

**A STUDY ON HUMAN RESOURCE IMPACT FOR A COMPETITIVE ADVANTAGE OF NEW
PRODUCT DEVELOPEMT MANAGEMENT IN AUTOMOBILE INDUSTRY**

V.Vishala¹

1. Working as an Assistant Professor in the Department of Master of Business Administration in Sri Indu institute of Engineering and Technology, Sheriguda (Village), Ibrahimpatnam (Mandal), Ranga Reddy (District), Hyderabad Telangana. India.

ABSTRACT

The customer expectations from an automobile industry has created competitive pressure and enriched the industry with attitude, knowledge, flexibility and speed for new challenges and changes. Processes are being streamlined and teams are reorganized and redeployed for higher productivity, enhanced quality, timely delivery and low cost. Together with these changes, companies are looking for ways to plan better and control their operations by shifting away from rigid and preplanned activities to quick response to changes. New Product development management has become a major component of competitive strategy to enhance organizational productivity and profitability.

There is a human resource impact for a competitive advantage of new product development management - for speed, for creating an enhanced environment for an interactive role and for breaking the barriers on increasing reliability and dependability of new product and development. There is a demand for talent. There is significant role of the human resources in developing a successful new product. It should ensure right talent at the right time and make it a part of drivers for new product development.

The factors that are critical for selecting the right human resource for new product development in automobile industry have been listed and established as important and can be considered during selecting human resource for new product development in automobile industry. A framework has been developed with the factors and links has been established between factors and successful new product development in selected automobile industry.

The present automobile industry intake for new product development team is generally done by taking the top performers of the techno-commercial professionals from purchase team who has the attitude to do something new. In the present situation there is no set of factors that are identified in human resource, during selection, to perform development activity for new product development in the automobile industry. The study is being carried out to identify factors and its relationship which can be used to position the right person, at the right place, at the right time for an automobile industry that undertakes new product development. This is a cross sectional research on development professionals in automobile industries in India with the target population being the middle and top management from these organizations.

INTRODUCTION

This research has attempted in examining the factors that a development engineer should possess when inducted as techno-commercial for new product development in automobile industry.

1.1 OUTLINE

In life, it is usually easier to say 'no' than 'yes', but in product development, the opposite is more likely true — it's hard to turn down a major customer asking you to add more features to your product or asking you a new model product (Silverthorne, 2007). Despite substantial prior research on new product success, there are still high failure rates (Gima, 1996). In response to the competitive pressures to meet the expectation of the customers, companies are focusing on reengineering of operations – covering all the areas. (Fox, Chionglo, & Barbuceanu, 1993).

This needs a network, a network that covers the span of enterprise functions from new product design, new product development – from concept proto manufacturing till mass production readiness covering supplier selection, process design, validation and stabilization, continued with mass production ordering, receipt of raw materials, transform them into intermediate goods, final products and deliver the products to customers through a distribution system. Improving performance in new product development has become one of the critical issues for gaining competitive advantages for companies (Cai, Liu, Xiao, & Liu, 2009). In order to operate efficiently, the design, development, testing, purchase, quality, manufacturing, plant engineering, finance and human resource functions must operate in an integrated manner. Providing quick and quality responses to new product development events requires the coordination of multiple functions across the enterprise (Fox et al.,1993).

New product development management has been a major component of competitive strategy to enhance organizational productivity and profitability. The strategies and technologies for effectively managing a new product development is quite a vast area to be worked. In recent years, organizational performance measurement and metrics have received much attention. Performance measurement and metrics pertaining to new product development management, specifically covering new product development have not received adequate attention (Gunasekaran, Patel, & Mc Gaughey, 2004).

Life time employment with a single employer as a career pattern is declining because today's contemporary careers are increasingly pursued in economic and organizational settings that are significantly different from those in the last two decades. Challenging realities of the new economy, increased global competition and uncertainty, rapid technological advances and shortened product cycles creating pressure for lower costs, higher productivity and high energy team have forced many firms to change their structures, processes and human resource practices in significant ways (Colakaglu, 2005); (Allred, Snow, & Miles, 1996).

