle under ‘Rajdoot’ brand, which was a big success. In 1979, the company signed a technical collaboration with Yamaha Motors Company of Japan for manufacturing 350cc motorcycles. During this year, another manufacturer started manufacturing of 100cc motorcycles in India. Escorts Yamaha Ltd. also setup another plant at Surajpur in 1985 for the manufacture of 100 cc mobikes.

In 1988, with the new Indian motor vehicle act, features related to safety and emissions were made mandatory in all the vehicles. To remain in competition, the modified Rajdoot model was launched. Later in 1997, a new model ‘Yamaha RXZ’ was launched which captured a substantial part of the market in comparison to other brands. In 2000, new models like Libero, Enticer were introduced which have been doing well in the market. The company has been making losses for the last many years and the loss accumulated to Rs 156.80 crores in 2000-2001. After complete Japanese takeover in 2001, the company has realized the need of introducing new features in the mobikes, and to enhance market share through national and international marketing strategies. Appendix B2 shows some of the performance parameters of YMI over the years. Performance of the company and trends in various performance parameters over the last five years are briefly described below.

Market Share: Figure 5.9 shows the of market share of YMI from the year 1996 to 2002. This is found that the market share of YMI in motorcycles market decreased continuously. Because of old two-stroke technology and higher price as compared to other brands, there has been a reduction in market share of YMI. On the other hand, demand of the motorcycles has increased in the market. Realizing the need of the

customers, YMI developed a 125cc motorcycle in the year 1999, which got a good market response in the market and the market share increased to 14% in the year 2000 as compared to 13.2% in 1999. During 2001, after complete takeover by Yamaha, the new management changed the marketing strategies, and discontinued some old models. As a result of these policies, the market share came down to 8.2% in 2001 and 6.1% in 2002.

Vehicles Manufactured per Employee: The average number of motorcycles manufactured per employee from the year 1996 to 2002 is observed to have increased during the last few years (Figure 5.10). On the other hand, the market share of the company is found to reduce continuously. To increase productivity, the company introduced VRS. As a result, average number of vehicles produced per employee increased from 78.6 in the year 1999 to 128.3 in the year 2000. After complete takeover by Yamaha, however the parameter decreased to 104.1 in the year 2001, and 103.6 in the year 2002.

Profit/ loss Accumulated per Employee: The company has been making losses since 1998. Losses kept on increasing till the year 2001. However, a reduction in losses has been witnessed in the year 2002 (Figure 5.11). In the year 2000, the company made a major investment for developing a new technology motorcycle, replacing 2-stroke technology with 4-stroke technology. With low rate of returns on the investment, the company accumulated huge losses. Losses accumulated per employee rose to Rs. 7.03 lakhs in the year 2000 as compared to Rs. 1.08 lakhs in 1999. The losses per employee further increased to Rs. 8.85 lakhs in the year 2001 due to more expenditure on plant modernization, payment of employees opting for VRS, and accumulation of huge inventory of finished motorcycles. With new 100cc mobikes, better materials management, exports, and reduction of inventory levels, the losses were reduced to Rs. 2.54 lakhs per employee in the year 2002.

Profit/ loss Accumulated per Vehicle: Figure 5.12 shows the trends of accumulation of loss per vehicle from 1998 to 2002. This is shown that due to large overheads and high manufacturing cost, the loss per motorcycle increased continuously till 2001. However, a reduction in accumulated losses was observed in 2002. Losses per motorcycle had accumulated to 0.013 lakh in the year 1999, 0.054 lakh in 2000 and 0.087 lakh in 2001. Through manufacturing of new 100cc mobikes, effective advertising, widening of

dealers' and service networks, and controlling the sales price, the losses per motorcycle reduced to 0.024 lakh.

Inventory Turnover Ratio: Inventory turnover ratio remained almost stagnant till the year 1999. With reduction in sales due to competition, the sales of the company dipped in 1999-2000 and the inventory turnover ratio registered a decline. In 1999-2000, labour unrest for 70 days resulted in accumulation of inventory of raw material. The inventory turnover ratio reduced to 2.762 from 7.463 in the previous year (Figure 5.13). Later on, by re-engineering, the company regulated the supply of raw material and spares, and inventory turnover ratio increased to 6.25 in the year 2001 and 12.3 in the year 2002.

Profit Turnover Ratio: Profit turnover ratio decreased in the years 1999 and 2000 (Figure 5.14). It however showed an upward trend during 2001 and 2002, but even in these years it remained negative due to net losses. Years 1998 to 2000 were marked by extensive competition and the company's inability to act due to old technology products. Profit turnover ratio declined to -0.005 in the year 1998, -0.036 in 1999 and -0.303 in 2000. However, profit turnover ratio improved to -0.194 in 2001 and -0.038 in 2002. The uptrend registered during the year 2001 and 2002 is due to development and manufacture of 4-stroke 100cc mobikes.

Man-hours Required per Vehicle: Figure 5.15 depicts a continuous reduction in man-hours employed per vehicle. This is due to the efforts of the company to improve manpower productivity. This has been achieved by making modifications in the process sequence and layout, addition of new plant facilities, reduction in losses and improvement in productivity. As a result of these, man-hours required per motorcycle has reduced from 25.34 hours in the year 1997 to 23.11 hours in 1998, 22.81 hours in 1999, 21.65 hours in 2000 and 19.98 in 2001. However, a slight increase has been observed in the man-hours required per motorcycle in the year 2002.

Scrap Level per Vehicle: Figure 5.16 indicates that scrap level per vehicle has continuously come down every year from 88.2 in the year 1997 to 82.8 in 1998, 68.5 in 1999, 27.5 in 2000, 16.7 in 2001 and 14.5 in 2002. This is an indication of the efforts made by the company to reduce wastage and become competitive.



Figure 5.9: Trends of market share for YMI

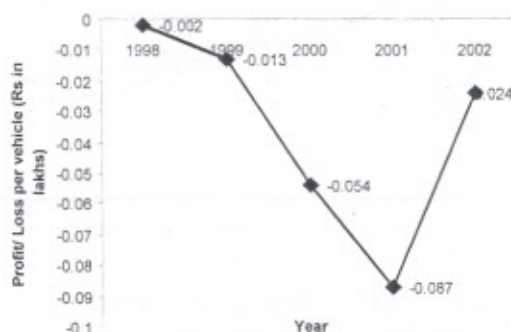


Figure 5.12: Trends of loss accumulated per vehicle for YMI

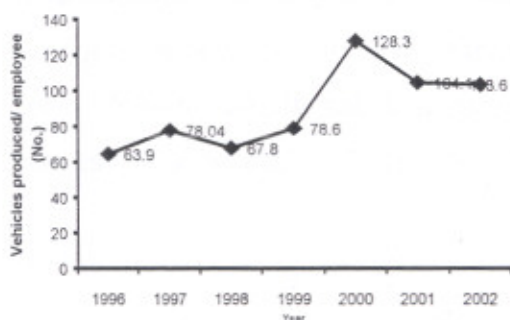


Figure 5.10: Trends of vehicles manufactured per employee for YMI

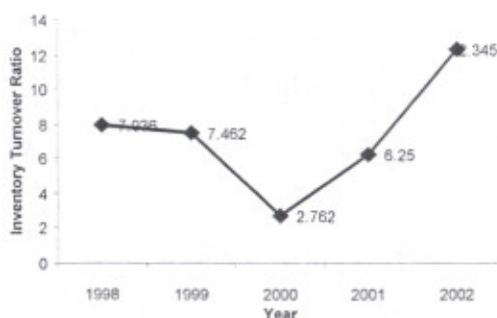


Figure 5.13: Trends of inventory turnover ratio for YMI

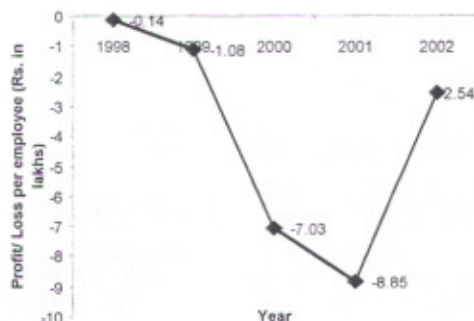


Figure 5.11: Trends of loss accumulated per employee for YMI

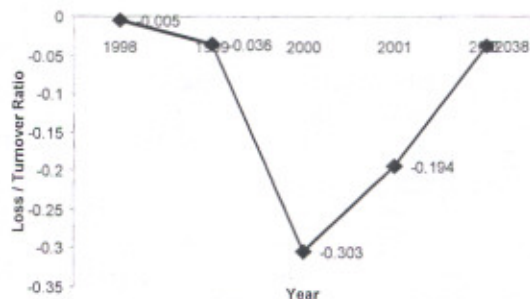


Figure 5.14: Trends of profit turnover ratio for YMI

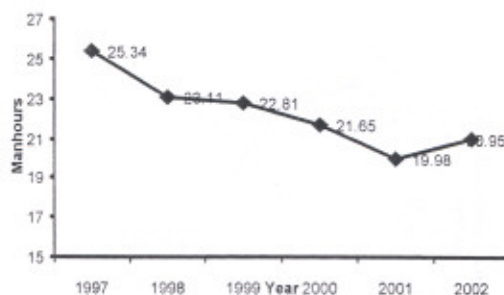


Figure 5.15: Trends of manhours required per vehicle for YMI

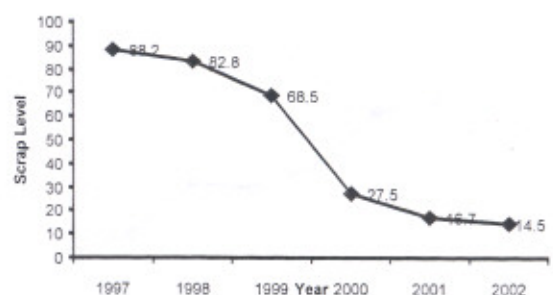


Figure 5.16: Trends of scrap level for YMI

From the above discussion of trends of various parameters, which are indicators of company's performance, it can be said that the company faced a very stiff competition from the new manufacturers in the market. It made losses because of old technology employed and old work practices in vogue. It made efforts to improve by developing and acquiring new technology and also by trying to become more cost efficient through waste reduction and improving manpower productivity. However still the company has not been able to be successful in its efforts.

5.3.3 Change Process at YMI

Table 5.5 represents the details of problems faced by the company, which made them realize the need for change, and the subsequent actions taken by them to bring in the desired change.

Table 5.5
Change Process at YMI

Year	Need of change	Area	T / K	S / F	Action taken
1965	Establishment of Escorts India Limited.				Started production.
1965	Preference for scooter in the market.	TC	K	F	Designed and developed a scooter.
1972	Market demand for cargo cum personal two wheelers.	TC	T	S	Development of GTS motorcycle with higher HP.
1979	Market demand of a motorcycle with large cargo capacity.	TC	K	F	Made technical collaboration with Yamaha Motors Company of Japan for 350cc motorcycles.
1983	Quality of components not up-to-the mark.	TC	K	F	Setup of CNC cell in the organization to improve quality level.
	Demand of fuel-efficient motorcycles.	TC	T	S	Development of 175cc Super-D Rajdoot model.
1985	Entry of new motorcycle manufacturers in 100cc range.	ST	K	F	Establishment of another plant at Surajpur for manufacturing 100cc motorcycle.

1986	Lack of motivation of the employees.	SM	T	S	Implemented incentive scheme to improve morale of workers.
1989	Amendments in vehicles required as per Motor Vehicle Act 1988	TC	T	S	Introduction of indicators in the existing Rajdoot brand.
1990		TC	T	S	Up gradation of existing model by improving front forks by using Excel-T in place of telescopic front forks.
1990	Realization of low productivity due to excess staff.	ST	T	S	Introduced VRS to reduce manpower and increase productivity.
1993	Growing demand of fuel-efficient vehicle.	TC	T	S	Introduction of new Electronic ignition system in Rajdoot model for higher fuel efficiency.
1995	Enforcement of stringent emission norms by Supreme court of India.	TC	K	F	Investment on research and development to develop new 4-Stroke technology.
1996	Recognition of global avenues after globalization and liberalization.	SM	K	F	Accredited to ISO9001.
1997	Tough competition from other manufacturers.	TC	T	S	Launched Yamaha RXZ and 175cc Escorts ACE.
1998	Growing competition in 100cc range of motorcycles.	TC	T	S	Developed new model YBX with 4-stroke technology.
	High manufacturing cost and accumulating losses due to reduced market share.	SM	T	S	Initiatives taken for scrap reduction by process control and use of statistical control charts for quality assurance.
		TC	T	S	Replacing metals by alloys/ plastics for weight reduction, aesthetics and economy.
1999	Growing competition in 4-stroke motorcycles compliant to emission norms.	TC	T	S	Launch of YD125 4-stroke vehicle.
	Unfavourable incentive policy, labor unrest for 70 days over incentive issue.	SM	T	S	New job design for workers with zero incentive policy.
	Realization of excess staff and resultant less productivity, lack of market responsiveness.	ST	T	S	Manpower reduction through VRS program.
2000		TC	K	F	Implementation of Business Process Reengineering program.
2001	Reduced level of synergy between various plants.	PL	T	S	Renaming YMEL as YMI for exploring the global market.
	High manufacturing costs.	CC	T	S	Cost cutting through reduction in wastage and down time.
		SM	K	F	Improving overall equipment effectiveness (OEE).
2002	Reduced market share and accumulating losses.	SM	T	S	Enlarging dealers' network and sales promotion efforts through advertisements.
	Lack of belongingness at all levels.	PL	T	S	Involving people at all levels in meeting organizational objectives and decision making through TPM activity
		CC	T	S	Emphasizing on Kaizen activity to improve plant operations and reduce manufacturing costs.

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture, K: Kludging, T: Tinkering, F: Fast, S: Slow)

To depict the change strategy employed at YMI, all the initiatives have been consolidated in three phases (Table 5.6). First phase indicates 'technology' as the driver of change and goes up to the year 1983. During this phase, the scooters were in demand. The organization developed a fuel-efficient motorcycle 'Rajdoot 175' with large HP. In the second phase that can be called a competitive phase, competition in 100cc motorcycles increased. The company met stiff competition in 100cc class mainly because of high pickup of 2-stroke mobikes. But later because of lack of fuel efficiency and non-compliance to emission norms, the sales dropped. After 1996, competition increased tremendously ushering in, what can be called as turbulent phase for the company. During this period, the control of the plant shifted to Yamaha Motors Limited Japan. New strategies like discontinuation of some old models, pricing, aiming the global market were adopted which did not work to the desired extent and the organization made severe losses. Subsequently, various systemic changes were made like effective job designs, discontinuation of incentives, improving OEE, involving people in achieving goals, and reducing manpower through VRS. The company has launched many new models, and has tried to change the mindset of employees through new practices like TPM and Kaizen. As a result of all these initiatives, indicators like productivity, waste and scrap levels, straight pass ratio etc. have improved, losses have also reduced but market share has continuously gone down. The company has still not able to come out of the blue.

Table 5.6
Areas of change considered during change process at YMI

S No	Year	Area of change	Phases	Change Strategies	Driver of change
1	1965	TC	<i>Stable market conditions, manufacturers' market, dominance of scooter in market, large profit margin, competition of Rajdoot model from Yezdi and Enfield.</i>	• Slow changes on long term basis • Using kludging • Made investment on research and development	Technology
2	1972	TC			
3	1979	TC			
4	1983	TC - TC			
5	1985	ST	<i>Competitive market conditions, growing demand of 100cc motorcycles, rising material prices.</i>	• Need based change on short term basis • Using kludging • Made investment on production facilities.	Technology
6	1986	SM			
7	1989	TC			
8	1990	TC - ST			
9	1993	TC			
10	1995	TC			

Contd.....

11	1996	SM	Turbulent market conditions, reduced profits, accumulating losses, stiff competition cost-cutting, vendor development, customers' market.	- Emergent change - Using tinkering and kludging. - Avoiding major investments to safeguard against future losses.	Systems
12	1997	TC			
13	1998	TC – SM - TC			
14	1999	TC – SM – ST			
15	2000	TC			
16	2001	PL – CC – SM			
17	2002	SM – PL – CC			

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture)

5.3.4 SWOT Analysis at YMI

Table 5.7 shows the SWOT analysis at YMI.

Table 5.7
SWOT Analysis at YMI

<i>Strengths</i>	<i>Weaknesses</i>
- Backing of Yamaha Motor Company of Japan - Wide range of models to satisfy the customers of various classes and age groups - Sufficiently large number of vendors - Commitment from top management in the changed leadership - Well-established export market, being one of the top two-wheeler exporter from India	- Adapting to Indian government rules and regulations related to tax structure - A big unorganized sector producing non-genuine spares parts - Weak work culture on the shop-floor influenced by a workers' union - Old organization with old culture that is very difficult to change
<i>Opportunities</i>	<i>Threats</i>
- Rising demand of personal vehicles in India - Higher living standard of middle class people - A preference of youth for motorcycles over other two-wheelers - Growing exports avenues	- Growing competition in the market - Reducing profit margins - Increasing prices of petrol at international level

5.3.5 SAP-LAP Analysis at YMI

Table 5.8 shows the SAP analysis at YMI while LAP synthesis is described below.

Learning Issues

Yamaha Motors India has made losses since 1998. The losses kept on increasing till the year 2001. In 2002, there has been a slight decline in the losses. In addition the market share of the company has declined over all these years including the year 2002. This company, which had captured a lot of market in the mid and late eighties, has put itself in a very precarious situation, and the whole control has gone to the foreign collaborator. A close analysis of the performance and time-to-time actions taken up by the company brings out the following learning issues:

- Product life cycles:** Product-life cycles have become very small because of changing customer-needs and preferences. Something that is selling very well today,

may not continue for a long time. It is important to identify what the customers would need in the times to come, and also what the competitors are thinking of providing in future. The company seems to have remained complacent because of success of the “Yamaha RX 100” in the initial year. It did not even take adequate measures to modify existing model or launch new models when new models by other manufacturers were entering in the market one after the other.

Table 5.8
SAP Analysis at YMI

<i>Situation</i>	<i>Process</i>
• A 100% subsidiary of Yamaha Motors Company of Japan • Higher demand of motorcycles over scooters and mopeds • Complex product mix • New models are dominated by technology (power and fuel efficiency) and aesthetics • Compliance necessary to stringent emission norms (EURO I and EURO II) • Reduction of manpower has taken place through restricted employment, VRS and delayering • Availability of large number of models/ variants in the market and very stiff competition • Increase in purchasing power of people and availability of soft loans for purchase of motorcycle • Sales and service network for customers are developed	Technological aspects • Making use of local manufacturing facilities and a strong base of vendors • Technology up-gradation by addition of CNC machines, new process plants, automation, mechanization and robotics • Cost-cutting through technological up-gradation, waste reduction, inventory reduction etc. Systemic aspects • Implementing ERP • Shortening of the procurement time from the vendor through on-line link • Strengthening systems and quality by continuous use of ISO-9001 systems • Increasing sales by advertisement and offering easy finance to customers • Increasing productivity through systemic and effective working and process re-engineering Structural aspects • Developing service network of sales outlets and authorized service stations • Achieving flat organization structure for transparency, quick decisions, and seeking belongingness • Resorting to restricted employment for higher manpower productivity People and culture • Continuous education of employees • Involving all the employees in achievement of organizational goals and objectives • Making cost reduction through employees' participation • Involvement and participation of employees in decision-making, particularly regarding employee-related affairs
<i>Actor</i>	
• Executive Director manages day-to-day affairs • Managers and supervisors of the company • Employees for participation to achieve organizational goals and objectives • A sufficiently large network of vendors spread all over India • A large number of sales outlets and service stations • A strong workers' union in the plant	

- ***Pace of change:*** Market is changing very fast and one has to keep pace with the market. The changing-conditions may make a product successful or ruin it. “Yamaha RX 100” was successful primarily because of its pick-up and looks. Another manufacturer of mobikes (Hero-Honda) on the other hand relied on its fuel-efficiency. With the escalating petrol-prices, the decline of RX-100 was a forgone conclusion that, it seems, could not be read in time by the company.
- ***Price competitiveness:*** It has come out as a major learning from this case study that the customer-focus and manufacturing products of high quality at low cost are essential in the market. The competition is so stiff that if one is not giving as many features as given by others or its prices are higher, one cannot compete in the market by relying only on its past glory.
- ***Overstaffing:*** VRS alone does not pay off. The company introduced VRS in the year 1990, coinciding almost with the onset of globalization and liberalization. It is right that the company was overstaffed and there was a culture in which employees were not putting in effective 8-hour work per day, thus under utilizing the plant facilities. But introducing VRS as a strategy for cost cutting did not pay off. VRS should be introduced in an organization when people become redundant as a result of effective measures taken in the areas of technology, systems and culture. Effective cost cutting will come through improving efficiency in all resources rather than offering VRS alone.
- ***Trade unionism:*** For old companies where unions have been very strong in the past, changing as per the needs of present manufacturing scenario is not easy. It would come by applying a very systematic and planned approach. Changing and turning-around a company is more difficult than starting a new venture with a new culture.
- ***Market responsiveness:*** For success in change management, timely actions must be taken. These cannot be postponed. The programmes cannot be delayed because of fear of unionism and others.
- ***Vendor development:*** Vendors on the one hand and dealers on the other hand are the backbone of a company. The company seems to have lacked on this front.

- *Impact of advertisements:* Advertisements of YMI have not been comparable to that of market-leaders (TVS, Hero-Honda, Bajaj etc.), and have also been responsible for the failure of the company.

Action

The change initiatives taken up at YMI depict the fight of the organization against the competition. Manufacturing costs of mobikes need to be reduced to make them comparable with other brands. Technological and systemic changes at vendors' end are a must. The company must develop vendors who have the state of art processes, equipments, systems, and other factors. Cost cutting must be achieved by better use of resources and reducing scrap level. A cost-cut in the parts supplied by the vendors must be achieved learning from the experience of MUL.

Performance

Major factors of competitiveness that need to be closely monitored in order of importance for assessing the implementation of change management in this case are: profitability, price competitiveness, turnover, customers' reaction and response, competitors, market share.

5.4 Case Study – III (Majestic Auto Limited)

M/S Majestic Auto Limited, manufacturer of two wheelers (mopeds), is located at Ludhiana (India). The company was established in 1978 as a Hero Group company. Board of Directors manage the affairs of the company whereas Managing Director looks after routine affairs. The company has diversified to chain-wheels, exercisers, silencers for motorcycles and fine-blanks for car manufacturers.

5.4.1 About the Company

Majestic Auto Ltd (MAL) became operational in the year 1973. The main activity of the company was to produce spokes and nipples for bicycles, and two-wheelers up to 350 c.c. Production of mopeds started in 1978. The main focus of the company has been to capitalize on the demand for two-wheelers in the rural areas. With the drop of demand of mopeds due to changed trend of the market, the company has diversified to exercisers, silencers and fine blanked components for car manufacturers.

5.4.2 Need of Change

The new technology bikes and entry of MNCs in 2-wheeler business resulted in a tough situation for moped manufacturers in India. As a result, MAL felt a dire need to change its products and working styles. Appendix B3 depicts some of the performance parameters of the company. Performance and trends in various indicators over the last few years are described below.

Market Share: Market share of MAL decreased from 19.67% in the year 1998 to 19.07% in 1999 and further to 15.33% in 2000. It showed a slight improvement in 2001 and 2002 as depicted in Figure 5.17. Customers' choice for motorcycles instead of mopeds, rapid technological developments in motorcycles and easy availability of finances are responsible for general decline in the sales of mopeds.

Average Daily Production: Average daily production of mopeds reduced continuously over the years (Figure 5.18). As already pointed out that trend has been towards motorcycles in the Indian market. A slight improvement in the year 2001-02 is due to the launch of a new model "Panther 4S-Super" which has a 4-stroke engine with attractive features like kick start, shock absorbers, long saddle and side indicators. In the year 2002, average daily production showed a marginal improvement at 87 as compared to 85 in the previous year.

Average Number of Vehicles Produced per Employee: Average number of mopeds produced per employee reduced from 20 during the year 1998 to 14 in the year 2001 with a continuous decrease every year (Figure 5.19). To counter this, the company implemented early separation scheme in 2001-2002, thereby reducing the number of employees by 400. This measure helped the company to bring back the parameter to 20 vehicles per employee per year.

Operating Profit per Vehicle: The company has been making losses since the year 1998, barring the year 1999 when it recorded slight profits (Figure 5.20). Declining demand of mopeds, escalating prices and reduced profit-margins are mainly responsible for this state of affairs. The efforts of the company in diversification and development of new vehicles also entailed substantial investment, which may improve the situation in future.

Profit per Employee: Figure 5.21 depicts that the company ran into losses in the year 1998. In 1999, also because of change in the policy for valuation in inventories as per accounting standard (AS2) of the Institute of Chartered Accountants of India to write off of the dead and slow moving stocks, and reduced sales of mopeds, the company recorded a net loss. During 1999-2000, the company incurred heavy expenditure on research and development. Even after launching new model in the year 2001, the sales did not pick up to a level so as to transform the financial status of the company, and the losses continued. During the year 2000-2001, the company reduced the manpower by implementing early separation scheme. Also the company made profits through manufacturing new products like fine blanks, silencers, and exercisers. Due to all these, the losses per employee reduced, but in 2002, it dipped to Rs. 0.109 million.

Inventory Turnover Ratio: After 1998-99, demand of mopeds reduced in Indian automobile market resulting in accumulation of inventory, thus adversely affecting the inventory turnover ratio. The company then revised its material planning. Number of vendors was reduced and preference was given to local vendors. Vendor rating system also helped a lot in getting the supply of material at the scheduled timing. Contact was developed on-line with the vendors for timely dispatch of material. Inventory turnover ratio increased to 14.81 in the year 2000-2001 from 10.8 in 1999-2000 (Figure 5.22). With the adverse circumstances, the inventory turnover ratio dropped to 8.12 in the year 2001-2002

The above discussion depicts that the Indian moped industry is facing a tough time. With the technology revolution in motorcycle industry, availability of easy finance through banks and financial institutions, and growing demand for means of personal transportation, the moped industry has been badly hit. In the wake of diminishing market share, the organization developed new models of mopeds, reduced manpower, reduced investment on inventory, increased transparency, and improved work culture. Further, it diversified to silencer manufacturing, fine blanking and exercisers. In spite of all these efforts, the financial status of the company is still critical. Losses are accumulating continuously which indicates that the company has not been successful in its efforts.

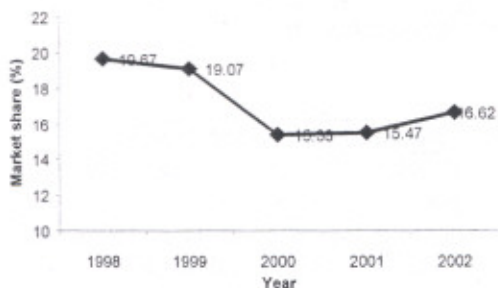


Figure 5.17: Trends of market share at MAL

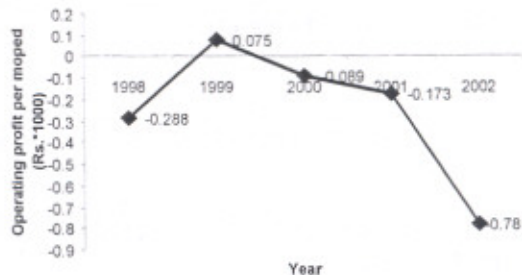


Figure 5.20: Trends of operating profit per moped at MAL

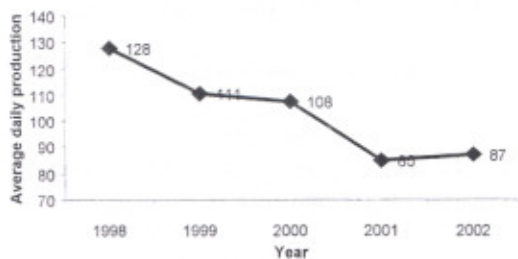


Figure 5.18: Trends of average daily production at MAL

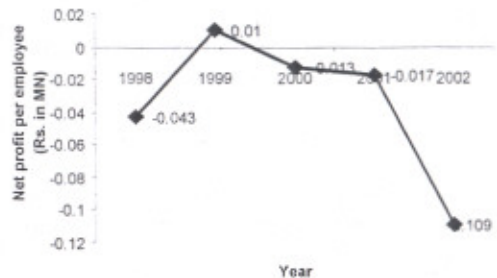


Figure 5.21: Trends of net profit per employee at MAL

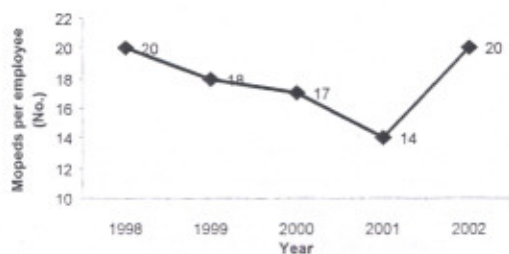


Figure 5.19: Trends of mopeds manufactured per employee at MAL

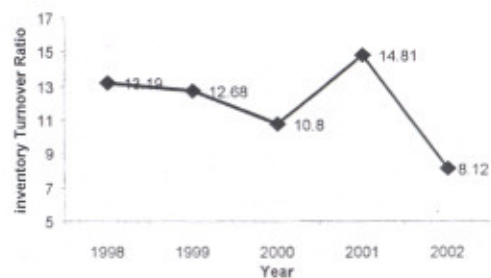


Figure 5.22: Trends of inventory turnover ratio at MAL

5.4.3 Change Process at MAL

Table 5.9 depicts details of the changes made against various reasons of change at MAL.

Table 5.9
Change Process at MAL

Year	Need of change	Area	T / K	S / F	Action taken
1978	Production started at MAL.	TC	T	S	Planned new models of mopeds.
		ST	K	F	Developing dealers' network for penetration in the market.
1981	Unscheduled material supply from vendors.	SM	T	S	Transferring many components to new ancillaries started and owned by Hero group.
1982	Realized deficiency in the capabilities of the company for frame designing.	TC	K	F	Collaboration form M/S DB Design of UK for frame designing.
	Competition from other manufacturers.	TC	T	F	Launch of a new model 'Hero Popular' in 1981
		TC	T	F	Launch of a new model 'Hero MP' in 1982
		TC	T	F	Launch of a new model 'Ankur' in 1983.
1984	Market feedback about performance of earlier models not favorable.	TC	T	S	Launch of two new upgraded models: Popular DX and VIP.
1985		ST	K	F	Start of a new unit "Munjal Showa" owned by Hero group for quality production of shock-absorbers.
1986	Growing competition from other manufacturers.	TC	T	S	Launch of two new models: Hero Pacer and Hero Panther.
1987	Growing demand of mopeds outside India	ST	K	S	Starting of a new unit "Hero Motors" for exports.
		TC	K	F	Made a technical collaboration with Steyr Daimler Puch of Austria for international design.
	Inadequate quality level of die-cast components supplied by the vendors.	ST	K	F	Start of a new unit "Sunbeam Auto" owned by Hero group for high quality die-cast components.
1988	Tough competition amongst moped manufacturers.	TC	T	S	Introduction of new model: Hero Puch in two variants: 50cc and 65cc.
1990	Large scrap rate due to conventional processes.	ST	K	F	Diverted many components to Hero cold rolling division.
1993	Competition from other manufacturers.	TC	T	S	Launch of a new model: Hero Gizmo.
	Trend of the market towards scooters.	TC	K	F	Made collaboration with M/S Malaguti of Italy for scooter design.
1996	Growing competition in mopeds manufacturers.	TC	T	S	Launch of new model: Hero Winner with a choice of 50cc and 75cc engine.
		TC	T	S	Launch of new model: Hero Panther Super 60.
1998	Compliance of stringent emission norms as per EURO I/II standards	TC	K	F	Collaboration with Briggs and Stratton Auto Private Limited to produce 4-stroke moped-engine.

		TC	K	F	Made collaboration with M/S Recardo of UK and Zongshen of China for developing 4-stroke motor- cycle.
		TC	T	S	Development and launch of Stepmatic vehicles in the market
	Realized high electrical losses in the plant	SM	T	S	Installation of energy meters in each shop to check the waste reduction.
	Huge losses due to reduced demand of mopeds.	TC	K	F	Diversification into exercisers manufacturing.
		TC	T	S	Introduction of new model of exerciser: Twistpero.
		TC	K	F	Started new business of fine blanking in technical collaboration with Fientool of Switzerland.
	Trend of market towards motorcycles.	TC	K	S	Launch of new model: Hero Stallion 4S model with the desired technological changes.
	Enforcement of stringent emission norms in all the mopeds.	TC	K	F	Changing the existing mopeds with a catalytic converter to meet the emission norms.
		TC	T	S	Launch of an upgraded version of scooter: EZ10.
	Observed a need to be systematic.	SM	T	S	Accreditation to ISO 9002.
	Growing export avenues.	TC	T	F	Development of 50cc engine mopeds with high power engine for exports.
		TC	T	F	Development of a new model- Shaktiman.
	Large manufacturing costs of the mopeds.	TC	K	S	Adapting tubular design instead of AL design through value engineering.
	A large inventory of the finished mopeds.	SM	T	S	Rescheduled the production target of mopeds.
	Huge accumulating losses.	TC	T	F	Started manufacturing of exercisers.
	Realized less cohesion among the employees.	ST	K	S	Formation of Departmental Improvement Committees (DIC) for organizational improvement.
	Large resistance offered by the employees due to rigid mental set.	PL	T	S	Increase of transparency, openness through flat structure, and commitment by CEO (MD).
2001	Compulsion of accreditation of QS9000 for exports.	SM	K	F	Accreditation to QS9000.
	Accumulating losses due to reduced market share.	TC	K	F	Started with a silencer project for another group company.
	Requirement of safety features as per Motor vehicle Act 1988.	TC	T	F	Amending existing "Puch" model with new headlights, taillight and blinkers.
	Large manufacturing costs of mopeds.	TC	K	S	Development of low cost catalytic converter in technical collaboration with IDEA Italy.
	Large design and development time.	TC	K	S	Use of PRO-E for design and development.
	Lack of flexibility in the manpower.	PL	T	S	Starting yearly plan for the training of workers and executives/ supervisors.
	Reduced teamwork culture.	SM	T	S	Adapting goal-monitoring system to increase accountability of the individuals.
	Large overheads and accumulating losses.	SM	T	S	Diverting works like security, cleaning, mason work on contract.

2002	Large blocked investment on inventory.	SM	K	S	Adopting vendor rating system for scheduled delivery of the components.
	Market trend towards motorcycles	TC	K	F	Launch of a new model: Hero Panther 4S Super with the shape and features of a motorcycle
	Increased demand of mopeds in foreign countries.	TC	T	S	Launch of new models: Power XL and GXL introduced.
		TC	T	S	Development of 55cc high power moped especially for export purposes.
	Low morale of workers and lack of belongingness at lower levels	CC	T	S	Starting publication of annual report in English and Punjabi for transparency.
	Huge accumulating losses.	TC	K	S	Diversification into exerciser manufacturing.
		TC	T	S	Launch of three new models of exercisers
		ST	T	F	Offloading 400 employees through an early separation scheme.
		CC	T	S	Training for self-supervision and autonomous-maintenance at lower levels.
	Large manufacturing costs.	SM	T	S	Starting of waste reduction, cost cutting and productivity improvement for survival through cost-competitiveness.
		SM	T	S	Starting of new incentive system taking monthly efficiency of individuals into account.

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture, K: Kludging, T: Tinkering, F: Fast, S: Slow)

Table 5.10 depicts three phases of change at MAL. First phase depicts stable market conditions till demand of mopeds in the market was increasing. The company chose technology as the major driver of change and introduced numerous new models for offering more choice to the customers. In the second phase, which may be called as competitive phase, moped industry got a major setback from motorcycle industry. The company developed numerous technology-advanced models of mopeds but the demand of mopeds observed a continuous downfall. The company took systemic measures like reducing inventory level, waste reduction, conservation of energy, more customer orientation, accreditation to QS9000, etc. MAL also made a major investment to develop a new scooter but did not succeed. During third phase, the market conditions became turbulent. Market share of mopeds slid down further and the company registered a huge loss. The company made emergent changes choosing systems as the driver of change. The company made efforts to reduce the manufacturing cost and consolidated the vendors through vendor rating system. With the objective of reduction in productivity, the company reduced manpower by 400 through early separation scheme. With the unchanged market trend, the company planned to manufacture other products like silencers, and fine blanks for other automobile manufacturers. Realizing the threat to its

survival, the company started the production of exercisers in addition to mopeds for its future growth. From the performance-indicators, it is concluded that inspite of all these efforts, the company has not been successful and losses have been accumulating continuously.

Table 5.10
Areas of change considered during change process at MAL

S. No	Year	Area of change	Phases	Change Strategies	Driver(s) of change
1	1978	TC – ST	<i>Stable market</i> , growing demand of mopeds in the market, Competition from other manufacturers not very tough.	- Planned change on long-term basis. - Adapting tinkering. - Investment on R&D and technology developments - Large number of new models	Technology
2	1981	SM			
3	1982	TC-TC-TC-TC			
4	1984	TC			
5	1985	ST			
6	1986	TC			
7	1987	ST-TC-ST			
8	1988	TC			
9	1990	ST			
10	1993	TC-TC	<i>Competitive market</i> , down trend of mopeds in the market, increasing trend of motorcycles, offering new models with new technology to attract the customers, reduced profit margins, accumulation of losses.	- Made changes based on need. - Adapting tinkering and kludging. - Huge expenditure made on technological developments.	Technology and Systems
11	1996	TC-TC			
12	1998	TC-TC-TC-SM-TC-TC-TC-TC-TC-TC-SM-TC-TC-TC-SM-TC-ST-PL	<i>Emergent conditions</i> , reduction in market share, downtrend of demand of mopeds, huge accumulated losses, diversification to other products.	- Made emergent changes - Adapting tinkering and kludging. - Avoiding any major investments.	Structure and Systems
13	2001	SM-TC-TC-TC-TC-PL-SM-SM			
14	2002	SM-TC-TC-TC-CC-TC-TC-ST-CC-SM-SM			

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture)

5.4.4 SWOT Analysis at MAL

Table 5.11 shows the SWOT analysis at MAL.

Table 5.11
SWOT Analysis at MAL

<i>Strengths</i>	<i>Weaknesses</i>
• Backing of Rs 7000crore Hero group • High level of product and process flexibility • Large network of vendors • High level of commitment from top management • Well-established export market through Hero group • Capability of diversification into exercisers, fine blanking and silencers	• Downtrend of the moped industry • Reducing profit margins because of large overheads and rising costs of raw materials
<i>Opportunities</i>	<i>Threats</i>
• Rising demand of personal vehicles in India • Exports avenues in the neighboring countries • Escalating petrol prices demanding fuel-efficient vehicles	• Accumulation of inventory as a result of market conditions • Chinese threat of very low priced vehicles • Indian road conditions not favorable for mopeds especially in rural areas • Adapting to Indian government rules and regulations related to tax structure

5.4.5 SAP-LAP Analysis at MAL

Table 5.12 shows the SAP analysis at YMI while LAP synthesis is described afterwards.

Table 5.12
SAP Analysis at MAL

<i>Situation</i>	<i>Processes</i>
• Trend of market towards motorcycles • Accumulation of losses • Financial help through Hero group of industries • Excise policies by government of India not favorable to moped industry • Diversification in other products like exercisers, fine blanking and silencers • Easy availability of soft loans from banks and financial institutions • Higher standard of living in the middle class families • Need of personal mode of conveyance by people of all segments • Escalating petrol prices	Technological issues • Technological collaboration for design of new scooter • Reducing overheads and reducing wastage by improving manufacturing processes Structural issues • Reduction of manpower through early separation scheme • Developing ancillary-network through Hero Group of Industries • Formation of departmental committees for the purpose of innovations and encouraging teamwork spirit • Reduction in the number of vendors for the manufacturing of mopeds Contd.....

<i>Actors</i>	<i>Processes</i>
• Managing Director manages day-to-day affairs • Employees of the company • A large number of ancillaries under Hero group of companies	Systemic issues • Reduced inventory level • Implementing QS9000 quality systems • Increased accountability of individuals by “Goal monitoring system” • Revision in the systems of daily production planning through morning-meetings and review of daily production targets • Cost cutting by reducing unwanted manpower, lowering inventory level, and optimizing the available resources People and Culture • Education and training to employees for meeting organizational objectives, and goals • Increased transparency in the organization • Involving people at all levels in planning to achieve increased sense of belongingness

Learning Issues

Based on the analysis of the needs of change and initiatives taken at MAL, following learning issues have emerged.

- **Network of suppliers:** A network of ancillaries has been found helpful for the competitiveness of an automotive-manufacturing organization. Recognizing the potential of mopeds in Indian market, Hero Group of Companies decided to establish ancillaries for MAL. Because of the network of ancillaries owned by the parent group, the company developed close contacts with them. The case study of MAL has brought out a major learning that sister-concerns help a major company especially in growing stages. MAL earned a reasonably good profit margin due to scheduled deliveries and less manufacturing costs till the demand of mopeds was increasing.
- **Market conditions:** Strategies of a company should be planned taking trends of market into consideration. With the entry of 100cc mobikes in Indian market, trend shifted to mobikes. Higher mileage, better pick-up, international style and colors, availability of soft loans and need of personal transportation by individuals affected the plight of the moped industry. The company made efforts for technological changes and developed new models but kept the basic shape unchanged. The new

model could not be successful in competition with the motorcycles and scooterette (a scooter-version of mopeds developed by other manufacturers).

- **Product life cycles:** Product life cycle has become very short in the wake of changing customer needs and preferences. The market is also changing very fast and one has to keep pace with it. It is learnt that the customer focus and high quality with cost cutting are essential for competitiveness of an organization. In the era of globalization and liberalization, success of a company depends upon competitive prices, features, styles, colors and reputation of the company.
- **Productivity enhancement:** Structural change for the sake of cost cutting does not pay off. Realizing the huge accumulating losses, the company introduced early-separation-scheme and reduced manpower. However, its impact on the manufacturing cost could not be noticed. It is realized that effective cost cutting can be made through productivity enhancement rather than downsizing.
- **Expansion and diversification:** Another major learning from this case study shows that when it comes to survival, the organization should diversify to new markets and even new products. With the accumulating large losses, the company started manufacturing silencers for a manufacturer of motorcycles. Later on, it set up new facilities for manufacturing fine-blank components for car-manufacturers. Further, the company started the production of exercisers in the same plant. Profits of the company observed an instant increase but with the excessive investment in research and development for new motorcycle, the company went into huge losses.
- **Organizational systems:** It is realized that competitiveness of an organization is not solely dependent upon technology in use, rather organizational systems have been found complementary for the same.

Action

For survival, MAL has developed new models with new technology/ designs/ styles. Diversification into exercisers, silencers and fine blanking has been helpful in recovery of the organization. The company needs more such plans to come out of the financial crunch.

Performance

Major factors of competitiveness that need to be closely monitored in order of importance for assessing the implementation of change management in this case are: market trend, profitability, competitors, price competitiveness, technological developments, and new products.

5.5 Concluding Remarks

Various areas of change in the organizations manufacturing personal vehicles have been studied and presented in this chapter. It is seen that change in technology is quite fast in automobile manufacturing organizations these days especially in cars and motorcycles industry. The technological changes have been primarily attributed to the technology transfer from Japanese companies through joint ventures or partnerships. Amongst the studied organizations, MUL demonstrates a successful fight with competition to reemerge as the leading manufacturer of the personal vehicles. The overall strategy adopted by MUL from its inception is a revelation and a great learning for all organizations operating in the automobile sectors. Their stress on customer focus, dealers and service networks, strengthening vendors, technology upgradation etc. and their timing, all have been planned and executed very well. The difference between this organization and other studied organizations is basically the timing of initiatives, disciplined and whole-hearted approach.

CASE STUDIES IN ORGANIZATIONS MANUFACTURING COMMERCIAL VEHICLES AND TRACTORS

6.1 Introduction

This chapter describes the detailed case studies carried out in various organizations manufacturing light commercial vehicles and tractors. The current status, performance and financial indicators, change process adopted and success achieved have been studied in depth in three organizations namely Swaraj Mazda Limited, Punjab Tractors limited and HMT limited. The case studies have been described in the following sections.

6.2 Case Study – IV (Swaraj Mazda Limited)

M/S Swaraj Mazda Limited (SML) is a joint venture project of Punjab Tractors Limited (PTL) Mohali and Mazda Corporation of Japan, manufacturing light commercial vehicles (LCVs). The plant is located at village Asron in District Ropar (Punjab). The company started production in 1985 with Japanese technology. Today SML is manufacturing LCVs including mini-trucks, mini-buses, ambulances, police-personnel vehicles, water tankers and other special vehicles. The company also exports the vehicles to Nepal, Zambia, Bangladesh, Kenya, Tanzania, Ghana, Ivory Coast, Rwanda, Seychelles, Syria and Jordan. SML has a network of 128 dealers spread over the country.

6.2.1 *Need of Change*

In the year 1985-86, the Indian LCV industry had a manufacturing capacity of approximately 34,000 vehicles. The manufacturers were principally concentrating on the payload category of 3.0 ton and below. By the year 1990-91, demand of LCVs increased to 55,000, out of which 29% belonged to vehicles with Japanese technology. These vehicles had a payload of +6 tons, with actual carriage in the range of 9-10 tons. With rupee devaluation during the years 1991-93, profits of SML suffered because of costly imported parts and components. With the initiative of Government of India to widen the highways, demand of LCVs slowly increased, after the year 1994.

Appendix B4 depicts some performance parameters of SML over the years. Performance and trends in various performance indicators are briefly described below.

Market Share: Although the demand of light commercial vehicles in the market had reduced after the year 1996 due to low rate of industrial growth, lack of infrastructure investment, tapering of export/ import activity, volatility in diesel prices and stagnant freight rates, but with the efforts of the company its market share kept on increasing. As shown in Figure 6.1, the market share increased from 3.7% in the year 1995 to 3.9% in 1996, 4.1% in 1997, 4.5% in 1998, 5.2% in 1999, and 6.6% in 2000. During the year 2001-2002, the company widened its dealers' and service network across the country, and the market share of SML increased to 8% in 2001 and 13.1% in 2002.

Vehicles Manufactured per Employee: Production of LCVs per employee increased from 6.6 in the year 1995 to 7.7 in the year 1996. Then, due to low industrial growth and stagnant freight rates, demand of LCVs observed a drop. Production of LCVs per employee came down to 6.9 in the year 1997, 5 in 1998 to 4.9 in 1999 (Figure 6.2). With the favourable industrial policy and manufacturing of new vehicles, production of LCVs per employee increased to 6.9 in the year 2000, 8.7 in 2001 and 10.5 in 2002.

Profit Earned per Employee: Figure 6.3 depicts the trends of profit earned per employee from the year 1998 to 2002. It is notable that the company registered net profit in the year 1998, the year of its inception. However, with additional import duty, modvat allowance and devaluation of rupee in the international market, profit per employee reduced to Rs. 0.52 millions in the year 1999 as compared to Rs. 1.29 million in the previous year. During the year 2000, company broadbased its product-range and redressed for a wider market segment and thus, profit per employee increased to Rs. 0.64 million in the year 2000, followed by Rs. 1.08 million in 2001, and Rs. 1.73 million in 2002.

Operating Profit per Vehicle: Trends of operating profit per vehicle from the year 1998 to 2002 are shown in Figure 6.4. Rise in manufacturing costs and industrial recession gave a decline to profits of SML. Profit per vehicle registered a drop as indicated at Rs. 0.11 million in 1999 against Rs. 0.25 millions in 1998. With stiff competition from other manufacturers, profit per vehicle reduced to Rs. 0.09 million in the year 2000. During 2000-2001, the company introduced many new models of LCVs and also started mini-buses. Profit per vehicle increased to Rs. 0.12 million in 2001 and Rs 0.16 million in 2002.

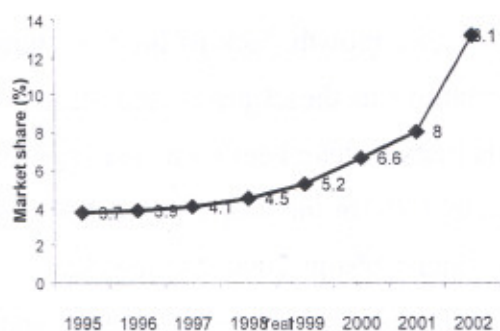


Figure 6.1: Trends of market share at SML

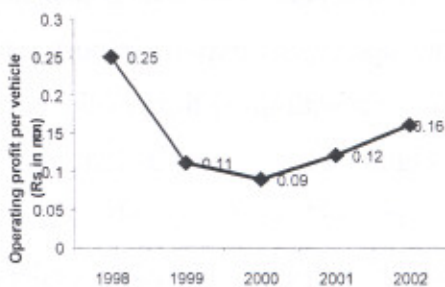


Figure 6.4: Trends of operating profit per vehicle at SML



Figure 6.2: Trends of vehicles manufactured per employee at SML

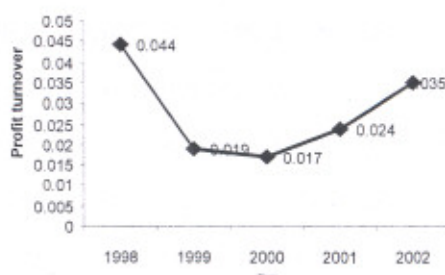


Figure 6.5: Trends of profit turnover ratio at SML

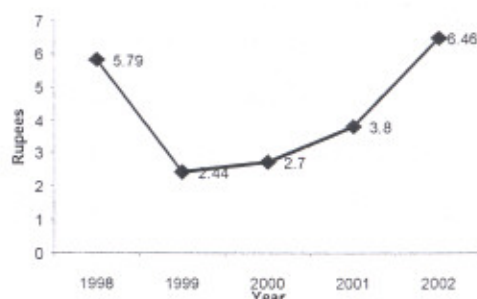


Figure 6.6: Trends of earning per share at SML

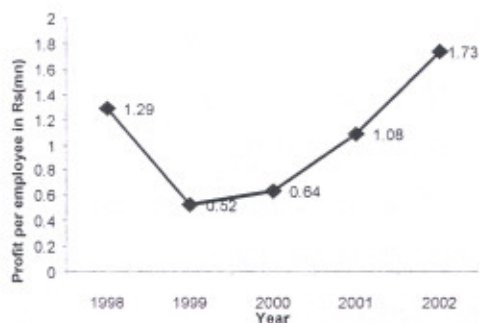


Figure 6.3: Trends of profit per employee at SML

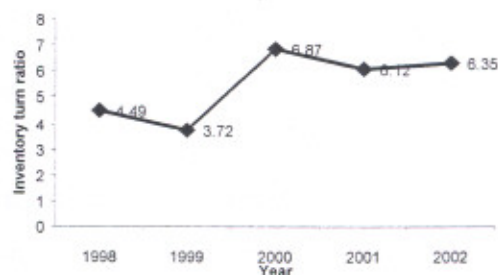


Figure 6.7: Trends of inventory to turnover ratio at SML

Profit Turnover Ratio: It is indicated in Figure 6.5 that the profit turnover ratio reduced to 0.017 in the year 2000 against 0.044 in 1998 and 0.019 in 1999. During 2001, with the launch of new technologically advanced models and thrust on customer-satisfaction, profit to turnover ratio increased to 0.024 in 2001 and 0.035 in 2002.

Earning per Share: EPS reduced to 2.44 in the year 1999 from 5.79 during 1998 as depicted in Figure 6.6. Realizing a threat to its survival, the company adopted new business strategies like getting the vehicles financed to the customers, and manufacturing mini-buses and other vehicles as per the requirements of the customers. As a result of the efforts, EPS increased to 2.7 in the year 2000, 3.8 in 2001, and 6.46 in 2002.

Inventory Turnover Ratio: Figure 6.7 shows the trends of inventory turnover ratio from the year 1998 to 2002. With the new industrial policy and additional taxes by Government of India, demand of LCVs observed a decrease in the year 1999. Inventory turnover ratio recorded a drop from 4.49 in the year 1998 to 3.72 in 1999. Subsequently, by better material management and developing local vendors, the ratio increased to 6.87 in 2000, 6.12 in 2001 and 6.35 in 2002.

From the above discussion, it is observed that profits of SML slid down in 1998-99. Realizing the situation, the company chose 'customer satisfaction' as its motto. With the manufacturing of factory-finish buses and special vehicles, and adopting cost-cutting, further drop in profits was arrested. Trends of performance parameters from the year 1999 indicate the successful management of change at SML.

6.2.2 Change Process at SML

Table 6.1 depicts details of the actions taken against various needs of change at SML. The symbols used in the table have already been explained in the case-study of Maruti Udyog Limited.

Table 6.1
Change Process at SML

Year	Need of change	Area of change	T / K	S / F	Action taken
1986	Production of LCVs started in the payload range of 2-3 ton.				Plans to increase market share.
1988	Requirement of carriage load of +6 ton in the market.	TC	T	F	Designed new chassis larger in size than the existing for increased carriage load.

	Competition from existing manufacturers	TC	T	S	Increase in product mix for all the segments.
1991	Devaluation of rupee in comparison to Yen.	TC	T	S	Research and development to reduce the imported content in the vehicles.
1994	Huge losses, SML declared a sick unit.	SM	T	S	Start of a 7-year rehabilitation programme to come out of losses.
1995	Market demand of load-carrying capacity in the range of 3 tons to 6 tons.	TC	T	F	New models of LCVs with various wheelbases in the payload of 3-6 tons.
	Realization of low manpower productivity.	SM	K	S	Imposing a ban on recruitments at workers' level.
1999	Reduction in demand of LCVs due to industrial recession.	TC	T	F	More thrust on mini-buses and speciality vehicles.
	Changing customers' requirements.	ST	T	F	Manufacturing of the components for new models from local vendors.
2000	Encouragement to tourism, education and health care sectors by Government of India.	TC	T	F	Research and development for mini-buses, ambulances, water-carrier and bottle-carrier vans.
	Growing market of mini-buses and speciality vehicles.	TC	K	F	Started manufacturing of factory-finish buses for customer satisfaction.
	Realized life of chassis less than designed value.	TC	T	F	Started phosphate reaction to the base of the chassis for increasing its life.
	New emission norms mandatory as per Bharat-I standards.	TC	K	F	Modification in the engine technology to comply with emission norms.
	Inefficient shop floor planning and low productivity levels.	SM	T	S	Start of Industrial engineering techniques for new job-designs and to reduce idle man-time and man-movements.
2001	Competition from other manufacturers.	TC	K	F	Introduction of a new Sartaj model in the upper ton range of 15 tons
		TC	K	F	Introduced a new CNG vehicle after R&D.
		TC	K	F	Developed engine complying with Bharat-II emission norms.
	Growing demand of factory-finished buses.	ST	T	S	Promoted new vendors with state-of-art technology for making bus-bodies.
2002	Competition from other manufacturers.	SM	T	F	Marketing through effective advertisements.
	Low plant productivity.	SM	T	S	New incentive system based on 'plant productivity' than individual's productivity.
	Large investment on inventory of imported components.	SM	T	F	Localization of more parts for reducing investment on inventory.
	Reduction in scheduled deliveries by the vendors.	SM	T	S	Started vendor-rating system for getting scheduled delivery of material.
	Recognition of indiscipline on the shop floor	PL	T	S	Enforcing strictness, checking indiscipline and absenteeism of employees from working areas.

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture, K: Kludging, T: Tinkering, F: Fast, S: Slow)

Table 6.2 shows three phases of change initiatives at SML.

Table 6.2
Areas of change considered during change process at SML

S No	Year	Area of change	Phases	Change Strategies	Driver of change
1.	1988	TC-TC	<i>Stable market conditions</i> , limited demand of LCVs, fewer profit margins due to imported components.	a. Long term Planning	Technology
2.	1991	TC		b. Using tinkering.	
3.	1994	SM		c. Using kludging for new models.	
4.	1995	TC-SM	<i>Competitive market conditions</i> , unfavorable import/export policies, stagnant freights, lack of investment on infrastructure, accumulated huge losses.	a. Need based change strategies	Systems
5.	1999	TC-ST		b. Using tinkering to make up losses.	
6.	2000	TC-TC-TC-TC-SM	<i>Turbulent market conditions</i> , growing competition, devaluation of rupee against yen, unfavorable policies of Govt. of India, Changing customers' requirements.	a. Emergent change strategy	Technology, Structure
7.	2001	TC-TC-TC-ST		b. Through kludging.	
8.	2002	SM-SM-SM-SM-PL		c. Setting 'Customer satisfaction' prime motto. d. Developing new vendors e. Reduction in inventory level f. Diversification into buses and utility vehicles	

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture)

The first phase indicates stable market conditions and goes till 1994. The company chose 'technology' as the driver of change during this phase. But with devaluation of rupee in international market and costly imported components in LCVs, the company accumulated a huge loss of Rs. 19.3 crores. The company was declared a sick unit and was handed over a 7-years BIFR package for its financial rehabilitation in 1995. During this phase, which may be called as critical phase, through making need-based changes and choosing 'systems' as the driver of change, the losses were wiped off by the year 1998. In the third phase from the year 1999, the market conditions were turbulent. There was a stiff competition in the market. SML managed a higher market

share by emphasizing on new vehicles like mini-buses, ambulances, water- tankers and vehicles for Defence and Para-military forces, State Police, Ministry of Health, Local Municipal Corporations etc. The company also established new local vendors for timely delivery of components and sheet-metal parts. New mid-size trucks and buses were designed with the same chassis complying with Bharat-I and II emission norms. The company remained careful of organizational-structure also, and widened its sales and service- network to deep-penetrate into the market. The continuous increase in performance parameters depicts the successful management of change process at SML.

6.2.3 SWOT Analysis at SML

Table 6.3 shows the SWOT analysis at SML.

Table 6.3
SWOT Analysis at SML

<i>Strengths</i>	<i>Weaknesses</i>
• Support from Punjab Tractors Limited, a PSIDC project • Full technology transfer from Mazda Motors Corporation of Japan • In-house R&D center for carrying out research work • Capability to manufacture 4-wheel drive vehicles, ambulances, tankers, bottle- carriers and CNG buses • High level of flexibility in products and processes • Sufficiently large number of developed vendors • High level of commitment from top management • Growing confidence of Indian customers towards Japanese technology	• Imported parts and components in the vehicles • Adapting to government rules and regulations
<i>Opportunities</i>	<i>Threats</i>
• Rising demand for mini-buses and ambulances with encouragement to tourism, education and healthcare by Government of India • Rising demand of CNG buses in metropolitan cities • Rising demand of LCV with the better highways by Golden Quadrilateral Project • Easy availability of soft loans from banks and financial institutions to add fleet of buses • Growing export avenues of buses and trucks to neighboring countries	• Reducing profit margins • Decision of the government to disinvest its share from SML • Accumulation of inventory as a result of market conditions • Devaluation of Indian rupee in international market

6.2.4 SAP-LAP Analysis at SML

Table 6.4 shows the SAP analysis at SML and LAP synthesis is described.

Table 6.4
SAP Analysis at SML

<i>Situation</i>	<i>Process</i>
• Transfer of technology from Mazda Motors Corporation, Japan • Large product mix for varied demands of customers • Reduced profit margins due to costlier imported components • Growing demand of mini trucks and mini buses • Diversifications to CNG buses, ambulances, bottle carriers, trucks for Military and Para-military forces and Municipal Corporations • Compliance necessary to the emission norms (EURO I /II) • Growing competition between various manufacturers • Better road conditions giving a better economy • Boost to industrial growth from Government of India	<i>Technological issues</i> • Manufacture of chassis, tankers, bus and truck bodies indigenously • Optimal use of local manufacturing-skills • Changing existing chassis design to meet the requirements of customers • Manufacturing of factory-finish buses, tankers, ambulances and LCVs <i>Structural issues</i> • Developing new ancillary units/ vendors for LCVs and other vehicles • Widening the sales and service-network across the country • Imposing a virtual ban on recruitment for higher manpower productivity <i>Systemic Issues</i> • Reducing product development time • Reduced overheads and wastage reduction through improved manufacturing processes • Better house keeping through 5S programme • Reducing inventory level through Just-In-Time (JIT) system • Enhancing productivity and quality through Juran's approach <i>People and culture</i> • Continuous education of employees • Involving all the employees in achievement of organizational goals and objectives • Making cost-saving through waste reduction • Encouraging teamwork culture through a new incentive policy based on plant-productivity
<i>Actors</i>	
• Chairman, Board of Directors as the key decision maker • Vice-Chairman and Managing Director to manage day-to-day affairs • Skilled, trained and flexible work force • Flexible and dedicated managers and supervisors • PTL as the promoter of the project	

Learning Issues

Following learning issues have emerged from the detailed study of SML:

- **Requirements of competitiveness:** Offering of vehicles of advanced technology at competitive prices has been observed to be a critical requirement in the era of globalization and liberalization. It has come out as a major learning from this case study that an organization can acquire better market share by various measures like customer-focus, high quality level, low manufacturing costs and competitive prices. Merely the name of world-class technology does not help.

- **Customer focus:** Changing customer needs and preferences have demanded small product-life cycles. It is important to make timely amendments as demanded by the customers. From this case study, it is learnt that the company tinkered with the existing chassis-size and developed new chassis for new models in very less time and thus, gained large market reputation.
- **Innovation:** It is important to identify the future needs of the customers well in advance. A company, which launches an entirely new model with new features suiting to the customers' expectations, gains high popularity. With the start of factory-finish buses and afterwards introducing new aesthetic-looks in new models, the market share of SML has observed a continuous rise.
- **Cost cutting:** The era is long over when the prices used to be the determinants of quality of a product. The manufacturers used to decide the price by compiling the costs and adding handsome profit margin to it. But in the present scenario, every organization has to be price competitive and has to adopt cost cutting in a big way. It is found that SML has never been complacent and continued efforts for cost-cutting through rapid indigenisation of parts and components. It is learnt from this case study that there is a lot of scope for cost-cutting through reduction in costly imported components, improvements in supply-chain management, new job-design and increase in productivity.
- **Diversification:** Making a relative comparison of various brands of LCVs feature-by-feature, and projecting the special features in the advertisements, has been found to boost customers' confidence towards manufacturing-capability of the organization. Success of factory-finished mini-buses by SML has been attributed to impressive advertisements published in magazines, journals and newspapers on routine basis.
- **Company strategy:** The case of SML has amply demonstrated that an organization can get success through advanced technology and suitably paced systemic changes. Alongwith developing new models at a fast pace, the company made efforts for systemic changes like developing local vendors, imposed a ban on recruitments to improve productivity, developing close relations with suppliers, reducing hidden-costs, adopting new incentive policy etc. and observed favourable trends in various indicators like reduction in scrap rate, increase in productivity, increase in inventory-

turnover ratio etc. which indicate the success of change management programme at SML.

Action

Various initiatives taken at SML depict the strategy of the organization for its survival. Vendors need to be developed more. The company must extend technology assistance to vendors in this regard. Cost cutting must be achieved by better use of resources. Inventory turnover ratio needs to be increased. Manpower productivity needs to be developed more by imparting quality education and training. Reduction in manufacturing costs by developing Indian alternatives in place of costly imported components must be accelerated for the success of the organization.

Performance

Major factors of competitiveness that need to be closely monitored in order of importance for assessing the implementation of change management in this case are: customer focus, product mix, diversification, profitability, productivity and price competitiveness

6.3 Case Study – V (Punjab Tractors Limited)

Punjab Tractors Limited (PTL), a public limited company, manufacturer of tractors and farming equipments is located at Sahibzada Ajit Singh Nagar (SAS Nagar) near Chandigarh (India). A Board of Directors has been managing affairs of the company. The Secretary, Department of Industries, Government of Punjab has been its ex-officio Chairman. The Vice Chairman and Managing Director have been managing the day-to-day affairs of the company. PTL has been a fast growing company and over the years has diversified its product range. Products made by this organization are:

- a. Tractors and matching equipments
 - Swaraj Model 720 19.5 BHP
 - Swaraj Model 724 26.5 BHP
 - Swaraj Model 735 39 BHP
 - Swaraj Model 855 55 BHP
- b. Self-propelled harvester combines
- c. Multi-crop threshers

6.3.1 *About the Company*

The first batch of tractors rolled out of PTL on 14th November 1973. In the beginning, PTL suffered severely due to poorly developed ancillary units and accumulated a cash loss of Rs. 7.8 millions in the very first year of production. Afterwards, the company developed multiple sources of supply for each component. It promoted new ancillaries near the plant location and also provided technical assistance to new entrepreneurs. Thus its material supply pipeline improved and it was able to increase its output to full capacity by the end of 1977.

Manufacturing cost of tractors at PTL has increased steadily with the increasing input costs. 'Swaraj' tractor manufactured at PTL has no import content. Further, Government of India granted exemption of excise duty to the organization with effect from 1975. Due to this exemption, 'Swaraj' is less expensive as compared to other brands. As a result of the price advantage and able management, financial performance of PTL has improved over the years. New models were introduced through in-house research and development from time to time. In the first twenty years of its existence, its tractor manufacturing capacity has increased to a whopping twenty-four thousands tractors per annum that has been a considerable achievement.

6.3.2 *Realization of Need of Change*

The company started its commercial production in 1974 with a single 26.5 HP model, Swaraj – 724. PTL developed its own technology to match the customer requirements. Whenever they found some information in journals/ research papers regarding technological innovations in tractors, they decided to incorporate that through research and development. The company regularly carries out extensive analysis of the past trends to establish the need and the extent of technological change in future. From the beginning, manufacturing tractors using own technology has been a challenge for PTL against renowned international brand names: Massey Ferguson, International, Ford, Zeator, Deutz, Russian etc.

With in a span of 30 years, PTL has achieved a great success. Market share has increased continuously. Profit per employee and return on average net worth has also increased. Appendix B5 depicts some of the performance indicators of PTL over the years. Performance and trends in various indicators are briefly described below.

Market Share: Figure 6.8 shows the trends in market share of PTL from the year 1992 to 2002. It is found that market share was increasing till the year 1995. In the year 1996, it dropped due to its low installed capacity as compared to other manufacturers and increasing demand of tractors in the market. The company increased its manufacturing capacity in the year 1997 to 36000 tractors and captured more market share. The uptrend of market share continued till the year 1999. After the year 1999, repeated draughts in many states hampered the agriculture output in India, resulting in a drop of purchase power of people involved in agricultural activity. This, in turn, reduced the demand of tractors in the market. For its survival, the company introduced new models of tractors. Its market share stabilized at about 18% during the year 2001- 2002.

Profit Earned per Employee: Figure 6.9 shows the trends of profit earned per employee from the year 1992 to 2002. It is depicted that the profit earned per employee increased till the year 2000 and then a decreasing trend started. As a result of increasing demand of 'Swaraj' tractors in the market, profits of PTL were increasing till the year 2000, as indicated by the upward trend of profit per employee in Figure 6.9. During the year 1999-2000, due to draught the profit of PTL reduced considerably as compared to previous year. After the year 2000, the total demand of tractors in the country reduced to a large extent. Although the company has been able to stabilize its relative market share in the recession, but the total profits have reduced appreciably due to reduced demand. The company has been overburdened by large recurring expenditure due to excess manpower. Due to the government rules and regulations, it has not been possible to oust the manpower. Salaries and wages of the manpower have been approximately 70% of the profits made in the year 2001-2002. As a result, profit per employee showed a downtrend from the year 2000 onwards. The profit per employee during the year 2002 further reduced to Rs. 0.582 million.

Production of Tractors per Employee: Figure 6.10 shows the trends of tractors produced per employee from the year 1992 to 2002. It is depicted that the production of tractors per employee at PTL has increased continuously till the year 2000 and then reduced. As discussed earlier, the natural calamity has resulted in recession in the tractor industry from the year 1999. As a result of decreasing demand of tractors and excessive manpower, production of tractors per employee dropped to 18 in the year 2001 as

compared to 21 in the year 2000. Production of tractors per employee further dropped to 16 in the year 2002.

Earning per Share: Figure 6.11 shows the trends of earning per share (EPS) from the year 1992 to 2002. It is depicted that the average pattern of EPS has been increasing till the year 2000. During 1992-93 and 1996-97, the company offered a bonus issue for its shareholders, which resulted in instant reduction of EPS. From 1997 to 2000, there has been up trends of EPS. During 1999-2000, the country observed recession in tractors industry. As a result, sale of tractors at PTL and other manufacturers dropped. EPS of PTL dropped from 65.8 in 2000 to 18.52 in the year 2001, and to 16.46 in the year 2002.

Profit to Turnover Ratio: Profits to turnover ratio of the company increased continuously till the year 1999 (Figure 6.12). Due to low cost technology, exemption of excise duty by GOI, and rising demand of tractors, the company earned large profit. Net profits, however, reduced drastically because of lower sales due to draughts, increase of prices of inputs and plant overheads, and the profit to turnover ratio declined. Since the year 1999, there has been a recession in the tractor market as depicted in the graph.

Expenditure on Research and Development: Figure 6.13 shows the expenditure made on research and development as a percentage of turnovers from the year 1992 to 2002. It is depicted that the company has made a lot of expenditure on research and development over the years. During 1994-95 and 1997-98, the company concentrated on its existing models and reduced the capital expenditure on research and development. The same has been indicated as a downtrend in the Figure 6.13. After 1999, with the increase of tractor manufacturers in the Indian market and unfavorable market conditions, PTL made more investment on research and development to develop new models of tractors and also for the production of harvester. As a result, the ratio of expenditure on research and development to turnover increased continuously as depicted in the graph.

From the above discussion, it is clear that the company had a good market till 1999. The draught conditions in many states from the year 1999 resulted in a recession in the tractor industry. In the mean time, prices of inputs and overheads increased, and profit margins reduced due to competition from new manufacturers in tractors business. To become competitive, the company chose technology as the driver of change. New models of tractors and harvesters were developed. Many systemic changes like education of



Figure 6.8: Trends in market share at PTL

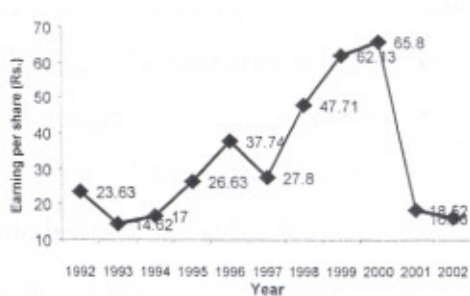


Figure 6.11: Trends of earning per share at PTL

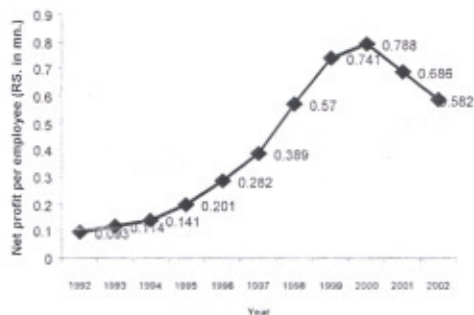


Figure 6.9: Trends in profits per employee at PTL



Figure 6.12: Trends of profit turnover ratio at PTL

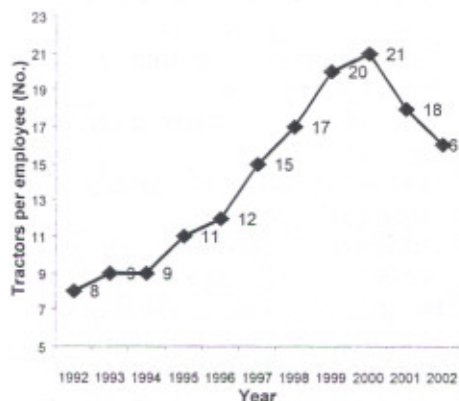


Figure 6.10: Trends in tractors produced per employee at PTL

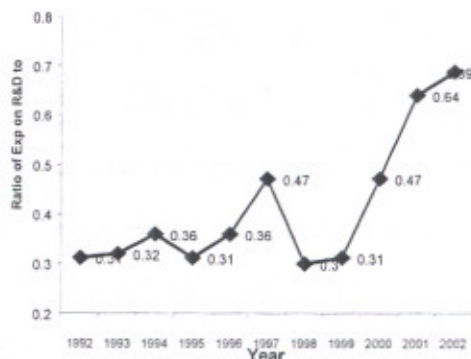


Figure 6.13: Trends of ratio of expenditure on R&D to turnover at PTL

localization of vendors who effected to support technological changes. The organization did not try major structural changes like downsizing, VRS etc. From the very beginning PTL had a good work culture supported by all employees.

6.3.3 Change Process at PTL

To gain competitive edge in the Indian market, some change initiatives have been taken from time to time at PTL. Table 6.5 depicts details of these changes since the inception of the company. Improvements have been made in any one or a combination of the five major areas namely technology, system, structure, people, and culture by tinkering or kludging.

Table 6.5
Change process at PTL

Year	Reason of change	Area	T / K	S / F	Action taken
1974	New company: Started production with some expansion plans.				Production started with indigenous technological model 724
		PL	T	S	Imparted education and training to the new employees.
1975	Ran into losses in the beginning itself.	SM	K	F	Obtained exemption of 10% excise duty from Government of India (GOI).
	Poorly developed ancillary units.	SM	T	S	Developed ancillaries, also extended technical support to them.
	Competition from other manufacturers in 30-40 HP range	TC	T	S	Developed a new model with 39 HP through in-house R&D.
1976	Increasing demand of tractors in the market	ST	K	F	Widened dealers' and service network for customer satisfaction.
	Work environment not cordial.	CC	T	S	Promoted a good working atmosphere by revising salary structures.
	Typical bureaucratic procedures in use.	SM	T	S	Delegation of authority to various cadres to avoid delay in routine affairs.
1978	Growing demand of tractors in lower HP range.	TC	T	S	Introduced a new model of tractor with 19.5 HP for the small farmers.
	Under utilization of production facilities.	ST	K	F	Recruitments at various cadres for getting more production using idle facilities.
	Increase of credits of dealers in lieu of booking of advance orders.	SM	T	S	Changed credit system to cash dealing.
1979	Growing demand of farming attachments for ease of farmers.	TC	T	S	Developed new attachments thro' R&D to make tractors as a versatile machine.
1984	Increase in demand of combined harvester in agriculture.	TC	K	F	New plant setup for making self propelled combined harvester.
	Lack of technology for production of harvester.	TC	T	S	Technical design and development done at PTL R&D centre.
1985	Growing demand of tractors in large HP range in north India.	TC	T	S	Developed a new model 855 with 55 HP power.

		TC	T	S	Improved the existing models thro' aesthetic and ergonomic improvements, e.g. spring saddle, long exhaust pipe, new disc brakes, canvas roof and hydraulic lift.
	Rapid industrialization and demand of fork lifters in the market.	TC	K	F	Started production of fork lifters in technical collaboration with Komatsu Fork Lift Company of Japan.
1987	Trend of mechanized farming to meet shortage of farming labor.	TC	T	S	Developed technology for multicrop thresher.
	Low growth of the company in terms of turnover than competitors.	ST	T	S	Enlarging dealers network for penetration into the market.
1988	Growing demand of engine for other purposes like pumping of water, running generator, etc.	TC	K	F	Diversified to engine manufacturing thro' establishing of a new unit "Swaraj Engines".
1993	Growing competition between tractor manufacturers.	TC	K	F	Setting up of a research and development center for tractors, harvester and fork lifters production.
		SM	T	S	Reduction in rejection level, and increase in quality level
	Lack of belongingness at all levels.	CC	T	S	Encouragement to employees to give suggestions, thus boosting their morale and enhancing mutual trust.
		PL	T	S	Improvement in skill level of workers by advanced training at Human Resource Management center.
1995	Growing need of tractors in 20-25 HP range.	TC	T	S	Introduction of a tractor with 22 HP.
1997	Stiff competition from other tractor manufacturers.	SM	T	S	Marketing through effective advertisements.
		ST	T	S	Enlarging service network for service/ genuine spares.
	High inplant rejection rates	TC	T	S	Addition of new technology machines to reduce plant rejection.
	Lack of mutual trust and large absenteeism in the production area.	CC	T	S	Strengthened work culture by establishing performance measurement.
2000	Growing demand of tractors in 40-50 HP in north India.	TC	T	S	Introduction of a new model with 44 HP with attachments like water pumping, hydraulic lift, ground leveling etc.
2001	Increase in production cost and reduced profit margins.	SM	T	S	Developed local vendors for the supply of parts and components.
	Export avenues for sale of tractors.	TC	T	S	Plant up gradation for better quality, commissioning of an engine-testing lab.
2002	Low productivity levels in the production area.	SM	T	S	New incentive system introduced linking workers' performance with productivity.
	More money blocked in large inventory.	SM	T	S	Reduced inventory level by making close links with vendors.
	Lack of discipline and control on the shopfloor	SM	T	S	Steps taken for checking absenteeism and staying away of employees from work area
	Large rework on the supply made by the vendors.	SM	T	S	Vendor rating system introduced for improvement in the supply- chain management.
	More idle manpower and large man-movements.	PL	T	S	Using industrial engineering techniques to reduce idle time and minimize man-movements in the production area.

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture, K: Kludging, T: Tinkering, F: Fast, S: Slow)

With the objective of analyzing the change strategies at PTL, a consolidation of the actions taken has been made, as shown in Table 6.6. Two phases of change have been noticed at PTL. The first phase has shown “stable market conditions”. The demand of tractors in all the ranges was increasing continuously. After 1997, with the liberalization of economy and globalization of market, three multi-national companies (New Holland Tractors, Sane Greaves, L&T John Deer) and three Indian companies (Indo Farm, Standard, and Sonalika) entered the Indian tractor industry. Entry of more companies in the market increased the quality consciousness among the existing manufacturers. After 2000, because of repeated draughts and recession in the tractor industry, sales and profit of PTL were badly affected.

Table 6.6
Areas of change considered during change process at PTL

S No	Year	Area of change	Phases	Change Strategies	Driver of change
1	1974	PL	<i>Stable market conditions</i> , growing demand of tractors, trend of mechanized farming, large profit margin, subsidy of excise duty from govt.	a. Need based change b. Using tinkering and kludging c. Making large expenditure on R&D to develop new models.	Technology
2	1975	SM-SM-TC			
3	1976	ST-CC-SM			
4	1978	TC-ST-SM			
5	1979	TC			
6	1984	TC-TC			
7	1985	TC-TC-TC			
8	1987	TC-ST			
9	1988	TC			
10	1993	TC-SM-CC-PL			
11	1995	TC			
12	1997	SM-ST-TC-CC			
13	2000	TC	<i>Tough market conditions</i> , repeated draught in many states, recession in tractor industry, new Indian units and MNCs, Reduction in profit margin, Rising material price, Customer market.	a. Emergent change b. Using kludging c. Avoiding large investment on new resources	Systems
14	2001	SM-TC			
15	2002	SM-SM-SM-SM-PL			

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture)

In the first phase, the company chose technology as the main driver of change. New models were introduced, and amendments made in the existing models. Tendency has been to manufacture all the HP ranges to give a competition to other brands.

In the second phase “tough market conditions”, emphasis has shifted from technology to systems. Due to repeated draughts, and the industrial recession, the company diverted its attention to reduce the overheads through systemic changes. The company imparted more education and training to people, developed local vendors, increased advertising to make an impact on masses, improved service stations, decreased inventory level, more customer orientation etc. The market share of the company stabilized nearly at 18% after the year 2000. Considering the number of players in the market and their capabilities, this is surely an achievement that could be possible because of a successful change process.

6.3.4 SWOT Analysis at PTL

Table 6.7 shows the SWOT analysis at PTL.

Table 6.7
SWOT Analysis at PTL

<i>Strengths</i>	<i>Weaknesses</i>
• Government support through Punjab State Industrial Development Corporation (PSIDC) • Capability to develop its own technology • In house R&D center • Manufacture of wide range of tractors for satisfying needs of all customers. • No imported components in the tractors • Capability to diversify in the allied areas like harvester combine, multicrop thresher and also LCVs • Committed manpower and team spirit • High level of commitment from top management • Large sales and service network • Strong relationship with farmers • A culture encouraging learning, experimentation and ownership feeling	• Absence of support from any MNC in technological development • Governed by government rules and regulations in routine affairs because of being a public sector unit • Bureaucratic systems and procedures • Dependence of farmers on monsoon in a large part of India
<i>Opportunities</i>	<i>Threats</i>
• Higher standard of living after green revolution • Rising demand of farming equipment in North India • Large agricultural land in India, second largest in the world • Increase of mechanized farming • Export avenues in the neighboring countries • Assembly of engines for farming purposes other than manufacturing tractors	• Shrinking demand of tractors due to draught and natural calamities • Fragmented land with farmers • Existing level of subsidies and impact of impending WTO regime. • Increasing prices of diesel in the international market • Entry of MNCs with advanced technology in Indian tractor industry • Government decision to disinvest its share • Competition with Chinese cheap alternatives

6.3.5 SAP-LAP Analysis at PTL

Table 6.8 shows the SAP analysis at PTL while LAP synthesis is described.

Table 6.8
SAP Analysis at PTL

<i>Situation</i>	<i>Process</i>
• PTL has developed its own technology, without any collaboration. • Getting exemption of the excise duty. • Localized vendors ensuring easy supply of components at reduced costs. • Large number of models to satisfy all segments of customers. • Diversification to harvesters and fork lifters. • Recession in economy. • Entry of MNCs in Indian market. • Stable market share for the last three years although the tractors demand reduced in this period.	Technological aspects • Making use of local manufacturing facilities, skill and raw material through a strong base of vendors. • Reducing product development time by in-house research and development facilities. • Saving costs through technology and efficient working. • Introducing new features in the tractors as and when required. • Further diversification to fork lifter, combined harvesters and others. Structural issues • Developing dealers network and service network all over India. • Developing local vendors for timely supply of parts and components. • Increasing number of share holders/ equities for financial implications. Systemic issues • Cash dealing with dealers to avoid credit system. • New vendor policy for ranking them based on their performance. • Strengthening systems and quality assurance by Juran's approach. • Reducing inventory level of the plant through JIT. • Increased and effective advertisement. People and Culture • Educating employees on a continuous basis for achieving organizational objectives, goals and vision. • Offering employment to a large number of people as a public sector organization. • Establishing center for research and development, human resource development, training of management staff, supervisors and workers. • Starting cost reduction by avoiding wastage, increasing productivity and other employee oriented efforts.
<i>Actors</i>	
• Punjab State Industrial Development Corporation (PSIDC). • Representative of Government (PSIDC) as Chairman of PTL. • Managing Director • All the employees of the organization. • All the customers through feedback and suggestions.	

Learning Issues

Based on the detailed study and analysis of initiatives taken at PTL to survive in the era of globalization and liberalization, following learning issues have emerged.

- ***State of business:*** Tractor industry's performance in India has been closely associated with the time, quantum and distribution of monsoon and also with the central government's policies.
- ***Customers' requirements:*** Rapid mechanization of farming in India has demanded the addition of new technological features/ attachments required for various crops. PTL has invested a huge amount on research and development during the last few years to come out with new models. An organization not in a position to introduce the technological features as and when required, may lose its market share and ultimately land into a difficult situation.
- ***Cost cutting:*** The competition between existing Indian manufacturers and new manufacturers/ MNCs, and reduced demand of tractors in the market has resulted in reduced prices. For survival, the organizations have been compelled to adopt cost cutting strategy in a big way so as to retain their profit margins. It is seen that there has been a lot of scope for cost cutting through strategies like improving supply chain management, reducing inventory, increasing plant productivity and reducing waste, reducing plant overheads and making the vendors competitive.
- ***Role of change agent:*** The case of PTL has demonstrated that public sector unit can also face the business challenge through effective role of CEO. To fight the competition with MNCs and other brand manufacturers, MD as CEO at PTL has been choosing mainly technological and systemic changes for competitiveness.
- ***Customer focus:*** Close interaction with farming community has been very important. PTL, from the very beginning, has been customer focused and has maintained close relations with farming community. PTL has focused on enlarging its dealers' base, besides upgrading service facilities. These strategies have prevented the other manufacturers to grab a large share of the market.
- ***Pace of change:*** For a successful change process, small changes (tinkering) and big changes (kludging) must be suitably spaced to provide a dynamic stability during the change process.