The turbulence and uncertainty of the new economy has forced organisations to adopt leaner, flatter and more customer driven structures (Colakaglu, 2005), (Parasuraman, Greenhaus, & Linnehan, 2000). Success in new product development is from self managed, cross functional teams working collaboratively with greater employee involvement in decision making (Colakaglu, 2005).

Global competition, rapidly changing technology and shorter product life cycles have contributed to making the current manufacturing environment an extremely competitive one. Organisations face significant uncertainty and almost continuous change. Organizations must develop new methods and perspectives to effectively manage their supply chains to meet the market needs in a timely and cost effective fashion. The

supply chain capabilities is a firm's ability to build, integrate, and reconfigure its upstream supply chain, internal operations, and downstream supply chain to address rapidly changing market needs (Koste, 1999).

Traditional manufacturing approaches, such as mass production of a few standardized products, are no longer sufficient competitive weapons by themselves. In more and more markets, customers are demanding a greater variety of high quality, low cost goods and services (Pine, 1993).

Innovation in product and process development is regarded as a key avenue for growth, profitability and competitive advantage in many industries. With lifetime of products shortened by both the accelerating pace of technological change and global competition, firms are forced to invest continually and ever-increasing amounts to maintain their competitive edge. However, due to increasing complexity of offerings and intensifying competition, successful innovation depends not only on a firm's capabilities but also on the strength of its alliances (Nair S. R., 2006).

To enhance the performance in new product development one of the ways may be a refinement in the induction of people for new product development. An appropriate identification and understanding of the factors in selection development resource for successful new product development will enhance quality, cost and delivery of the new product.

1.2 PURPOSE OF THE STUDY

The study attempts to contribute to the knowledge pool for the new product development. It seeks to understand the factors for the development professionals getting selected for new product development team for achieving superior successful products in automobile industry.

The data collected were examined to discover the acceptance by experts and practitioners on the factors important for the engineers getting inducted for new product development team. The result is expected to enlighten the factors importance and its relationship. It is also expected to craft an improved quality level in the induction of the new product development engineers enabling enhancement in speed, technologies, customer understanding and team working with a resultant improvement in quality, cost and delivery and thereby successful new product.

The interest was to list the factors which are to be identified during intake in new product development team and further nurtured during the course of execution of the new product development. By focusing on these factors, organisations will be able to develop their plans and structure themselves to the dynamically changing pace of innovation and learning in automobile new product development.

1.3 DEFINITIONS

1.3.1 New product development

There are many different types of new products; indeed "newness" can be defined in terms of two dimensions. New to the company – in the sense that your business has never made or sold this type of product before, but other companies might have. New to the market – the product is the first of its kind to the market. This is the traditional definition for new product. There are six categories of new product – New to

the world products, New product lines, Additions to existing product lines, Improvements and revisions to existing products, Repositioning, Cost reduction. (Cooper R. G., 2005)

1.3.2 Successful new product development

Successful new product development is a scalable proactive format where success in all aspects, from concept to delivery is spread across to blend the expertise of the engineers and to develop a new product conceptually and commercially viable for the end user segment, more specifically to the automobile industry.

Successful new product development focuses on identification, integration and application of set of factors that are vital in engineers working for new product development and align all the resources to meet the exact requirements of the industry in a better way.

1.3.3 Factors

Factors are contributing elements to complete any task when identified and efficiently deployed in areas such as production processes, employee management and technological advancements. The factors listed and nurtured greatly contribute to the success in design, development and delivery of automobile new products. Embracing these factors with proper alignment of human resources will result in extremely desirable products.

1.4 RIGHT JOB RIGHT PERSON

It means, after a clear analysis; let this work be done by this man who has the capacity to do it well.

You need to give the job to the right person who is capable of doing the right job with the right tools. This is from the world renowned saint who has given the crux of human resource management in two lines and seven words (Thiruvalluvar, B.C).

Human resource is critical for any activity execution. The mind and brain of this resource is unique and works beyond imagination of science. The skill set is a destiny available in different forms in human beings. The effort to list, amalgamate and relate specific skill sets of human resource is to extract the abundant untapped potential in a professional to enhance the life style of the individual and the society.