- ***Inhibitors to change:*** To reduce manpower in a public sector through retrenchment, early retirement, delayering etc. has been difficult in Indian context because of adherence to government rules and regulations. Main structural changes at PTL have been development of vendors, ancillaries and suppliers. This was backed up by matching changes in systems and other areas and proved successful.
- ***Advertisements:*** Advertisement has a great impact on the people and their perception about a company. Highlighting the strength of organizations like dealers and service network, and new features introduced in the products from time to time have been helpful to capture a better market share.
- ***Systems' approach:*** Significant improvements have been made at PTL involving employees at all levels using Juran's approach. Through proper education, training, motivation and organizational policies, resistance to change has been reduced at all levels.
- ***Involvement of people:*** Recognizing the workers' union and involving them in policymaking has been helpful in cultivating rich work culture. At PTL, management has been signing an agreement with the workers' union valid for four years to avoid grievances and developing cordial relations.

Action

Various initiatives taken at PTL to achieve change in various areas depict a successful fight of the organization against growing competition in Indian context. Because of draught and other natural calamities, the purchasing power of the farmers (customers) was severely affected and reduction in the demand of tractors was inevitable. But by the use of technological and systemic efforts at PTL, it has been able to sustain competition. The management/ CEO should plan new changes, implement them, check the results and act again. Vendor development needs to be continued for cost effectiveness and quality. The company must try to reduce inventory levels. Recurring expenditure needs to be reduced by adopting flat structure through delayering, job rotation, job enlargement and job enrichment.

Performance

Major factors of competitiveness that need to be closely monitored in order of importance for assessing the implementation of change management in this case are: technology

upgradation, research and development, customers' reaction and response, profitability, market share and price competitiveness

6.4 Case Study – VI (Hindustan Machine Tools- Tractor Division)

M/s Hindustan Machine Tools Limited- Tractor Division (HMT) at Pinjore (near Chandigarh) is manufacturing tractors and farm equipments. A Board of Directors manages this public sector unit and Executive-Director manages its day-to-day affairs. Over the years, the unit has introduced various models of tractors and farming equipments.

6.4.1 About the Company

HMT Limited was established in 1953 by Government of India to manufacture machine tools in collaboration with Oerlikons of Switzerland. In 1961, the company started India's first watch-making unit in collaboration with Citizen Watch Company of Japan. Later, it diversified into printing machines. Manufacturing of tractors and farming machinery was started in 1971. Now HMT Limited has a diverse range of products, owns 18 manufacturing units and a countrywide well-established marketing network under the ambit of a "Holding Company". The holding company retains "Tractors Business Group".

HMT Limited started its tractors' manufacturing unit in 1971 in technical collaboration with M/S MOTOKOV, Czechoslovakia Republic. Over the years, various models ranging from 25 HP to 75 HP were introduced. At present, the company owns tractor-manufacturing units in India located at Pinjore in Haryana and Hyderabad in Andhra Pradesh. It has a well-equipped research and development centre recognized by Department of Scientific and Industrial Research, Government of India.

The Tractor Unit of HMT at Pinjore is a proud recipient of a number of National Level - Productivity Awards. It has been certified to ISO-9001 by KEMA, Netherlands. It has an installed capacity of 18,000 tractors. It possesses a well-organized marketing setup comprising 17 area-offices, 11 stockyards and over 300 dealers spread across the country. HMT Tractors Group is well supported by over 40 ancillary units.

6.4.2 Need of Change

Till 1971, prices of imported components were less than their manufacturing-costs in the Indian context. Thus, the company preferred to fit imported CKD kits in the tractors in

the beginning. Later on, with the expiry of the technical collaboration with M/S MOTOKOV, Czechoslovakia Republic, the company made its own efforts for new models. Also the manufacturing of a large number of components was started in the main plant whereas other components were transferred to ancillaries.

HMT made another technical collaboration with Austria for AVL technology in 1991. The earlier models were modified as well as new models were developed with this technology. Growing competition between Indian tractor-manufacturers, newly established companies as well as MNCs in tractor industry have posed tougher conditions for HMT. Increasing recurring burden due to excessive manpower, rising cost of raw materials, new import policy, pro-employees' government rules, interference of central government in marketing strategies, and lack of teamwork have further added to the problems of the company. Presently the company is running in losses and has relatively less market share. Appendix B6 depicts some of the performance parameters of HMT over the years. Performance and trends in these parameters are briefly described below.

Market Share: Market share of HMT has decreased during the period under observation (Figure 6.14). Frequent drought conditions in many states reduced the demand of tractors in the market. Further, with the entry of three MNCs (New Holland Tractors, Sane Greaves, and L&T John Deere) and three new Indian companies (Indo-Farm at Badi, Standard at Barnala, and Sonalika at Hoshiarpur) in tractor-manufacturing, reduction in market share of the existing manufacturers was inevitable. Market share of HMT reduced from 8.74% in the year 1998 to 8.41% in 1999, 7.08% in 2000, 6.42% in 2001 and 6.51% in 2002.

Tractors Manufactured per Employee: It is indicated that average production of tractors per employee has decreased from 6.26 in the year 1998 to 5.05 in 2000, 4.78 in 2001 and 4.34 in 2002 (Figure 6.15). These trends have been attributed to new tractor-manufacturers, reduction in demand of tractors, and internal problems of the company.

Profit per Employee: In Figure 6.16, it is shown that annual profits per employee have reduced from Rs. 1.11 million per employee in the year 1999 to Rs. 0.47 million in 2000, 0.19 million in 2001 and Rs. 0.07 million per employee in 2002. Profit per employee has decreased at a faster rate after the year 1999 with drop in demand of tractors, stiff

Inventory Turnover Ratio: Trends of inventory to turnover ratio from the year 1998 to 2002 are shown in Figure 6.17. The ratio has continuously decreased from 6.02 in the year 1999 to 4.63 in 2000, and 3.74 in 2001. Imbalance of demand and supply, inefficient material planning, and poor marketing strategies have contributed to the same. Inventory turnover ratio has increased notably in the year 2002 to 6.53 against 3.74 in the previous year.

Profit Turnover Ratio: Profit turnover ratio is found to be reducing continuously over the years (Figure 6.18). It has dropped from 0.08 in the year 1999 to 0.04 in 2000, 0.02 in 2001 and 0.01 in 2002. The company has suffered a lot due to pro-employees' government rules and large overheads especially during industrial recession.

Expenditure on Research and Development: Expenditure on research and development is shown as a percentage of turnover from the year 1998 to 2002 (Figure 6.19). It is shown that more expenditure was made on research and development in 1998-1999. Afterwards with the downtrend of the market share and reduction in turnover and profits, expenditure on research and development was reduced. Realizing the need for new technological models, the company had to make more expenditure on research and development activities, viz. 0.23% of turnover in 2000, 0.31% of turnover in 2001 and 0.37% of turnover in 2002

From these trends, it is concluded that the organization has faced stiff competition from existing and new tractor-manufacturers after 1999. Further, adverse market scenario has posed tough conditions for the company. Profit margins have decreased due to high manufacturing costs, large overheads and typical Indian work-culture. With the reduction in demand for tractors in the market and reduction in profit margins, the organization seems to be in trouble. In these circumstances, the company has made efforts to improve by developing and acquiring new technology and also trying to become cost efficient through improving manpower productivity. From the trends of performance indicators, it is found that the company has not been successful in its efforts.

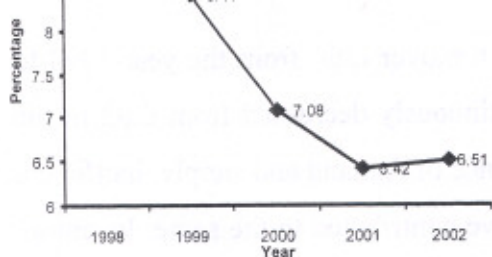


Figure 6.14: Trends of market share at HMT

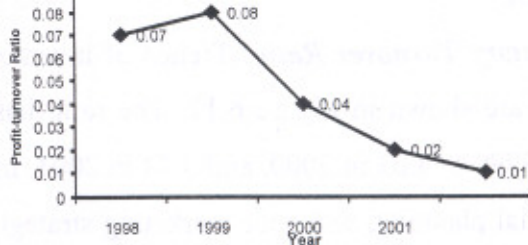


Figure 6.18: Trends of profit turnover ratio at HMT

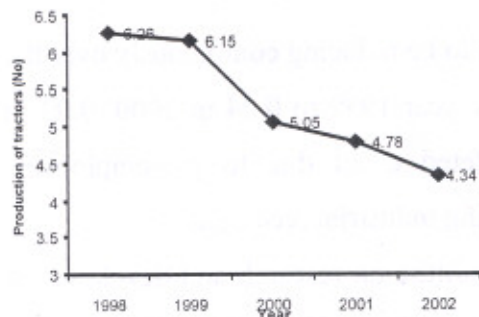


Figure 6.15 Trends of average production per employee at HMT

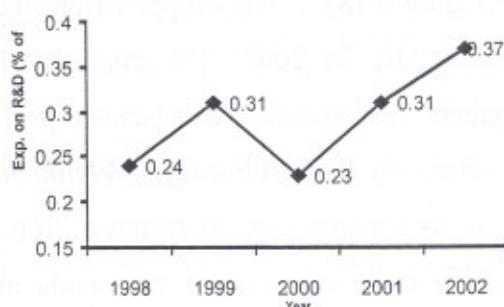


Figure 6.19: Trends of ratio of expenditure on research to turnover at HMT

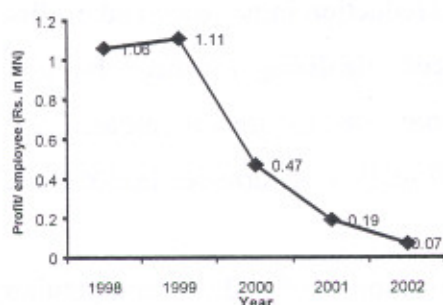


Figure 6.16: Trends of profits per employee at HMT



Figure 6.17: Trends of inventory turnover ratio at HMT

6.4.3 Change Process at HMT

Some change initiatives have been taken from time to time at HMT. Table 6.9 depicts details of them. The symbols used have already been explained in the case study of Maruti Udyog Limited.

Table 6.9
Change Process at HMT

Year	Reason of need of change	Area	T / K	S / F	Action taken
1970	Lack of technological competency in tractors manufacturing in Indian companies.	TC			Technical collaboration with MOTOKOV, Czechoslovakia Republic and Government of India for production of tractors.
1971	Started production.	TC	K	F	Started manufacturing of 2-cylinders tractors with 20HP power.
1972	Many imported components in the tractors.	ST	T	S	Started ancillaries for the supply of many components at competitive prices.
1975	Market response of existing model (20 HP) not so good.	TC	T	F	Introduced new model with 25 HP power.
1977	Competition among tractor-manufacturers in large HP range.	TC	K	S	Establishment of R&D centre for developing new models.
1980		TC	T	F	Developed a new 3-cylinders model with 35 HP.
1981		TC	T	F	Developed another model with 4-cylinders with 57 HP.
1983		TC	T	F	Developed another model with 59 HP for big farmers.
		ST	K	S	Widening of dealers network for improving sales network.
1985	Demand of a new tractor in the range of 40-50 HP from middle size farmers.	TC	T	F	Developed a new tractor with 45 HP.
1986	Growing competition from other manufacturers.	SM	T	S	Started sale of tractors to dealers on credit basis.
		SM	T	F	Extended warranty period from 6months to one year.
1988	Trend towards mechanized farming, rising demand of tractors in the market	ST	K	S	Started a new plant at Mohali, near Chandigarh
		ST	T	S	Increased local vendors.
		SM	T	S	Offered production incentives to the employees to increase production rate.
1990	Useful product-life of the tractors less than offered by other competitors.	TC	T	S	Investment on research and development to increase useful product life.
1991	New emission norms as per New Motor Vehicle Act 1988.	TC	K	S	Developed technical collaboration with Austria for AVL technology in the tractors.
1992	New models of tractors by other manufacturers complying emission norms.	TC	T	F	Introduced new models with AVL technology with 25 HP and 35 HP power.

1993	Large manufacturing costs.	SM	T	S	Reduced inventory to reduce the accumulated investment.
		TC	T	S	Encouraging indigenisation of more number of components than to import.
1995	Observed large stock of finished tractors in the stockyards due to recession.	SM	T	S	Search for new markets and export avenues.
	Large overheads due to excessive manpower.	SM	K	F	Revised age of retirement to 58 years.
1999	Market requirement of a tractor in the range of 40-50 HP for midsize farmers.	TC	T	F	Launched a new model with 45 HP power for middle and big farmers.
		ST	K	F	Start of another plant at Hyderabad for manufacturing tractors of 45 HP.
	Realization of need of more systematic approach.	SM	K	S	Accredited to ISO-9001.
	Difficulty to absorb systems of ISO9000 at lower levels.	SM	T	S	Conducted programmes in routine regarding awareness and training for ISO 9000.
2001	Growing competition in 35-45 HP ranges of tractors.	TC	T	S	Development of new model with 40 HP power with AVL technology.
	Large blocked investment on inventory.	SM	T	S	Reducing inventory turnover ratio through vendor-rating system.
	Large recurring burden due to excess manpower and large overheads.	ST	K	F	Reduction of manpower by 400 through VRS
		SM	T	F	Reduction in profit margins of vendors for cost cutting.
		SM	T	F	Diverting transport services (for employees) to contractors.
2002	Stringent emission norms by Government of India.	TC	T	F	Launched new model of 35 HP with AVL technology.
	Large overheads.	ST	K	F	Reduction in number of manpower (about 200) through VRS

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture, K: Kludging, T: Tinkering, F: Fast, S: Slow)

Table 6.10 shows all the actions consolidated during change process at HMT. Three phases of change process are observed at HMT (Table 6.10). The first phase depicts stable market conditions when demand of tractors was continuously increasing. Profit margin of the manufacturers was quite large. The company chose technology as the driver of change and introduced new models in the varied HP range. During the second phase, which may be called as competitive phase, the company observed a stiff competition from new Indian tractor-manufacturers and multi-national companies. The profit margins reduced considerably. With the systems and technology as drivers of change, the company developed more new models, increased warranty period of tractors, revised incentives rates of operators, and controlled inventory of raw materials. In the third phase, due to turbulent conditions the industry observed a drop in the demand of tractors. Profit margins shrunk with reduction in demand, industrial recession,

devaluation of rupee in the international market, rising manufacturing cost and large recurring burden/ overheads. With systems and structure as drivers of change in this phase, the company made concerted efforts. The company reduced manpower at various levels through VRS. Further, the company took measures to reduce its vendors and widen its sales and service-network.

Table 6.10
Areas of change considered during change process at HMT

S No	Year	Area of change	Phases	Change Strategies	Driver(s) of change
1	1970	TC	<i>Stable market conditions, growing demand of tractors, only a few tractors' manufacturers, large profit margins.</i>	a. Planned change based on long term basis b. Using kludging method c. Made a lot of investment on production facilities.	Technology
2	1971	TC			
3	1972	ST			
4	1975	TC			
5	1977	TC			
6	1980	TC			
7	1981	TC			
8	1983	TC - ST			
9	1985	TC			
10	1986	SM - SM	<i>Competitive market conditions, growing demand, reduced profit margins, setup of new plant.</i>	a. Need based change for short term basis b. Using tinkering and kludging c. Made a lot of investment on new production facilities. d. Did not increase the production capacity.	Technology and Systems
11	1988	ST - ST - SM			
12	1990	TC			
13	1991	TC			
14	1992	TC			
15	1993	SM - TC			
16	1995	SM - SM			
17	1999	TC - ST - SM - SM	<i>Turbulent conditions, drought in many states, decrease in the purchase power of people, reduction in demand and sales, large overheads.</i>	a. Emergent change b. Using tinkering c. Reducing manpower through VRS. d. Vendors' consolidation through vendor-rating system for cost cutting.	Systems and Structure
18	2001	TC - SM - ST - SM - SM			
19	2002	TC - ST			

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture)

The change programme at HMT has not been effective as indicated by the trends of various performance parameters. The prevailing organizational systems, technology, structure and culture have not shown any notable shift in any performance-indicator leading to progress/ success to the company.

6.4.4 SWOT Analysis at HMT

Table 6.11 shows SWOT analysis at HMT.

Table 6.11:SWOT Analysis at HMT

<i>Strengths</i>	<i>Weaknesses</i>
• International reputation of HMT group • Capability to develop its own technology using in-house R&D facilities • Wide range of tractors to satisfy the customers • Financial support of the government • Large sales-and-service network	• Governed by government rules and regulations in plant administration and marketing/ sales • Formal lengthy procedures to get sanction from head office/ authorities for any new strategy/ system, need, innovation, new model, price, etc. • Weak work-culture due to lack of teamwork • Lack of initiatives and commitment by the middle management • Lack of flexibility in manpower and manufacturing processes
<i>Opportunities</i>	<i>Threats</i>
• Rising trend of mechanized farming • Capability to design farming equipments and attachments • Increased demand of tractor-engines for pumping and other agricultural purposes	• Drought and other natural calamities reducing the purchasing power of customers • Reducing profit margins due to stiff competition • Rising material costs • Challenge from Chinese cheap products in India

6.4.5 SAP- LAP Analysis at HMT

Table 6.12 shows SAP analysis at HMT and LAP synthesis is described.

**Table 6.12
SAP Analysis at HMT**

<i>Situation</i>	<i>Process</i>
• Diminishing demand of the tractors with adverse conditions like low industrial growth, drought, natural calamities, etc. • Entry of MNCs and establishment of new Indian units in tractors business after globalization and liberalization • Shrinking profit margins • Stiff competition among tractor-manufacturers • Large overheads and recurring expenditure due to excessive manpower • Lack of sufficient funds for research and development to match world-class manufacturing • Bureaucracy, red-tapism, and centralized decision-making • Pro-employees' rules and regulations • Interference of the central government in the affairs of the company	<i>Technological aspects</i> • Developing numerous models of tractors in wide HP range • Designing farming equipments and attachments by local research and development <i>Systemic issues</i> • Accreditation to ISO 9001 • New vendor policy based on their product quality and delivery schedules • Reduction in overheads, and reduction in wastage level by improving manufacturing processes • Developing local vendors, ancillaries and suppliers • Diversion of some plant services on contract <i>Structural issues</i> • Developing local vendors and ancillaries for scheduled supply of materials and components • Reduction in unwanted manpower by VRS programme <i>People and culture</i> • Offering employment to a large number of employees as a public sector organization • Bureaucratic interference in policy-making • Sense of belongingness among people quite less • Follow of pro-employees' rules and regulations of central government
<i>Actors</i>	
• Executive Director as the key decision-maker • Managers and supervisors of the company • Workers' union inside the plant • Vendors, ancillaries and subsidiaries	

Learning Issues

The following learning issues have emerged from the case study of HMT:

- ***Government rules and regulations:*** It is learnt that a public sector undertaking following government rules and regulations, having an old technological setup, practicing bureaucratic systems, with centralized planning and decision-making is liable to face difficulties in the era of liberalization and globalization.
- ***Bureaucracy and red-tapism:*** Bureaucracy and red-tapism in the current scenario can take an organization in blue. The case of HMT has demonstrated that the strategies related to price regulation, technology up-gradation, systems modifications, reduction of manpower etc. have been delayed due to these practices, and have resulted in pitiable situation for the organization.
- ***Lack of professionalism:*** If change has to be implemented successfully, it requires strict enforcement, a disciplined approach, total commitment and involvement at all levels. The case of HMT has demonstrated that due to lack of commitment and rigid mindset of employees, bringing a change in organization is difficult.
- ***Manpower reduction:*** Structural changes have been very critical and should be planned very carefully. Reduction of manpower in a public sector through various methods like early separation plan, VRS, retrenchment, delayering etc. has been a tedious process because of adherence to government rules and regulations. HMT offered VRS but the financial burden increased so much that the organization had to temporarily discontinue it.
- ***Marketing Strategies:*** Advertisements have a great impact on the perception of customers about the company. Highlighting the strengths of organization can help in capturing a large market share. It is found that HMT has not made sufficient efforts on effective advertising of its products.
- ***Timely changes:*** For the success of the organization, timely actions must be taken. Due to the prevailing systems, HMT could not plan any increase in the installed capacity during favorable market conditions whereas other competitors nearly doubled their installed capacity. As a result, the relative share of HMT in the industry

dropped. Later on, with the reduction in profit margins due to stiff competition, the company observed net losses.

Action

Following the famous PDCA cycle, there is a need to plan new initiatives, implement them, check the results and act again. New changes in structure, systems and technology are urgently required. Vendors need to be developed. Decentralization of decision-making and bureaucratic bashing seem to be an immediate necessity. Cost cutting must be achieved by better use of resources, rather than unmindful lay-off of the employees.

Performance

Major factors of competitiveness that need to be closely monitored in order of importance for assessing the implementation of change management in this case are: systems implementation, professionalism in business, timely actions, customers' reaction and response, price competitiveness, profitability and competitors.

6.5 Concluding Remarks

Various actions taken to make change in the identified manufacturing units producing light commercial vehicles and tractors have been studied and presented in this chapter. It is realized that the Indian tractors industry is passing through a very difficult phase. The demand of the tractors is continuously reducing in the market. This has been attributed to the consecutive draught conditions in many states of India. Due to stiff competition between the manufacturers of tractors, profit margins have reduced over the years. With the in-house research and development, cutting edge technology, favorable business policies from the government and implementation of systems, PTL has been successful in the business. On the other hand, inspite of world-class technology and skilled manpower, HMT has not met with the desirable level of success. The reasons of the failure have been government rules and regulations, long bureaucratic procedures, work culture and large overheads. By in-house research and development, low cost technology, new marketing strategies and adopting better systems of work, the tractor industry can revitalize itself.

It is revealed that demand of LCVs is slowly increasing in the Indian market. With Japanese technology, customer focus, diversification to new vehicles with small changes in the design of the chassis, and systems design and implementation have been responsible for the success of LCVs' manufacturing organizations.

CASE STUDIES IN ORGANIZATIONS MANUFACTURING COMPONENTS FOR AUTOMOBILE MANUFACTURERS

7.1 Introduction

This chapter describes the detailed case studies in various organizations manufacturing components for original equipments manufacturers (OEMs). In this category, three organizations have been taken up for detailed study. These are: Sona Koyo Steerings Systems Limited, VeeGee International and GNA Axles Limited. Case studies are described in the following sections.

7.2 Case Study - VII (Sona Koyo Steering Systems Limited)

M/S Sona Koyo Steering Systems Limited (SKSSL) is manufacturing steering systems and column assembly for cars, LCVs and HCVs. The factory is located at Gurgaon near Delhi. A Board of Directors manages the affairs of the company whereas Managing Director looks after routine affairs. SKSSL is a tier-1 vendor of steering systems and many other components to various automobile manufacturers (OEMs) like Maruti Udyog Limited, Hyundai Motors, Mahindra and Mahindra, Eicher Tractors and Telco.

7.2.1 About the Company

SKSSL was promoted by Maruti Udyog Ltd. (MUL) as a joint-venture for manufacturing of steering systems for passenger-cars. The company entered into technical agreement with Koyo Seiko Co Ltd. (Koyo) Japan for seeking technological guidance for manufacturing of steering systems. Commercial production of steering systems commenced on 1st October 1987. In the beginning, the company was manufacturing mechanical steering systems only. Later on, it started manufacturing other products like rack and pinion type steering gear, re-circulating ball-screw type steering gear, power steering gear, steering column, propeller shaft, axles and differential assemblies for car manufacturers. The company imports substantial raw materials to meet the technical requirements of the steering systems.

SKSSL's fortunes have been closely linked to the performance of MUL, because it is a main supplier of steering systems to it. However during the last two years, it endeavored to widen its customer base. Now it supplies steering systems to Hindustan Motors, Hyundai, Eicher, Daewoo and Toyota in addition to MUL.

7.2.2 Realization of Need of Change

Profit margins of SKSSL reduced over the last few years. Main reason for this reduction was the stiff competition between automobile manufacturers and reduction of their profit margins. As a common strategy, OEMs offered bigger lot sizes to their vendors and asked for reduction in prices for the supply of parts and components. This strategy brought tremendous pressure on SKSSL and required a change in the business practices. With the new manufacturers of steering systems, monopoly of SKSSL in steering systems has been challenged. Financial performance of the company was affected a great deal. Appendix B7 depicts various performance indicators of the company over the years. Trends of these indicators and performance of the company are briefly described below.

Earning per Share: Figure 7.1 shows the trends of earning per share (EPS) from the year 1998 to 2002. It is realized that earlier SKSSL was earning large profit margins. EPS of the company in the year 1998 was registered at Rs.10.2 but reduced to Rs. 6.5 in 1999. With the setting up of another production unit and diversifying to power steering systems, EPS increased to Rs 9.8 in the year 2000. During 2000-2001, due to recession in car market, EPS reduced drastically to Rs. 0.89. But with the recovery of the market in the year 2002, EPS of the company improved to Rs 4.29.

Profit Turnover Ratio: It is depicted (Figure 7.2) that profit turnover ratio decreased continuously from the year 1998 to 2001, barring 2000 when the company registered a marginal increase in its profits. Profit turnover ratio observed a record low value of 0.01 in the year 2001 as compared to 0.07 in 1998, 0.04 in 1999, and 0.05 in 2000. The decrease is attributed to market recession, increasing material costs, reduction in profit margins, and costlier import components in power steering systems. By making efforts for cost cutting, the company achieved an increase in its profit-turnover-ratio at 0.02 during the year 2002.

Profit per Employee: Profits per employee show a continuous decline from 0.18 million in the year 1998 to 0.03 million in 2001 barring 2000 when profits rose to 0.18 million (Figure 7.3). With the cost cutting programme and making supply of steering systems to other cars- and utility-vehicle manufacturers, further decrease in profit per employee at SKSSL was arrested and profits per employee increased to Rs. 0.10 million in the year 2002.

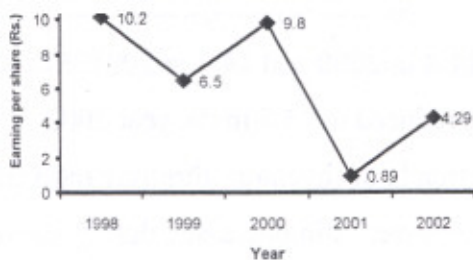


Figure 7.1: Trends of earning per share at SKSSL

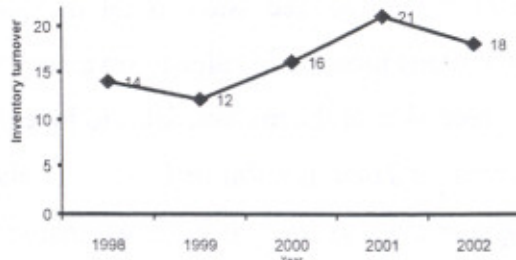


Figure 7.5: Trends of inventory turnover ratio at SKSSL

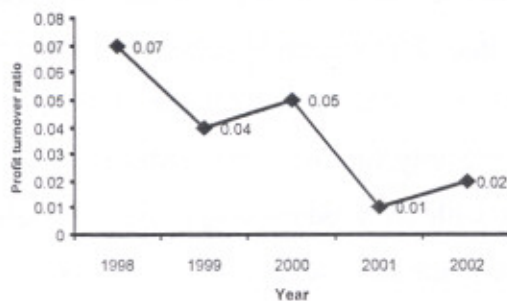


Figure 7.2: Trends of profit turnover ratio at SKSSL

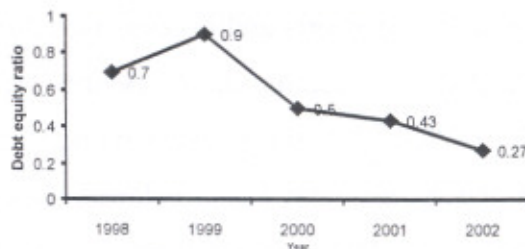


Figure 7.6: Trends of debt equity ratio at SKSSL

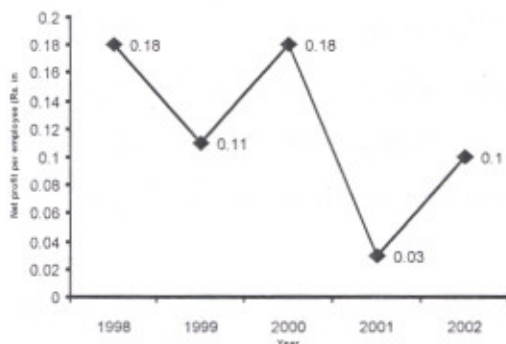


Figure 7.3: Trends of net profit per employee at SKSSL

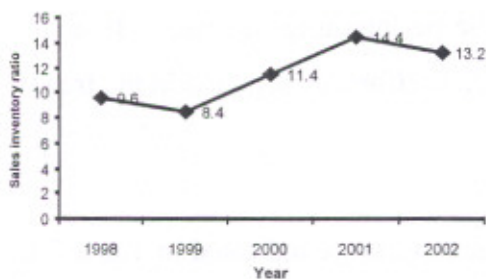


Figure 7.4: Trends of sales inventory ratio at SKSSL

1999 with the recession in car industry (Figure 7.4). Subsequently, there has been a continuous increase in sales to inventory ratio at 11.4 in 2000 and 14.4 in 2001. But with the recession in the market, sales to inventory ratio reduced to 13.2 in the year 2002.

Inventory Turnover Ratio: Figure 7.5 shows the trends of inventory turnover ratio from the year 1998 to 2002. It is shown that inventory turnover ratio decreased during the year 1998-1999. During this time, SKSSL had not been very careful and large investments were made on inventories of raw materials. With the reduction in profit margins, the company made efforts and implemented Just-in-Time (JIT) system to reduce investment on inventory. As a result, inventory turnover ratio increased to 16 in 2000 and 21 in 2001. In 2001-2002, with the stagnant market share, inventory turnover ratio reduced to 18. Now the organization has developed close links with its vendors and OEMs through internet for the immediate requirements and to control the stock levels.

Debt Equity Ratio: With the increase of the debts of the company, the debt equity ratio increased from 0.7 in 1998 to 0.9 in 1999 (Figure 7.6). It was realized that shareholders' profit in SKSSL was eroding mainly because of long-term investments made out of internal accruals, which were not yielding satisfactory returns. The organization planned to dispose off these investments and repay the loans taken earlier. As a result of these efforts, debt to equity ratio reduced to 0.5 in the year 2000 followed by 0.43 in 2001 and 0.27 in 2002.

From the trends of the performance parameters, it can be concluded that the company has faced a tough time with the recession in automobile industry. Profit margins have substantially reduced but with the efforts of the company for increasing production capacity, quality assurance, increase in productivity, repaying the loans, and reduction in inventory, the company has shown an increase in the performance-indicators. It seems that the company has been successful as a result of these efforts as depicted in the trends of performance parameters since the year 2001.

7.2.3 Change Process at SKSSL

Details of need of change and actions taken from time to time are indicated in Table 7.1. Various symbols used in the table have been explained in the case study of Maruti Udyog Limited (MUL).

Table 7.1
Change Programme at SKSSL

Year	Need of change	Are -as of cha- nge	T / K	S / F	Action taken
1987	Started production of mechanical steering systems in technical collaboration with Koyo Seiko Co Ltd Japan.				Plans to increase production rate.
1988	Growing demand of steering systems from OEMs.	TC	T	S	Increased production rate through optimizing line operations.
1991	Realization of new avenues with growing demand of cars and utility vehicles.	TC	K	S	Started production of steering column, propeller shafts, axles and differential assemblies in addition to steering systems.
	Low levels of quality assurance and productivity.	SM	K	S	Started statistical process control techniques for quality assurance.
		SM	T	S	Started education and training programmes for the manpower for improving their productivity.
1993	Inadequate level of belongingness among employees.	SM	T	S	Involved all employees in improvement and modification plans through suggestion schemes.
1994	Growing demand of steering systems in the global market.	ST	K	F	Establishment of Mahindra Sona Ltd, a subsidiary for prompting exports business.
1995	Stagnation in profit margins.	ST	K	F	Started manufacturing of ball joints in technical and financial collaboration with Somic Ishikawa Inc. Japan in additon to steering systems.
		SM	T	S	Increased manpower productivity.
1996	Large money blocked due to huge inventory of raw materials.	SM	T	S	Reduced inventory by adopting Japanese manufacturing systems and transferring small components to tier-2 and tier-3 vendors.
	Realization of large scrap rate and rework due to conventional machining processes.	TC	K	S	Started a cold forging unit under technical guidance from Matsuda Industry Inc. Japan with the objective of reducing scrap.
1997	Realization of better market avenues through global partnerships.	TC	K	S	Made technical and financial collaboration with Mitsubishi Materials Corp, Japan for manufacturing of synchronizer rings and bevel gears.
1998	Lack of synergy in the organization for growth in global markets.	ST	T	F	Increased the equity of Koyo Seiko to 20.4% and also renamed the company to Sona Koyo Steering Systems Limited.

	Reduced profits, economic downtrend, and recession in The Indian automobile industry.	SM	T	S	Started supply of steering systems to other auto-manufacturers (OEMs) in addition to MUL.
	Changing customer preferences towards new technology cars with power steering systems offered by MNCs.	TC	T	S	Started production of power steering in the same plant for car manufacturers in addition to mechanical steering systems.
	Lack of flexibility due to centralized decision making.	ST	K	S	Appointed Sr VP (General), VP (Marketing), Executive director and Directors to fasten decision-making.
	Large design and development time.	TC	K	S	Developed Test - Rig and field and track testing facilities for quick test-results of new designs.
	Costly imported components in the power steering systems.	TC	K	S	Started in-house research and development to replace the imported components with Indian alternatives.
	Increasing demand of power steering systems by new OEMs.	ST	K	F	Started a new plant at Chennai to supply steering systems to Hyundai Motors India.
1999	Reduction in profit margin due to cost cutting strategy of OEMs.	SM	T	S	Made efforts for increase in productivity and reduce scrap rate and rework through training of the employees.
	Large breakdowns and large investment on maintenance.	SM	T	S	Involved manpower to maintain the machines themselves.
	Large debt to equity ratio.	SM	T	S	Planned to repay the loans.
2000	New market avenues due to growing auto-industry.	TC	K	S	Started production of differential assembly and other components for cars and LCVs.
	Inadequate involvement of people towards organizational objectives and goals.	SM	T	S	Started TPM programme under the guidance of an external expert from Japan.
	Compulsion of accreditation of ISO9000 from MUL.	SM	K	F	Accredited to ISO 9002.
	Realization of large losses of electrical energy in the plant.	SM	T	S	Improved inhouse generation of electricity per litre of diesel by proper load distribution and planned-maintenance of generators.
2001	Decline in sales due to general recession in the industry.	SM	T	S	Improved sales through exports and new OEMs.
		SM	T	F	Improved supply chain management thro' ERP.
	Demand by the customers for accreditation to QS9000.	SM	K	F	Accredited to QS9000.
2002	Increase in the demand of MUV.	TC	T	S	Started manufacturing components for MUVs.

Demand of electronic power steering by OEMs for new models.	TC	T	S	Changes in the production line to start manufacturing of electronic power steering systems.
Large in-house rejections and high customers' returns.	SM	T	S	Improved quality assurance, and reduced rejection rate through TPM programme.
	SM	T	S	Made improvements in supply chain management through ERP.
Increased competition amongst new vendors for manufacturing components for OEMs.	ST	K	F	Developed closer ties with OEMs and increased the lot sizes.
Mutual grievances amongst workers on incentive issue.	SM	T	F	Introduced variable monetary compensation based on transparent and fair performance criteria.
Large procurement and transactional cost.	SM	K	F	Developed on-line links with suppliers and OEMs.
High cost of transportation for making supply to OEMs.	SM	T	F	Innovated a logistics programme by using a common vehicle to transport components from different suppliers located in the same geographical cluster.
Inadequate level of transparency and openness, and lack of prompt decision-making.	ST	T	F	Restructured Board of directors, designated Chairman and MD as a whole time executive directors, and others as non- executive directors, made the authority clear at every level for prompt decision-making.
Large debts.	SM	T	S	Disposed long-term investments made in the subsidiaries of Sona group.

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture, K: Kludging, T: Tinkering, F: Fast, S: Slow)

All initiatives of making change at SKSSL have been consolidated as depicted in Table 7.2. The entire change process has been divided into three phases (Table 7.2). In the first phase, the market conditions were fairly stable. The company enjoyed a monopoly in the absence of any competitor. Profit margins were quite large. During this phase, the company chose technology as the driver of change. In the second phase, which may be called as 'competitive phase', competition between vendors increased and profits of SKSSL decreased. The organization chose structure as the driver of change and made efforts for its success. The company established a new plant to manufacture steering systems for Hyundai Motors. In addition, new tier-2 and tier-3 vendors were increased and available resources were optimally utilized. The company also expanded its customer-base and started manufacturing steering systems for LCVs. In the third phase, after the year 1999, the market conditions turned turbulent. Demand of cars increased

tremendously in the market. In the leadership-war of OEMs, profit margins of vendors were severely hit due to their cost-cutting programme. SKSSL chose systems as the driver of change and made efforts for cost-cutting, quality improvement, reduction in waste and rework, and increase in productivity. This phase clearly reveals the company's struggle for its existence and re-emergence as the leader in steering systems manufacturing.

Table 7.2
Areas of change considered during change process at SKSSL

S No	Year	Area of change	Phases	Change Strategies	Driver(s) of change
1	1987	TC	<i>Stable market conditions, monopolist market, no major competitor, large profit margins.</i>	a. Planned change on long term basis	Technology
2	1988	TC		b. Using kludging	
3	1991	TC-SM-SM		c. Made big investments	
4	1993	SM			
5	1994	ST			
6	1995	ST-SM			
7	1996	SM-TC			
8	1997	TC			
9	1998	ST-SM-TC-ST-TC-TC-ST	<i>Competitive market, rising material price, competition from other vendors.</i>	a. Need based change b. Using tinkering and kludging c. Making large expenditure for capacity increase.	Structure
10	1999	SM-SM-SM	<i>Turbulent market, Reduction in profit margin, customers' changing needs and preferences, Customers' market.</i>	a. Emergent change	Systems
11	2000	TC-SM-SM-SM		b. Using mainly tinkering but kludging also	
12	2001	SM-SM-SM		c. Not very large investments, mainly realigning of systems	
13	2002	TC-TC-SM-SM-ST-SM-SM-SM-ST-SM			

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture)

From the above discussion, it can be concluded that technology remained as the driver of change till the market conditions were favorable. In the absence of competition, the company enjoyed monopoly in steering systems manufacturing. With the increase in auto-manufacturers and vendors in the industry, the situation turned to competitive and ultimately turbulent. Market share, profit margins, and quality levels were affected a lot. Realizing a need for change, the company chose structure and systems as the required

drivers of change in the second and third phases respectively. With the rising material costs and changes in customers' preferences, the organization started manufacturing power steering systems also. Subsequently it made efforts for cost cutting, waste-reduction, productivity-enhancement, and quality-improvement. From the trends of performance indicators, it is clear that the efforts of change at SKSSL brought success in the year 2001.

7.2.4 SWOT Analysis at SKSSL

Table 7.3 shows the SWOT analysis at SKSSL.

Table 7.3
SWOT Analysis at SKSSL

<i>Strengths</i>	<i>Weaknesses</i>
• International reputation of Sona Group • Joint venture of Maruti Udyog Limited • Technological and financial support from Koyo Seiko Company Ltd Japan • Tier-I vendor to many OEMs supplying steering systems • Adherence to Japanese work system and group work culture, implementation of Toyota Production System (TPS), accreditation to ISO 9002 and QS 9000, use of TQM and TPM methodologies • Committed manpower and team spirit • High level of commitment from top management • High level of flexibility in changing products and processes.	• Main dependence on Maruti Udyog Limited • Adapting to The Indian government rules and regulations • Costly imported components in the power steering systems
<i>Opportunities</i>	<i>Threats</i>
• Establishment of more automobile companies in India • Strategy of OEMs to procure parts and components from tier-I vendors only • Growing demand of power steering systems • Growing exports avenues in the neighboring countries	• Squeezing profit margin • A big unorganized sector producing non-genuine spares parts for cars and utility vehicles • In-house manufacturing of steering systems by new MNCs or imports • Escalating prices of raw materials

7.2.5 SAP-LAP Analysis at SKSSL

Table 7.4 shows the SAP analysis at SKSSL and its LAP synthesis is described.

Table 7.4
SAP Analysis at SKSSL

Situation	Process
• The company has obtained its technology for Koyo Seiko Company Ltd. of Japan through technical collaboration. • Market share and profit margin of MUL has affected the performance of this company because it is the main supplier of steering systems to it. • The company has diversified into allied products like UJ assembly and Rack and Pinion assembly. • SKSSL has widened its customer base from MUL to other OEMs also, e.g. Hyundai, Eicher, Telco etc. • SKSSL as a tier-1 vendor to OEMs is dealing with tier-2 and tier-3 vendors, and has assured scheduled supply components to OEMs on JIT system. • The company started a new plant in Tamilnadu for Hyundai Motors as tier-1 vendor. • ISO9002, QS9000, TQM, TPM, 5S, JIT, and ERP solutions have improved the systems of the organization and changed the work-culture.	Technological issues • Technical collaboration with world leaders has helped in manufacturing of world-class products • Optimal use of manufacturing facilities for productivity increase • Suitable change in technology for Electronic Steering systems • Automation in the production area Structural issues • Restructuring of the board of directors for quick decision-making • Increase in the partnership of Koyo Seiko Company Limited Japan • Start of a new plant for making steering systems for Hyundai Motors • Increasing the customers' base and starting manufacturing of steering systems for utility vehicles and LCVs Systemic issues • Use of statistical process charts for quality assurance • Display of targets and level of accomplishment for more transparency • Reduction in inventory levels through J-I-T • Implementation of TPM, 5S, and accreditations to Toyota Production System, ISO9002 and QS 9000 People and Culture • Open-office culture for easy accessibility • Common uniform at all cadres and common-canteen for rich work-culture • Education and training to employees to achieve organizational objectives, and goals • Involving people at all levels for innovations • Participative management by Kaizen, Quality Circles, and Suggestion Schemes and Cross-functional Teams • Enormous savings by developing cost cutting as a habit by all employees
Actors • Managing Director as the key decision-maker • Skilled, trained and flexible work force • Flexible and sincere managers and supervisors • Tier-2, tier-3 vendors and other suppliers to SKSSL	

Learning Issues

Based on the detailed study and analysis of the initiatives taken at SKSSL, the following learning issues have emerged.

- **Outsourcing:** Case study of SKSSL has emerged with a major learning issue that success of vendors in tier-1 category is dependent upon the success of its OEMs. Profits of SKSSL dropped as and when profits of MUL decreased.
- **Cost Cutting:** Another major learning issue from this case study is that in the era of globalization and liberalization when competition is getting stiff and profit-margins are decreasing, gross profits of a company are dependent upon quantity of sales. Profits per steering system were reduced by the OEMs, but with the increased lot size, the gross profits of SKSSL increased. Cost cutting has been very helpful for the success of SKSSL.
- **Vendor Consolidation:** It is learnt that vendor consolidation can result in quality assurance. It is seen that SKSSL and its tier-2 /tier-3 vendors upgraded their facilities to meet the desired quality and quantity of their OEMs.
- **Waste Reduction:** Performance of an organization is not solely dependent upon its technology level, rather operating systems can contribute a lot in its success. SKSSL made considerable efforts to reduce wastages like rework and scrap, and increase productivity, which increased its net profits.
- **Strategic Change:** Expansion of a manufacturing organization should be planned carefully. With the plan of manufacturing steering systems for another car-manufacturer, the company preferred to select a new site near the customer. This strategy not only reduced the transportation costs rather helped the company in developing a new work-culture instead of managing with existing old work-culture.

It is learnt that with large product-mix, a company can make use of its facilities optimally. Starting with the mechanical steering systems and subsequently manufacturing of power steering systems, steering column and differential assemblies at the same plant, the company not only used the facilities optimally rather created new avenues for its future.

Action

The change initiatives taken up at SKSSL depict the capability of organization to manufacture products with the desired quality-standards and at competitive prices. The company should plan new changes, implement them, check their results and act again. For further cost-cutting, more systemic changes are needed in the company.

Performance

Major factors of competitiveness that need to be closely monitored in order of importance for assessing the implementation of change management in this case are: product mix, diversification, profitability, productivity and cost cutting

7.3 Case Study – VIII (VeeGee Industrial Enterprise)

M/S VeeGee Industrial Enterprise (VeeGee) is manufacturing sheet metal components and subassemblies for cars, tractors and motorcycle manufacturing units. The factory is located at Faridabad near New Delhi. Its managing partners have been managing the company. The customers of the products made by the company are the automobile giants like Maruti, Eicher, Honda Seil and Hero Honda.

7.3.1 About the Company

VeeGee enterprise was established in the year 1990 as a family business for manufacturing sheet metal components for Maruti Udyog Limited (MUL) and Eicher Tractors Limited (Eicher). By that time, MUL was in the process of increasing its production capacity and was in need of good vendors. The company started the production of sheet metal components for MUL using conventional machines with the installed capacity of 24000-25000 strokes per day. As the managing partners were familiar with the technical and industrial environment from their background, they recruited skilled manpower from the beginning.

During this time, demand of tractors increased in the market. To increase its production capacity, M/S Eicher Tractors was also looking for new vendors for supply of components. VeeGee started manufacturing sheet metal components for this organization also. With the growth of business, VeeGee set up another new plant in Faridabad industrial area in the year 1994, with the installed capacity of 400,000 strokes per day. The company has also procured an advanced technological welding machine from Italy. The company is the OEM supplier for sheet metal components for various models. Second shift was started in the year 1996-97 to double the operational time.

7.3.2 Need of Change

Till 1997-98, the company was growing without any problem with an average growth rate of 25-30% per annum. But with the liberalization and globalization initiatives of the government of India, the situation underwent a radical change. Appendix B8 depicts

Profit Margin: Figure 7.7 shows the trend of profit margin from the year 1998 to 2002. Profit margin reduced continuously till the year 2000. VeeGee also diversified in LCVs and started manufacturing sheet metal components for LCVs also. As a result, profit margin of the company increased to 3.13% during the year 2001 and 3.45% during 2002.

Turnover per Employee: Turnover per employee increased continuously from the year 1998-99 to 2002-03 (Figure 7.8). Factors responsible for this achievement have been selection of skilled and capable employees, training them to reduce wastage, scrap and downtime, introduction of piece rate system, diversification and production of multiple products.

Wastage Level: Figure 7.9 shows the trend of wastage level of VeeGee enterprise from the year 1998 to 2002. As a part of cost cutting programme initiated to satisfy the stiff requirements of auto-manufacturers, the company reduced the wastage levels by training employees. ISO 9002 accreditation also helped the organization in this pursuit by pinpointing critical areas. The company is in the process of implementation of TPM to reduce downtime, increase quality level and enhance OEE.

In-house Rejection: In-house rejections came down continuously from a level of 600 ppm in the year 1998-99 to 154 ppm in the year 2002-2003 (Figure 7.10). Addition of new machines, effective maintenance, implementation of TPM and TQM, regular education and training of employees and continuous improvement in working standards and procedures have made this possible.

Machine Breakdowns: Figure 7.11 shows the trend of machine breakdowns from the year 1998-99 to 2002-03. Frequency of machine breakdowns increased from 80 to 83 during 1999-2000 because of ineffective preventive and scheduled maintenance and casual attitude of the operators. By imparting more education to its employees and start of TPM, the frequency of breakdowns has gradually reduced.

Trends of performance indicators of VeeGee enterprise as discussed above, indicate the successful management of change by the company. The hard-core areas targeted by the company for cost cutting and becoming competitive, have definitely yielded results.

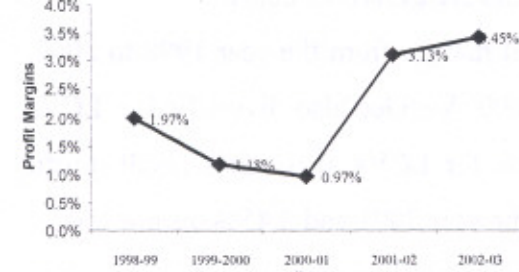


Figure 7.7: Trends of profit margins at VeeGee

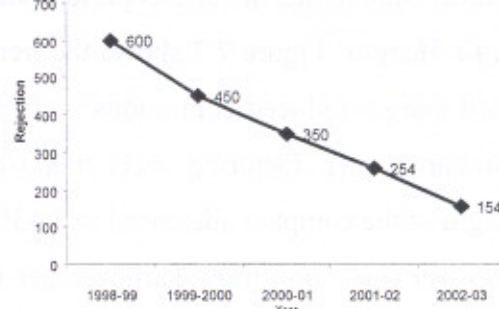


Figure 7.10: Trends of in-house rejection at VeeGee

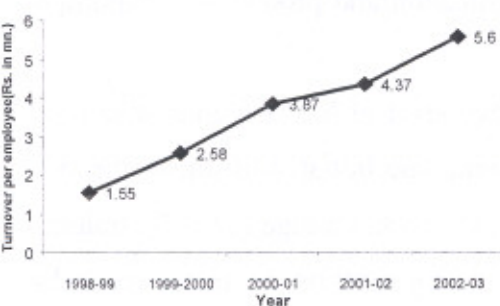


Figure 7.8: Trends of turnover per employee at VeeGee

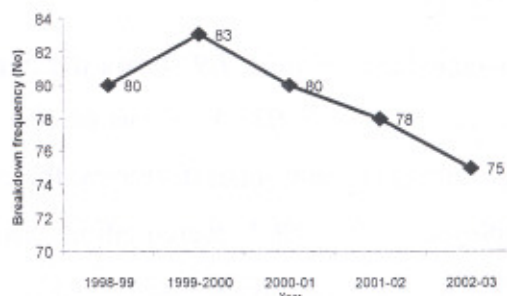


Figure 7.11: Trends of machine breakdown at VeeGee



Figure 7.9: Trends of waste level at VeeGee

7.3.3 Change Process at VeeGee

Table 7.5 depicts various change initiatives taken at VeeGee since its inception. The scheme of presentation in the table and symbols used are the same as in other case studies discussed earlier.

Table 7.5
Change Process at VeeGee

Year	Need of change	Are -as of cha- nge	T / K	S / F	Action taken
1990	Started manufacturing of sheet metal components for MUL and Eicher.	SM	T	S	Plans for expansion in future by making changes in the production systems.
1991	Requirements of higher quality standards for OEMs.	SM	T	S	Started 100% inspection of the products.
	Under utilization of plant capacity.	TC	T	S	Started manufacturing more components for cars and tractor companies.
1992	Low turnover of the unit	TC	T	S	Started making multiple products.
	Large number of setups	SM	T	S	Reduced set-ups and set-up times.
1994	Realization of need to become more systemic. Also pressure from MUL to acquire ISO9000 certification.	SM	K	S	Accredited to ISO 9002.
	Establishment of new manufacturers of cars, tractors and two wheeler business.	ST	K	F	Started a new plant in Faridabad Industrial Area with increased capacity and new technology.
		TC	K	F	Imported world-class technology machine in the new plant with guidance from new manufacturers.
		ST	K	F	Recruited highly skilled manpower for improving production quality.
1996	Low productivity due to large scrap rate and rework.	SM	T	S	Started quality assurance through SQC techniques, and FMEA / FTA analysis.
	Shortage of skilled manpower.	SM	T	S	Used the same manpower in the second shift by offering overtime.
1998	Delays in meeting customer orders.	SM	T	S	Strengthened production planning and control activity.
	Large downtime due to breakdowns.	SM	T	F	Upgraded preventive maintenance of dies, tooling and fixtures by scheduled maintenance.
	Excess material movement on the shop floor.	SM	T	F	Provided bins and conveyers to streamline the material transfer.
1999	Reduced profit margins.	SM	T	F	Adopted cost cutting by reducing rejections.
		SM	K	S	Imparted education and training to the employees for autonomous inspection.
	Wasted human efforts on material movement	TC	K	S	Replaced manual movement by the forklifters
2000	Demand of closer tolerances by the customers.	SM	T	S	Determined process capability of machines.

	Lack of synergy amongst employees.	SM	T	S	Started weekly meeting to discuss various issues related to production and employees, improved transparency and enhanced communication.
	Lack of belongingness and rigid mental set of workers	SM	T	S	Introduced flexibility by involving the employees in value added suggestions under Kaizen programme.
2001	Lack of discipline in the plant.	SM	T	S	Started new system of checking absenteeism on every entry and exit from the work area.
	Difficulty of employees to adjust to new technology and systems.	SM	T	S	Training made mandatory for the employees @ 18 hours per annum
2002	Frequent change in the design and drawing of components by customers.	SM	T	S	Trained workers for multiskills.
	Large business avenues due to recovery of automobile industry from recession.	ST	T	S	Started manufacturing components for LCV, HTV and other car manufacturers in addition to existing customers.

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture, K: Kludging, T: Tinkering, F: Fast, S: Slow)

With the aim of deciding the effective strategy, all the change initiatives at VeeGee have been consolidated as shown in Table 7.6. Three phases of change are considered at VeeGee Enterprise during its change process. The first phase goes till 1994 when there was normal competition in the market. The profit margins of automakers and their vendors were reasonably good during this period. Market share and profit margin of existing units started declining after liberalization and globalization. During the second phase, VeeGee increased its production capacity, expanded product mix and improved technology capabilities. The company chose systems as the driver of change. After the year 1999, the market has been turbulent. Many new vendors were established by automakers, profit margins reduced, and quality requirements increased. The company made systemic changes and brought in TPM and TQM culture. Also, manufacturing of small parts has been transferred to outside vendors. This phase has been dominated by system modifications for cost cutting. No doubt, some changes in structure have supported the systemic changes in the organization.

Table 7.6
Areas of change considered during change process at VeeGee

S No	Year	Area of change	Phases	Change Strategies	Driver of change
1	1990	SM	<i>Stable market condition, large demand of cars and utility vehicles, large profit margins.</i>	d. Slow planned change based on long term basis	Technology
2	1991	SM-TC		e. Kludging	
3	1992	TC-SM		f. Large investments in technology machines.	
4	1994	SM-ST-TC-ST			
5	1996	SM-SM	<i>Market competition, rising prices, reduction in profit margins.</i>	a. Need based change	Systems
6	1998	SM-SM-SM		b. Tinkering	
7	1999	SM-SM-TC		c. Making small expenditure for required changes.	
8	2000	SM-SM-SM	<i>Turbulent market conditions, reduction in profit margin, cost cutting by the OEMs and vendors.</i>	a. Emergent change	Systems
9	2001	SM-SM		b. Tinkering	
10	2002	SM-ST		c. Optimal utilization of resources	

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture)

7.3.4 SWOT Analysis at VeeGee

Table 7.7 shows the SWOT analysis at VeeGee.

Table 7.7
SWOT Analysis at VeeGee

<i>Strengths</i>	<i>Weaknesses</i>
• Technological guidance from MUL and other OEMs • Capability to diversify into sheet metal components for LCVs and HCVs • High level of commitment from top management • Equipped with machines of new technology • Wide exposure of the top management through attending highly specialized training programmes in Japan and other places	• Government rules and regulations • Main dependence on Maruti Udyog Limited. Large volumes are supplied to them
<i>Opportunities</i>	<i>Threats</i>
• Increase in demand of personal vehicles in India • Establishment of more automobile manufacturing companies in India • New avenues due to diversification in other products	• Reduction in profit margin after liberalization and globalization • Accumulation of inventory as a result of market conditions • Large number of competent vendors existing in the market • Trend to replace metal components by plastics

7.3.5 SAP-LAP Analysis at VeeGee

Table 7.8 shows the SAP analysis at VeeGee and LAP synthesis is described.

Table 7.8
SAP Analysis at VeeGee

<i>Situation</i>	<i>Process</i>
- Increased demand of sheet metal components for all categories of vehicles - Performance of automobile manufacturers directly affecting the performance of vendors - Increased demand of cars and utility vehicles in the Indian market whereas reduced demand of tractors due to repeated draughts - Reduction in the profit margins of the vendors - Changed trend towards reduction in product mix and large lot sizes	Technological issues - Technical assistance from automobile manufacturers - Optimal use of local manufacturing facilities, skills and raw materials Structural issues - Installation of new plant for increasing manufacturing capacity - Making limited recruitment and increasing productivity - Educating operators for autonomous inspection and maintenance Systemic issues - Reducing overheads and wastage by improving manufacturing processes and working systems and procedures - Improving productivity by TQM and TPM programme - Accreditation to ISO 9002 - Participative management and continuous improvement by kaizen - Use of statistical process control for quality assurance - Shortening of the procurement time from the vendors through on-the-line link People and Culture - Continuous education to employees for meeting organizational objectives, goals and vision - Involving all employees in the accomplishment of objectives
<i>Actors</i>	
- Managing Partners as the key decision makers - Employees of the company as skilled, trained and flexible work force - Flexible and dedicated managers and supervisors of the company	

Learning Issues

Based on the detailed study and analysis of the initiatives taken at VeeGee enterprise to fight competition and survive in the era of globalization and liberalization, following learning issues have emerged.

- Competition:** Market competition has increased tremendously as a result of globalization and liberalization and resulted in competitive prices. This has compelled the organizations to adopt cost cutting in a big way.

- **Cost Cutting:** It is seen that there is a lot of scope for cost cutting through strategies like mass manufacturing, reducing waste, better productivity, more automation, new materials and better discipline.
- **Benchmarking:** The case of VeeGee has demonstrated that compatibility of vendor and automobile manufacturers depends upon the matching technology, system and culture. Through benchmarking of quality and other production facilities of automobile manufacturers, the vendors can try to achieve the required levels in their organizations.
- **Manpower Optimization:** Job rotation, job enlargement and enrichment, developing multiskills of workers have resulted in optimal utilization of manpower.
- **Employees' Involvement:** Employees in the organization do resist some of the initiatives on change but participation of management in company affairs can considerably subside such reactions and achieve a great deal of employee involvement.
- **Strategy:** The case study has amply demonstrated the success of the strategy aimed at better utilization of resources (TPM, TQM) and modification of systems and procedures for cost cutting. The company did not adopt cost cutting as strategy but used systemic changes for cost cutting.

Action

Cost cutting through becoming more systematic and organized, has helped VeeGee enterprise to remain competitive. Using PDCA cycle, the company should plan new initiatives, implement them, check their results and act again. All the earlier initiatives taken at VeeGee enterprise need to be continued with more vigor.

Performance

Major factors of competitiveness that need to be closely monitored in order of importance for assessing the implementation of change management in this case are: productivity, profitability, cost cutting, diversification and product mix

7.4 Case Study – IX (Guru Nanak Axles Limited)

M/S Guru Nanak Auto Axles Limited (GNA), manufacturer of axles for the automobile-companies, is located at village Mehtiana, 50 Km from Jalandhar (Punjab). Starting from an artisan's workshop in the year 1946, now the organization has diversified to GNA

Group of Industries. GNA Udyog Limited, GNA Axles Limited, GNA DuraParts, and Seehra Overseas are various companies under this group. Managing Director manages the activities of the group whereas Director looks after the routine affairs of this unit.

GNA Axles Ltd. is one of the largest integrated plants of its kind in the sub-continent of Asia. The organization manufactures axles, propeller shafts and gearbox components of high quality for Original Equipment Manufacturers (OEMs). GNA group has maintained a consistent growth over the years and has ambitious plans for manufacturing the following sub-assemblies:

- Rear axle assemblies
- Propeller shaft assemblies
- Gearboxes (transmission)
- Spiral bevel gears

Today, the group supplies components to many automobile majors in India as well as outside India. Some major customers are Tata Engineering and Locomotive Company Limited, Swaraj Mazda Ltd, Eicher Motors Limited, Mahindra and Mahindra, Mercedes Benz Germany, Dana Spicer Limited, Maruti Udyog Limited, Premier Auto Limited, Suzuki Corporation Limited Japan etc.

7.4.1 Need of Change

The company was established in 1990 for the manufacturing of Rear Axle Shafts, hydraulic lift shaft and Rower Takeoff shafts for HCVs and tractors manufacturing companies. Till 1980s, the Indian economy was fully protected from foreign competition and only domestic competition existed in India. After 1990, with the globalization and liberalization, many multi-national companies entered in India and established manufacturing units for tractors, cars, LCV, HCV, MUV, SUV etc. As a result, market avenues increased for the vendors. With the increased demand of the vehicles, GNA looked forward for new customers, and started with new products and new strategies. Due to the industrial recession and devaluation of rupee in the international market, overall performance of the companies was affected a lot in the year 2000. Appendix B9 depicts some performance indicators of the company over the years. Performance of the company and trends in these indicators are described below.

Market Share: Figure 7.12 shows the trends of market share of GNA from the year 1996 to 2002. It is depicted that market share of GNA has increased gradually from 59% in the year 1996 to 60% in 1997, 62% in 1998, 65% in 1999 and 69% in 2000. Accreditation to ISO 9002 and QS 9000 helped the company a lot in getting new orders from OEMs. After the year 2000, market share of GNA got almost stagnant. During this time, the organization made efforts to change the old manufacturing-practices, and applied low cost manufacturing to absorb the rise-in-price of raw materials and to make profits.

Turnover per Employee: It is shown in Figure 7.13 that turnover per employee has increased from Rs. 3.61 lakhs in the year 1997 to Rs. 4.13 lakhs in 1998, 4.21 lakhs in 1999 and 4.29 lakhs in 2000. With the industrial growth and growing demand of axles and other components by OEMs, turnover per employee further increased to Rs. 5.38 lakhs in the year 2001 and Rs 5.67 lakhs in 2002.

Profit per Employee: This is indicated that profit reported per employee increased continuously from the year 1996 to 2000 (Figure 7.14). Profit per employee was registered at 0.12 lakhs in 1997 followed by 0.20 lakhs in 1998, 0.21 lakhs in 1999 and 0.23 lakhs in 2000. In the year 2000, due to recession in economy and natural calamities in a few states of India, the demand of vehicles dropped. Further due to growing competition from new vendors with world-class technology, and recession in industry, profits per employee reduced to 0.17 lakhs in 2001. The organization made systemic changes like reducing investment on inventory, reducing waste, developing multiskill abilities of the employees etc. Due to these efforts, net profit per employee increased to 0.19 lakhs in 2002.

Inventory Turnover Ratio: Inventory turnover ratio has increased from 10.00 in the year 1996 to 14.29 in 2001 barring 1999 when it reduced to 12.50 compared to 14.29 in 1998. With the new excise policy and rising prices of raw materials, the ratio observed a decrease at 11.11 in the year 2001. But with better material management, inventory turnover ratio increased to 12.5 in 2002 (Figure 7.15).

Profit Turnover Ratio: Profit turnover ratio of GNA increased continuously upto the year 2000 as depicted in Figure 7.16. Then with adverse market conditions, reduction in demand of tractors, stiff competition, and hike in material-prices, the ratio dropped to 0.04 in 2001 from 0.07 in the previous year. The company took several actions for better

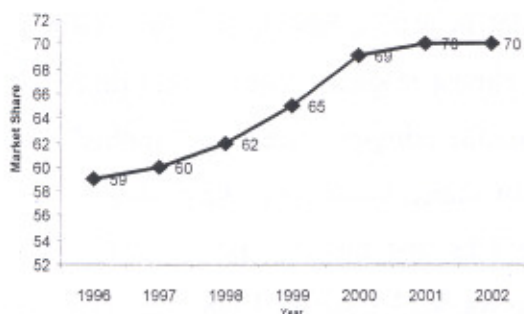


Figure 7.12: Trends of market share at GNA

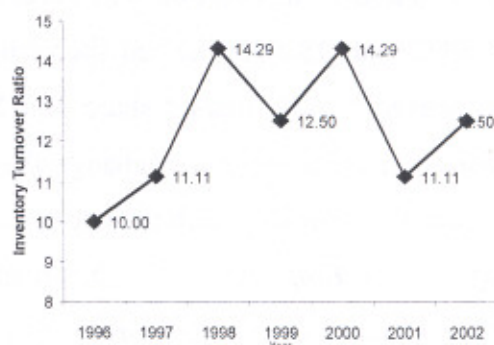


Figure 7.15: Trends of inventory turnover ratio at GNA

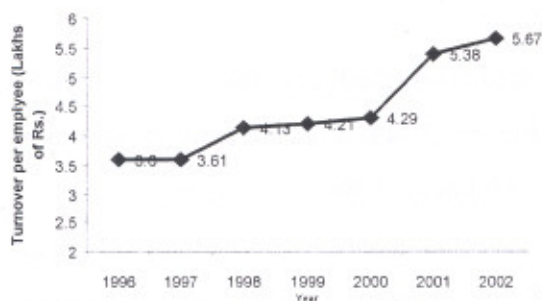


Figure 7.13: Trends of turnover per employee at GNA

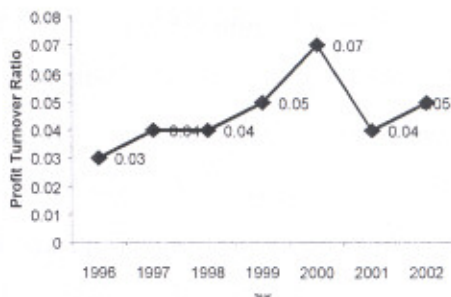


Figure 7.16: Trends of profit turnover ratio at GNA

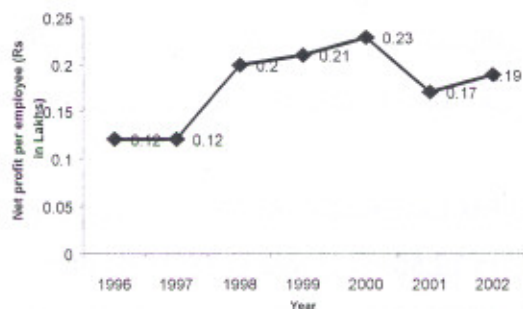


Figure 7.14: Trends of net profit per employee at GNA



Figure 7.17: Trends of rejection level at GNA

material management, reduction in wastage, optimizing the manpower and increasing customer base. As a result, profit turnover ratio improved to 0.05 during the year 2001-2002.

Rejection Level: Rejection level at GNA is found to reduce continuously as depicted in Figure 7.17. This shows the continuous efforts made by the company. With new technology machines, accreditation to ISO 9001 and QS 9000, the company has been successful in reducing in-house rejection level. As shown in the figure, the rejection level reduced from 8% in the year 1996 to 7 % in 1997, 6% in 1999, 5% in 2001 and 4% in 2002.

It is realized that the company faced competition from new component manufacturers. Rising material prices also added to the woes of the company. There was a sudden drop in the profit margins during 2000-2001. To face the situation, the organization made considerable efforts and achieved cost cutting in a big way. Also it controlled manpower, increased product-mix, and started TPM programme. The efforts to make changes at GNA have proved successful as depicted by the trends of performance indicators from the year 2001.

7.4.2 Change Process at GNA

Change initiatives taken from time to time at GNA for its success are depicted in Table 7.9. Against every need of change, action has been taken in one or more major areas like technology (TC), system (SM), structure (ST), people (PL), and culture (CC).

Table 7.9
Change Process at GNA

Year	Need of change	Area -s of chan -ge	T / K	S / F	Action taken
1946	Start of the shaft forging as artisan's work.	TC	T	S	Plans to increase the quantity of production.
1955	Increasing demand of axles and shafts by the auto-manufacturers.	TC	K	F	Installation of a forging machine for production of axles for HCVs.
1982	Quality level lower than the market requirements.	TC	K	F	Procured an imported Spline Rolling machine for quality production.

1990	Increasing demand of tractors and other vehicles in the market.	TC	K	S	Installation of advanced technology machines for quality production.
		ST	K	S	Established “GNA Axles Limited” for manufacturing of axles for OEMs.
1992	Inadequate level of quality assurance.	SM	K	S	Setting world leaders as benchmarks of quality and aligning production systems to achieve the same.
		TC	K	F	Setting up a material-testing lab for quality assurance.
1994	Inadequate materials management.	SM	K	S	Introduction of Kanban system.
1995	Compulsion of ISO9000 certification of the vendors by OEMs.	SM	K	F	Accredited to ISO 9002.
	Low productivity due to large machine-down-time.	SM	T	S	Started planned maintenance of machines.
	Realized congestion on shop floor.	SM	T	S	Implemented 5S programme.
1996	Realized the need of becoming more systematic.	SM	K	S	Accredited to QS 9000.
1998	High manufacturing costs.	SM	T	S	Practicing e-buying for the lowest material price.
	Low morale of workers.	SM	T	S	Employees empowered to take decisions.
		SM	T	S	Imparting training to staff for knowledge and skill upgradation.
2000	Large overheads and lack of teamwork.	ST	T	S	Reducing levels of management (layers).
		SM	T	F	Forming of “company council” involving people from various levels.
	Low availability of machines.	SM	T	S	Introduction of TPM, emphasis on increasing OEE.
2001	Short production runs, frequent change-overs.	TC	T	S	Setting new parallel lines for continuous production for meeting demand on JIT basis.
2002	Inadequate accountability of individuals on shop floor.	ST	T	S	Reduced layers of management to only three levels i.e. GM, line in-charges, and operators.
	Low morale of the employees.	SM	T	S	Compulsory training for all employees.
		SM	T	S	Starting job rotation amongst employees.

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture, K: Kludging, T: Tinkering, F: Fast, S: Slow)

All change actions have been consolidated as shown in Table 7.10. In the table, three phases of change process are depicted at GNA. The first phase depicts the status till the organization was enjoying leadership and monopoly in the market. There was a large demand for axles in the secondary market. The company chose technology as the driver of change and made a large investment for new technology machines. In the second phase, GNA chose systems as the driver of change and increased the quality standards for global recognition. The company got accredited to ISO9002 and QS9000. With the

increase in market competition due to new vendors manufacturing axles and other components, the competition became very stiff. To reduce manufacturing costs, the company adopted cost cutting and utilized resources optimally. During third phase, which may be called as the turbulent market conditions, the company implemented TPM, 5S and Kaizen. Systems remained as the driver of change. With customer focus, more efforts were made for reducing rejection level and enhancing the quality assurance. The efforts made by the organization resulted in success as depicted by the trends of performance parameters in the year 2001.

Table 7.10
Areas of change considered during change process at GNA

S No	Year	Area(s) of change	Phases of change process	Change Strategies	Driver of change
1	1946	TC	<i>Stable market conditions, large demand of axles, only a few vendors manufacturing axles for OEMs, large profit margins.</i>	a. Planned change based on long term basis b. Large investment on technology machines.	Technology
2	1955	TC			
3	1982	TC			
4	1990	TC - ST			
5	1992	SM - TC			
6	1994	SM	Rising material price, increasing quality requirements in the market, adverse market conditions, increase in vendors for OEMs, <i>competitive phase.</i>	a. Need based change b. Using tinkering and kludging. c. Avoiding any large expenditure on extra resources.	Systems
7	1995	SM - SM - SM			
8	1996	SM			
9	1998	SM - SM - SM			
10	2000	ST - SM - SM	<i>Turbulent market conditions, reduction in profit margin, stiff competition from other vendors, rising material prices, and large overheads.</i>	a. Made emergent changes b. Using tinkering. c. Cost cutting. d. Optimizing resources.	Systems
11	2001	TC			
12	2002	ST - SM - SM			

(TC: Technology, SM: Systems, ST: Structure, PL: People, CC: Culture)

7.4.3 SWOT Analysis at GNA

Table 7.11 shows the SWOT analysis at GNA.

Table 7.11:SWOT Analysis at GNA

<i>Strengths</i>	<i>Weaknesses</i>
• Reputation of GNA Group for quality production of forged components • Large product mix • Committed manpower and team spirit • High level of flexibility in products and processes • High level of commitment from top management	• No technical collaboration with any national or international agency • Limitation on investment for research and development to meet international challenges • Increasing material costs are affecting profit margins
<i>Opportunities</i>	<i>Threats</i>
• Increased demand of components and spares due to large number of OEMs • Capability of the organization to diversify into other products • New avenues of exports in the neighboring countries • Trend of the automobile manufacturers to boost tier-1 vendors	• Reducing profit margins of the vendors due to stiff competition • A big unorganized sector producing non-genuine spares parts • Use of plastics and other materials replacing metallic parts and components

7.4.4 SAP-LAP Analysis at GNA

Table 7.12 shows the SAP analysis at GNA and LAP synthesis is described.

**Table 7.12
SAP Analysis at GNA**

<i>Situation</i>	<i>Process</i>
• Developing technology out of own efforts without any collaboration • Increased product mix for variety of customers • Industrial recession and adverse environmental conditions • Entry of MNCs in automotive manufacturing • Slow industrial growth at national level • Growing demand of tractors, LCVs and HCVs in the market • Easy availability of quality vendors in the market	<i>Technological issues</i> • Manufacturing axles comparable to world-class products • Reducing overheads and wastage through upgradation of plant and machinery • Diversification into manufacturing of axles for LCVs, HCVs and MUVs • Procuring high-tech machinery to increase the quality and quantity level • Reducing changeovers and increasing the production capacity using parallel lines <i>Structural issues</i> • Restructuring of the organization by appointing three directors: for production, marketing and finance • Delegation of authority to the line incharges for meeting daily targets • Formation of functional groups for innovations • Formation of departmental councils for quick decision-making • Putting a ban on recruitment of operators/workers Contd.....

<i>Actors</i>	<i>Process</i>
• Director to manage day-to-day affairs • Employees of the company • Flexible and dedicated managers and supervisors	<i>Systemic issues</i> • Enhancing overall equipment effectiveness (OEE) • Implementation of TPM programme • Better materials management by Kaizen approach • Use of industrial engineering techniques, statistical process charts and free flow of information for better management • Strengthening systems by accreditations to ISO9002 and QS 9000 • Started e-buying of raw material for minimum material prices <i>People and culture</i> • Continuous training of employees to achieve organizational objectives • Involving employees at all cadres in innovations • Making enormous saving by cost cutting • Increasing teamwork spirit through quality circles, kaizen, and suggestion schemes • Increase in transparency through effective communication and information- sharing

Learning Issues

Based on the detailed study of the initiatives taken by GNA to succeed, following learning issues have emerged.

- **Vendor consolidation:** Success of a component manufacturer is possible through its supplies to OEMs rather than depending on the secondary market. The case of GNA axles Ltd has demonstrated that by manufacturing axles exclusively for OEMs, the company has been able to retain its market share, earned good profit margins and survived in the era of globalization and liberalization.
- **Cost cutting:** It is seen that there is a lot of scope for cost cutting through strategies like: reducing inventory turnover ratio, reduced changeovers, reducing waste, increasing productivity, and using formalized systems, increasing OEE using TPM.
- **Technological upgradation:** State of technology can help an organization in cost cutting. Case of GNA has shown that the organization has made a large investment

for up-gradation of the plant facilities, and has been manufacturing world-class products without any foreign collaboration.

- **Benchmarking:** Benchmarking with respect to the organization of international repute is found to increase its competitiveness. Case of GNA has demonstrated that setting the tier-1 vendors of MNCs as benchmarks, the organization made efforts for continuous improvements and got success.

Action

The change initiatives taken at GNA depict the successful implementation of change in the organization, as and when needed. Recognizing the need of high quality products in The Indian market, GNA imported new technology machines for axles and other forged components. Proper planning before investments, checking the results and correcting the errors will prove helpful in the success of GNA in future. Manufacturing costs must be reduced further.

Performance

Major factors of competitiveness that need to be closely monitored in order of importance for assessing the implementation of change management in this case are: acquiring and absorbing state-of-art technology, promoting and strengthening innovative culture in the organization, and transforming GNA to a tier-1 vendor will take the organization to new heights

7.5 Concluding Remarks

In this chapter case studies of three organizations manufacturing components for various automobile manufacturers have been presented. M/S Sona Koyo Steering Systems Limited and M/S VeeGee are tier-1 suppliers to OEMs like MUL, Honda Seil etc. Since the advent of globalization and liberalization, these companies have paid attention to improving their technology and working systems are procedures. All the three organizations are accredited to ISO9000 and QS9000 quality management systems. M/S Sona Koyo and M/S VeeGee have fought the competition on the pattern of the fight of MUL and have achieved results similar to MUL. On the other hand, M/S GNA Axles mainly concentrated on high quality of their product and this has given them a great degree of success and growth.

CHAPTER 8

MATRIX OF CHANGE

8.1 Introduction

This chapter presents development of matrix of change for the categories of case organizations studied in the preceding three chapters. A detailed study and analysis of the change initiatives taken by various organizations and the results thereof have given a clear insight into the success of various actions taken by the organizations at different stages of their change process. Based on this insight and the present and past status of the organizations, these have been divided into various categories. A matrix of change has then been developed for each category wherein the existing practices and target practices have been listed and the desired change process has been evolved.

8.2 Matrix of Change

The Matrix of Change is a tool introduced by Brynjolfsson et al (1997). It presents a way to capture connections between organizational practices. It graphically displays both reinforcing and interfering organizational processes. Armed with this knowledge, a change agent can use intuitive principles to seek points of leverage and design a smoother transition. Once the broad outlines of the new system and the transition path are charted, authority can be decentralized for implementation. The procedure recommended by the researchers in the tool is used in this research work.

Matrix of Change functions as a four-step process. It provides a systematic means to judge those practices that matter most to the organization. It highlights interactions among these practices and possible transition difficulties from one set of practices to another. It encourages people to provide feedback on proposed changes. And, it uses process interactions to provide guidelines on the pace, sequence, feasibility, and location of change. These procedures have been used in this study to analyze the change process in Indian automobile industry.

Matrix of Change system consists of three matrices and a set of evaluation made by the people. These matrices represent the following:

- The current organizational practices,
- The desired practices,

- And a transitional state that bridges these two.

Involvement of people working in the organization is sought in evaluation. The evaluation by people provides them an opportunity to state the importance of these processes to their job activities. The matrix of change is constructed in four steps as described below.

8.2.1 Step 1 - Identify Critical Processes

First of all, the manager lists goals, current business practices and ways of creating value for consumers. Current practices are then broken into constituent processes suggesting how they are accomplished. The similar procedure is adopted for targeted practices. Most important processes can be identified based on the purpose or objectives of change. A team is formed based upon their knowledge of functions essential to business objectives and their ability to support during subsequent phases.

8.2.2 Step 2 - Identify System Interactions

From existing practices, a horizontal triangular matrix is prepared and complementary and competing existing practices are identified. Complementary processes reinforce one another whereas competing processes work at cross-purposes. Doing more of complementary practices increase returns to the other. A grid connects each process in an interference matrix; and at the junction of each grid plus sign(+) indicates complementary and minus sign(-) competing processes. An analogous process is followed for the vertical triangular matrix for target practices.

8.2.3 Step 3 - Identify Transition Interactions

Transition Matrix is a square matrix formed by combining the horizontal and vertical matrices. It helps in determining the degree of difficulty in shifting from existing to target practices. Plus sign (+) indicates the reinforcing and minus (-) the interfering practices. Certain practices reinforce one another while others may interfere.

8.2.4 Step 4 – Opinion of People

Next, it is determined where people (as stakeholders) think to retain current practices and implement target practices. Each participant uses a simple five point Likert scale anchored at zero. A value of "+2" means that a practice is extremely important and a value of "+1" that a practice is important but not essential, while a value of "-2" indicates

a strong desire to change or reject business as usual. A value of "0," which can be omitted, represents indifference.

8.3 Interpreting the Matrix

Interpretation of the information in the transition matrix is as follows.

8.3.1 Feasibility

The sign and density of interactions are important for determining feasibility, i.e. process of coherence and stability. A system of processes with numerous reinforcing relationships is coherent and therefore inherently stable, whereas one with numerous competing relationships is inherently unstable.

8.3.2 Sequence of Execution

The most easily eliminated practices are those that oppose other existing practices. Since stable systems generally have few opposing practices, it is recommended to start removing practices that have no inherent effect on other practices. On the target side, the easiest new practices to implement are those that complement existing ways of doing business. If new practices strengthen old habits in the way that make dismantling of the old regime even harder, it should be avoided.

8.3.3 Location

Density of interfering relationships in the transition matrix indicates how disruptive proposed changes will be. Increasing interference indicates a greater need for isolation and makes the existing or Brownfield sites less attractive. New or Greenfield sites are much more popular for introducing new systems.

8.3.4 Pace and Nature of Change

Three factors help to determine an appropriate pace of change, i.e. task interdependence, organizational receptiveness to change, and external pressure. The first, task interdependence, concerns how modular and how serial the essential steps are, i.e. the divisibility of organizational processes. Divisibility of tasks reduces the scope of change at any given instant. The culture of an organization helps to indicate the second factor, its receptiveness to change. A supportive culture permits phased adaptation to unfamiliar practices, particularly if change migrates through several parts of an organization. External pressure, third factor, is linked to trade unionism. Low pressure provides slack time for adaptation, and hence the slow pace of change. With extreme external pressure,

concern for survival and the absence of slack resources may force the pace to be rapid. This, in turn, interacts with the culture of an organization. If there is a history of opposition to change or a pattern of regressive change, then transition times should be minimized.

8.3.5 *People's Evaluation*

Evaluation by people helps anticipate their response by providing data on support, indifference or hostility toward proposed changes. If employees give existing practice low marks, they are likely to support a change. Conversely, if they do not support a change they will likely give existing practice high marks than targeted. People's evaluations open a window onto organizational receptiveness to change.

'Target Value - Existing Value' gives an approximation of the 'net value' to be gained by changing practices. This assumes that units of all the practices are same and practices with no counterpart are paired with a value of zero. Practices are put in a sequence based on the net value plotting a "Tornado Plot."

8.4 *Categorization of Companies*

Instead of using the matrix of change for each case organization, it is planned to categorize them and use the tool for them. The categorization has been done on the basis of type of products, operations, strategies, time at which actions taken, and results of change achieved. A detailed comparison of the case organizations was done as shown in Appendix C1. Based upon the detailed comparison, a consolidated data was prepared as indicated in Table 8.1. Times of action have been considered as 'early', 'neither early nor late', i.e. 'in time', 'late', 'very late', and 'not implemented'; and levels of success as 'maximum', 'moderate', 'fair' and 'poor'. Based on the times of actions and level of success, the companies have been categorized into four groups (Porter, 1980) as given below:

Group I	:	Market Leaders	:	MUL(Case-I), SKSSL(Case-VII), VeeGee (Case-VIII)
Group II	:	Market Challengers	:	PTL(Case-V), SML(Case-IV), GNA (Case-IX)
Group III	:	Market Followers	:	YMI(Case-II), HMT (Case-VI)
Group IV	:	Market Wraps	:	MAL (Case-III)

Table 8.1
Categorization of companies

S. No.	Aspects of change	MUL	SKSSL	VeeGee	PTL	SML	GNA	YMI	HMT	MAL
1	Major Technology changes	A	A	A	A	B	B	C	C	C
2	ISO 9000/ QS 9000/ TS 16949/ TQM/ TPM etc.	B	B	B	E	E	C	C	C	C
3	Waste reduction, cost cutting, inventory reduction etc.	B	B	B	D	D	D	D	D	D
4	VRS	C	E	E	E	E	E	B	C	C
5	Delaying, ban on recruitment, vendor consolidation, sales and service networks	C	C	C	C	C	C	C	C	C
6	Education and training	A	A	B	A	A	C	C	C	C
7	Japanese ways of work	A	A	A	C	C	D	D	D	D
8	Cultural change, flexibility	A	A	A	C	C	C	D	D	D
9	Change Success	M1	M1	M1	M2	M2	M2	M3	M3	M4
		GROUP-I			GROUP-II			GROUP-III		GROUP-IV

(Appendix C1: A: Early, B: in time, C: late, D: very late, E: not implemented,

M1: maximum, M2: moderate, M3: fair, M4: minimum)

Group-I indicates the 'market leaders'. These companies have maintained their market position through innovation, market responsiveness, and cost reduction. These companies have used various change strategies at the right time and have been successful (Porter, 1980). Group-II depicts the 'market challengers'. These companies remained in blue for a long time and after a lot of efforts, got success. These companies have publicly announced its intension to take no. one position either by price advantage, product innovation or promotion. Group-III depicts 'market followers'. These

companies are allowed to stay in the market only if the leader chooses to maintain a price umbrella and not maximize share. However, these companies are able to serve segments on a more personal level and maintain an industry position. These companies did not take timely actions and got quite less success in competition. Group-IV indicates the market warps, which could not face the competition and landed in a pitiable situation. These companies remained insensitive to the market trends/customer expectations and did not take timely change initiatives. Matrix of change for these four categories of case organizations has been constructed as described in the subsequent sections.