1.5 MANAGING THE HUMAN RESOURCE

“Live in the world like an ant. The world contains a mixture of truth and untruth, sugar and sand. Be an ant and take the sugar” (Ramakrishna, 1836).

There is an influx of resource. Practicing good induction process becomes essential and refinement in the induction process is indispensable. To ensure quality during induction, factors needs to be instilled to avoid wrong person in wrong place and get maximum efficiency and achieve successful new product development.

1.6 QUALITY IN ENGINEERS

To manage the new product development activities we need engineers who have a distinctive attitude. Apart from their basic qualifications and their experience, when it comes for handling the new product development, it requires specific quality and special set of factors. The challenge lies in bringing out the factors that are inherent within the engineers and apply them effectively in their career as well for successful new product development.

1.7 PIRSIG'S METAPHYSICS OF QUALITY

The Metaphysics of Quality originated with Pirsig's college studies as a chemistry student. In the late 1950s, Pirsig decided to explore what exactly was meant by the term "Quality".

"Quality," or "value," as described by (Pirsig, 1974), cannot be defined because it empirically precedes any intellectual construction of it.

1.8 DYNAMIC AND STATIC QUALITY

Dynamic quality cannot be defined (Pirsig, 1974). It can only be understood intellectually through the use of analogy. When an aspect of quality becomes habitual or customary, it becomes static. The dynamic beauty of a piece of music can be recognized before a static analysis explaining why the music is beautiful, can be constructed. Static quality is everything which can be defined. Everything found in a dictionary, for instance, is static quality.

This deliberation from (Pirsig, 1974) directs the need for understanding dynamic and static quality in successful new product development. Human resource is a dynamic quality and induction of human resource for successful new product development needs a static quality pattern, meaning, it has to be continuously defined and redefined until the new product development team delivers the best possible results for successful new product development. Listing factors for successful new product development bestow an improvement in engineer's induction. A proper graphing of engineers will escort a better-quality automobile and achieve successful new product development.

1.9 MOTIVATION FOR RESEARCH

In the present scenario, there is a dearth of factors in the selection of development professionals for achieving successful automobile new product development. There is a scantiness of research in understanding the set of factors and its impact in bringing out successful new product development. Earlier research and papers published shows the new product development criticality with respect to various factors. They have been taken separately and analyzed for its role in new product development success, but the set of factors has not been considered and studied. Also, there has been no evidence from the literature to show the relationship among the list of factors to bring success in new product development. This research is an attempt to list the factors and show its collective energy in heaving out successful new product development.

1.10 SCOPE OF THE STUDY

The scope of this study, gives a clear picture of flow of new product development which is also aligned with Advanced Product Quality Planning (APQP). The scope of this study is also constrained with ten factors which are imperative to be in new product development professionals. The study has been conducted in India

with automobile organizations listed in Automotive Components Manufacturers Association of India 2010 (ACMA). This study focuses and limits to automobile new product development professionals involved from new product conceptual design till the handing over the new product developed for mass production.

The automobile industry in India works with the base from its experience and has got enhanced from systems from west. The APQP system has been framed by Ford, Chrysler and General Motors. The Figure 1-1 shows the flow followed for new product development and also has been aligned with APQP stages.

APQP is a process for product development system developed in the late 1980s for General Motors, Ford, Chrysler and their suppliers. It is a framework of techniques and procedures used to develop products in automobile industry. According to the Automotive Industry Action Group, generally known as AIAG (a not-for profit association created to develop recommendation and framework for the improvement of quality in the North American Automotive Industry) the purpose of using APQP is to produce a product quality plan that will support development of a product which will satisfy the customer. APQP focuses on up-front quality planning, customer satisfaction evaluation and support continual improvement.