8.5 Using Matrix of Change for Companies in Group-I

For making matrix of change, a team was constituted in which supervisors were involved from the grouped companies. The objective of the matrix of change was made very clear to them. It was assured to keep their identity secret for their participation in the study. Critical processes in Group-I companies are found as in-house research and development capability, reduction in inventory, cost cutting and better HR practices.

8.5.1 Existing Practices

- *Run an efficient, low cost production*
 - Technological support from collaborator/ promoter
 - Well defined job functions
 - High technological machines and equipments
 - Large number of decisions made by the employees
 - Functional groups work independently
 - Effective cost-cutting techniques
 - Customer focus
 - Japanese ways of working
- *Meet products requirements*
 - JIT inventory (for one week)
 - Outsourcing of components, subassemblies and assemblies
 - Self inspection by operators and final inspection by QA department
 - Large dealers' and service networks
 - Accredited ISO9000, QS9000
 - Implementing TQM
- *Hierarchical structure to define role and responsibility*
 - Flat organization
 - Several management levels

8.5.2 Target Practices

- *Energized, empowered organization*
 - In-house research and development capabilities
 - Global marketing
 - Reduced lead time to product development
 - Diversification to other products
 - Employees' development
- *Higher quality of output*
 - Self inspection at all stages
 - JIT inventory (for one day)
 - Vendors' consolidation
 - Cheap alternatives of costly components
 - Implementing TPM
- *Elimination of non-value adding costs*
 - Fewer layers
 - Line rationalization
 - Increased productivity
 - Better HR practices

Matrix of change for this category of case organizations was prepared as shown in Figure 8.1.

8.5.3 Interpreting the Matrix

- *Feasibility:* From horizontal matrix, this is depicted that the current practices in Group-I companies are stable. From vertical matrix, the target practices are also indicated as stable. It depicts that the organization can make the targeted change.
- *Sequence of execution:* From transition matrix, it is shown that till the companies have centralized planning, they will face more problems to change. Adopting line rationalization can signal an irreversible commitment to a new way of doing business and cascade a complementary change in working practices.
- *Location:* Taking the level of interference in the transition matrix into consideration, it is recommended to go for small changes leading to a radical change.
- *Pace and nature of change:* Various factors depict pace and nature of change as given follows:

- *Independence*: Pace of change within the block is rapid but between the blocks may be slow. Target block associated with JIT inventory (for one day) is independent as depicted in the transition matrix, while all others are interdependent.
- *Receptiveness to change*: Since the change needs to migrate through several parts of the organization, so change in increments is preferred in these companies. Since the existing culture is supportive so it is easy to make changes.
- *External pressure*: Since there is no strong pressure of trade unions in these companies, the transition time does not affect the change process. Hence slow pace of change can manage the change process.

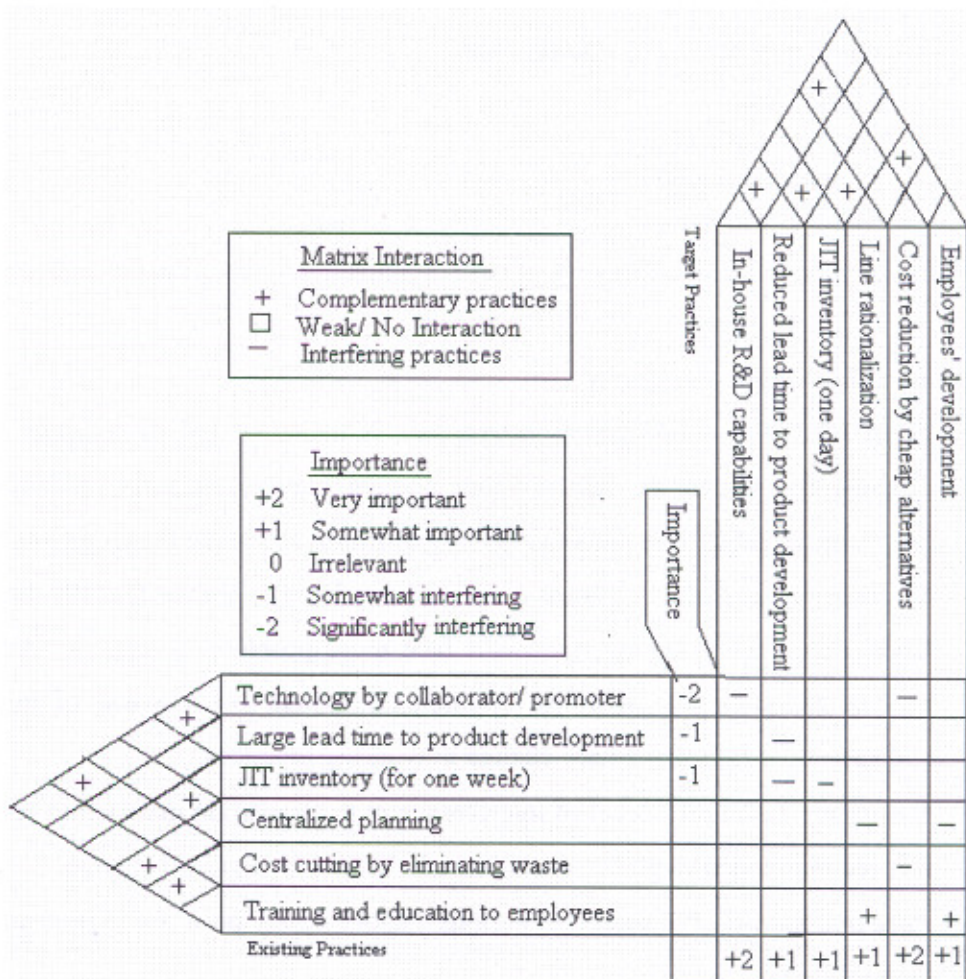


Figure 8.1: Matrix of change for group-I organizations

- *People's evaluation:* Culture in this group is supportive and mindset of people flexible. From Tornado plot (Figure 8.2), this is recommended that in the wake of globalization and liberalization, these companies need to develop in-house research and development capabilities followed by developing cheap alternatives without sacrificing quality. Other recommendations are to reduce the lead time to product development, reducing JIT inventory to one day against the existing one week, delegation of authority to line supervisors through line rationalization, employees development, in order.

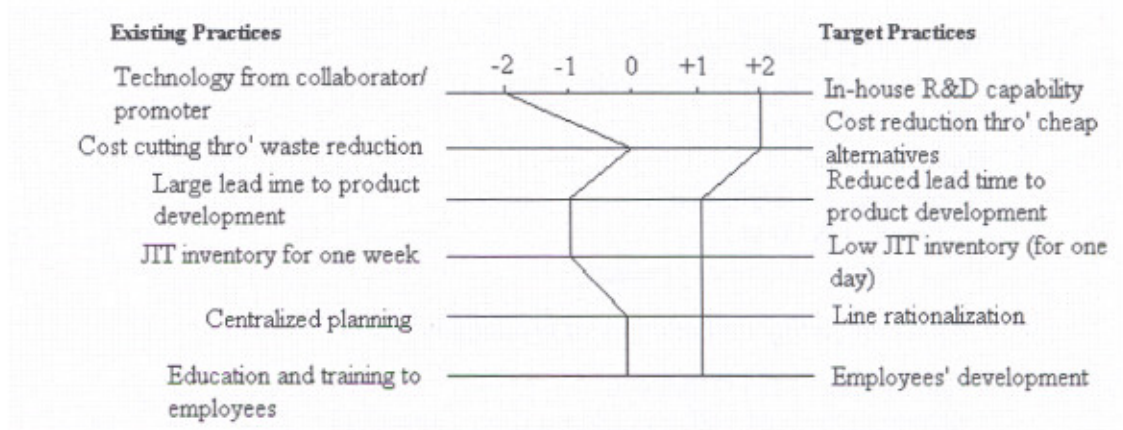


Figure 8.2 Tornado plot for group-I organizations

8.6 Using Matrix of Change for Companies in Group-II

The companies in this group are well managed, possess self developed technology and talented workforce, but could not take early/timely actions. Lack of professionalism in business and organizational setup have contributed to the situation. In consultation with the experts, critical factors for the companies in this group have been identified as productivity, technological capability, systems adaptation and lead-time to product development.

8.6.1 Existing Practices

- *Efficient manufacturing practices*
 - Making use of self-developed technology
 - Use of general purpose machines
 - Narrow job functions
 - Centralized decisions
 - Low product mix

- Customer focus
- *Meet product quantity and quality*
- Under developed vendors
- Limited use of Juran's approach of quality improvement
- Large work-in-progress inventory and finished goods inventory
- *Organizational structure*
- Line and staff organization
- Several management layers

8.6.2 Target Practices

- *Energized organization*
- World class technology
- Less lead time to product development
- Vendor development
- Benchmarking
- Reengineering, TQM, TPM
- ISO 9000, QS 9000
- Diversification to other products
- *Increased quality and quantity of production*
- Highly professional management
- Outsourcing of material, components and assemblies
- Large product mix
- Low inventories
- Global avenues
- Customer focus
- *Eliminating non-value operations adding costs*
- Fewer management layers
- Vendor consolidation
- Improving productivity

Matrix of change for this category of case organizations was prepared as shown in Figure

8.3.

8.6.3 Interpreting the Matrix

The following results are interpreted using matrix of change for the companies in Group-II:

- *Feasibility:* Since there is no interference in the current and target practices. So the companies can make the desired change without any problem.

- *Sequence of execution:* From the transition matrix, it is indicated that till the managements in these organizations are not professional, no target practices can be practically met. With better HR practices at the top management, change as desired is possible.
- *Location:* The transition matrix proposes a Greenfield location (new) for the proposed change, which is possible by making a radical change.

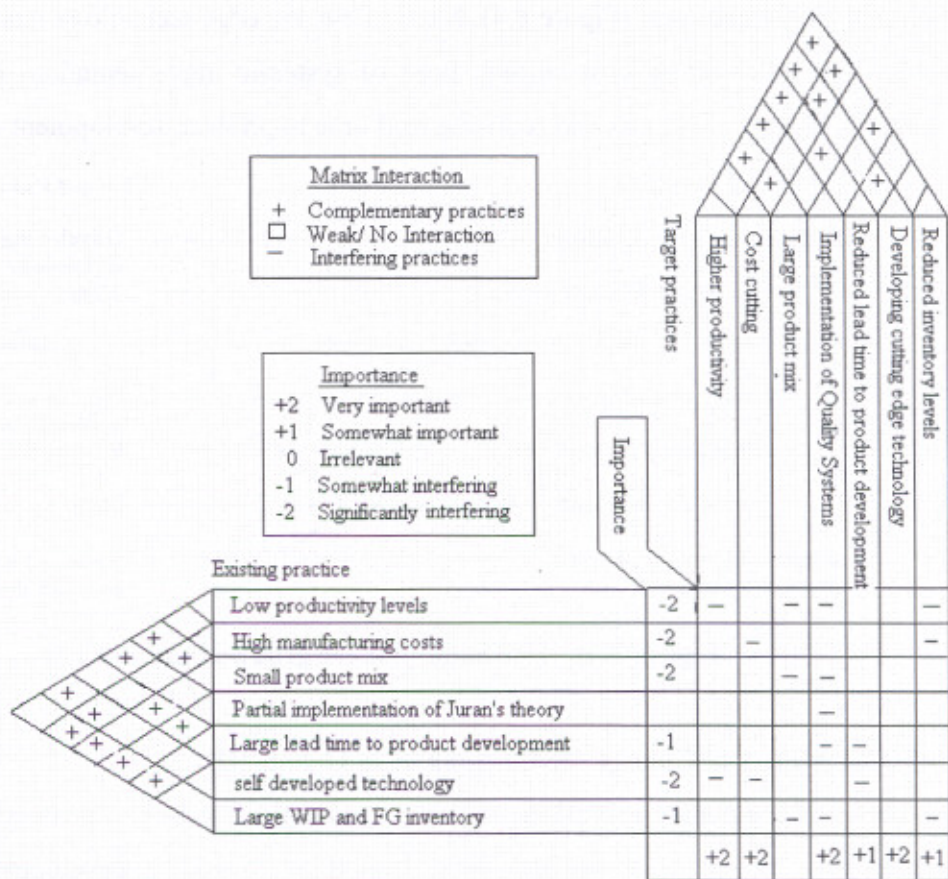


Figure 8.3: Matrix of change for group-II organizations

- *Pace and nature of change:* Pace and nature of change is studied by the following factors:
 - *Interdependence:* No target practice is dependent on the existing practices. Also there is no interference of the desired change with the existing practices.
 - *Receptiveness to change:* Since the change migrates through several parts of the organization, so change in increments i.e. slow change may be preferred.

- *External pressure:* Since level of resistance by the trade unions have been reduced through involving them in the agreements, slow rate of change can manage the change process.
- *People's evaluation:* The culture of these organizations is not supportive to the change. The employees have been enjoying the government rules and regulations and there is a lack of professional approach. The opinion of people as stakeholders is indicated in Tornado plot (Figure 8.4). Need of cutting edge technology has emerged on the top, followed by cost cutting, need of systemic implementation, inventory reduction, large product mix and reducing lead time to product development in order.

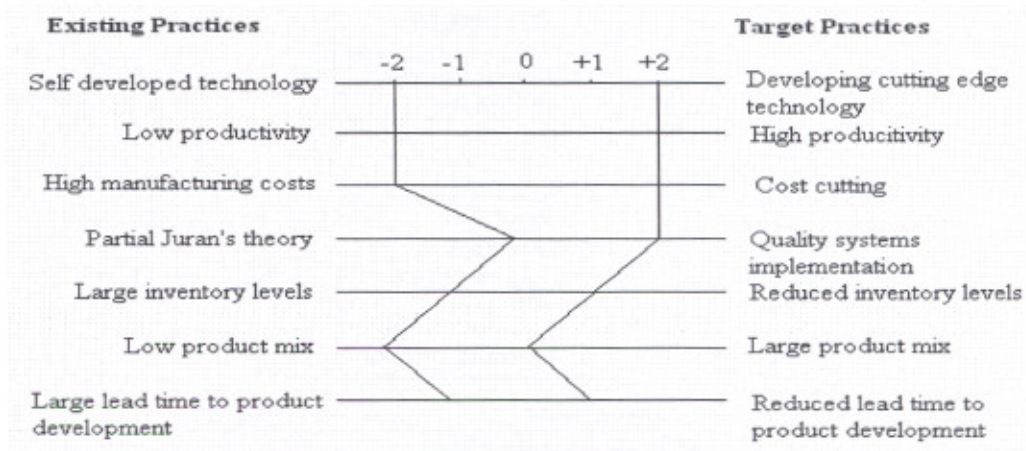


Figure 8.4: Tornado plot for group-II organizations

8.7 Using Matrix of Change for Companies in Group-III

For this group of companies, critical factors have been noticed as lack of professionalism, bureaucracy, red tapism, over staffing, large lead time to product development, high manufacturing costs, large overheads, large resistance to change, and lack of market responsiveness. In spite of high technological capability and large assets, the companies could not meet the challenges of the competition and remained unsuccessful.

8.7.1 Current Practices

- *Manufacturing capabilities*
 - High manufacturing costs
 - Started with world class technology
 - No improvement after initial technology adaptation
 - Large lead time for product development

- Inefficient manufacturing practices
- Large overheads
- Wide sales and service networks
- *Prevailing organizational practices*
 - Influence of trade unions
 - Resistance to change due to rigid mindset of people
 - Unrevised old production targets
 - No expansion of the facilities
 - Following government rules and regulations
- *Organizational structure*
 - Bureaucratic procedure
 - Vertical organization
 - Many management layers
 - Over staffing
 - Lack of professionalism

8.7.2 Target Practices

- *Professionalism in the business*
 - New vision on the top
 - Better management approach
 - Review of organizational objectives
 - Privatization of the business
 - Bureaucracy bashing
 - Reduction in manpower
 - Fewer layers of management
- *Technological capabilities*
 - Keep pace with technological development
 - Achieve desired productivity levels
 - Expansion as per market requirements
 - Reducing manufacturing costs by cost cutting
- *New initiatives*
 - Make workers as stakeholders
 - More involvement of workers
 - Transparency to reduce resistance to change
 - Setting new production targets through industrial engineering techniques
 - Upgrading the capabilities of the manpower by education and training

Matrix of change for this category of case organizations was prepared as shown in Figure 8.5.

8.7.3 Interpreting the Matrix

Matrix of change is interpreted for this group of case companies as discussed below:

- *Feasibility:* From horizontal matrix, current practices are depicted as stable. Also targeted practices are stable as found from vertical matrix. This implies that the companies may meet the desired change.
- *Sequence of execution:* From the transition matrix, it is clear that until these organizations do not become professional in working, become compliant to quality standards, increase productivity, and reduce lead time to product development, they will lack competitiveness. Involving unions in the change process can make a successful change in the prevailing scenario.
- *Location:* Taking the level of interference into consideration, it is recommended to go for a radical change than to drag with the existing practices.
- *Pace and nature of change:* The following factors determine the pace and nature of change:
 - *Interdependence:* Target block associated with reduction of lead time to product development has been depicted independent of the prevailing practices while other target practices are quite dependent on the existing ones. Therefore, a radical change is needed in these companies.
 - *Receptiveness to change:* Since these companies have a lack of supportive culture, radical change can make the desired change.
 - *External pressure:* Due to a strong resistance to change due to trade union culture, follow of government rules and regulations, and indifferent attitude of the management, the transition time affects the rate of change. In this situation, radical change is the preferred strategy.
- *Evaluation by the people:* Due to the high level of resistance and lack of work culture in these case organizations, the opinion of the people cannot be treated as true. Talking to a few supervisors in a cordial atmosphere and telling them the objective of the study, their opinions were obtained which were later transformed into the quantitative data as depicted in the transition matrix. Tornado plot (Figure 8.6) indicates that these organizations require complete renewal through privatization. This has been followed by implementing systems approach,

involvement of people in change process, optimizing manpower through structural strategies, shortening lead time to product development, reducing manufacturing costs by cost cutting, and to become market responsive in order.

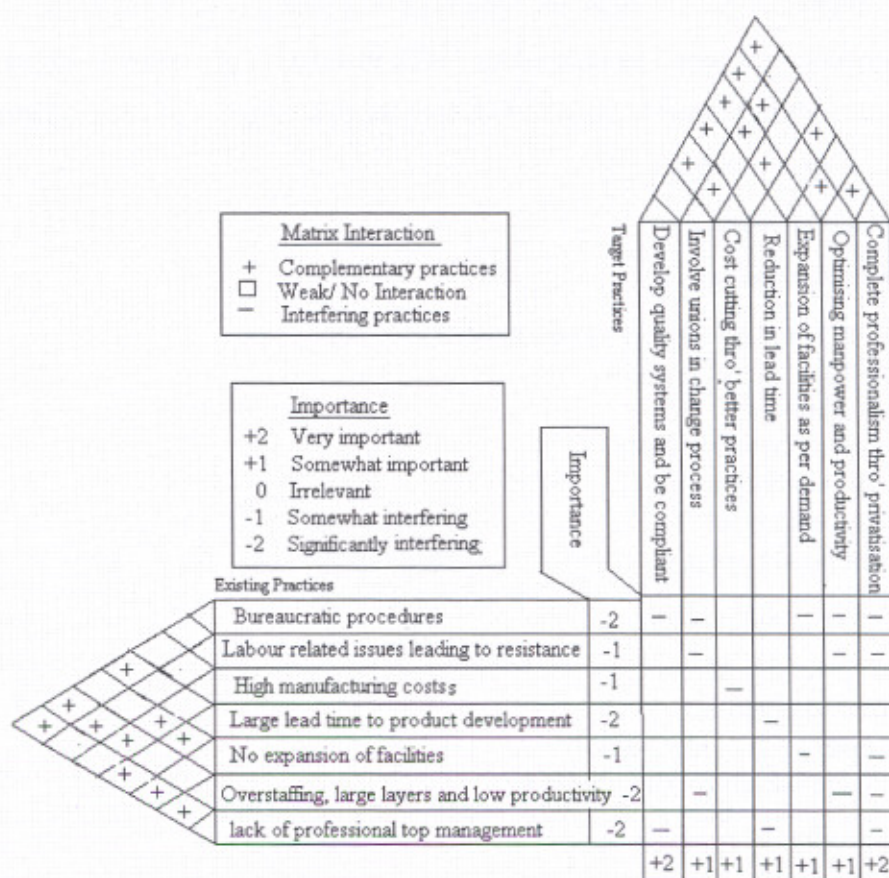


Figure 8.5: Matrix of change for group-III organizations

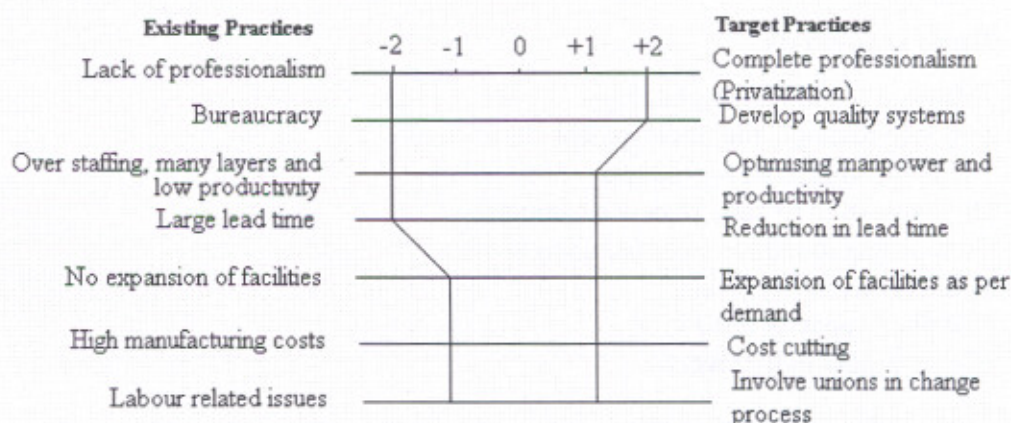


Figure 8.6: Tornado plot for group-III organizations

8.8 Using Matrix of Change for Companies in Group-IV

This group represents the companies with conventional technology and skilled manpower. The performance of these organizations has slid down due to their inability to meet the market responsiveness and customer expectations. Critical factors in this group of companies are found as technology level, manufacturing costs, inventory level and professionalism in business. Matrix of change for this category of case organizations was prepared as shown in Figure 8.7.

8.8.1 Existing Practices

- *Product manufacturing*
 - Conventional machinery and equipments
 - Changing trends of market
 - Low product mix
 - Large manufacturing costs
 - Low productivity levels
 - Large inventory level
 - Unspent plant capacity
- *Lack of professionalism*
 - Family owned business
 - Centralized planning
 - Manpower with moderate skill
 - Inadequate education and training
- *Organizational structure*
 - No set organizational structure
 - Contracting many works from outside agencies

8.8.2 Target Practices

- *World class products*
 - Adapting world class technology
 - In-house research and development capabilities
 - Diversification to new products
 - Diversification to cater to new customers
 - Cost cutting to reduce manufacturing costs
 - Reduced inventory levels
 - Full plant capacity utilization
 - Higher productivity levels
- *Professionalism in business*
 - Invest in good talents on the shop floor

- Line rationalization
- Intensive training and education of the employees
- Low lead time to product development
- *Productivity*
 - Better HR practices
 - Adapting TQM, TPM

8.8.3 *Interpreting the Matrix*

The following interpretations are made from the matrix of change for the companies in this group:

- *Feasibility:* Both target and current practices are found stable. So the organizations can make the proposed changes.
- *Sequence of execution:* It is indicated in the transition matrix that till the organization does not diversify to new products, possess world class technology, reduces manufacturing costs and bring professionalism in its operations, no cascade of change is possible. By triggering the change by becoming market responsiveness, other changes can be possible.
- *Location:* Since there are many interfering relationships as indicated in the transition matrix, it is recommended to go for a Greenfield (new) location.
- *Pace and nature of change:* Following factors are considered to study pace and nature of change:
 - *Interdependence:* No change initiative has been found with interference in the desired change.
 - *Receptiveness to change:* The change needs to migrate to several parts of the organization, so change in increments may be preferred.
 - *External pressure:* There is no pressure of unionism, so there is no strong resistance. Slow rate of change can manage the change process.
- *People's evaluation:* The organization possesses supportive work culture and therefore evaluation by people as stakeholders can be reasonable. From Tornado plot (Figure 8.8), diversification to new products has emerged on the top. This has been followed by managing the organization professionally, world-class technology, reduced inventory levels, reducing manufacturing costs, large product mix, full plant capacity utilization, and large productivity, in order.

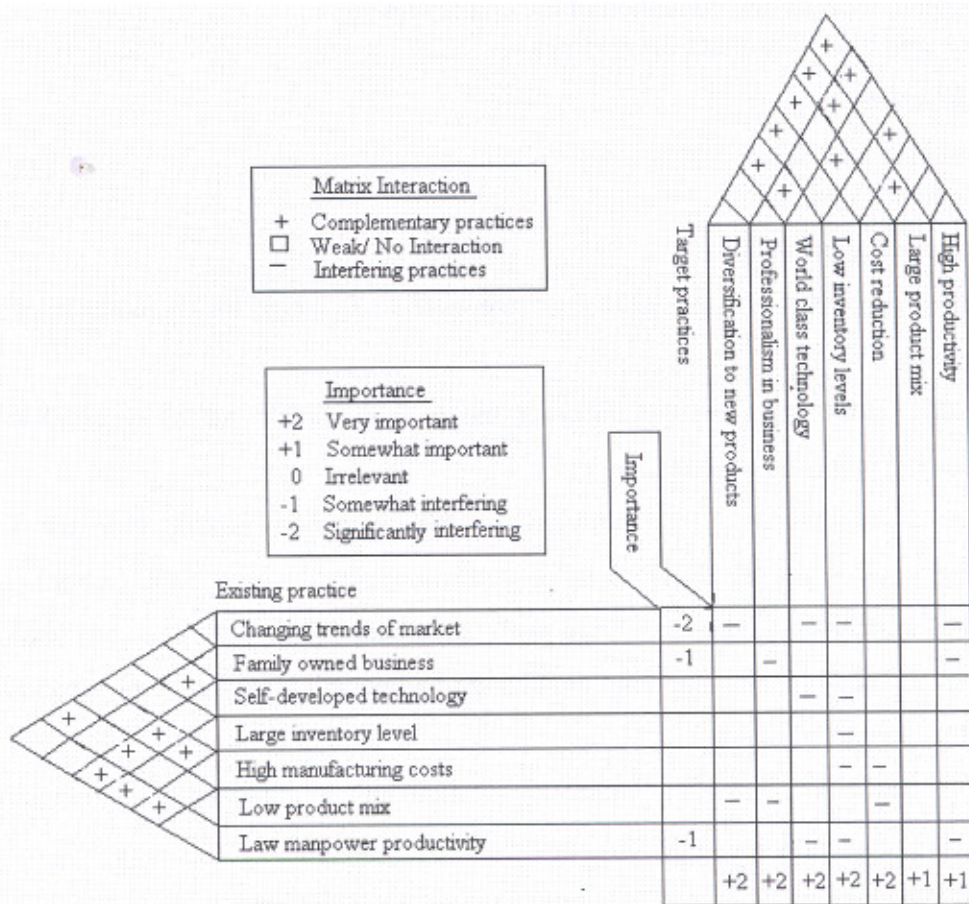


Figure 8.7: Matrix of change for Group-IV organizations

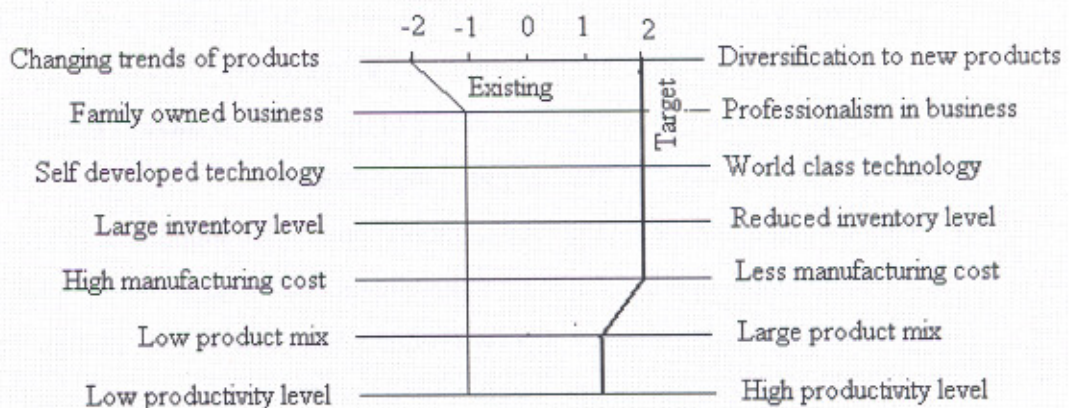


Figure 8.8: Tornado plot for group-IV organizations

8.9 Relationship Between the Groups Formed

Current and target practices of all the four groups formed have been compared to each other as shown in Table 8.2. It is illustrated in the table that target practices of group-IV matches with the existing practices of group-III, target practices of group-III with existing practices of group-II, and target practices of group-II with existing practices of group-I. Since group-I represents the market leaders followed market challengers by group-II, market follower by group-III and market wraps by group-IV in order, this indicates four sets of goals and four levels of competitiveness through which Indian organizations pass before becoming successful. The four goals/objectives to be achieved in the Indian automobile industry are goal-A, goal-B, goal-C and goal-D, in a sequence. These goals will be used subsequently while designing change strategies for the industry. Further, the competitiveness of the case companies increases in a sequence from level-1 to level-2, level-3 and level-4 as indicated in Table 8.2.

8.10 Discussion on Research Propositions (R5 and R6)

Tables 5.2, 5.6, 5.10, 6.2, 6.6, 6.10, 7.2, 7.6, and 7.10 satisfy the research proposition R5, i.e. Indian automobile industry has witnessed three phases of change management namely stable market conditions (pre-globalization phase), stiff market competition (globalization phase), and turbulent market conditions (post-globalization phase). During these phases, different organizations have used different drivers of change for competitiveness, i.e. technology or systems or structure.

Table 8.1 and Table 8.2 meet the research proposition R6 satisfactorily. As shown in Table 8.1, case organizations have been grouped into four groups, i.e. group-1 (market leaders), group-2 (market challengers), group-3 (market followers), and group-4 (market wraps) depending upon type of products/operations, timeliness of initiation of actions of making change, and results achieved. Table 8.2 shows the goals set and competitiveness levels for these groups. For a group, existing practices and target practices (goals) decide a level of competitiveness. It is shown that as the goals of industry shift to target practices of group-1 companies, i.e. market leaders, competitiveness approaches to its maturity level, i.e. competitiveness level-4.

8.11 Concluding Remarks

The state of an organization at an instant of time can be judged from the present practices and future targets. Tornado plots for various groups of the case organizations indicate the recommended sequence of actions to achieve the future goals. It is seen that competitiveness of the Indian automobile industry from level-1 to level-4 depends upon accomplishment of the following actions, but in different sequences for various organizations:

- Managing the organization professionally and better HR practices.
- Keeping pace with world-class technology and diversification to new products.
- Reducing lead-time to product development and large product mix.
- Adopting JIT inventory systems and vendors' consolidation.
- Reducing manufacturing costs by eliminating non-value adding activities and cost cutting.
- Productivity enhancement and diversification to other products.
- Employees' development through education and training.

The targeted practices of the four categories of case organizations denote the goals for an organization to get success (Table 8.2). These goals have been used for qualitative modeling to design the change strategies as described in the next chapter.

Table 8.2
Goals and levels of competitiveness for Indian automobile industry

Existing practices of GROUP-IV from matrix of change	Target practices of GROUP-IV/ Existing practices of GROUP-III	Target practices of GROUP-III/ Existing practices of GROUP-II	Target practices of GROUP-II/ Existing practices of GROUP-I	Target practices of GROUP-I
Family owned business, lack of professionalism, changing trend of market	Professionally managed organization, market responsiveness	Develop quality system standards and ensure compliance at all levels	Compliance with quality system standards	100% compliance with quality system standards, better HR practices.
Conventional machinery and equipments, unspent capacity of plant	Special purpose machines with an aim to have high product quality, full capacity utilization	High product quality	Keep pace with technology developments, high quality production	World class technology, develop in-house research and development capabilities
Large lead time to product development, low product mix	Reduction in lead time to product development, large product mix	Full capacity utilization, large product mix	Reduce lead time to product development	High productivity levels, large product mix for customer satisfaction
Large inventory levels	Reduction in inventory	Reduction in WIP and FG inventory	JIT inventory system	JIT inventory system and vendor consolidation
Large manufacturing costs	Reducing inefficient manufacturing practices, cost cutting	Waste reduction to reduce manufacturing costs	Cost reduction by developing new materials and other innovations	Cost cutting, developing cheap alternatives of the costly components maintaining quality level
Limited production, few customer, small market share	Diversification to new segments, market responsiveness	Expansion as per market demand, diversification to new products	Expansion and diversification to other products	Expansion and diversification to other products
Low manpower productivity	Increasing manpower productivity by controlling fresh recruitments	Increasing productivity through ban on further recruitment, job design, and new incentive policies.	Imparting intensive training and education to develop multiskill capabilities.	Employees' development, increasing productivity through optimizing manpower, delayering, VRS, etc.
	Goal-A	Goal-B	Goal-C	Goal-D
Competitiveness level-1				
	Competitiveness level-2			
		Competitiveness level-3		
			Competitiveness level-4	
Minimum	→ → →	Success with change		→ → → Maximum

CHAPTER 9

DEVELOPMENT OF CHANGE MANAGEMENT STRATEGIES

9.1 Introduction

This chapter presents inferences drawn from literature review, survey carried out in the automobile industry, case studies and recommendations of matrix of change in a structured manner within the boundaries of a qualitative model to develop workable and effective strategies for managing socio-technical change for competitiveness. The inferences from various areas of change management have been listed with a careful analysis. The overlapping inferences have been scrutinized to develop a list of independent learning issues. These learning issues alongwith the suggestions of the experts received through Delphi study have been taken as options for a qualitative modeling involving Options Fields Methodology (OFM), Option Profile methodology (OPM), and Fuzzy Set Theory (FST). The outcome of the qualitative model is the emergence of preferred strategies under various conditions of optimism, pessimism, and realism for effective and efficient management of change in automobile industry..

9.2 Delphi Study

The Delphi Technique is a useful decision-making tool that can be used to build consensus or limited agreement in situations. The technique was originally developed by "The Rand Corporation" to gather opinions from a group of experts (Patton 1986). Its use has spread to many areas, and it is widely recognized as a consensus-building tool. The Delphi Technique is based on the Hegelian Principle of achieving 'Oneness of Mind' through a three step process of thesis, antithesis, and synthesis (Chakravarty et al, 1998). "In thesis and antithesis, all present their opinion or views on a given subject, establishing views and opposing views. In synthesis, opposites are brought together to form the new thesis". All participants are made to accept ownership of the new thesis and support it, change their views to align with the new thesis.

The change agent or facilitator acts as an organizer of Delphi study, getting each person in the target group to elicit expression of the program, project, or policy in question. The facilitator listens attentively, forms "task forces," "urges everyone to make lists," and so on. While s/he is doing this, the facilitator learns something about each member of the target group. S/He identifies the "leaders," the "loud mouths," as well as

those who frequently turn sides during the argument — the "weak or noncommittal" and coordinates the activity.

The first step for Delphi study is to form a panel of experts. In round one, a questionnaire on various aspects is mailed to all participants with open-ended questions, often in a very unstructured format. Participants give their opinions and support the facts. The facilitator synthesizes the information into a single document detailing patterns of responses. Round two begins when this new document is sent to the participants for their responses again. At this stage, participants may change their minds, further support their original position, or raise further issues or options. Similar rounds can continue till the facilitator judges that the comments have ceased to change substantively.

9.2.1 Conducting Delphi Study

The findings of the empirical study, case studies and matrix of change were mailed to the experts for the first round of Delphi study (Appendix D1). A request was made to them to express their opinions about the subject, i.e. how to manage socio-technical change for competitiveness in the Indian automobile industry. The responses received in first round were compiled and again sent to the experts in second round for review and further comments (Appendix D2). As a result, the following consensus has emerged:

- **Achieving change in a phased manner:** The following goals, if met in order, can facilitate the organizations to change successfully in a phased manner to attain higher competitiveness:
 - i. Goal-A: Manufacturing high quality products using special purpose machines, reducing lead-time to product development, reducing inventory, diversification to new products, increasing skill level of the manpower and becoming professional in business
 - ii. Goal-B Managing professionalism through customer responsiveness, implementing systems formed, production at rated capacity, reducing manufacturing costs, reducing investment in inventory, and enhancing productivity
 - iii. Goal-C: Keeping pace with technological developments, using JIT for inventory management, cost cutting, plant expansion and diversification to meet the market demand, and developing multi-skill abilities among the people

- iv. **Goal-D:** Be compliant to world-class technology, making innovations, better HR practices, reducing inventory through JIT, optimizing manpower, vendor consolidation, corporate restructuring and productivity enhancement

These goals will be used for the design of change management strategies.

- **Change Agent:** Appointing a change agent out of the following, help the organizations in making change:
 - General Manger
 - Managing Director/ CEO
 - Board of Directors.
- **Timing of initiatives:** Organizations make changes in various areas e.g. technology, structure, systems, people and culture at different instants of time. It is found that the companies which have made changes at an early stage, have achieved more success than the companies which got late in making change.
- **Drivers of change:** Competitiveness of the organization is dependent upon the driver of change. For achieving goal-A, technology has been considered as the main driver of change, systems for goal-B, structure for goal-C, and technology for Goal-D.
- **Mix of big and small changes:** For successful change, small changes using available resources (tinkering) should follow big changes requiring additional investments (kludging).
- **Use of Japanese techniques:** Japanese manufacturing techniques and ways of work have helped the industry a lot in getting success.
- **Customer focus:** With customer focus, many organizations in automobile sector have been successful, and at the same time have made the customers more demanding.
- **Human aspects:** Changing the mindset of people and improving work culture in Indian organizations have been very slow, and has been supplemented by systemic, structural and technological changes.
- **Limited benefits of VRS:** Achievements of introducing voluntary retirement scheme (VRS), early separation schemes and other strategies in Indian organizations have not been significant. Due to government rules and regulations, such schemes have proved

very costly to the organizations. Also many competent people have opted for these schemes that has resulted in a big loss to the organizations.

9.3 Synthesis of Learning Issues

The learning issues of the empirical study, case studies, matrix of change and Delphi study have been synthesized and are given below according to the areas of change:

9.3.1 Technological Changes

Organizations, which have paid attention to the following technological aspects in change management, have met with a fair degree of success:

- Making technological collaborations/ tie-ups with multinational companies (MNCs)
- Procuring new dies and tools and fixtures, CNC technology, automation and robotics for high quality production and enhanced productivity level
- Keeping pace with world-class technology, developing in-house research and development and reducing manufacturing costs
- Reducing lead-time to product development
- Developing cheap alternatives to costly components
- Developing cutting edge technology and increasing product mix to widen the customer base
- Transferring technology from original equipment manufacturers (OEMs) to ancillaries/ vendors/ component manufacturers to make them competitive
- Using information technology to share the latest technology know-how through worldwide web

9.3.2 Systemic Changes

For getting success, attention has been paid to the following systemic aspects of change management in the successful organizations.

- Implementing SODA (systems oriented decision approach) in place of DOSA (decision oriented systems approach)
- Implementing ISO9000, QS9000, TQM, TPM, Quality Circles and anonymous maintenance in the organizations to increase competitiveness
- Enhancing manpower productivity through job rotation, new incentive schemes, new job design and revised production targets

- Reducing investment on inventory and overheads by diverting manufacturing of many components, subassemblies and assemblies to tier-I, II and III vendors
- Implementing just-in-time system in the organizations
- Changing the quality system from product orientation to process orientation
- Keeping the documents updated to identify shortcomings and taking remedies measures
- Developing on-the-line link between OEMs and vendors to streamline the supply of the components
- Increasing lot sizes at vendors' end to increase the gross profits and to reduce the changeovers

9.3.3 Structural Changes

Success has been achieved in the organizations, which have implemented the following aspects of structural changes:

- Adapting flat structured organization for increased transparency and free flow of information
- Reducing number of layers (levels) in the organization to increase accountability of individuals and make them more responsible
- Outsourcing of the material and components for savings
- Widening the sales and service network to deeply penetrate in the market
- Offering voluntary retirement schemes (VRS) and other early separation schemes to get rid of excess and inefficient manpower, thus reducing the liabilities of the organizations
- Reducing number of vendors through vendor-consolidation, thus making the functioning of OEMs simpler
- Making mergers, collaborations, alliances, tie-ups, etc. to survive in the competition

9.3.4 Cultural and People Change

The following aspects of people in change management have been found effective and the companies, which have implemented these aspects, have met with success.

- Involving people at all levels to decide organizational objectives and goals

- Imparting education and training to all in the organization to reduce resistance to change
- Organizing short-term courses for executives/ supervisors to keep them abreast of the latest advancements
- Defining key result areas (KRA) of individuals related to their area of work and judging their performance against their achievements
- Involving people at all levels in deciding organizational objectives, goals and actions through suggestion schemes, better HR practices
- Increasing flexibility in the products, processes and procedures to make changes in the organizations without pain
- Reducing resistance to change by imparting education and training
- Introducing strictness and discipline in the organization through impartial policies

9.4 Methodology for Modeling

A qualitative model using Delphi study, Options Fields Methodology (OFM), Options Profile Methodology (OPM) and Fuzzy Set Theory (FST) has been developed and applied to the situation (Figure 9.1) in a flexible system methodology framework (Sushil, 1993). A brief description of the model is given below.