APQP consists of five phases:

- Plan and Define Program
- Product Design and Development Verification
- Process Design and Development Verification
- Product and Process Validation
- Launch, Feedback, Assessment & Corrective Action
- Planning
- Product Design and Development
- Process Design and Development
- Product and Process Validation
- Production

The APQP process has seven major elements:

- Understanding the needs of the customer
- Proactive feedback and corrective action
- Designing within the process capabilities
- Analyzing and mitigating failure modes
- Verification and validation
- Design reviews

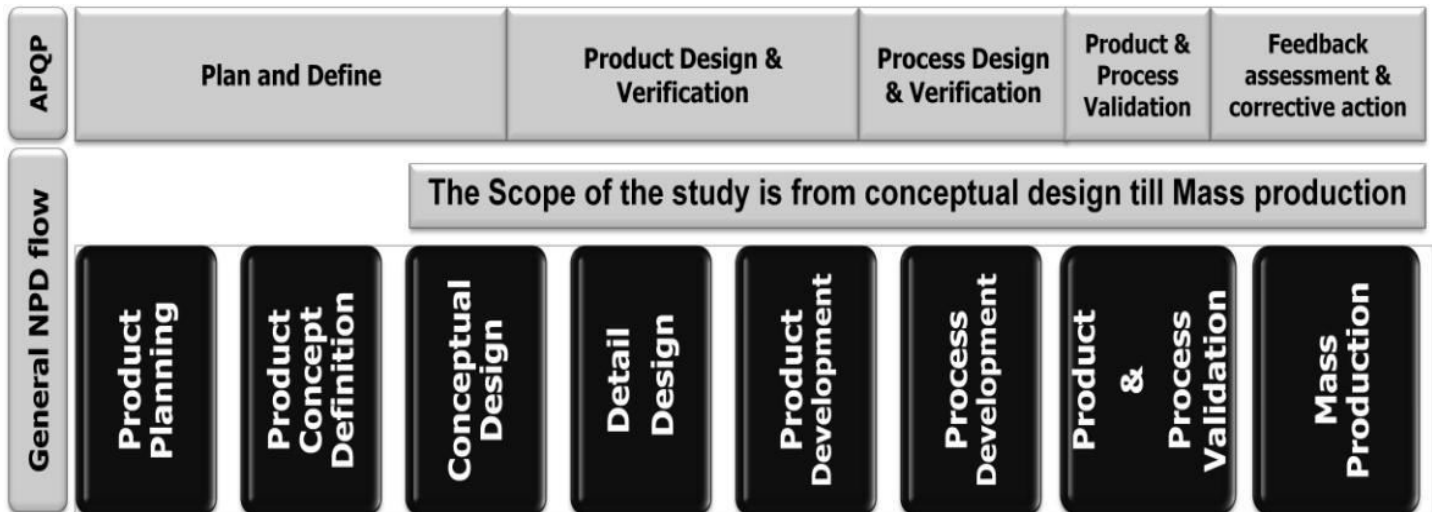


Figure 1-1. Scope of the study with general flow of new product development aligned with Advanced Product Quality Planning Sequence.

1.11 NEW PRODUCT DEVELOPMENT PROFESSIONALS

The new product development professionals are the one who are supposed to possess multi-faceted traits by which the organization gets the benefit of demonstrating their skill to the external world – their customer as well as competitors, of their ability of being close to their customer by the development (physically making the products from drawing) of new and unique featured automobile products they were dreaming within them.

1.12 ROLES AND RESPONSIBILITY OF NEW PRODUCT DEVELOPMENT PROFESSIONALS

Typical development professionals with an engineering qualification from 2 to 20 years experience in automobile original equipment manufacturers (OEM) and automobile ancillary generally takes a role of Engineer to Deputy General Manager. It is spread with partial responsibility from concept design, detailed design, product development and with full responsibility of process development, process and product validation and mass production. Their primary responsibility is to make the new parts physically from drawing with QCD targets.

The following are the few skills that are essential, though not exhaustive, but important to ensure optimum contribution in the above said responsibilities of development engineer:

- Understand customer and customer requirements.
- Understand and comment on design and design concepts.
- Benchmark, compare and analyze concepts.
- Ability of de-skilling from the concept stage of development.
- Ability to understand and analyze business requirements & customer expectations.
- Ability of working concurrently with design during concept development.
- Knowledge in different materials being used.
- Knowledge on ways of product development with minimal cost and precise quality.
- Knowledge in process design and validation.
- Knowledge of de-skilling of activities in process design and engineering.
- Knowledge of various processes which are to convert the raw material to finished parts.
- Ability to understand the jig, fixture and gauging design and finalization.
- Knowledge in manufacturing and tooling technology.
- Right time right decision making capability.
- Skill on statistical techniques of solving problems during process establishment and bulk supplies.
- Conversant with statistical process control and process stabilization.
- Knowledge in systems implementation and checking – this includes APQP covering
- Understanding of testing conducted on the parts developed during product validation.
- Selection of suppliers – right part with the right supplier – on various capabilities through supplier onsite audits.
- Knowledge on costing and analysis of costing with competitor's system.
- Negotiation with suppliers on tool cost and on part cost, part quality and part development time.
- Strong communication, leadership and interpersonal skills.
- Knowledge on project management.
- Should be a team player and learner.

1.13 AUTOMOTIVE INDUSTRY OVERVIEW

The evolution of the automotive industry has been influenced by various innovations in fuels, vehicle components, societal infrastructure, and manufacturing practices, as well as changes in markets, suppliers and business structures. It is believed by most historians that the key starting point for the automobile was the development of the engine. The engine was developed as a result of discovering new energy carrying mediums, such as steam in the 1700s, and new fuels, such as gas and gasoline in the 1800s. Shortly after the invention of the 4-stroke internal combustion gasoline-fueled engine in 1876, the development of the first motor vehicles and establishment of first automotive firms in Europe and America occurred. The Figure 1-2 and Figure 1-3 shows the timeline of the automotive industry from 1895 to 1950 and 1950 to 2000 respectively (Bradley, et al., 2005).

1.14 AUTOMOTIVE INDUSTRY IN INDIA

The Automotive industry in India is one of the largest in the world and one of the fastest growing globally. India is emerging as one of the world's fastest growing passenger car markets and second largest two wheeler manufacturer. It is home for the largest motor cycle manufacturer and fifth largest commercial vehicle manufacturer (Panda, 2006).

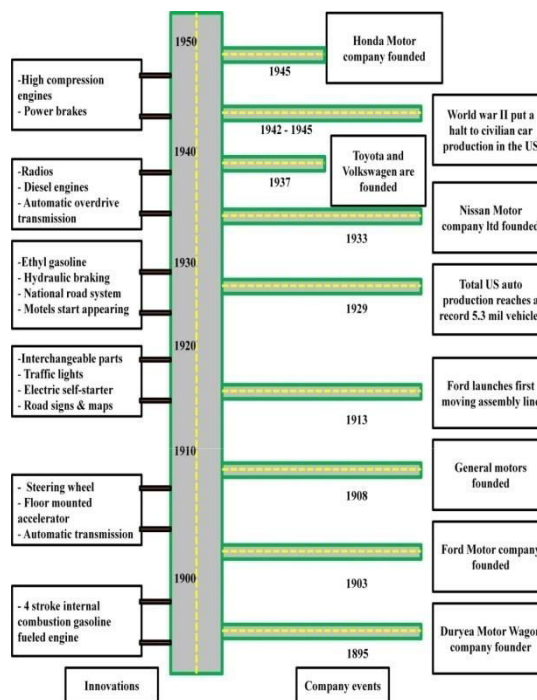


Figure 1-2. Automotive Industry Timeline from 1895 – 1950. (Bradley, et al., 2005)