The model begins with listing of options as a solution to manage socio-technical change for competitiveness. The list of options was converted into a conceptual design. OFM/OPM (Warfield 1979, 1982, 1990) and was used as a basis for this purpose. Finally, the alternative options profiles were developed and ranked through FST (Zadeh, 1965).

9.4.1 Options Field/ Options Profile Methodology

In order to adopt the method of idea writing to design, Warfield (1979) introduced a methodology for the conceptual design of systems, which resulted into a portrayal on one page of the products of a conceptual design a foot. This portrayal shows not only what is accepted in the design but also what options are rejected. Options Field Methodology and Options Profile Methodology provide means for thorough development of design situation description and design target description.

The model involves discovery and identification of dimensionality of the situation, and facilitates matching dimensionality of the target with dimensionality of the design situation. Various steps involved in these two methodologies are described below:

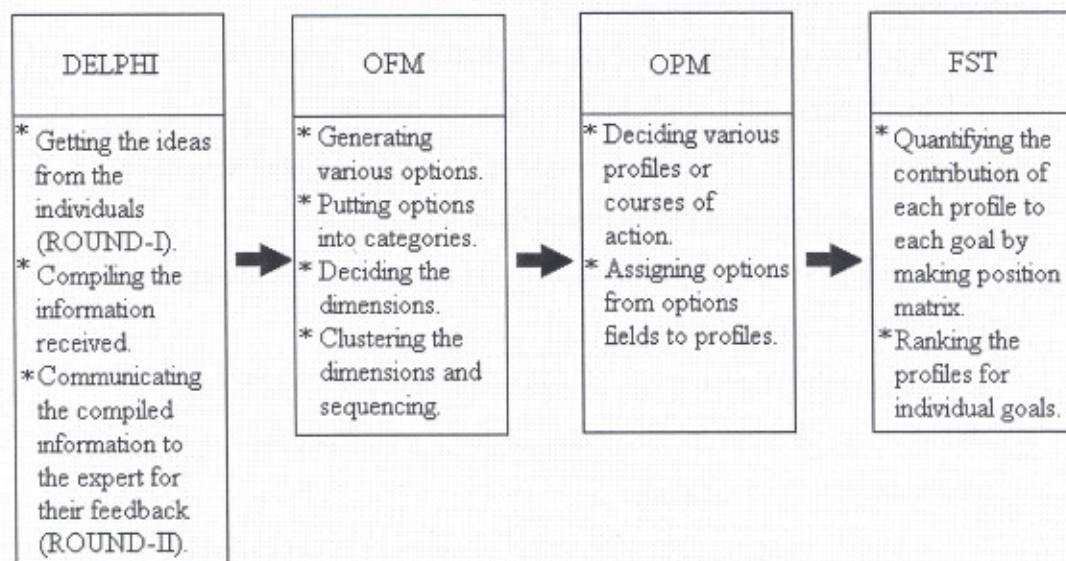


Figure 9.1: Quantitative modeling

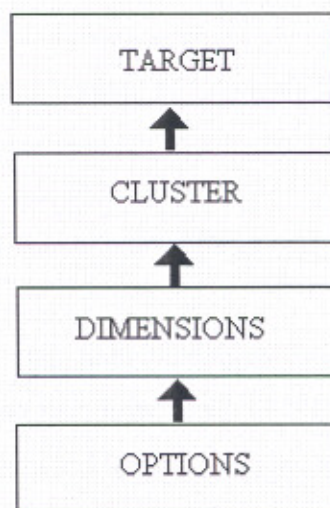


Figure 9.2: Four level structure quad.

Options Field Methodology (OFM)

- i. *Construction of a polystructure:* The completed options field is a polystructure. Its construction begins with the generation and classification of a set of options. This

set may be generated using modified idea writing in response to the broad subject. The subject must stimulate creative and productive responses that do not stray from the topic under consideration.

- ii. *Initial structuring (placing options in categories):* Once a set is developed, the initial structuring begins. The initial structuring is for the purpose of placing options into categories. A relationship that may be used for this initial structuring is "in the same category as". Theory of dimensionality is used for placing the options into categories.

The structural theory of dimensionality of situations and processes introduces options field and options profile as by-product of design activity. Options field is a triply structured-quad, since it is a four level structure, whose levels are named as target, cluster, dimension and options reading from top to bottom (Figure 9.2). It is triply structured because its structure incorporates three distinct relationships (Warfield, 1990) described the membership in a dimension for classifying options into dimensions, independence for classifying dimensions into independent cluster and time preference relationship for relating dimensions to each other in clusters.

- iii. *Naming the categories:* Following the placing of options into categories, options are displayed as sets, arrayed vertically in anticipation of developing a name for each category that will be placed at the head of the appropriate column options.
- iv. *Identifying design-dimensions:* After the set of categories has been achieved, it is reasonable to believe that learning has occurred. At this point, it is appropriate to ask whether every category should be taken as a dimension of design. The criteria for making this decision is to ask whether some option(s) in that category really must be specified in order to provide adequate definition of the alternative represented in order to provide adequate definition of the alternative represented by choosing one or more options from each dimension, or whether any particular category is not essential to the definition of the target.
- v. *Discovering clusters of dependent dimensions:* Once the group has settled on the dimensions of the target, a second structuring occurs. Now it is the set of dimensions that is structured. The relationship used is "independent of". Two

dimensions are defined to be independent if a choice of one or more options in one of the dimensions does not rule out any choices in the other dimensions. If two dimensions are independent, the choice of options in one may be restricted by the choice of options in the other. Following this structuring, there is a definite set of clusters, each cluster consisting of a set of dimensions, and each dimension consisting of a set of similar options.

- vi. *Establishing a choice-making sequence for clusters:* Now the third structuring begins. This structuring takes the clusters as elements to be structured. The structuring relationship involves the sequence in which choices of options should be made. A suitable relationship is "should be considered first in making choices of options".
- vii. *Sequencing dimensions within the clusters:* A fourth structuring is carried out now. In this, structuring is carried out separately for each cluster and initial decision-making sequence among dimensions in each cluster is defined.
- viii. *Displaying the completed options field:* It is then appropriate to organize the options field by placing dimensions in the order determined with name of each dimension heading a list of options therein and with the cluster clearly identified.

Options Profile Methodology (OPM)

Options profile is the visual representation of an alternative consisting of a set of chosen options with at least one option coming out from each dimension in the options field. Each option that has been selected is designated by a line drawn from the bullet in front of the selected options down to the tie line. In applications, it is common to construct several options profile for a given options field. Each options profile represents one design alternative. In choosing options, choices are made in the sequence determined in formulating the way options field is represented.

Having made the profiles, next task is to list various goals (objectives) of the design or targets.

9.4.2 Fuzzy Set Theory

Fuzzy set theory (FST) developed by Zadeh (1965) is based upon recognition that certain sets have imprecise boundaries. Fuzzy sets and sub-sets are those ill specified and non-distinct collection of objects with unsharp boundaries in which transition from

membership to non-membership is gradual rather than abrupt. A fuzzy set is characterized by a membership function, defined as a real number in the interval (0,1). For example, a membership measure $(X)=0.5$ suggests that X is a member of set A to a degree 0.5 on a scale where 0 is no membership at all, and 1 is complete membership. Thus, a fuzzy set can be reduced to a crisp set by transforming memberships to extremes of the range 0 to 1. FST has been successfully applied to automata theory, system analysis, decision theory, man-machine systems, modeling of industrial processes etc. In this study, it has been used for the purpose of finding out the ranking of options profiles in an integrated form.

In order to represent the views of each of the interest group, a position matrix is prepared from the responses of all the experts in the group by giving the numerical values to the qualitative assessment. There are three ways to aggregate the position matrix i.e. optimistic, average and pessimistic aggregation. The highest value among various group responses represents the optimistic value, the lowest value represents the pessimistic value and the average of all the values represents the mean value.

The best course of action for a decision maker in such a situation may be to use a Hadley's criteria of cautious optimism (Hadley, 1967). The decision maker may choose different coefficients of optimism. If 'A' is the dominance weight of the option as determined from optimistic matrix and that of the pessimistic dominance matrix, weight of the option according to the Hadley criterion is determined by the relationship:

$$W = \alpha * A + (1-\alpha) * B.$$

Since the process of choosing the coefficient of optimism in the Hadley criterion of "cautious optimism" is a judgment based approach, ranks of the options from the dominance matrix is considered on the basis of dominance and ignoring the considerations of being dominated.

9.5 Qualitative Modeling

Based on the learnings from the survey and the case studies and the measures suggested by the experts through the Delphi study, a total of 147 options were listed as the solutions to the problem of managing change successfully. Out of these options, some were overlapping. After scrutinizing and combining them, 50 independent options were made

and the polystructure was completed. These options are shown in the completed options profiles in Figure 9.3.

9.5.1 Putting the Options into Categories

These options were then put into various categories and the categories were named.

These categories are as follows:

- Acquire world class technology
- Develop in-house research and development capabilities
- Vendor development and consolidation
- Cost cutting without sacrificing quality
- Outsourcing of material/ subassemblies/ assemblies
- Setting of new production targets
- Optimization of manpower
- Professional top management
- Productivity enhancement
- Line rationalization
- JIT inventory systems
- Quality systems standards
- Group incentives
- Team work culture
- Education and training
- Reduction of lead time to product development
- Diversification to new products
- Customer focus
- Product mix
- Marketing strategies
- Reducing resistance to change
- Change agents and drivers of change

9.5.2 Dimensions of the Design

The above categories were scrutinized to include them or exclude any of them for the design. All of these have been included and considered as the dimensions of the design.

9.5.3 Clustering

The dimensions were put into broader categories called clusters. The principles have already been explained. These are shown in the next section.

9.5.4 Sequencing the Clusters and Dimensions within Clusters

The clusters were put into sequence as per the importance of the dimensions. For the purpose of sequencing of dimensions, ratings of all the dimensions were obtained by the experts. The sequencing of dimensions within clusters was carried out using “a theme

matrix” (Shiba et al, 1993). A scale of 1-3 (1 for the best) was chosen for the rating and each dimension was rated on four criteria, i.e. ease of data collection, ease of potential implementation, urgency/ impact, and speed of solution. Table 9.1 gives sequencing of dimensions in the resultant clusters.

Table 9.1
The theme matrix

Sr No	Dimensions	Ease of data collection	Ease of potential implementation	Urgent/ Impact	Speed of solution	Total score	Rank
1.	Acquire world class technology	3	2	1	2	8	8
2.	Develop in-house research and development capabilities	3	2	2	2	9	14
3.	Reduction of lead time to product development	3	2	2	1	8	9
4.	Diversification to new products	2	3	2	3	10	18
5.	Customer focus	1	2	1	2	6	2
6.	Productivity enhancement	1	2	1	1	5	1
7.	Line rationalization	2	3	2	3	10	19
8.	Vendor development and consolidation	3	3	2	2	10	20
9.	Product mix	2	2	2	2	8	10
10.	Cost cutting without sacrificing quality	2	3	1	2	8	11
11.	Setting of new production targets	2	3	2	1	8	12
12.	JIT inventory systems	1	2	1	2	6	3
13.	Quality systems standards	2	2	1	1	6	4
14.	Outsourcing of material/ subassemblies/ assemblies	3	3	2	1	9	15
15.	Group incentives	2	3	2	2	9	16
16.	Optimization of manpower	2	3	1	3	9	17
17.	Team work culture	2	2	1	1	6	5
18.	Professional top management	2	2	2	1	7	6
19.	Marketing strategies	3	3	1	1	8	13
20.	Education and training	2	2	2	1	7	7
21.	Reducing resistance to change	3	3	2	3	11	22
22.	Change agents and drivers of change	3	3	2	2	10	21

1. Keeping pace with technology

- Acquire world class technology
- Develop in-house research and development capabilities

2. Reducing manufacturing costs

- Cost cutting without sacrificing quality
- Outsourcing of material/ subassemblies/ assemblies
- Vendor development and consolidation

3. Professionally managed organization

- Professional top management
- Setting of new production targets
- Optimization of manpower
- Change agents and drivers of change
- Reducing resistance to change

4. Better HR practices and employees development

- Productivity enhancement
- Team work culture
- Education and training
- Group incentives
- Line rationalization

5. Systems design and implementation

- JIT inventory systems
- Quality systems standards

6. Market responsiveness

- Customer focus
- Reduction of lead time to product development
- Product mix
- Marketing strategies
- Diversification to new products

9.5.5 Options Profile Methodology

Various profiles or courses of actions planned for managing socio-technical change were decided to be the following:

- Driving change with System- Structure- Technology, i.e. initiating change with system as driver of change followed by structure and technology, in order.
- Driving change with System- Technology- Structure, i.e. initiating change with system as driver of change followed by technology and structure, in order.
- Driving change with Technology- System- Structure, i.e. initiating change with technology as driver of change followed by system and structure, in order.

- iv Driving change with Technology- Structure- System, i.e. initiating change with technology as driver of change followed by structure and system, in order.
- v Driving change with Structure- Technology- System, i.e. initiating change with structure as driver of change followed by technology and system, in order.
- vi Driving change with Structure- System- Technology, i.e. initiating change with structure as driver of change followed by system and technology, in order.

The people and culture-linked changes are dependent on changes in technology, systems and structure.

The opinion of the experts from industry has been taken about these profiles as well as goals set. After deciding upon various profiles, the next task performed has been to find out the options from each cluster contributing to each profile. For this purpose, completed options fields have been displayed. A tie line has been drawn on the bottom. Each option contributing to a profile (course of action) has been joined to the tie line through its bullet. This has been shown in Figure 9.3.

9.5.6 Fuzzy Set Theory

The next step has been to make position matrices. In these matrices, the qualitative value of contribution of each profile or course of action to each goal has to be decided. Five respondents (experts from the industry) have done this exercise. The goals, i.e. goal-A, goal-B, goal-C, and goal-D have been set from the targeted practices of the matrices of change made for four categories of companies. The position matrices are given in Appendix D3.

From these position matrices, Optimistic, Average and Pessimistic position matrices have been made using Fuzzy Set Theory. For optimistic matrix, the highest value of each position has been selected, for pessimistic the lowest values and for average matrix, the average values have been selected. Tables 9.2 to 9.4 show these values. Hadley's matrix of cautious optimism has also been created as shown in Table 9.5. Various levels of optimism have been considered here, i.e. 80%, 60%, 40% and 20% (Appendix D4).

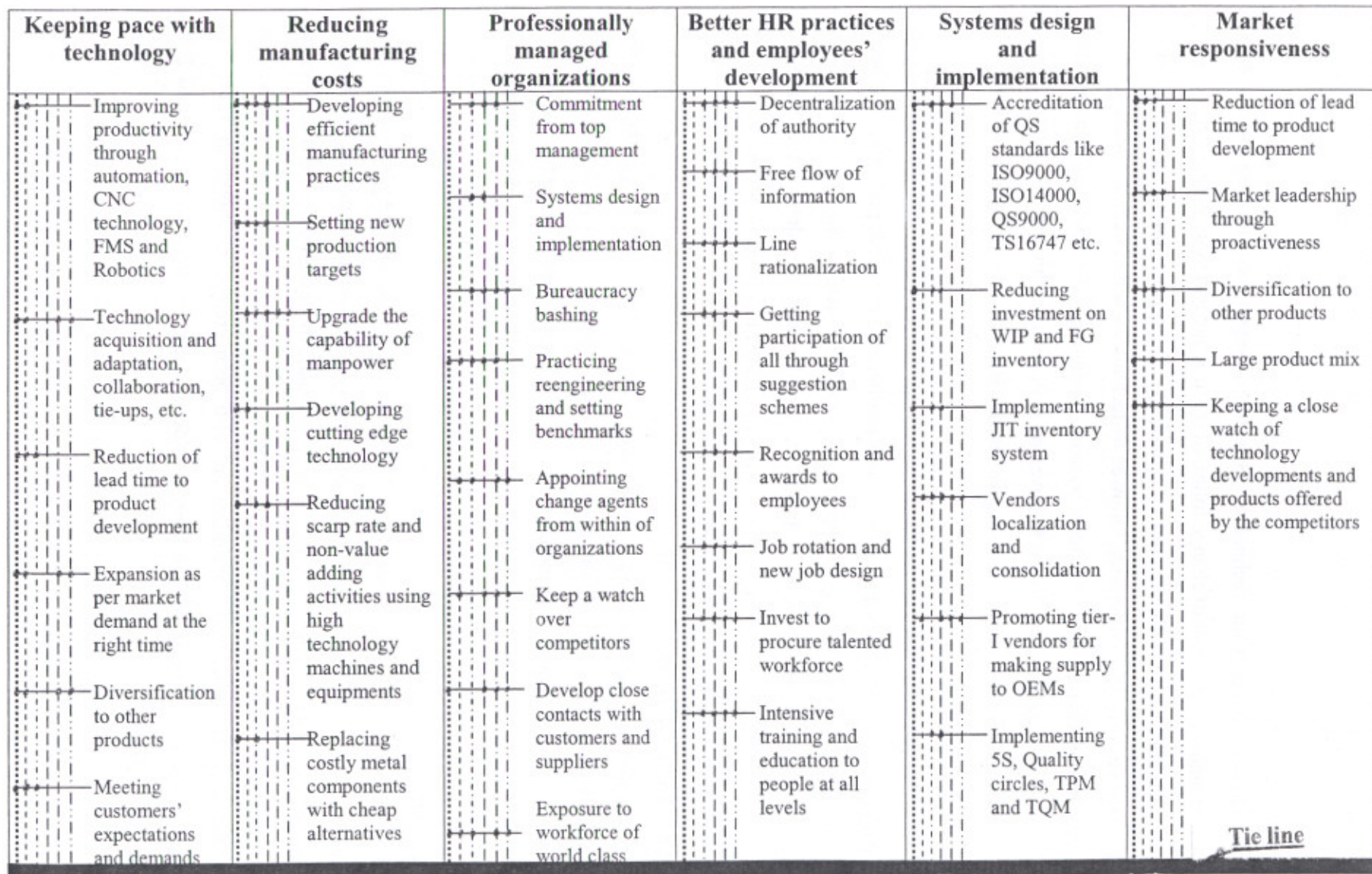


Figure 9.3
Options Profiles

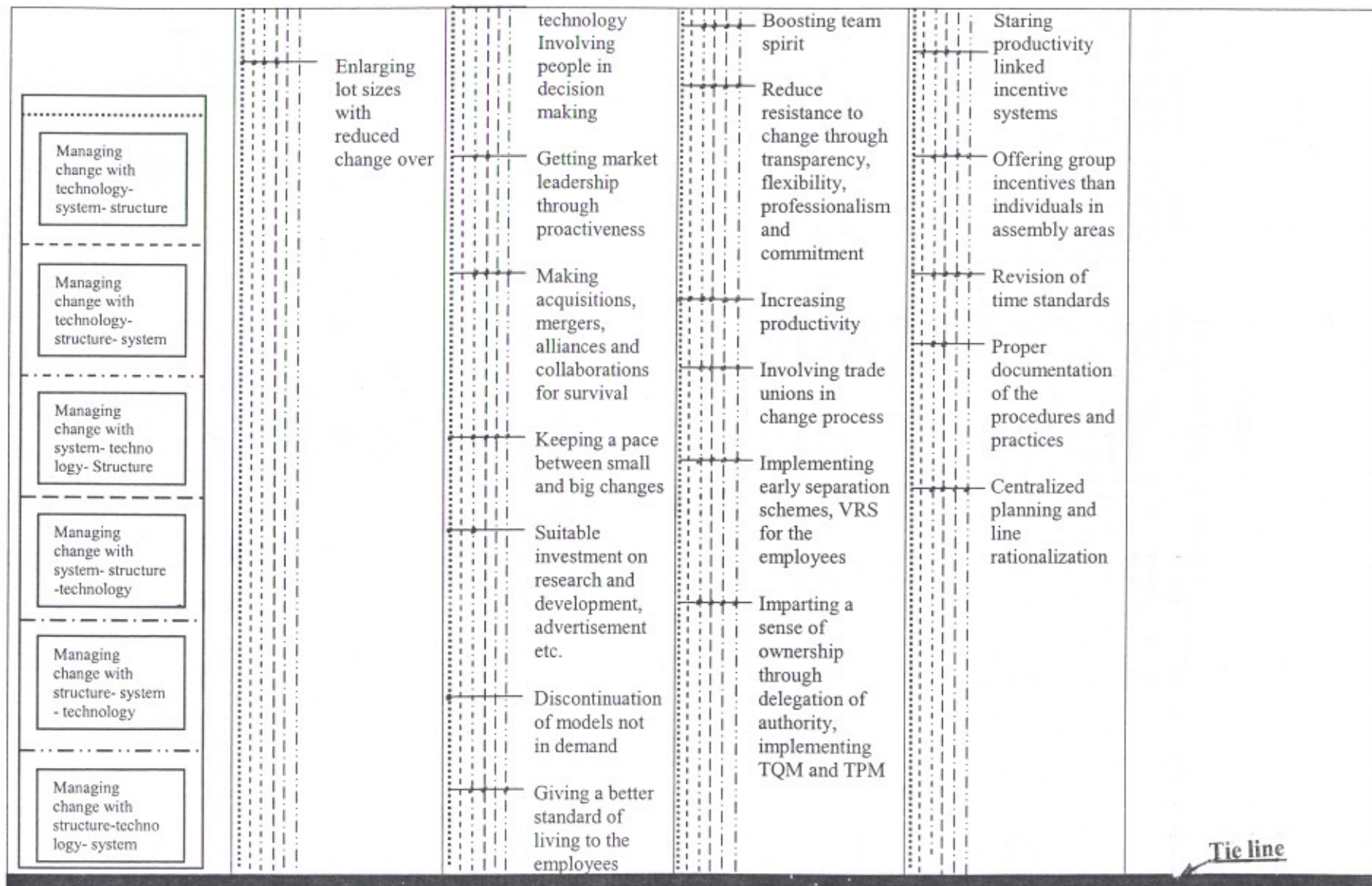


Figure 9.3
Options Profiles

Table 9.2

Optimistic position matrix

Profile Goals	Driving change with System-Structure-Technology	Driving change with System-Technology-Structure	Driving change with Technology-System-Structure	Driving change with Technology-Structure-System	Driving change with Structure-Technology-System	Driving change with Structure-System-Technology
Goal - A	0.3	0.3	0.9	0.7	0.5	0.3
Goal - B	0.9	0.7	0.5	0.5	0.5	0.7
Goal - C	0.7	0.9	0.5	0.7	0.7	0.5
Goal - D	0.5	0.7	0.9	0.9	0.5	0.5

Table 9.3

Pessimistic position matrix

Profile Goals	Driving change with System-Structure-Technology	Driving change with System-Technology-Structure	Driving change with Technology-System-Structure	Driving change with Technology-Structure-System	Driving change with Structure-Technology-System	Driving change with Structure-System-Technology
Goal - A	0.3	0.3	0.5	0.5	0.1	0.1
Goal - B	0.7	0.3	0.3	0.3	0.3	0.7
Goal - C	0.3	0.7	0.3	0.3	0.5	0.3
Goal - D	0.3	0.3	0.7	0.5	0.3	0.3

Table 9.4

Average position matrix

Profile Goals	Driving change with System-Structure-Technology	Driving change with System-Technology-Structure	Driving change with Technology-System-Structure	Driving change with Technology-Structure-System	Driving change with Structure-Technology-System	Driving change with Structure-System-Technology
Goal - A	0.3	0.3	0.7	0.66	0.3	0.18
Goal - B	0.82	0.62	0.42	0.46	0.44	0.7
Goal - C	0.5	0.86	0.42	0.5	0.66	0.38
Goal - D	0.46	0.54	0.86	0.66	0.46	0.34

Table 9.5

Hadley's matrix of cautious optimism

Profiles for meeting goals for various optimism levels							
Goals	100% Optimism	80% Optimism	60% Optimism	40% Optimism	20% Optimism	100% Pessimistic	Average
Goal-A	III	III	III	III	III	III, IV	III
Goal-B	I	I	I	I	I	VI	I
Goal-C	II	II	II	II	II	II	II
Goal-D	III, IV	III, IV	III	III	III	III	III

(I: Driving change with System- Structure- Technology, II: Driving change with System- Technology- Structure, III: Driving change with Technology- System- Structure, IV: Driving change with Technology- Structure- System, V: Driving change with Structure- Technology- System, VI: Driving change with Structure- System-Technology)

Results of qualitative modeling, which are in fact an outcome of opinion of experts, taken in a structured way brings out the following important points:

- i. Organizations aspiring to attain competitiveness level-1 or goal-A must pay attention to technology, followed by system and structure. At this level, the change has to be triggered by technology. In all cases, i.e. optimistic, pessimistic and average, a sequence of technology-system-structure has emerged to be the preferred approach.
- ii. For attaining goal-B or competitiveness level-2, however, the experts have laid more emphasis on systems. This logic behind this appears to be that once the company is at competitiveness level-1, it has a good level of technology. Further improvement can take place if this technology and other resources are optimally utilized. For this, more emphasis has to be laid on systems. Thus, change has to be triggered off at this level by systems, which could be followed by structure and technology. In optimistic and average approach, the sequence that has emerged to be the preferred one is systems-structure and technology, while in pessimistic approach, the emerged sequence is structure-systems-technology.
- iii. From transition from competitiveness level-2 to competitiveness level-3, emphasis still remains on systems. The emerged sequence from the experts' opinion through qualitative modeling in all the three approaches of optimistic, average and pessimistic is systems-technology and structure. It can be explained with the logic that optimal utilization of technology and resources will remain a priority at this level. Unnecessary investment in technology would not be a wise decision unless the already existing technology is fully harnessed by improving working-systems and procedures. As and when systems are improved, technology must be supplemented and accordingly structure has to be adjusted.
- iv. Once the organization has achieved competitiveness level-3 which in today's scenario is a very good level, further improvement can take place primarily by laying emphasis on technology. At competitiveness level-3, through the use of efficient and effective systems, the present level of technology and other resources are almost optimally utilized. In case of all the three approaches of

optimistic, pessimistic and average, the sequence recommended by the experts is technology-systems and structure.

From the results of qualitative modeling, it can be concluded that in the initial stages, technology should be used to trigger off and manage change. Efforts then should be made to utilize this technology optimally through laying emphasis on systems oriented approach. Once the organization harnesses the technology optimally and reaches good level with regard to change, management emphasis should again shift to technology. Setting goals is very crucial because strategies for change management are dependent upon them. For this, it is necessary to have assessment of the present level. Triggering change with structure has not been recommended under any approach at any stage. This supports the fact that the organizations which brought in strategies like VRS at early stages have not been successful in change management efforts.

9.6 Comparison of Qualitative Modeling and Matrix of Change

Comparison of the qualitative modeling and matrix of change has resulted in some interesting results. In fact, qualitative modeling has been based upon the goals, which are concluded from the matrix of change (Chapter-VIII). It is recommended in the qualitative modeling that driving change with technology-system-structure is the recommended course of action for goal-A, system-structure-technology for goal-B, system-technology-structure for goal-C, and technology-system-structure for goal-D.

From Tornado plots in matrix of change for various categories of case organizations (Chapter-8), recommendations are given by the people as stakeholders to make changes in the organizations for competitiveness. As indicated in Group-IV case organizations (or goal-A), the prime recommendation has been to diversify to new products, keep abreast with world-class technology and becoming professional in business. This has been followed by reducing inventory levels, reducing manufacturing costs, large product mix, and enhancing productivity. The sequence of recommendations is followed in qualitative modeling, i.e. driving change with technology-system-structure for goal-A.

As indicated in Tornado plot for case companies in group-III (or goal-B), the sequence of the recommended actions has been professionalism in business, implementing quality systems, manpower optimization, reduction in lead time to product

development, plant expansion, cost cutting and involving unions in change process. This sequence of actions is justified with the recommended course of action in qualitative modeling for goal-B, i.e. driving change with system-structure-technology.

For group-II of case companies, Tornado plot recommends a sequence of actions as developing cutting edge technology, enhancing productivity, cost cutting, implementation of quality systems, reducing inventory levels, vendor development, and reducing lead time to product development, in order. This sequence of actions is partially satisfied with the actions recommended in the qualitative modeling for goal-C, i.e. driving change with system-technology-structure.

The actions recommended by stakeholders in group-I of case companies has been to develop in-house research and development capability, cost reduction, decrease of lead time to product development, JIT inventory system, line rationalization and employees' development, as indicated in the Tornado Plot. The course of action in the qualitative modeling for goal-D, i.e. driving change with technology-system-structure, is fully satisfied by this sequence of recommendations.

Thus, the two studies have corroborated the findings of each other leading to a higher level of confidence in the suggested strategies for change management.

9.7 Concluding Remarks

Various courses of actions as described in the qualitative modeling to meet the goals set have been recommended as the preferred strategies in the Indian automobile industry to manage socio-technical change for competitiveness. Depending upon the status of the goals set for the organization, appropriate change strategy and the sequence of actions can be followed. The recommended strategies have been based on the outcomes of a detailed survey of a large number of organizations and in-depth case studies of nine organizations. These are further supported and reinforced by the recommendations of stakeholders through matrices of change and expert opinion through Delphi study and qualitative modeling.

CHAPTER 10

CONCLUSIONS AND RECOMMENDATIONS

10.1 Introduction

This chapter covers the summary of the research work, its results, conclusions and recommendations. Various areas are listed that can be taken up for further research. The summary of the research covers the methods adopted, salient features, and tools and techniques used in the work. Also, the results of survey, case studies, Delphi study and the inferences drawn from them have been presented. Based on the results and findings, conclusions have been drawn and recommendations have been made. The limitations alongwith the scope for future work are also covered in the chapter.

10.2 Summary of the Research

The research work was undertaken for analyzing automobile industry in details with an aim to design strategies for managing socio-technical change for competitiveness. The study has been made in a phased manner. Various phases of the study have been: clarifying the context through a review of literature on various aspects and areas of socio-technical change; understanding and assessing the current status of change management by conducting a survey of the automobile industry of north India; analysis of data collected through industrial survey and to establish the relationships between areas of change, drivers of change, change agents, extent of change and success of socio-technical change; assess actor's capability by conducting the case studies in some of the surveyed industrial units, developing change mechanisms using matrix of change after categorizing the case companies, conducting a Delphi study to append to and generalize the learnings from survey and case studies and developing generalized strategies for managing socio-technical change through a qualitative modeling using OFM, OPM and FST.

The survey was conducted through a specially designed questionnaire. The review of literature provided an insight into various aspects of socio-technical change and its management that was helpful in deciding the contents and the format of the questionnaire. The questionnaire was standardized after pre-testing. The survey was then carried out by mail and through personal visits. From the survey, the status of 83 organizations in the northern region of India with respect to managing socio-technical

change was found. The correlations between areas of change, accomplishments of objectives, extent of change, competitiveness and success were established.

The purpose of the case studies has been to analyze those areas and aspects of change management, which have been reflected as the potential areas requiring further investigation in the survey. These areas have been reasons of need of change, change actions, strengths and weaknesses of the industry, phases of change process, and results of change efforts. In the case studies, the existing practices and targeted practices have been the important areas studied and explored.

To carry out case studies, the basis for selection of industrial unit(s) has been:

- The unit(s) to be a representative of the automobile industry, i.e. most of the operations and process are prevalent in these units.
- It has requisite activities going on pertaining to the potential areas of socio-technical change as reflected by the results of the survey.
- The unit is forthcoming and co-operative for conducting case studies.

Within the framework, the following areas have been studied in the case organizations:

- Need of change and actions taken at various instants of time.
- Changes made from time to time in various major areas like technology, systems, structure, culture and people.
- Pace of change and quantum of change at a time, i.e. kludging and tinkering
- Procedure adopted by the company and benefits achieved/ resistance faced
- Management and people's response to change and its management
- Strengths and weaknesses of the organizations

Case studies were followed by categorization of companies in various levels with regard to status and competitiveness of the companies. For each category of companies, separate matrices of change were developed wherein based on the present and desired practices, a Tornado plot was constructed. A management process was, then, developed based on the findings of all previous phases of study and their supplementation and generalization through a Delphi study in consultation with experts from the industry. For this, various techniques of qualitative modeling like options field methodology (OFM), options profile methodology (OPM) and fuzzy set theory (FST) were used.

10.2.1 Results and Major Learnings

The following are the results and major findings of the research work:

Results from the Survey

- 69% organizations out of the respondents have considered increased cost of production and reducing profit margins due to stiff competition as the main reason of need of change.
- 61% companies have found technology as the prime driver of change in Indian context for success. Systems, culture, people, structure and strategy have followed this.
- 70% organizations have recommended Managing Director as the change agent, which has been followed by General manager (55%) and Board of Directors (52%).
- Old working culture has been mainly responsible for resistance to change in the Indian organizations.
- The average score of technological change in Indian automobile industry has been calculated as 0.80, which definitely is encouraging. In technology change, a large number of companies have changed the tools, dies, fixtures, machines and setups, and procured CNC technology.
- A large number of Indian organizations are getting accreditation of quality standards like ISO9000 and QS9000. Thus there has been a welcome change of the industry from product consciousness to process consciousness.
- Many organizations have taken actions to optimize manpower and improve productivity putting ban on new recruitments, while response to early separation schemes and VRS has been quite low. Main structural changes have been widening of the sales and service network, vendor development and consolidation. Average score of structural change has been calculated as 0.73 which is quite satisfactory.
- For cultural change, most of the organizations have started with organizational learning to various extents. Average score has been calculated as 0.69 for organizational learning and training.
- In technological change, 53% companies are in the range of 'good' and 'very good', which indicates that Indian organizations are becoming conscious towards

technological advancements. 33% companies are in 'fair' bracket and 14% in 'poor' bracket, which is a cause of concern.

- In structural change, 14% of the responding firms fall in 'very good' bracket, which indicates that organizational structures have been changed in these organizations. 34% of the organizations are in 'good' and 41% in 'fair' category. 11% of the organizations are found to be 'poor' in this aspect. Structural change in Indian automobile industry has been made by various techniques, e.g. manpower optimization, productivity improvement, vendor consolidation, and widening of dealers/service networks.
- As far as systemic changes are concerned, 52% of the responding firms are in the range of 'good' and 'very good', and 31% companies in 'fair' state. These organizations have made changes in their systems at the right time and have been successful in accomplishing their objectives as indicated in correlation analysis. 17% organizations fall in the 'poor' range, which demands an immediate attention.
- In people change, 16% organizations are in 'very good', 34% in 'good' and 37% in 'fair' brackets. 13% organizations are in 'poor' category, which points towards resistance offered and lack of awareness.
- 42% of the respondents are in the range of 'good' and 'very good' in cultural change. Out of them, only 20% are in the top bracket. 43% respondents are in the range of 'fair' and 14% in 'poor'. The main reasons for this have been lack of transparency, formal organizational structure, management styles and insecurity amongst employees.
- To become competent, need of flexibility has been felt in Indian organizations. 17% companies of the respondents are found to be in 'very good' bracket, 27% in 'good', 42% in 'fair' and 14% in 'poor'. To improve flexibility further, planned change is needed in the various areas, i.e. technology, structure, system, mindset of people and culture.
- Innovations have to be made in the organization to remain competitive. The average score of 0.769 reflects a fairly good status of attempts at innovations in Indian automobile industry, but a large value of standard deviation (0.119) shows the large variability of efforts made by the organizations.

- Entrepreneurship aspect has been found to be satisfactory to meet the challenges in the growth of an organization. 50% of the responding organizations are in 'good' and 'very good' range. 31% organizations fall in 'fair' and 19% in 'poor' range. The average value has been found as 0.483, which is quite low. Also the standard deviation has been low (0.090) that indicates lack of initiative of management in all the companies, in general.
- The overall change management in Indian automobile industry is satisfactory. Only 01% companies fall in 'very good' range, 16% in 'good', 81% in 'fair' and 02% in 'poor' range. Average score of 0.713 shows a satisfactory level but a standard deviation of 0.080 points out at moderate variability among the organizations. 48.2% companies fall below the average level and immediate attention is needed in this regard.
- Mean value of competitiveness is found as 0.35 in Indian automobile industry, which is quite low. Also standard deviation of competitiveness is 0.194 that indicates large variability among the organizations. Some units have been making appreciable changes in the major areas of change while others have been reluctant/ ignorant/ not able to make notable change.
- The values of coefficients of correlation show that there are significant relationships (at confidence level: 0.01) between various major areas of change management like technology, structure, systems, people and culture. This depicts the complementary nature of changes in one area with the changes in other areas.
- Extent of change achieved has a significant relationship at 0.01 level with structure, people, culture, entrepreneurship, organizational learning and overall change management.
- Results of change have been significantly correlated at 0.01 level with technology, system, structure, people, culture, innovations, entrepreneurship, organizational learning, overall change management and extent of change.
- Overall change management has been significantly correlated with the attitude of executives at a significance level of 0.05.

Learnings from the Case Studies

The major learnings from case studies in various automobile organizations have been synthesized as follows:

- Get competitiveness through technological collaborations/ tie-ups with multinational companies (MNCs).
- Keep pace with world-class technology and develop in-house research and development capability.
- Reduce manufacturing costs through reduction of waste level and plant overheads.
- Reduce lead-time to product development.
- Develop cheap alternatives to costly components.
- Develop cutting edge technology and increasing product mix to widen the customer base.
- Use information technology to share the latest technology know-how through worldwide web.
- Implement SODA (systems oriented decision approach) in place of DOSA (decision oriented systems approach).
- Implement ISO9000, QS9000, TQM, TPM, Quality Circles and autonomous maintenance in the organizations to increase competitiveness.
- Enhance manpower productivity through job rotation, new incentive schemes, new job design and revised production targets.
- Reduce investment on inventory and overheads by diverting manufacturing of many components, subassemblies and assemblies to tier-I, II and III vendors.
- Implement just-in-time system in the organizations.
- Reduce number of layers (levels) in the organization to increase accountability of individuals and make them more responsible.
- Outsourcing of the material and components for savings.
- Widen the sales and service network to deeply penetrate in the market.
- Implement voluntary retirement schemes (VRS) and other early separation schemes to get rid of excess and inefficient manpower, thus reducing the liabilities of the organizations and improving productivity.

- Reduce number of vendors through vendor-consolidation, thus making the functioning of OEMs simpler.
- Involving people at all levels in deciding organizational objectives, goals and actions through suggestion schemes, better HR practices.
- Reducing resistance to change by imparting education and training.

10.2.2 Matrix of Change

Based on the case studies, the case organizations were categorized into four levels. For each of these categories, a matrix of change was developed. The findings from matrix of change are:

- i. With regard to management of change, the competitiveness of the organizations can be divided into four levels, i.e. competitiveness level-1, competitiveness level-2, competitiveness level-3 and competitiveness level-4.
- ii. It is suggested that the organizations improve their competitiveness by one level at a time.
- iii. The existing practices in the organizations at each level must be documented and the goals or target practices must be defined. Based on that, a management process must be worked out.
- iv. The approach from transition from one level of competitiveness to another varies with regard to laying emphasis on technology, systems and structure.
- v. It is found that at the level-1 of competitiveness, emphasis must be put on technology. Once reasonable level of technology has been acquired, emphasis must shift to systems at the competitiveness levels- 2 and 3. However, further improvement to reach competitiveness level-4, technology again plays a pivotal role.

10.2.3 Delphi Study

The Delphi Technique is a useful decision-making tool that can be used to build consensus or limited agreement in various situations. The Delphi Technique is based on the Hegelian Principle of achieving “Oneness of Mind” through a ‘three-step process’ of thesis, antithesis, and synthesis (Patton, 1986). In thesis and antithesis, all present their opinion or views on a given subject, establishing views and opposing views. In synthesis, opposites are brought together to form the new thesis.

Delphi study was carried out in two rounds in this research work. In the first round, the findings and learnings from the survey and case studies and matrix of change were sent to the identified experts along with a request through an open ended question to give various ways out/options/strategies for management of change in automobile industry. As a result of the response to the first round, a large number of alternatives were obtained. After compiling them and eliminating the overlapped and repeated options, the cumulative response was sent to the experts once again for their opinions and suggestions. In second round, consensus was achieved. The findings are briefly covered here:

- The following goals, if met in order, would make the organizations competitive:
 - Goal-A: Manufacturing high quality products using special purpose machines, reducing lead-time to product development, reducing inventory, diversification to new products, increasing skill level of the manpower and becoming professional in business
 - Goal-B: Managing professionalism through customer responsiveness, implementing systems formed, production at rated capacity, reducing manufacturing costs, reducing investment in inventory, and enhancing productivity
 - Goal-C: Keeping pace with technological developments, using JIT for inventory management, cost cutting, plant expansion and diversification to meet the market demand, and developing multi-skill abilities among the people
 - Goal-D: Be compliant to world-class technology, making innovations, better HR practices, reducing inventory through JIT, optimizing manpower, vendor consolidation, corporate restructuring and productivity enhancement
- Organizations make changes in various areas, e.g. technology, structure, systems, people and culture from time to time. It is found that the companies which have made changes at an early stage, have achieved more competitiveness than the companies which got late in making change.
- Competitiveness of the organization has been dependent upon the driver of change. For achieving goal-A, technology has been considered as the main driver of change, systems for goal-B and goal-C, and technology for Goal-D.

- The organizations that have made small changes using available resources (tinkering) first, and subsequently large changes with additional investments (kludging) have achieved success.
- With customer focus, many organizations in automobile sector have been successful, and at the same time have made the customers more demanding.

10.2.4 Development of Strategies for Management of Change

To make the socio-technical change in Indian automobile industry, a management process was developed in consultation with the experts from the industry. A qualitative modeling using options field methodology (OFM), options profile methodology (OPM) and fuzzy set theory (FST) was used. The modeling began with the listing of various options using OFM. Findings and learnings from the survey and case studies alongwith the measures suggested by the experts through Delphi study formed the initial set of options after scrutinizing to remove the overlapping and repeating options. The options were then put into various categories. These categories were considered as the dimensions of the design. The dimensions were then put into broader categories called clusters. The clusters were sequenced based on the importance of an area. The sequencing of dimensions within the clusters was then carried out. For this purpose also, expert opinion was made use of. In OPM, various profiles or course of actions were planned for managing socio-technical change. These profiles are: Driving change with-

- i. System- Structure- Technology
- ii. System- Technology- Structure
- iii. Technology- System- Structure
- iv. Technology- Structure- System
- v. Structure- Technology- System
- vi. Structure- System- Technology

Also, various goals of automobile industry were decided using 'matrix of change' to the case organizations. Prior to formation of matrix of change, the case organizations were categorized into four categories based on the product, change actions and the success achieved. Matrices of change were formed for these categories. In forming the matrix, existing practices and targeted practices in an organization were listed and the people as stakeholders were involved for recommendations. Comparison of the existing

and targeted practices of these categories resulted in four levels of competitiveness. The targeted practices corresponding to these levels were treated as the goals to be accomplished in the automobile industry as given in section 10.2.3. These goals are required to be met in the sequence.