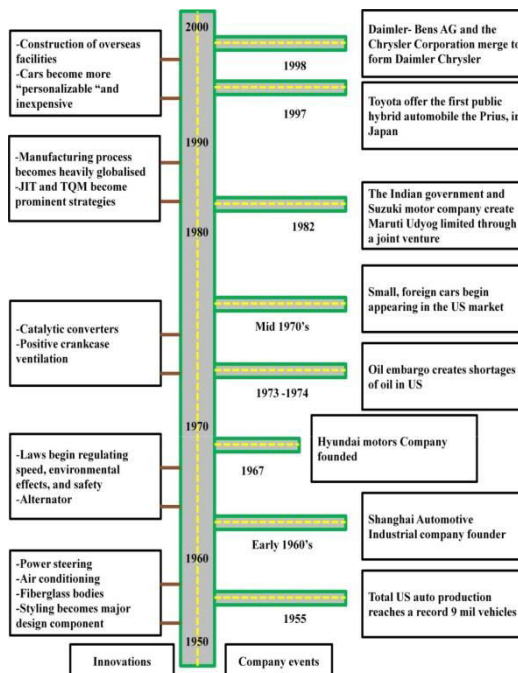


Figure 1-3. Automotive Industry Timeline from 1950 – 2000 (Bradley, et al., 2005).

India's passenger car and commercial vehicle manufacturing industry is the sixth largest in the world, with an annual production of more than 4.1 million units in 2012 (OICA, 2012). In 2010, India emerged as Asia's third largest exporter of passenger cars, behind Japan, South Korea and Thailand (Nair V. V., 2009).

The vision of Indian Automotive Mission Plan 2006-2016 was "To emerge as the destination of choice in the world for design and manufacture of automobiles and auto components with output reaching a level of US\$145 billion accounting for more than 10% of the GDP and providing additional employment to 25 million people by 2016" (Panda, 2006).

The increasing pull of Indian market on one hand and near stagnation in auto sector in markets of USA, EU and Japan on the other have worked as a push factor for shifting of new capacities and flow of capital to the auto industry of India. The increasing competition in auto companies has resulted in multiple choices for Indian consumers at competitive costs (Mitra, 2006).

The first car ran on India's roads in 1897. Until the 1930s, cars were imported directly. Embryonic automobile industry emerged in India in the 1940s. Following the independence, in 1947, the Government of India and the private sector launched efforts to create an automobile component manufacturing industry to supply to the automobile industry. Cars were still a major luxury. Japanese manufacturers entered the Indian market ultimately leading to the establishment of Maruti Udyog. A number of foreign firms initiated joint ventures with Indian companies. More Indian and multinational car companies launched operations following the economic liberalization in 1991. Since then, automobile component and automobile manufacturing growth has accelerated to meet domestic and export demands. The amount of cumulative foreign direct investment (FDI) inflow into the automobile industry during April 2000 to January 2013 was worth US\$ 7,653 million. The Indian small and light commercial vehicle segment is expected to more than double by 2015-16 and grow at 18.5 per cent compound annual growth rate (CAGR) for the next five years. The light commercial vehicles (LCV) market - both passenger and

goods carrier is estimated to register a sales growth of around 20 per cent during FY 2012-FY 2015. It is anticipated that the sales of medium and heavy commercial (M&HC) goods carriers will increase at a CAGR of more than 10.5 per cent during 2011-12 to 2014-15. The Government of India plans to push the supply of vehicles powered by electricity over the next eight years. It is expected that there will be a demand of 5-7 million electricity-operated vehicles by 2020 (SIAM, 2013).

In India, there are 100 people per vehicle, while this figure is 82 in China. It is expected that Indian automobile industry will achieve mass motorization status by 2014. Since the first car rolled out on the

streets of Mumbai in 1897, the automobile industry of India has come a long way. During its early stages, the automobile industry was overlooked by the then Government and the policies were also not favorable. The liberalization policy and various tax reliefs by the Govt. of India in recent years have made remarkable impacts on Indian Automobile Industry. Indian automobile industry, which is currently growing at the pace of around 18 % per annum, has become a hot destination for global automobile players like Volvo, General Motors and Ford.

Few facts of Indian automobile industry are shared below.	
1	The first automobile in India rolled in 1897 in Bombay.
2	India is being recognized as potential emerging automobile market.
3	Foreign players are adding to their investments in Indian automobile industry.
4	Within two-wheelers, motorcycles contribute 80% of the segment size.
5	Unlike USA, the Indian passenger vehicle market is dominated by cars (79%).
6	Tata Motors dominates over 60% of the Indian commercial vehicle market.
7	2/3 rd of automobile component production is consumed directly by OEMs.
8	India is the largest three-wheeler market in the world.
9	India is the largest two-wheeler manufacturer in the world.
10	India is the second largest tractor manufacturer in the world.
11	India is the fifth largest commercial vehicle manufacturer in the world.
12	The number one global motorcycle manufacturer is in India.
13	India is the fourth largest car market in Asia – recently crossed the 1 million mark.