Following this, quantitative contribution of each profile for each goal was determined through expert opinion using fuzzy set theory, and position matrices were prepared. From the position matrices, optimistic, pessimistic and average position matrices were developed. From these matrices, most effective courses of action for each goal were determined using optimistic, pessimistic and normal approach. In addition, Hadley's matrix of cautious optimism was prepared to develop final courses of action under varying degree of optimism. After developing the management process for managing socio-technical change for competitiveness in Indian automobile industry, a plan was developed for its effective implementation. Different strategies have been recommended in this regard to meet the desired goals in Indian context.

The results of case studies as well as the developed management process point out that 'driving change with systems and technology' is the key strategy to be followed for managing socio-technical change in Indian automobile industry. 'Driving change with structure' has not been recommended.

10.3 Conclusions and Recommendations

From the results of the detailed study carried out in this research work through survey, case studies, matrix of change, Delphi study and expert opinion, the following conclusions are drawn:

- i. The financial indicators and other performance measures of the Indian automobile industrial organizations indicate that they are hard pressed because of the rising prices of input resources, alarming high degree of competition and wide choices available with the customer due to rapid product innovations.
- ii. Most of the organizations have made efforts to manage socio-technical change by changing their technology, working systems, educating and training employees and changing structure by delayering, VRS, ban on recruitments, etc.

- iii. With regard to management of change, only a small percentage of organizations have been able to manage it effectively for competitiveness, while the remaining have received a varying degree of limited success.
- iv. With regard to technology, innovations, flexibility, use of new systems of work, layering, changing reporting structure and other aspects of socio-technical change, the Indian automobile industry has come a long way and have changed considerably. But still there is dire need and scope for further change. The industry has still not become competitive enough that it can effectively face any challenge from multinational companies.
- v. There is a definite relationship between various change agents used and the success achieved in change management. Managing Director of the companies as change agents have met a great success followed by other officers.
- vi. For drivers of change, it is found that technology has emerged as the main driver of change, followed in order by system, people, structure and culture. Regarding extent of change, the companies with technology as the driver of change has achieved maximum change which has been followed by companies opting people, structure, society, culture and system as drivers of change in order.
- vii. Significant relationships exist between various major areas of change management like technology, structure, systems, people and culture depicting their complementary nature. Innovations, flexibility and organizational learning have significant relationships with almost all the major areas of change and strategies.
- viii. People change, innovation and level of change management are found to be correlated significantly with competitiveness. Culture and organizational learning and knowledge management also have significant relationships with competitiveness. Extent of change has a significant relationship with technology, structure, people, culture, entrepreneurship, organizational learning and overall change management.
- ix. There is a significant relationship between inhibitors to change and overall change management. It is indicated that overall change management has been significantly correlated with the attitude of executives. As far as accomplishment

of objectives is concerned, it is found to decrease with the resistance posed by workmen, shortage of skilled manpower and multiskilled operators as indicated by the negative correlations.

- x. For an organization which is facing reduction in market share and profit margins because of competition from new manufacturers equipped with better technology, immediate upgradation of technology is a must.
- xi. Systemic changes must be taken up as an ongoing process to harness full potential of technological changes.
- xii. For a company which already possesses good technology, systems, structure and is making good quality products, it is necessary to continually tinker with the systems to bring about low cost improvement in product and processes.
- xiii. There is a lot of scope for cost cutting through strategies like reducing number of suppliers and giving large volumes of orders to them, improving supply chain management, and reducing inventory.
- xiv. Cost cutting cannot be achieved by treating it as a strategy to put pressure on the employees. Rather cost cutting can be achieved by the use of better technology, systemic changes and improving other areas, as well. Structural changes alone aimed at delayering through VRS or lay-offs cannot achieve cost cutting, and may erode competitiveness.
- xv. Customer focus cannot be lost even under extremely tight situations. MUL in the period of intense competition did not buckle under pressure. Rather, even in the face of losses in the year 2000, it gave more features to the customers, reduced prices and extended finance facilities.
- xvi. It is extremely important to highlight and publicize the strengths of the company. Every organization has some strengths which might be different from the others. For example, MUL has a great strength in dealers' networks and customer service. Highlighting this through television and newspaper advertisements prevented the manufacturers of other technologically advanced vehicles to grab a large share of the market.

- xvii. A successful change will not come only by individual measures taken here and there. Rather, it requires their strict enforcement, a disciplined approach, total commitment and involvement.
- xviii. To give a fight to the new entrants, it is very important to go all the way even with temporary losses and borrowings so that they are not able to establish.
- xix. For remaining competitive, it is necessary to take actions with regard to change, at the right time. A slight delay can make the recovery very difficult. Almost all the case organizations in this research work took similar actions but main difference was the timing. A proactive action is preferable rather than waking up when the problem has already started.
- xx. With regard to managing change and becoming competitive, the whole process can be divided into four stages. At every stage, efforts must be made through a structured approach to reach the next competitiveness level in a defined time frame.
- Competitive level-1 can be defined by a market wrap organization having reducing market share, obsolete product, conventional technology, systems and a hierarchical conventional structure.
 - At competitive level-2, improved technology has been acquired and resultant changes are being incorporated to the areas of systems and procedures to become competitive.
 - Competitive level-3 depicts an organization that has state of art systems, an efficient organization and a reasonably good level of technology.
 - Competitive level-4 is a picture of an efficient, technologically advanced, efficient organization that has matching systems and procedures and a lean management structure.

For achievement of various levels, following recommendations are made as an outcome of this research work:

- i. Organizations aspiring to attain competitiveness level-1 or goal-A must pay attention to technology, followed by system and structure. At this level, the change has to be triggered by technology. A sequence of technology-system-structure has emerged to be the preferred approach.

- ii. For attaining goal-B or competitiveness level-2, however, the experts have laid more emphasis on systems. The logic behind this appears to be that once the company is at competitiveness level-1, it has a good level of technology. Further, improvement can take place if this technology and other resources are optimally utilized. For this, more emphasis has to be laid on systems. Thus, change has to be triggered off at this level by systems that could be followed by structure and technology. The sequence, i.e. systems-structure-technology or systems-technology-structure has emerged to be the preferred approach.
- iii. From transition from competitiveness level-2 to competitiveness level-3, emphasis still remains on systems. The emerged sequence is systems-technology and structure. It can be explained with the logic that optimal utilization of technology and resources will remain a priority at this level. Unnecessary investment in technology would not be a wise decision unless the already existing technology is fully harnessed by improving working-systems and procedures. As and when systems are improved, technology must be supplemented and accordingly structure has to be adjusted.
- iv. Once the organization has achieved competitiveness level-3 which in today's scenario is a very good level, further improvement can take place primarily by laying emphasis on technology. At competitiveness level-3, through the use of efficient and effective systems, the present level of technology and other resources are almost optimally utilized. The sequence, i.e. technology-systems and structure has emerged to be the preferred approach.

10.4 Accomplishment of Objectives and Limitations of the Study

Main purpose of the study was to examine the relationship of change management with competitiveness in Indian automobile industry, which has been accomplished by way of survey and case studies. Research propositions in this regard have been fulfilled to a great extent by the way of average scores and correlations established through survey as well as classification of companies through case study method. Accomplishment of objectives set in line with the 'purpose of research' and the limitations of the study are described below.

To assess the impact of increased level of competition due to globalization and liberalization on Indian automobile industry, a questionnaire survey was conducted. Response was obtained from 83 organizations including both automobile manufacturers and component manufacturers, and analyzed. Effect of various aspects of management of change on competitiveness was studied comprehensively depicting the current status of management of change in Indian automobile industry. However, the study remained confined to north India (covering the states of Punjab, Haryana, Himachal Pradesh, Uttar Pradesh, Delhi and Union Territory of Chandigarh) covering various automobile manufacturers and component manufacturers. It is important to highlight in this study that both types of the organizations, i.e. automobile manufacturers as well as component manufacturers have been treated alike. In addition, the response to the questionnaire from 83 organizations has been used only to assess the current status of management of change, no mathematical model or equation has been derived to act as a tool to calculate the success of change or otherwise.

To systematically study the path treated by various automobile manufacturers/ component-manufacturing organizations to change from conventional working and meet the new demands, a multiple-descriptive case study approach was used. Nine organizations were studied in details. Out of these nine organizations, six are automobile manufacturers while remaining three as component manufacturers. Information related to various actions taken against reasons of need of change from time to time was first collected and then arranged in a chronological order. Afterwards, various phases were identified depicting the path treated during process of change in each case study. As far as limitations of this objective are concerned, the case studies have been conducted at a macro-level only involving all aspects of change management. Micro-level studies of individual phases have not been carried out.

For developing guidelines for various segments and levels of organizations for successful management of change for competitiveness, nine case organizations were categorized into four groups on the basis of products/operations, timeliness of actions taken and results achieved. Finally, guidelines depicting a process of management of change were laid for these groups using various tools and techniques including matrix of change, Delphi study and qualitative modeling using options field methodology (OFM),

options profile methodology (OPM) and fuzzy set theory (FST). However, the change strategies (profiles) examined in the design phase concentrated on changes in the areas of technology, systems and structure only. The concerns of people and culture are assumed to be dependent upon these aspects and are not explicitly included in the design of management process.

10.5 Scope for Future Work

While carrying out this study, a number of areas have come in focus where detailed research can be taken up. Such areas demanding attention, further exploration and analysis through research work are mentioned below:

- Technology is the prime thought that comes in the manager's mind when considering change for competitiveness, but this strategy alone has not been adequate. Although other areas of change like system, structure, culture and people have been considered in this study, many new areas like customer demand, market trends, devaluation of Indian currency in the international market, pre-owned vehicles and standard of life are indirectly related to managing socio-technical change. Thus, research should be carried out to understand the relationship of the change in these areas also.
- The present study has concentrated on automobile industry only. The work can be extended to other categories of industries like process industry, engineering industry, consumer durable industry and service industry.
- Research should be carried out to correlate overall change with customer satisfaction.
- The present study has suggested a management process and change strategies for managing change success fully in the Indian context. It is important that structural strategies like downsizing, retrenchment and similar others are not practiced in Indian automobile industry mainly on account of the government rules and regulations. Comparative studies need to be conducted focusing on these options.

10.6 Concluding Remarks

The Indian industry is fast becoming a part of a business environment that is becoming fiercely competitive in Indian context. Achieving competitiveness in such an ambience is pivotal upon the ability of a company to follow a well-articulated and

defined policy conducive to motivating everyone to respond quickly to the changing market requirements. The company also has to strive hard to be innovative, profitable, technologically superior and productive as well as quality conscious. The continuous pace with world-class technology, supportive systems, restructuring and cultural modifications will help the organizations to change flexibly and achieve success.

There is an urgent need to nurture and develop an ambience conducive to managing socio-technical change. Efforts by apex bodies such as Confederation of Indian Industry, Regional Chambers of Commerce, Government of India and leading academic and research institutes should establish more centers in research and development in managing change in the Indian automobile industry.

It is concluded that in this new millennium, managing change in technology, systems, structure, culture and people and the allied areas are the tools to succeed in the global competition.

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APPENDIX A1

Sample of Questionnaire sent to Automobile Companies

Subject: Ph.D. research work titled: MANAGING SOCIO-TECHNICAL CHANGE FOR COMPETITIVENESS IN INDIAN AUTOMOBILE INDUSTRY”.

Respected Sir,

Most respectfully, I beg to say that I am pursuing Ph.D. at Thapar Institute of Engineering and Technology Patiala (Punjab). My research work is related to management of socio-technical change for competitiveness in Indian automobile industry. In the current scenario when growing competition is posing a challenge to the automobile manufacturers in India, it seems mandatory to adapt to socio-technical aspects of change in the organizations. Technical, social, organizational systems, structure, people and cultural aspects of change are the fields of my research work.

The literature survey on the topic has already been done by me which indicates that several Indian organizations have started adopting small change in the above aspects or are planning to do so in the future. The objective of the research work is to devise new strategies for the automobile industry to add to their competitiveness.

Sir, this endeavor will only be possible by your cooperation. I am enclosing a questionnaire consisting of related questions specially designed to assess the current situation of automobile industry in India. Multiple answer type questions are framed to facilitate answering. The questionnaire is supposed to be filled up by senior-executives in the organization.

Kindly answer all the questions to fulfill the objectives of my research work and mail it to me at the earliest possible.

I shall ever remain grateful to you for your help and cooperation in this regard.

Yours truly,

Rajiv Kumar Garg
Assistant Professor
e-mail:

garg_recjal@indiatimes.com

Questionnaire

PART-A (General Information)

1. Name of the company:..... Year of establishment
2. Address:
.....
3. Products:.....
4. Collaboration/ merger, if any:.....
5. Type of company

Type	Tick()
Automobile manufacturer	
Automobile components manufacturer	

6. The automobiles/ components made by your company are/ are meant for:

Category	Tick()	Category	Tick()
Cars		Farm machinery	
Tractors		2-wheelers	
Light Commercial Vehicles		3-wheelers	
Heavy Transport Vehicles		Multi-utility vehicles	

7. Objectives of organization and level of accomplishment

Objectives	Level of accomplishment				
	Not applicable	Full 100%	High 75-99%	Medium 50-75%	Low <50%
To achieve:					
Market leadership					
Large percentage of market share					
High profitability					
Large volumes of output					
High quality products					
Any other, please specify					

Part B

8. Have you felt a need to change in the recent past?
☐ To a large extent ☐ To some extent ☐ To a small extent ☐ Not at all
9. In your opinion, the reasons for the need of change have been

<i>Reasons</i>	To a large extent	To some extent	To a small extent	Not at all
Shrinking profit margins				
Increased competition				
Higher growth in terms of turnover				
Made aware of better ways of working				
Need to achieve higher level of quality				
To reduce cost of production				
Low productivity levels				
Labour unrest				
Any other, please specify				

10. The following indicators of the organization increased/ decreased over a period of 5 years before starting the change process:

(A= Appreciable, B= Moderate, C= Marginal, D= No change)

Indicators	Increased				Decreased			
	A	B	C	D	A	B	C	D
Turnover								
Profit margins								
Output/ Production								
Product mix								
Number of employees								
Productivity								
* Material type								
* Energy type								
* Equipment type								
* Labour type								
Number of competitors								
Quality requirements								

11. Need of systemic changes is felt in your organization because of

<i>Reasons</i>	To a large extent	To some extent	To a small extent	Not at all
Old and inefficient manufacturing practices				
Ineffective Information system				
Non-motivating wage and incentive system				
Emergence of new technology				
Any other, please specify				

12. Which of the following has enabled your company to understand and implement changed practices?

<i>Enablers</i>	To a large extent	To some extent	To a small extent	Not at all
Executive development programs				
Consultants				
Literature reviews				
Observation of the set up of MNCs				
Awareness and training programs for workers and supervisors				
Any other, please specify.....				

13. Which of the following have been the change agents in your company?

<i>Change agents</i>	To a large extent	To some extent	To a small extent	Not at all
Board of Governors/ Directors				
Managing Director				
General Manager				
Consultants				
Trade Union Leaders				
Outside experts				
Any other, please specify				

14. In your setup, what do you think will be the driver for change?

<i>Drivers</i>	Main driver	Also an imp. driver	To some extent	Not at all
Technology				
Society				
People				
System				
Strategy				
Culture				
Any other, please specify.....				

15. Which of the following flexibilities, would you like to have in your organization after change?

<i>Flexibilities</i>	To a large extent	To some extent	To a small extent	Not at all
Manpower flexibility				
Process flexibility				
Organizational flexibility				
Product mix flexibility				
Equipment flexibility				
Routing flexibility				
Product flexibility				
Managerial flexibility				
Volume flexibility				
Total flexibility				
Any other, please specify.....				

16. Has reengineering been tried in your organization? Yes No

If yes, has it made your organization achieve:

<i>Achievements of Reengineering</i>	To a large extent	To some extent	To a small extent	Not at all
More efficiency and higher production				
More responsiveness to market demands				
Better work environment				
Enhanced quality levels				

17. Have you setup a benchmark for your company and the working is being aligned to achieve it?

☐ Yes ☐ Almost decided ☐ Exercise started ☐ No

18. Has your organization implemented any of the following concepts/ techniques to bring about change?

Concepts/ Techniques	Implementation of technique				
	Not applied	Level of help in change process			
		Extremely helpful	Very Helpful	Some Helpful	Not helpful
5 S					
World Class Manufacturing					
ISO 9000					
ISO 14000					
QS 9000					
Any other, please specify.....					

19. Has your organization implemented any of the following aspects to bring about structural changes?

<i>Aspects/ techniques</i>	To a large extent	To some extent	To a small extent	Not at all
Delaying				
Downsizing				
Horizontal communication				
Regrouping of units				
Making the organization more process based				
Any other, please specify				

20. For changing customer requirements, which innovations have been made/ tried in your company?

<i>Innovations</i>	To a large extent	To some extent	To small extent	Not at all
Introduction of new models				
Use of new technology				
Incorporating new features				
Use of new materials				
Use of Information technology				
Any other, please specify.....				

21. To sustain in the automotive market, which of the following strategic changes were introduced in your organization?

<i>Strategic changes</i>	To a large extent	To some extent	To a small extent	Not at all
Acquisitions				
Alliances				
Mergers				
Joint-ventures				
Spin-offs				
Divestment				
Any other, please specify				

22. Have the necessary changes in the following technical areas been introduced in your organization?

Technical area	To a large extent	To some extent	To small extent	Not at all
Tools, dies, fixtures				
Machinery and equipments				
Work stations				
Skill levels of man power				
Automation				
Flexibility				

23. By which of the following techniques, you have incorporated more empowerment to employees?

Techniques	To a large extent	To some extent	To a small extent	Not at all
Decentralization of decision making				
Formation of self-organized teams				
Total ownership by the employees				
Self supervision				
Any other, please specify				

24. Have you tried to introduce the following aspects to bring continuous improvement in your organization?

<i>Techniques/ aspects</i>	To a large extent	To some extent	To a small extent	Not at all
Setting of Kaizens (teams)				
Setting of working groups				
Quality circles				
Bench marking				
Total quality management				
Any other, please specify				

25. In your organization, what do you see as the major inhibitor in the change process?

<i>Inhibitors</i>	Main factor	Also important	Worth considering	Not important
Resistance to change by executives				
Resistance to change by workmen				
Lack of education and awareness				
State of technology and automation				
Organizational structure				
Styles of management				
Availability of skilled and unskilled labor				
Availability of multi-skilled labor				
Culture				
Union influence				
Feeling of insecurity at various levels				
Any other, please specify.....				

26. Have you tried to improve the following areas to bring about the desired change?

(A= To a large extent, B= To some extent, C= To a small extent, D= Not at all)

Areas	A	B	C	D	Areas	A	B	C	D
Technology and state of automation	☐	☐	☐	☐	Incentives and fringe benefits	☐	☐	☐	☐
Relations amongst seniors and subordinates	☐	☐	☐	☐	Promotion policies	☐	☐	☐	☐
Transparency	☐	☐	☐	☐	Accountability	☐	☐	☐	☐
Organizational system	☐	☐	☐	☐	Strictness and discipline	☐	☐	☐	☐
Layers of management	☐	☐	☐	☐	Suggestion schemes	☐	☐	☐	☐
Job Design	☐	☐	☐	☐	Awards to good suggestions	☐	☐	☐	☐
Job evaluation	☐	☐	☐	☐	Extensive use of information technology	☐	☐	☐	☐
Work environment improvement	☐	☐	☐	☐	By providing help in domestic chores	☐	☐	☐	☐
Authority and span of control	☐	☐	☐	☐	Better human-human interaction	☐	☐	☐	☐
Pay packages	☐	☐	☐	☐	Any other, please specify				

27. By which of the following, you have been able to attract the manpower for education and training?

By making it compulsory as policy ☐

By introducing incentives ☐

By changing working times ☐

Motivating the employees ☐

28. To have a sustainable share of automotive market, strategies used by your company are:

Strategies	To a large extent	To some extent	To a small extent	Not at all
Full financing				
Partial financing				
Festival offers				
Free limited maintenance				
Free unlimited maintenance				
Any other, please specify.....				

29. When in general, are the following technological advancements introduced in your models/ products:

Technological advancements	Before a competitor	Along with competitors	Against a need	Not at all
Introduction of new models				
Introduction of new features				
Emission norms				
Safety features				
Ergonomic features				
Aesthetics				
Up gradation of models				
Power steering				
Dashboard improvement				
Better wipers				
Continuous refinement of features				
Stereo system				
MPFI				
Air conditioning				
Central locking				
Alarm system				
Steering locking				
Any other, please specify.....				

30. What was the response of the following schemes, if implemented, in your organization?

Schemes	Not implemented	Very good	Good	Average	Poor
VRS					
Retrenchment					
Golden Handshake					
Ban on recruitment					
Any other, please specify					

31. After the introduction of above schemes, whether the desired results have been achieved?

☐ To a large extent
☐ To a small extent

☐ To some extent
☐ Not at all

32. As a result of VRS in your organization, which of the following have voluntarily opted for retirement?
- ☐ Competent persons ☐ Incompetent persons
- ☐ Mostly competent persons ☐ Mostly incompetent persons
33. After the implementation of VRS, with the resulting less people and new technology in use, are you feeling comfortable?
- ☐ Yes ☐ Many problems being experienced ☐ With initial adjustments
- No
34. After VRS, have you achieved the desired change in the organization?
- ☐ To a large extent ☐ To some extent
- ☐ To a small extent ☐ Not at all
35. Did you have to employ more people occasionally to cope up with the burden?
- ☐ Yes ☐ Occasionally
- ☐ Once a while ☐ No
36. How did you cope up with the less number of people?

Techniques	Always	Sometimes	Occasionally	Rarely
By pressuring them for more work				
By offering them higher salary				
By paying them overtimes				
Contracting some works from outside agencies				
Using computers, more automation and better technology				
Any other, please specify.....				

37. Which of the following strategies were adopted to adjust the manpower problem in your organization?

Strategies	Always	Sometimes	Occasionally	Rarely
Transfers from one unit to other				
Multiple jobs				
Better job designs				
Less bureaucratic procedures				
Any other, please specify				

38. Would you like to continue with the above strategy?
- ☐ Yes ☐ No
39. The organizations are now adopting a structure in which the overall activities are divided into various functions likes marketing, operations, engineering etc. but at the same time, teams are formed for projects and innovations. You have an organization of the following type:

Type of organization	Functional	Sometimes teams	Functional and teams	No set organization
Before change process				
After change process				

40. Please specify the status of the following aspects of your organization for “before” and “after” change process: (A=Very good, B= Good, C= Fair, D= Poor)

Indicators of change	Before change process				Present during or after change process			
	A	B	C	D	A	B	C	D
Definition and documentation of individual’s authority & responsibilities								
Participation of all cadres in decision making								
Organizational setup								
Sense of belongingness at all levels								
Team work								
Voluntary participation of employees for education and training								
Customer focus								
Government rules and regulations								
Extent of use of computers in office								
Extent of use of computers in MIS								
Extent of use of CNC Machines								
Extent of use of CAD/ CAM								
Reactive and proactive improvement								
Extent of use of quality circles								
Layers of management								
Transparency								
Accountability								
Use of information technology								

41. To what extent, the following aspects have undergone a change in your organization as a result of change process?

Indicators of change	To a large extent	To some extent	To a small extent	Not at all
Ways of doing work				
Documentation of ways of work and standard data				
Work content and standard time for employees				
Working environment				
Emoluments and other fringe benefits				
Total and actual working hours				
Team work and automation				
Up gradation in state of technology & level of automation				
Education and training to the employees				
Any other, please specify.....				

42. Results of efforts aimed at improving the social relations are
☐ Encouraging ☐ Reasonably good ☐ Good to begin with ☐ Discouraging
43. As a result of change, what has been the impact on the following areas/ indicators in your organization?

(A= To a large extent, B= To some extent, C= To a small extent, D= Not at all)

Area/ Indicator	Increased				Decreased			
	A	B	C	D	A	B	C	D
Productivity								
Material type								
Energy type								
Equipment type								
Labour type								
Growth								
Profits								
Quality								
Flexibility								
Manpower type								
Process type								
Product mix type								
Equipment type								
Routing type								
Product type								
Managerial type								
Volume type								
Total flexibility								
Any other, please specify.....								

44. Any other information of your company related to change management:

Information of the Responder:

Name (Optional): _____

Designation: _____

Department: _____

Years of experience: _____

Qualifications: _____

Contact Address: _____

APPENDIX A2

VARIABLES OF SURVEY

Various variables have been identified to facilitate the survey. These variables are as follows:

- ***Need of Change:*** Need of change indicates the reasons based upon which the organizations realizes the shortcomings in their working styles and plan to change for the desired goals. Need of change has been evaluated by referring to the financial indicators of the organizations like turnover, profit margins, volume of output, quality parameters, earning per share, inventory turnover ratio etc.
- ***Driver(s) of Change:*** Drivers of change are associated with various change initiatives taken to make the desired changes in an organization. It has been noticed that organizations have chosen various drivers of change at different instants of time depending upon the organizational needs. In the present study, various drivers of change considered have been technology, system, structure, culture and people.
- ***Change Agents:*** Change agents are responsible for implementing the change programme in an organization. It is important to find the most useful change agent in the Indian organizations and also study the impact of choice of change agent on competitiveness. Change agents can be chosen from within the organizations as well as from outside.
- ***Areas of Change:*** To manage the socio-technical change in the Indian automobile industry, various areas of change, e.g. technology, systems, structure, people and culture have been considered in the current study. It is planned to study the interrelationship of these areas of change and also their effect on change management.
- ***Inhibitors to Change:*** The purpose of inhibitors to change is to study the reasons of resistance encountered while making change in the organizations. It is planned to find the relationship of inhibitors with the change management.
- ***Organizational Learning:*** Organizational learning has been considered effective for introducing flexibility in the organizations and making cultural change. It is

planned to study various techniques of organizational learning and knowledge management being implemented in Indian companies and find their success.

- ***Flexibility:*** Flexibility has been found the key behind the success of change programme in an organization. Flexibility and its impact on various areas of change have been considered as a research variable in the study. It is learnt that lack of flexibility is due to fixed mindset and culture of an organization.
- ***Reengineering:*** Reengineering has been used as a tool of making change in an organization and has been treated as a research variable.
- ***Innovation:*** Innovations denote the capabilities of the organization, attitude of the management and people, and the efforts made for achieving success. In the wake of competition after globalization and liberalization, innovations have been considered important for the success of the organizations. In this study, it is taken as a research variable for descriptive study.
- ***Entrepreneurial Aspects:*** Entrepreneurial aspects have been effective in the growth of the organization and help in deciding strategies to meet the market demands. Entrepreneurial aspects have also been considered as an important research variable in the study.

APPENDIX A3

PRETESTING AND VALIDATION OF THE QUESTIONNAIRE

Following tasks were undertaken for pre-testing and validation of the questionnaire:

- a. Suggestions received for the following were included:
 - i. Managing Director of M/S Kads Enterprise Patiala.
 - ii. Senior Manager at M/S Maruti Udyog Limited Gurgaon.
 - iii. General Manager (Technical) of M/S Swaraj Mazda Limited Ropar.
 - iv. Personnel Manager of M/S HMT Limited Pinjore.
 - v. Training Manager of M/S Hero Honda Limited Gurgaon.
 - vi. Vice-President of M/S Sraraj Combines Limited Ropar.
 - vii. Two professors, one each from Thapar Institute of Engineering and Technology Patiala and Indian Institute of Technology New Delhi.
 - viii. Workshop Superintendent of Thapar Institute of Engineering and Technology Patiala.
 - ix. Senior Manager of M/S Minda-Rika Industries Limited Gurgaon.
- b. Questionnaire pretested on the industry to be surveyed

A sample of 20 industrial units was selected on random basis covering each class of the industry. Sample contained the following:

	Class of Industry	Sample size
i.	Total	20
ii.	Private sector	12
iii.	Public sector	08
iv.	Punjab Region	05
v.	Haryana Region	07
vi.	Himachal Pradesh region	02
vii.	Uttar Pradesh Region	02
viii.	Delhi Region	02
ix.	Chandigarh Region	02
x.	Automobile Manufacturers	08
xi.	Component Manufacturers	12

Out of above 20 units, only 11 units took keen interest and made suggestions. The feedback received from them was duly incorporated.

APPENDIX A4

QUESTIONS NUMBERS RELATED TO VARIOUS AREAS OF CHANGE MANAGEMENT

S.No.	Major Areas of change management	Related Question numbers (Appendix A1)
1	Technological change	22, 26a, 29, 41h
2	Systemic change	18, 26d, 26f, 26g, 26o, 26p, 26q, 41a, 41b
3	Structural change	19, 26e, 26i, 30, 37
4	People change	24, 26b, 26h, 26j, 26k, 26l, 26m, 26r, 41c, 41d, 41e, 41f
5	Culture change	23, 26c, 26n, 26s, 41g, 42
6	Flexibility	15
7	Reengineering	16
8	Innovativeness	20
9	Entrepreneurship	21, 27, 28, 36, 37
10	Organizational learning	12, 17, 41i

APPENDIX A5
STATUS OF MAJOR AREAS OF CHANGE MANAGEMENT

Units	TECH	SYS	STR	PPL	CULT	FLEX	RENG	INNV	ENTR	LRNG	CM
1	0.750	0.725	0.682	0.641	0.611	0.825	1.000	0.700	0.347	0.786	0.707
2	0.906	0.694	0.705	0.656	0.639	0.750	0.250	0.700	0.375	0.679	0.635
3	0.906	0.694	0.705	0.656	0.639	0.750		0.700	0.375	0.679	0.678
4	0.844	0.694	0.705	0.656	0.639	0.750		0.700	0.375	0.643	0.667
5	0.781	0.656	0.659	0.594	0.639	0.750		0.600	0.400	0.643	0.636
6	0.607	0.694	0.659	0.578	0.639	0.800	0.688	0.800	0.333	0.429	0.623
7	0.607	0.694	0.636	0.563	0.694	0.800	0.688	0.800	0.333	0.429	0.624
8	0.719	0.750	0.727	0.672	0.722	0.775		0.800	0.453	0.643	0.696
9	0.781	0.750	0.519	0.609	0.639	0.750	0.688	0.700	0.417	0.821	0.667
10	0.500	0.650	0.432	0.625	0.556	0.725	0.688	0.750	0.375	0.607	0.591
11	0.598	0.750	0.769	0.703	0.833	0.750		1.000	0.536	0.714	0.739
12	1.000	0.896	0.673	0.813	0.889	0.775	0.188	0.800	0.488	0.857	0.738
13	0.719	0.563	0.773	0.688	0.833	0.925	0.750	0.600	0.469	0.571	0.689
14	0.688	0.795	0.795	0.750	0.806	1.000	1.000	0.900	0.485	0.714	0.793
15	0.688	0.795	0.795	0.750	0.806	1.000	1.000	0.900	0.485	0.714	0.793
16	0.688	0.656	0.750	0.703	0.611	0.600		0.800	0.469	0.250	0.614
17	0.792	0.886	0.818	0.906	0.917	0.825	0.938	0.700	0.500	0.857	0.814
18	0.594	0.750	0.727	0.688	0.556	0.700		0.550	0.422	0.679	0.629
19	0.844	0.861	0.682	0.781	0.778	0.750		0.850	0.484	0.643	0.741
20	0.683	0.816	0.712	0.750	0.833	0.875	0.938	0.850	0.486	0.786	0.773
21	0.885	0.977	0.917	0.875	0.833	0.925	1.000	0.900	0.667	0.679	0.866
22	0.722	0.625	0.625	0.531	0.528	0.600		0.600	0.405	0.714	0.594
23	0.688	0.875	0.705	0.563	0.722	0.700		0.700	0.363	0.679	0.666
24	0.906	0.556	0.864	0.781	0.889	0.850	0.813	1.000	0.469	0.714	0.784
25	0.844	0.682	0.727	0.813	0.750	0.925	0.938	0.800	0.453	0.857	0.779
26	0.688	0.596	0.625	0.547	0.528	0.600		0.600	0.417	0.714	0.590
27	0.769	0.688	0.591	0.703	0.611	0.775		0.600	0.458	0.571	0.641
28	0.778	0.904	0.667	0.813	0.806	0.775	0.875	0.800	0.488	0.679	0.758
29	0.688	0.813	0.750	0.656	0.694	0.700	0.875	0.800	0.422	0.750	0.715
30	0.964	0.865	0.636	0.734	0.806	0.800	1.000	0.900	0.571	0.857	0.813
31	0.792	0.896	0.818	0.906	0.917	0.850	0.938	0.700	0.547	0.857	0.822
32	0.986	0.841	0.792	0.750	0.806	0.825	0.250	0.900	0.476	0.750	0.738
33	0.786	0.792	0.727	0.609	0.639	0.700		0.800	0.492	0.714	0.695
34	0.875	0.833	0.705	0.672	0.722	0.725		0.750	0.453	0.607	0.705
35	0.641	0.750	0.705	0.734	0.667	0.725	0.875	0.900	0.595	0.821	0.741
36	0.982	0.885	0.792	0.750	0.667	0.700	0.813	0.800	0.539	0.893	0.782
37	0.643	0.904	0.614	0.766	0.694	0.650		0.750	0.516	0.786	0.702
38	0.469	0.625	0.409	0.625	0.556	0.475		0.450	0.391	0.464	0.496
39	0.792	0.896	0.818	0.875	0.917	0.850	0.938	0.700	0.547	0.857	0.819
40	0.719	0.688	0.591	0.625	0.528	0.750		0.550	0.500	0.679	0.625
41	0.728	0.750	0.667	0.766	0.722	0.700		0.650	0.619	0.714	0.702
42	0.826	0.700	0.733	0.797	0.889	0.575	0.250	0.800	0.595	0.643	0.681

43	0.827	0.750	0.659	0.656	0.694	0.800	0.875	0.700	0.578	0.679	0.722
44	1.000	0.932	0.886	0.922	0.917	0.850	0.813	1.000	0.702	0.857	0.888
45	0.729	0.654	0.591	0.703	0.639	0.850		0.650	0.297	0.714	0.647
46	0.815	0.808	0.614	0.797	0.694	0.950	0.500	0.650	0.393	0.536	0.676
47	0.781	0.563	0.591	0.641	0.639	0.675		0.700	0.563	0.750	0.656
48	0.673	0.727	0.604	0.656	0.611	0.725	0.750	0.800	0.469	0.643	0.666
49	0.630	0.865	0.875	0.828	0.667	0.850	0.875	0.850	0.542	0.821	0.780
50	0.750	0.692	0.733	0.594	0.556	0.825	1.000	0.850	0.500	0.643	0.714
51	0.772	0.788	0.833	0.688	0.750	0.775	0.813	0.800	0.595	0.893	0.771
52	0.797	0.923	0.800	0.828	0.889	0.975	0.250	0.900	0.500	0.893	0.775
53	0.750	0.875	0.833	0.734	0.833	0.850		0.900	0.631	0.821	0.803
54	0.719	0.731	0.591	0.688	0.778	1.000		0.650	0.405	0.714	0.697
55	0.815	0.896	0.688	0.734	0.583	0.750		0.900	0.583	0.750	0.744
56	0.848	0.981	0.617	0.875	0.972	0.825	0.750	0.950	0.643	0.929	0.839
57	0.707	0.854	0.750	0.781	0.861	0.900	0.938	0.850	0.595	0.857	0.809
58	0.641	0.792	0.682	0.734	0.694	0.950		0.700	0.560	0.714	0.719
59	0.875	0.769	0.646	0.766	0.778	0.725	0.813	0.800	0.600	0.821	0.759
60	0.844	0.827	0.659	0.859	0.694	0.875	0.875	0.900	0.476	0.750	0.776
61	0.656	0.750	0.591	0.609	0.611	0.625		0.650	0.453	0.750	0.633
62	0.813	0.846	0.636	0.750	0.639	0.750	0.125	0.700	0.453	0.679	0.639
63	0.844	0.827	0.659	0.859	0.694	0.875	0.875	0.900	0.476	0.750	0.776
64	0.688	0.591	0.545	0.625	0.556	0.625		0.700	0.406	0.500	0.582
65	0.865	0.923	0.864	0.859	0.944	0.700	1.000	0.800	0.422	0.750	0.813
66	0.826	0.700	0.733	0.797	0.889	0.575		0.800	0.583	0.643	0.727
67	0.688	0.650	0.523	0.625	0.556	0.625		0.650	0.406	0.500	0.580
68	0.786	0.950	0.636	0.688	0.833	0.450	0.813	0.850	0.393	0.821	0.722
69	0.781	0.917	0.568	0.672	0.722	1.000		0.850	0.310	0.607	0.714
70	0.906	0.955	0.773	0.813	0.861	0.875	0.875	0.950	0.539	0.857	0.840
71	0.906	0.875	0.773	0.750	0.861	0.750		0.800	0.563	0.643	0.769
72	0.938	0.827	0.682	0.734	0.833	0.775	0.188	0.950	0.391	0.750	0.707
73	0.829	0.750	0.659	0.672	0.611	0.750		0.650	0.569	0.464	0.662
74	0.896	0.722	0.659	0.641	0.694	0.925	0.875	0.700	0.464	0.607	0.718
75	0.731	0.750	0.614	0.641	0.611	0.750		0.600	0.514	0.536	0.638
76	0.813	0.827	0.409	0.625	0.417	0.900		0.800	0.438	0.750	0.664
77	0.906	0.889	0.773	0.781	0.861	0.750		0.900	0.563	0.643	0.785
78	0.792	0.977	0.818	0.906	0.917	0.850	0.813	0.700	0.547	0.857	0.818
79	0.844	0.667	0.682	0.578	0.694	0.750		0.650	0.375	0.500	0.638
80	0.882	0.806	0.750	0.781	0.806	0.775	1.000	0.800	0.528	0.786	0.791
81	0.674	0.875	0.477	0.703	0.722	0.900	0.750	0.800	0.476	0.571	0.695
82	0.625	0.575	0.500	0.641	0.583	0.575	0.063	0.550	0.313	0.571	0.500
83	1.000	0.818	0.773	0.922	0.889	0.850	0.063	0.900	0.667	0.857	0.774
Avg.	0.777	0.781	0.689	0.721	0.726	0.778	0.730	0.769	0.483	0.703	0.713
S D	0.113	0.109	0.107	0.097	0.124	0.116	0.288	0.119	0.090	0.128	0.080

APPENDIX A6

Level of accomplishment of objectives in different organizations

SNo	Objectives	Number of responses (Ni) meeting the objectives on 4-points scale with score choice (Si)				Cumm Score $\Sigma(Ni*Si)$	Weights: $(\Sigma Ni * Si) / 1250$	Priority
		Si						
		4	3	2	1			
1	Market leadership	15	21	28	19	198	16%	4 th
2	Large percentage of market share	8	23	32	20	185	15%	5 th
3	High profitability	4	20	19	40	154	12%	6 th
4	Large volume of output	13	34	26	10	216	17%	3 rd
5	High quality products	20	48	14	01	253	20%	2 nd
6	Better man-man relationship	16	46	21	00	244	20%	1st
		Grand sum				1250		

ACCOMPLISHMENT OF OBJECTIVES (OBJ) IN THE ORGANIZATIONS

Score of objectives (Si) by responding firms							Average value (OBJ): Σ(Si*Wi)/6
Firm No	Market leadership	%age of market share	High profitability	Large volume of output	High quality products	Man-Man relation	
	Weights (Wi)						
	0.16	0.15	0.12	0.17	0.20	0.20	
1	2	2	1	2	2	3	0.35
2	2	2	1	3	3	4	0.44
3	2	2	1	3	3	4	0.44
4	2	2	1	3	3	4	0.44
5	2	3	1	3	3	2	0.40
6	1	1	1	2	2	3	0.30
7	2	1	3	3	4	3	0.46
8	2	2	NR	3	3	3	0.39
9	4	3	3	3	4	3	0.56
10	4	2	3	2	3	2	0.44
11	1	1	1	1	3	3	0.30
12	2	2	1	4	3	4	0.47
13	2	2	2	2	4	4	0.47
14	2	2	2	3	3	3	0.43
15	2	2	2	3	3	3	0.43
16	1	2	1	3	4	2	0.38
17	1	1	1	2	4	3	0.36
18	1	1	2	2	3	2	0.32
19	2	2	1	2	2	3	0.35

20	2	1	2	2	3	3	0.38
21	4	2	2	3	3	4	0.52
22	2	2	1	3	3	2	0.38
23	4	NR	NR	NR	4	3	0.34
24	3	3	1	3	3	4	0.49
25	3	3	1	3	3	3	0.46
26	2	2	2	3	3	2	0.40
27	1	1	1	2	3	3	0.33
28	4	4	4	4	3	3	0.60
29	3	3	3	2	3	2	0.44
30	4	3	3	4	3	3	0.56
31	1	1	1	2	4	3	0.36
32	3	3	3	3	4	3	0.53
33	3	3	3	3	3	3	0.50
34	2	2	1	3	3	2	0.38
35	1	1	4	1	3	3	0.36
36	2	2	2	2	2	4	0.40
37	3	3	NR	2	4	3	0.45
38	1	2	2	2	2	2	0.31
39	1	1	1	2	4	3	0.36
40	1	1	1	3	3	3	0.36
41	3	3	2	4	4	4	0.58
42	2	2	3	4	4	4	0.54
43	1	1	2	2	2	3	0.32
44	1	1	1	1	2	2	0.23
45	3	3	3	3	3	3	0.50
46	1	1	2	2	2	3	0.32
47	2	2	2	2	3	4	0.43
48	4	3	1	2	3	2	0.43
49	4	4	1	1	3	3	0.46
50	4	4	3	4	4	2	0.58
51	3	2	1	2	2	4	0.41
52	4	4	3	4	4	3	0.61
53	2	2	2	2	3	3	0.40
54	3	3	1	3	3	3	0.46
55	4	4	3	4	3	3	0.58
56	4	4	3	4	4	4	0.65
57	4	2	1	3	3	3	0.46
58	2	2	2	2	3	2	0.37
59	3	3	2	1	2	3	0.39
60	3	3	3	3	2	3	0.47
61	3	2	2	3	3	2	0.42
62	3	3	3	3	3	3	0.50
63	3	3	3	3	2	3	0.47
64	2	2	1	2	3	2	0.35
65	4	4	4	4	3	3	0.60
66	3	3	2	4	4	4	0.58
67	2	2	1	2	3	2	0.35

68	1	1	1	1	4	3	0.33
69	3	3	3	3	3	4	0.53
70	3	3	2	3	4	3	0.51
71	1	1	1	1	1	3	0.23
72	4	4	4	4	4	3	0.63
73	2	2	1	3	3	2	0.38
74	1	1	1	1	2	3	0.27
75	2	2	1	3	3	2	0.38
76	3	3	3	4	3	2	0.50
77	2	2	1	3	3	3	0.41
78	1	1	1	2	4	3	0.36
79	2	2	1	3	3	4	0.44
80	3	3	3	3	3	3	0.50
81	3	3	3	3	3	3	0.50
82	2	2	1	2	3	2	0.35
83	1	1	1	1	2	2	0.23

APPENDIX A7

PERFORMANCE (PERF) AND COMPETITIVENESS (COMP) OF THE ORGANIZATIONS

Firm	A	B	C	D	E1	E2	E3	E4	E	PERF	OBJ	COMP
1	2	-3	2	3	-2	-2	-2	1	-1.25	0.3	0.35	0.33
2	-3	-4	-3	2	2	2	2	2	2	-0.3	0.44	0.07
3	-3	-4	-3	2	2	2	2	2	2	-0.3	0.44	0.09
4	-3	-4	-3	2	2	2	2	2	2	-0.6	0.44	-0.1
5	2	-2	2	1	3	2	2	4	2.75	-0	0.4	0.19
6	3	-3	3	-4	-3	-3	-4	-4	-3.5	0.08	0.3	0.19
7	3	-3	3	4	-3	-3	-4	-4	-3.5	0.24	0.46	0.35
8	3	-2	3	3	3	3	1	3	2.5	0.26	0.39	0.33
9	3	-3	3	2	-2	-2	-2	-3	-2.25	0.29	0.56	0.42
10	3	-2	3	4	1	-2	-3	-3	-1.75	0.59	0.44	0.51
11	2	-2	2	3	2	2	1	-2	0.75	0.31	0.3	0.31
12	1	-2	1	1	4	4	4	3	3.75	0.13	0.47	0.3
13	2	-2	2	3	2	3	2	-2	1.25	0.33	0.47	0.4
14	4	-3	4	3	2	2	1	1	1.5	0.53	0.43	0.48
15	4	-3	4	-2	2	2	1	1	1.5	0.03	0.43	0.23
16	2	-2	2	1	3	3	2	2	2.5	0.3	0.38	0.34
17	1	2	1	2	-2	-1	-4	-3	-2.5	0.41	0.36	0.39
18	-3	-1	-3	1	3	3	3	3	3	-0.5	0.32	-0.1
19	-2	-2	-2	3	2	2	2	3	2.25	0	0.35	0.18
20	-4	-4	-4	-4	-3	-3	-3	-4	-3.25	-0.7	0.38	-0.2
21	-2	-2	-2	1	3	3	3	3	3	-0.1	0.52	0.19
22	3	-4	3	-2	2	2	2	2	2	0.11	0.38	0.25
23	2	-1	2	1	3	3	2	1	2.25	0.34	0.34	0.34
24	3	-1	3	3	3	2	1	3	2.25	0.5	0.49	0.5
25	3	3	3	4	3	2	4	2	2.75	0.5	0.46	0.48
26	3	-3	3	-2	2	2	2	2	2	0.21	0.4	0.31
27	3	-3	3	2	-3	-3	-3	-3	-3	0.4	0.33	0.37
28	4	3	4	3	4	3	3	3	3.25	0.85	0.6	0.73
29	4	3	4	3	2	4	3	3	3	0.58	0.44	0.51
30	4	3	4	3	3	3	3	3	3	0.84	0.56	0.7
31	1	-1	1	2	-2	-1	-4	-3	-2.5	0.29	0.36	0.32
32	-4	-3	-4	4	3	3	3	2	2.75	-0.2	0.53	0.15
33	-2	-1	-2	2	1	4	3	3	2.75	0.01	0.5	0.26
34	-2	-2	-2	3	2	2	2	3	2.25	0.05	0.38	0.22
35	4	3	4	4	4	3	3	3	3.25	0.83	0.36	0.59
36	4	-3	4	4	4	4	4	4	4	0.53	0.4	0.46
37	-2	-3	-2	2	3	3	3	-3	1.5	-0.4	0.45	0.04
38	-2	-2	-2	2	1	1	2	2	1.5	-0.1	0.31	0.11
39	1	2	1	2	-2	-1	-4	-3	-2.5	0.43	0.36	0.39
40	-3	-2	-3	-2	2	2	2	2	2	-0.4	0.36	-0
41	4	-3	4	2	4	2	2	2	2.5	0.46	0.58	0.52

42	3	2	3	3	3	2	2	2	2.25	0.65	0.54	0.6
43	2	-2	2	2	4	1	2	2	2.25	0.35	0.32	0.34
44	3	-2	3	3	2	2	2	2	2	0.48	0.23	0.35
45	3	-3	3	3	3	3	3	3	3	0.44	0.5	0.47
46	3	-2	3	2	3	2	3	2	2.5	0.33	0.32	0.32
47	3	-3	3	3	3	2	3	3	2.75	0.41	0.43	0.42
48	3	-1	3	2	-1	-1	3	1	0.5	0.53	0.43	0.48
49	4	-3	4	2	3	2	2	2	2.25	0.44	0.46	0.45
50	3	-2	3	3	4	3	3	4	3.5	0.45	0.58	0.52
51	-2	-3	-2	3	2	1	2	2	1.75	-0	0.41	0.19
52	4	-3	4	4	3	1	3	1	2	0.56	0.61	0.59
53	3	3	3	4	3	3	4	4	3.5	0.81	0.4	0.61
54	2	-1	2	1	2	2	3	2	2.25	0.36	0.46	0.41
55	3	-3	3	3	3	4	4	2	3.25	0.45	0.58	0.52
56	4	-3	4	3	3	3	3	4	3.25	0.5	0.65	0.58
57	4	-3	4	4	1	3	4	4	3	0.55	0.46	0.51
58	3	1	3	2	2	2	2	2	2	0.6	0.37	0.49
59	2	1	2	2	2	2	2	2	2	0.48	0.39	0.43
60	2	1	2	3	3	3	3	3	3	0.55	0.47	0.51
61	3	-1	3	3	3	3	2	2	2.5	0.55	0.42	0.49
62	3	-1	3	1	3	3	3	3	3	0.34	0.5	0.42
63	2	-1	2	3	3	3	3	3	3	0.45	0.47	0.46
64	2	-2	2	1	-2	1	2	2	0.75	0.2	0.35	0.28
65	4	2	4	4	4	2	3	3	3	0.74	0.6	0.67
66	3	-1	3	3	3	2	2	-3	1	0.36	0.58	0.47
67	2	-2	2	1	-2	1	2	2	0.75	0.35	0.35	0.35
68	1	-3	1	-4	1	1	-3	-2	-0.75	-0.1	0.33	0.12
69	4	-3	4	4	4	4	4	4	4	0.6	0.53	0.57
70	3	-2	3	4	3	3	3	3	3	0.59	0.51	0.55
71	3	-2	3	3	3	3	3	3	3	0.26	0.23	0.25
72	3	-1	3	2	4	4	4	3	3.75	0.48	0.63	0.55
73	-3	-4	-3	2	-2	-1	-2	-2	-1.75	-0.3	0.38	0.04
74	-4	-4	-4	3	3	4	1	2	2.5	-0.3	0.27	-0
75	-3	-4	-3	2	2	2	2	2	2	-0.3	0.38	0.07
76	4	-3	4	3	3	3	3	3	3	0.29	0.5	0.39
77	3	-2	3	3	3	3	3	3	3	0.45	0.41	0.43
78	1	-2	1	2	-2	-1	-3	-3	-2.25	0.28	0.36	0.32
79	-3	-4	-3	2	2	2	2	2	2	-0.2	0.44	0.11
80	4	-1	4	4	4	3	4	3	3.5	0.66	0.5	0.58
81	4	-1	4	4	4	3	4	3	3.5	0.65	0.5	0.58
82	3	-2	3	2	2	3	2	2	2.25	0.38	0.35	0.36
83	2	-2	2	3	2	2	2	2	2	0.31	0.23	0.27
											Average	0.35

{ A = Turnover, B = Profit margins, C = Production, D = Product mix, E1 = Material productivity, E2 = Energy productivity, E3 = Equipment productivity, E4 = Labor productivity, E = average of all productivities, PERF= Average of A, B, C, D & E, COMP= Average of PERF and OBJ }

APPENDIX A8

EXTENT OF CHANGE ACHIEVED (EXTN) BY THE ORGANIZATIONS

Unit No	Cumulative score of all aspects of extent of change before change process (on 4-point scale)	Cumulative score of all aspects of extent of change after change process (on 4-point scale)	Change (Average score)= (Score after change - Score before change)/18	EXTN: Change /4
1.	35	52	0.944	0.24
2.	29	47	1.000	0.25
3.	29	47	1.000	0.25
4.	29	47	1.000	0.25
5.	33	48	0.833	0.21
6.	37	52	0.833	0.21
7.	37	52	0.833	0.21
8.	29	55	1.444	0.36
9.	47	58	0.611	0.15
10.	33	48	0.833	0.21
11.	55	64	0.500	0.13
12.	42	55	0.722	0.18
13.	37	52	0.833	0.21
14.	45	58	0.722	0.18
15.	45	58	0.722	0.18
16.	25	30	0.278	0.07
17.	31	66	1.944	0.49
18.	18	30	0.667	0.17
19.	37	66	1.611	0.40
20.	38	60	1.222	0.31
21.	38	60	1.222	0.31
22.	35	45	0.556	0.14
23.	44	44	0.000	0.00
24.	27	60	1.833	0.46
25.	27	63	2.000	0.50
26.	36	45	0.500	0.13
27.	18	40	1.222	0.31
28.	53	59	0.333	0.08
29.	38	59	1.167	0.29
30.	49	65	0.889	0.22
31.	31	68	2.056	0.51
32.	43	61	1.000	0.25
33.	18	31	0.722	0.18
34.	40	60	1.111	0.28
35.	33	62	1.611	0.40
36.	50	60	0.556	0.14
37.	35	54	1.056	0.26
38.	25	49	1.333	0.33
39.	30	68	2.111	0.53
40.	18	38	1.111	0.28

41.	47	64	0.944	0.24
42.	36	56	1.111	0.28
43.	28	47	1.056	0.26
44.	21	62	2.278	0.57
45.	29	44	0.833	0.21
46.	28	40	0.667	0.17
47.	36	38	0.111	0.03
48.	33	47	0.778	0.19
49.	42	47	0.278	0.07
50.	27	33	0.333	0.08
51.	36	54	1.000	0.25
52.	37	61	1.333	0.33
53.	35	60	1.389	0.35
54.	36	54	1.000	0.25
55.	39	54	0.833	0.21
56.	52	68	0.889	0.22
57.	47	57	0.556	0.14
58.	46	55	0.500	0.13
59.	30	52	1.222	0.31
60.	46	63	0.944	0.24
61.	43	55	0.667	0.17
62.	54	56	0.111	0.03
63.	45	63	1.000	0.25
64.	27	41	0.778	0.19
65.	48	65	0.944	0.24
66.	36	56	1.111	0.28
67.	25	41	0.889	0.22
68.	28	56	1.556	0.39
69.	57	63	0.333	0.08
70.	51	59	0.444	0.11
71.	45	60	0.833	0.21
72.	55	62	0.389	0.10
73.	18	45	1.500	0.38
74.	29	47	1.000	0.25
75.	29	47	1.000	0.25
76.	40	41	0.056	0.01
77.	45	60	0.833	0.21
78.	31	66	1.944	0.49
79.	29	47	1.000	0.25
80.	40	56	0.889	0.22
81.	51	52	0.056	0.01
82.	32	44	0.667	0.17
83.	29	57	1.556	0.39
				Average = 0.24
				S.D. = 0.12

APPENDIX B1

Performance parameters of Maruti Udyog Limited

S. No.	Parameter	1995	1996	1997	1998	1999	2000	2001	2002
1	Market share (%)	73.7	76.6	79.6	82.8	78.9	71.6	57.4	58.4
2	Average daily production (no of vehicles)	702	961	1165	1222	1157	1405	1235	1208
3	Vehicles produced per employee (Vehicles per employee)	38	45	50	61	59	69	60	77
4	Earning per share (Rupees)	187	323	386	493	395	250	-204	79
5	Net profit/employee (Rs in million)	0.54	1.31	1.51	1.73	1.37	0.66	-0.47	0.22
6	Operating profit/vehicle (Rs in million)	—	—	—	0.033	0.029	0.016	.0003	0.014
7	Return (%) on average capital employed	30.82	57.03	55.63	52.42	33.12	14.12	-8.46	4.93
8	PAT to average networth (%)	47.05	50.98	39.93	35.83	22.17	12.10	-9.90	4.04
9	Inventory turnover ratio	—	—	15.16	16.72	16.12	12.08	13.23	19.27

APPENDIX B2
Performance parameters of Yamaha Motors India

S. No	Performance Parameters	1996	1997	1998	1999	2000	2001	2002
1	Market share (%)	23.1	21.9	15.9	13.2	14	8.2	6.1
2	Vehicles/ employee (numbers)	63.9	78.04	67.8	78.6	128.3	104.1	103.6
3	Loss accumulated per employee (Rupees in lakhs)	-	-	0.14	1.08	7.03	8.85	2.54
4	Loss accumulated per vehicle (Rupees in lakhs)	-	-	0.002	0.013	0.054	0.087	0.024
5	Inventory turnover ratio	-	-	0.126	0.134	0.362	0.160	0.081
6	Loss Turnover Ratio	-	-	0.005	0.036	0.303	0.194	0.038
7	Manhours required / vehicle	-	25.34	23.11	22.81	21.65	19.98	20.95
8	Scrap rate	-	88.2	82.8	68.5	27.5	16.7	14.5
9	Straight pass ratio (%)	-	75.9	77.8	76.9	77.6	80.7	85.7

APPENDIX B3
Performance parameters of Majestic Auto Limited

SNo	Parameter	1998	1999	2000	2001	2002
1	Market share (%)	19.67	19.07	15.33	15.47	16.62
2	Average daily production (numbers)	128	111	108	85	87
3	Vehicles produced per employee	20	18	17	14	20
4	Operating profit/vehicle (Rs. In thousands)	-0.288	0.075	-0.089	-0.173	-0.780
5	Net profit/ employee (Rs. In million)	-0.058	0.013	-0.015	-0.024	-0.152
6	Inventory turnover ratio	13.19	12.68	10.80	14.81	8.12

APPENDIX B4

Performance parameters at Swaraz Mazda Limited

S.No	Year	Market share (%)	Vehicles/ employee (Numbers)	Profits (PBT)/ employee (Rs. in Million)	Profits (PBT)/ Vehicle (Rs. in Million)	Earning per share (Rs)	PBT/ Turn over	Inventory Turn Over Ratio	Manhour per vehicle
1	1995	3.7	6.6	-	-	-	-	-	-
2	1996	3.9	7.7	-	-	-	-	-	-
3	1997	4.1	6.9	-	-	-	-	-	41.04
4	1998	4.5	5.0	1.29	0.25	5.79	0.044	0.222	40.33
5	1999	5.2	4.9	0.52	0.11	2.44	0.019	0.269	40.56
6	2000	6.6	6.9	0.64	0.09	2.70	0.017	0.146	42.02
7	2001	8.0	8.7	1.08	0.12	3.80	0.024	0.163	40.54
8	2002	13.1	10.5	1.73	0.16	6.46	0.035	0.157	39.13

APPENDIX B5

Performance parameters of Punjab Tractors Limited

S.No	Year	Market share (%)	Market position	Profits (PBT)/ employee (Rs. in million)	Tractors/ employee (Number)	Return on average net worth (%)	Earning per share (Rs)	PBT/ Turn over	Ratio of exp. on R&D to Turn Over
1	1992	09.7	6 th	0.093	8	21.7	23.63	0.013	0.31
2	1993	11.4	5 th	0.114	9	22.8	14.62*	0.084	0.32
3	1994	13.2	4 th	0.141	9	23.0	17.00	0.093	0.36
4	1995	14.1	4 th	0.201	11	30.8	26.63	0.101	0.31
5	1996	13.8	4 th	0.282	12	35.1	37.74	0.118	0.36
6	1997	14.9	4 th	0.389	15	39.9	27.80*	0.128	0.47
7	1998	15.9	4 th	0.570	17	49.6	47.71	0.150	0.30
8	1999	18.5	2 nd	0.741	20	47.7	62.13	0.184	0.31
9	2000	18.6	3 rd	0.788	21	39.8	65.80	0.186	0.47
10	2001	18.1	2 nd	0.686	18	27.9	18.52**	0.174	0.64
11	2002	18.4	2 nd	0.582	16	22.5	16.46	0.161	0.69

(* on post bonus (1:1) equity, ** on post bonus (2:1) equity)

APPENDIX B6

Performance parameters of HMT Limited

S. No	Year	Market share (%)	Profits / employee (Rs. in million)	Tractors/ employee (No of tractors)	Inventory turnover ratio	Profit/ Turn over	R&D Exp to Turn Over (%)
1	1998	8.74	1.06	6.26	5.51	0.07	0.24
2	1999	8.41	1.11	6.15	6.02	0.08	0.31
3	2000	7.08	0.47	5.05	4.63	0.04	0.23
4	2001	6.42	0.19	4.78	3.73	0.02	0.31
5	2002	6.51	0.07	4.34	6.53	0.01	0.37

APPENDIX B7

Performance parameters of Sona Koya Steering Systems Limited

S. No	Year	Earning per share (Rs.)	Profit turnover ratio	Net profit per employee (Rs. in million)	Sales to inventory ratio	Inventory turnover ratio	Debt Equity Ratio
1	1998	10.2	0.07	0.18	9.6	0.78	0.7
2	1999	6.5	0.04	0.11	8.4	0.92	0.9
3	2000	9.8	0.05	0.18	11.4	0.69	0.5
4	2001	0.89	0.01	0.03	14.4	0.57	0.43
5	2002	4.29	0.02	0.10	13.2	0.63	0.27

APPENDIX B8

Performance parameters of VeeGee Enterprises

S.No.	Year	Reported net profit (%)	Turnover per employee (Rs. in million)	Wastage Level (%)	Inhouse Rejection (PPM)	Machine Breakdown Number
1	1998	1.97	1.55	20	600	80
2	1999	1.18	2.58	15	450	83
3	2000	0.97	3.87	15	350	80
4	2001	3.13	4.37	10	254	78
5	2002	3.45	5.6	9	154	75

APPENDIX B9

Performance parameters of GNA Axles Limited

S.No.	Year	Market share (%)	Turnover per employee (Rs. In lakhs)	Net profit per employee (Rs in lakhs)	Inventory turnover ratio	Profit turnover ratio	Rejection Level (%)
1	1996	60	3.60	0.12	10	0.03	8.0
2	1997	60	3.61	0.12	11.11	0.04	7.0
3	1998	62	4.13	0.20	14.29	0.04	7.5
4	1999	65	4.21	0.21	12.50	0.05	6.0
5	2000	69	4.29	0.23	14.29	0.07	5.2
6	2001	70	5.38	0.17	11.11	0.04	5.0
7	2002	70	5.67	0.19	12.50	0.05	4.0

Appendix C1

Comparison of case studies in terms of time of initiatives in various areas of change

S. No	Organization	New model/ variants	Robotics in plant operations	Innovations	Indegenization of vehicles	Localization of vendors	Diversification	Expansion of manufacturing capacity
1	MUL	53	1986	1987	1987	1986	1985	1993
2	SKSSL	03					1991	1988
3	VeeGee	--		1994			1991	1994
4	HMT	15			1993	1988		
5	MAL	14				1981	1998	
6	YMI	10		1998				1985
7	GNA	4		1994				2001
8	PTL	4				2001	1984	1985
9	SML	10		1995		1999	1999	2000

S. No	Organization	Waste reduction	Delaying	Dealers and service network	Vendor rating	Vendor consolidation	VRS	Ban on recruitment	Job rotation
1	MUL	1998	2000	1988	2001	1999	2001	2001	1988
2	SKSSL	1998	1998					2001	1998
3	VeeGee	1999							1994
4	HMT			1983	2001	2001	2002	1999	
5	MAL	2002			2002		2002	1998	1998
6	YMI	2001		2002			1999	1999	
7	GNA		2000					2000	2002
8	PTL	2001		1976	2002	2002		1995	1998
9	SML			2000	2002	2001		1995	1998

Contd.

S. No	Organization	Restructuring	ISO 9000	TQM	TPM	QS9000	5S	Suggestion scheme	Kaizens
1	MUL	1983	1993	1998	1999	2001	1993	1993	1993
2	SKSSL	2002	2000	1999	2000	2001		1993	1995
3	VeeGee		1994				1998		
4	HMT		1999						
5	MAL		1998			2001			
6	YMI		1996		2002			2002	2002
7	GNA	2002	1995		2000	1996	1995		
8	PTL							1993	
9	SML								

Contd.

S No	Organization	Quality circles	R&D	Spin off	JIT	Education and training	New incentive plans	Team work	Transparency	Checking absenteeism
1	MUL	1993			2000	1983	2000	1983	1983	2001
2	SKSSL	1995	1998			1991		1995	2000	
3	VeeGee					1994			1994	2001
4	HMT		1977			1999	1998			
5	MAL			1998		2001	2002	1998	1998	
6	YMI						1999			
7	GNA					1998		2000		
8	PTL		1979			1993	2002			2002
9	SML						2002			

Contd.

S. No	Organization	Disciplinary actions	Recognition to operators	Motivation	Increasing OEE	Delegation of authority	Vendor consolidation	VRS	Ban on recruitment	Job rotation
1	MUL	2001	1988	1998	2001	1984	1999	2001	2001	1988
2	SKSSL		1999	1995		2000			2001	1998
3	VeeGee	2001	1999	2001		2002				1994
4	HMT						2001	2002	1999	
5	MAL			2001				2002	1998	1998
6	YMI				2001	2002		1999	1999	
7	GNA				2000	2001			2000	2002
8	PTL	2002	2000	1998		1976	2002		1995	1998
9	SML		2000	1998			2001		1995	1998

For categorization: Initiatives taken before 1988: Early, Initiatives taken from 1988 to 1998: In-time, Initiatives taken from 1998 to 2002: Late, Efforts after 2002: Very late.

Impact of change efforts: Levels of success

S. No	Organization	Ways of doing work	Documentation	Effective work content	Work environment	Turnover	Flexibility	Productivity	Total score
1	MUL	4	4	3	4	4	4	3	26
2	SKSSL	3	4	3	4	3	3	2	22
3	VeeGee	3	3	3	3	3	3	3	21
4	PTL	2	3	2	2	3	2	2	16
5	SML	3	3	2	2	3	2	2	17
6	GNA	3	3	2	2	3	2	2	17
7	YMI	2	2	2	2	2	1	2	13
8	HMT	2	2	2	2	2	1	2	13
9	MAL	1	1	1	1	1	1	1	07

(Levels of success: 4: Maximum, 3: Moderate, 2: Fair, 1: Poor)

APPENDIX D1

Delphi Study (Round-I)

Subject: Delphi study on “Managing Socio-technical Change for Competitiveness in Indian Automobile Industry”.

Dear Sir,

We at Thapar Institute of Engineering and Technology, Patiala have undertaken a prestigious research work aimed at studying Indian Automobile Industry in details. We aim to develop suitable guidelines for managing socio-technical change for competitiveness in this industry. Initially a survey of 83 automotive companies was conducted which has given information on the aspects like the competition which have come up as a result of liberalization and globalization, the reducing profit margins, the declining market share, the efforts made by industry to meet this situation and the results achieved till now. The survey has been followed by detailed case studies in some organizations. Based on survey and case studies, we have got substantial information on the above listed aspects, also the strategies used by various organizations to meet changes and the results achieved. From the success and failure stories of the organizations, we propose to generate some common guidelines for use by the automobile industry in future.

Through this Delphi questionnaire, I seek your expert opinion and suggestions for “management of socio-technical change in Indian automobile industry”. I am writing similar letters to 20 experts including you. A brief write up on the need of change and the meaning of the associated terms is enclosed. Kindly engage in individual brainstorming so as to generate as many ideas as possible for dealing with the issue. Please give at least 15 suggestions pertaining to the areas and terms discussed in the enclosed paper for the purpose.

After getting initial response (Round 1) from all the experts, we will compile the information and formulate another questionnaire to seek questionnaire to seek clarifications on the points of difference (Round 2). In this round, we shall also provide the details of inferences drawn from survey and case studies. From the information and clarifications received from Round 2, a final questionnaire will be designed (if need be) to reach a final consensus.

Kindly provide us the requisite information and oblige. Your participation and help will go a long way in improving the quality of work and making it implementable in Indian automobile industry. Please reply through e-mail (if possible) or mail/ courier.

With regards,

Rajiv Kumar Garg

Ph.D Scholar

T.I.E.T. Patiala - 144011

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Associated terms

- **Change:** An alteration of an organization's environment, structure, technology, people and culture.
- **Need of change:** After globalization and liberalization of economy, competition has emerged between existing and multinational companies (MNC). MNCs possess world-class technology, supportive systems, skilled manpower, flexible mindset of people, and rich culture. For survival in such environment, Indian organizations have felt a need to adapt changes in their technology, structure, systems, attitude of people, and culture.
- **Social change within the organization:** Depicts cultural changes within the organizations to meet market challenges like customers' requirements, responsiveness to technological changes, readiness and enthusiasm to develop new skills and support to management policies.
- **Socio-technical change:** This approach views organization as open system engaged in transforming inputs into desired outputs. Technical subsystems and personnel subsystems are two major components of the transformation. Designing technology subsystems represents the tasks to be performed, whereas ways in which these tasks are performed are reflected by the design of personnel subsystem. Effects of these subsystems on society and their adaptation have been emphasized in this approach.
- **Change agent:** A facilitator of change in the organization.
- **Stable environment:** Environment with little or no unexpected or sudden change. Product changes occur infrequently, and modifications can be planned well in advance.
- **Changing environment:** Innovations in product, market, law or technology, trends are predictable and organizations are easy to adjust as per requirements.
- **Turbulent environment:** Unprecedented competition between various organizations, launch of new and unexpected products, revolutionized product design and production methods.
- **Customer focus:** Making changes in the products and processes with the objective of customer satisfaction and delight (for competitive advantage).
- **Proactiveness:** Ability of the organization to transform the customers' requirements into the products first than competitors.
- **Reactiveness:** Modifications in products and processes due to pressure of the environment.
- **Planned change:** Encompasses the application of systematic and appropriate knowledge to human affairs for the purpose of creating intelligent action and choices.
- **Supply chain management:** Management of the facilities, functions and activities involved in producing and delivering a product or service from supplier to customer.
- **Outsourcing:** An organization's use of outside firm for providing necessary products and services.
- **Reengineering:** A process of transforming organizations for performance improvement by transforming work habits, structure, systems, procedure and policies, and redesigning work processes.
- **Benchmarking:** The search for the best practices among competitors or non-competitors that lead to their superior performance.
- **E-commerce:** Any transaction that occurs when data are processed and transmitted over the Internet.
- **TQM:** A philosophy of management that is committed to continuous improvement and driven by customers' needs and expectations.
- **TPM:** A philosophy of maintenance management that involves people at all levels committed to maintain the machines themselves.
- **Strategic alliances:** A domestic and a foreign firm share the cost of developing new products and building production facilities in a foreign country.

- **Innovation:** The process of taking a creative idea and turning it into a useful product, service, or method of operation.
- **Product technology:** Modification and addition of new technological features in a product to meet competition.
- **Process technology:** Changing the conventional processes by robotics, CNC machines for some dimensional accuracy and repeatability.
- **Technological change:** Modifications in the way work is processed or the methods and equipment used. Computer technology, automation and robotics have made a remarkable impact on the functioning of organizations in recent times.
- **Technology adoption:** Adopting a competitive technology for the organization at the right time taking needs of customers into account.
- **Technology adaptation:** Transplantation of technology, starting from design and detailed engineering to improved prototypes and indigenization of tooling etc.
- **Technology diffusion:** Process by which technology is extended to other parts of organization or across organizations.
- **Technology substitution:** Life span of technology representing the decline in the use and eventual extension of a technology due to replacement of another technology.
- **Technology acquisition:** Assimilation and application of technologies, which already exist and at times are well known in developed countries.
- **Technology transfer:** A process by which ideas and techniques generated in one-place finds an application in another.
- **Flexibility:** An ability of a system to react to and accommodate changes during the entire life cycle of a product from design to manufacturing and distribution.
- **Structural changes:** Any alteration in any authority relationships, coordination mechanisms, degree of centralization, job design, optimizing manpower, restructuring, empowering, work specializations and cross-functional teams.
- **Layers of management:** A line of demarcation between various managerial positions in an organization.
- **Downsizing:** An activity in an organization designed to create a more efficient operation through expensive lay-offs.
- **Cross functional work team:** A team composed of employees from about the same hierarchical level but from different work areas in an organization who are brought together to accomplish a particular task.
- **Work specialization:** A component of organization structure that involves having each discrete step of a job done by a different individual rather than having one individual to do the whole job.
- **Job satisfaction:** Amount of overall positive effect or feelings that individuals have towards their jobs.
- **Job enrichment:** Deliberate upgrading of responsibility and challenge in work.
- **Job enlargement:** Enlarging jobs by increasing tasks and responsibilities.
- **Systemic changes:** Modifications in the existing practices, policies related to manpower, material and machine management.
- **Good communication system:** Depicts two-way channel, clarity of message, credibility of message, speed of transmission, mutual understanding and reliance of feedback.
- **JIT inventory system:** Systems in which inventory items arrive when needed in the production process instead of being stored in stocks.
- **People change:** Changes in employee attitudes, expectations, perceptions or behaviors to the organization's objectives of quality and continuous improvement.
- **Motivation:** Ways in which urges, drives, aspirations, strivings or needs direct, control or explain the behavior of human beings.
- **Entrepreneurship:** The process of initiating a business venture, organizing the necessary resources, and assuring the risks and rewards.
- **ISO 9000 series:** Standards depicting a process whereby independent auditors attest that a company's factory, laboratory and office has met quality management standard.

- **Cultural change:** Changes in the understanding of employees resulting in increase of belongingness towards organization, increased sense of teamwork, and enhanced mutual trust.
- **Learning:** A permanent change in behavior through education and training, practice and experience.
- **Kaizen:** The Japanese term for an organization committed to continuous improvement.
- **Motivation:** Willingness to exert high level of effort to reach organizational goals conditioned by the ability to satisfy some individual needs.

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Response Sheet (Questionnaire – Round 1)

Idea # 1:

Idea # 2:

Idea # 3:

Idea # 4:

Idea # 5:

Idea # 6:

Idea # 7:

Idea # 8:

Idea # 9:

Idea # 10:

Idea # 11:

Idea # 12:

Idea # 13:

Idea # 14:

Idea # 15:

APPENDIX D2

Delphi Study (Round-II)

Subject: Delphi study on “Managing Socio-technical Change for Competitiveness in Indian Automobile Industry”.

Dear Sir,

Thanks for the response given in Round-I. In Round-I, various options were obtained from all of you. After removing the overlapping and repeated suggestions, a comprehensive list has been prepared. Please give your valuable suggestions and opinions considering all of the options in this revised list (enclosed).

Kindly provide us the requisite information and oblige. Your participation and help will go a long way in improving the quality of work and making it implementable in Indian automobile industry. Please reply through e-mail (if possible) or mail/ courier.

With regards,

Rajiv Kumar Garg

Ph.D Scholar

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Total response of Round-I

- Excessive focus on assembly line techniques, and ignoring the human elements has led to a steady erosion of the competitive advantage of the American automobile industry. Very high attrition rates, absenteeism, rampant unionism and artificially propped up wage rates have shown that the industry there has not really managed the human aspects of this highly stressful industry. The Indian industry needs to learn from these mistakes and focus on the human resource management issues through techniques like job rotation, multiskilling, well designed incentive schemes, development of loyalty to the company through family incentives etc.
- The major automobile manufacturing companies should realize the vital role of the ancillary and support industries. They should spend time, effort and money to develop the ancillary and components industries, as the overall strengthening of the entire sector is essential for the rapid development of the industry.
- Diverting various items to ancillaries keeping in view the cost benefit analysis.
- The car penetration in India is still way below the global average. The automobile industry of India should exploit this unique opportunity to tap this vast market by coming up with truly basic and affordable cars for the masses.
- To appoint change agent in organization according to new technology processes and procedures to plan the change.
- Key Result Areas (KRA) need to be defined for each individual related to his area of work. These then should be quantified to the extent possible. Performance of the individual should be judged against his achievement vis a vis KRAs. This will lead to more objective type & result oriented evaluation system.
- Benchmark with the best practices of the global industry leaders: both in technology as well as personnel practices.
- Identify and appoint Key Change Managers, people in Middle Management level, who will be assigned specific responsibilities to anticipate, manage and institutionalize the change.
- Create a Special Economic Zone for the Automobile Industry with special tax breaks and other incentives to aggressively promote the exports for the automobile industry.
- Concerns about the environment are going to play a major role in shaping the future of the automobile industry. It has to respond to the rapidly changing scenarios by investing heavily in emerging technologies and R&D in areas like fuel cells, electric cars, solar powered cars etc, so that it is not left behind in the global race for such alternative solutions.
- The automobile industry should try to develop a synergy with the Road infrastructure developing agencies. Better roads will ensure more and more traffic and this will boost the sales of automobiles, and usher in a greater penetration of cars in the country.
- In the fast changing scenario, it is better to be first & fast mover & should not be rigid but be flexible.
- Focus on customer delight and continuous improvement is needed in the prevailing market competition.
- Cost saving & problem solving techniques needs revolution in our country, we are lagging behind 50 years. So for any change, speed is must.
- Yield Improvement: Process of getting more output from same input by reducing waste.
- Carry out any activity by doing PDCA. Any job carried out should be reviewed after a predetermined time to see the effectiveness of the results.
- Thrust on in-house R&D to meet changing customer demand. Currently, all we do is copy the designs and technologies of the west.

- Implementation of computerization of all public dealing affairs.
- Participation workmen in image building, continuous product development in organization.
- Thrust on export to have common design, features/parts for different automobile manufacturer to be cost effective in international market.
- Effective role of govt. to provide R&D structure in intensive areas to feed industry.
- Instead of DOSA (Decision oriented system approach) SODA (System oriented decision approach) should be adopted.
- Increase productivity by introducing new technological machineries, equipments and tools.
- Adoption of JIT system for speedy transportation system and to reduce inventory cost.
- Wastages of all kind should be found first, and try to recycle in useful form.
- To apply kaizen techniques, ISO 9000 to make the product equivalent to international standards. Development and introduction of latest industrial engg. techniques to improve productivity, quality and efficiency.
- Terms like TQM, TPM, Six Sigma, Quality Circles and many more should be brought into the curriculum of school students. Also we have to build our school going students quality oriented professionals not %age earners. We have a lot to teach in our old epics, why we are not doing?
- Introducing promotion based incentive scheme
- Explore alliances/tie-up with other organizations.
- Training is the key. The most critical areas need to be identified and strengthened by sending the employees, supervisors as well as managers for foreign training, especially to Germany, USA and Japan.
- There should be strong HRD depts. to meet employees' personal & professional needs in an industry.
- Job Orientation: Individual to be rotated within the organization up or down the value chain after a certain years of service in present job so as to give him 360 degree understanding of his job.
- Thrust on retaining capable manpower by providing sufficient opportunity at workplace and by providing better financial status.
- India is still perceived as the country with an unlimited supply of cheap and unskilled labor. While the abundance of labor is a distinct competitive advantage, there should be a greater focus on developing the skills of the workforce. Greater amounts of automation, newer technologies need to be introduced in order to develop a lasting competitive edge, rather than staying complacent with cheap, unskilled labor.
- Net working & partnership: By sharing of knowledge & experience and helping each other, this fosters better teamwork.
- Love & Respect for motherland is must for growth of an individual, an industry and finally a nation. (e.g. JAPAN)
- Strict laws to arrest spurious parts makers, copying design for quality improvements and to involve more and more in innovation and product development.
- Good health schemes, pension scheme for workers and officers so that they have free mind and better security while working.

APPENDIX D3

Position Matrices

Position Matrix: Respondent – I

Profile 	Driving change with System-Structure-Technology	Driving change with System-Technology-Structure	Driving change with Technology-System-Structure	Driving change with Technology-Structure-System	Driving change with Structure-Technology-System	Driving change with Structure-System-Technology
Goals 						
Goal - A	0.3	0.3	0.9	0.7	0.3	0.1
Goal - B	0.9	0.7	0.5	0.5	0.3	0.7
Goal - C	0.5	0.9	0.3	0.3	0.7	0.3
Goal - D	0.5	0.7	0.9	0.7	0.5	0.3

Position Matrix: Respondent – II

Profile 	Driving change with System-Structure-Technology	Driving change with System-Technology-Structure	Driving change with Technology-System-Structure	Driving change with Technology-Structure-System	Driving change with Structure-Technology-System	Driving change with Structure-System-Technology
Goals 						
Goal - A	0.3	0.3	0.7	0.7	0.1	0.3
Goal - B	0.7	0.7	0.5	0.5	0.6	0.7
Goal - C	0.5	0.9	0.3	0.5	0.7	0.5
Goal - D	0.5	0.7	0.9	0.5	0.5	0.3

Position Matrix: Respondent – III

Profile 	Driving change with System-Structure-Technology	Driving change with System-Technology-Structure	Driving change with Technology-System-Structure	Driving change with Technology-Structure-System	Driving change with Structure-Technology-System	Driving change with Structure-System-Technology
Goals 						
Goal - A	0.3	0.3	0.7	0.7	0.3	0.3
Goal - B	0.9	0.7	0.5	0.5	0.3	0.7
Goal - C	0.7	0.7	0.5	0.7	0.5	0.3
Goal - D	0.5	0.5	0.9	0.5	0.3	0.3

Position Matrix: Respondent – IV

Profile Goals	Driving change with System-Structure-Technology	Driving change with System-Technology-Structure	Driving change with Technology-System-Structure	Driving change with Technology-Structure-System	Driving change with Structure-Technology-System	Driving change with Structure-System-Technology
Goal - A	0.3	0.3	0.7	0.7	0.5	0.1
Goal - B	0.7	0.3	0.3	0.5	0.5	0.7
Goal - C	0.5	0.9	0.5	0.7	0.7	0.3
Goal - D	0.3	0.3	0.7	0.7	0.5	0.3

Position Matrix: Respondent – V

Profile Goals	Driving change with System-Structure-Technology	Driving change with System-Technology-Structure	Driving change with Technology-System-Structure	Driving change with Technology-Structure-System	Driving change with Structure-Technology-System	Driving change with Structure-System-Technology
Goal - A	0.3	0.3	0.5	0.5	0.3	0.1
Goal - B	0.9	0.7	0.3	0.3	0.5	0.7
Goal - C	0.3	0.9	0.5	0.3	0.7	0.5
Goal - D	0.5	0.5	0.9	0.9	0.5	0.5

APPENDIX D4

Hadley's Matrices of Cautious Optimism

Hadley's matrix – 80% optimism

Profile 	Driving change with System-Structure-Technology	Driving change with System-Technology-Structure	Driving change with Technology-System-Structure	Driving change with Technology-Structure-System	Driving change with Structure-Technology-System	Driving change with Structure-System-Technology
Goals 						
Goal - A	0.3	0.3	0.82	0.66	0.42	0.26
Goal - B	0.86	0.62	0.46	0.46	0.46	0.7
Goal - C	0.62	0.86	0.46	0.62	0.66	0.46
Goal - D	0.46	0.62	0.86	0.82	0.46	0.46

Hadley's matrix – 60% optimism

Profile 	Driving change with System-Structure-Technology	Driving change with System-Technology-Structure	Driving change with Technology-System-Structure	Driving change with Technology-Structure-System	Driving change with Structure-Technology-System	Driving change with Structure-System-Technology
Goals 						
Goal - A	0.3	0.3	0.74	0.62	0.34	0.22
Goal - B	0.82	0.54	0.42	0.42	0.42	0.7
Goal - C	0.54	0.82	0.42	0.54	0.62	0.42
Goal - D	0.42	0.54	0.82	0.74	0.42	0.42

Hadley's matrix – 40% optimism

Profile 	Driving change with System-Structure-Technology	Driving change with System-Technology-Structure	Driving change with Technology-System-Structure	Driving change with Technology-Structure-System	Driving change with Structure-Technology-System	Driving change with Structure-System-Technology
Goals 						
Goal - A	0.3	0.3	0.66	0.58	0.26	0.18
Goal - B	0.78	0.46	0.38	0.38	0.38	0.7
Goal - C	0.46	0.78	0.38	0.46	0.58	0.38
Goal - D	0.38	0.46	0.78	0.66	0.38	0.38

Hadley's matrix – 20% optimism

Profile 	Driving change with System-Structure-Technology	Driving change with System-Technology-Structure	Driving change with Technology-System-Structure	Driving change with Technology-Structure-System	Driving change with Structure-Technology-System	Driving change with Structure-System-Technology
Goals 						
Goal - A	0.3	0.3	0.58	0.54	0.18	0.14
Goal - B	0.74	0.38	0.34	0.34	0.34	0.7
Goal - C	0.38	0.74	0.34	0.38	0.54	0.34
Goal - D	0.34	0.38	0.74	0.58	0.34	0.34