A well developed transportation system plays a key role in the development of an economy, and India is no exception to it. With the growth of transportation system the automobile industry of India is also growing at rapid speed, occupying an important place in Indian economy. Today Indian automobile industry is divided into three broad categories – cars, two wheelers and heavy vehicles which are fully capable of producing various kinds of vehicles catering different customer requirements (Surfindia, 2011).

Following economic liberalization in India in 1991, the Indian automobile industry has demonstrated sustained growth as a result of increased competitiveness and relaxed restrictions. Several Indian automobile manufacturers such as Tata Motors, Maruti Suzuki and Mahindra and Mahindra, expanded their domestic and international operations. India's robust economic growth led to the further expansion of its domestic automobile market which has attracted significant India-specific investment by multinational automobile manufacturers. The well-developed Indian automotive industry produces a wide variety of vehicles: passenger cars, light, medium and heavy commercial vehicles, multi-utility vehicles such as jeeps, scooters, motor-cycles, mopeds, three wheelers, tractors and other agricultural equipment. Over the last few years the Indian Auto Component Industry has created a robust capacity base and all of the world's major manufacturers have set up their manufacturing units in the country (Panda, 2006).

It is a well accepted fact that the automotive industry is a volume driven industry and certain critical mass is a pre-requisite for attracting the much needed investment in Research and Development and New Product Design and Development. R & D investment is needed for innovations which is the life-line for achieving and retaining the competitiveness in the industry. This competitiveness in turn depends on the capacity and the speed of the industry to innovate and upgrade. The most important indices of competitiveness are productivity of both labour and capital. It is also felt that a general improvement in availability of trained manpower and good infrastructure is required for sustainable growth of the industry. Specialists in the areas of R & D, technology, product development, logistics and operations would be required, but getting adequately trained personnel will become a major challenge. The future challenge would be develop technical and human capabilities (Panda, 2006).

1.15 SUPPLY CHAIN OF INDIAN AUTOMOBILE INDUSTRY

The supply chain of automobile industry in India is very similar to the supply chain of the automobile industry in Europe and America. The orders of the industry arise from the bottom of the supply chain, i. e., from the consumers and go through the automakers and climbs up until the third tier suppliers. However the products, as channeled in every traditional automobile industry, flow from the top of the supply chain to reach the consumers. Automakers in India are the key to the supply chain and are responsible for the products and innovation in the industry.

The description and the role of each of the contributors to the supply chain are discussed below.

Third Tier Suppliers: These companies provide basic products like rubber, glass, steel, plastic and aluminum to the second tier suppliers.

Second Tier Suppliers: These companies design vehicle systems or bodies for First Tier Suppliers and OEMs. They work on designs provided by the first tier suppliers or OEMs. They also provide engineering resources for detailed designs. Some of their services may include welding, fabrication, shearing, bending etc.

First Tier Suppliers: These companies provide major systems directly to assemblers. These companies have global coverage, in order to follow their customers to various locations around the world. They design and innovate in order to provide “black-box” solutions for the requirements of their customers. Black-box solutions are solutions created by suppliers using their own technology to meet the performance and interface requirements set by assemblers. First tier suppliers are responsible not only for the assembly of parts into complete units like dashboard, brakes-axel-suspension, seats, or cockpit but also for the management of second-tier suppliers.

Automakers / Vehicle Manufacturers / Original Equipment Manufacturers (OEMs): After various researches on consumers’ wants and needs, automakers begin designing models which are tailored to consumers’ demands. The design process normally takes five years. These companies have manufacturing units where engines are manufactured and parts supplied by first tier suppliers and second tier suppliers are assembled. Automakers are the key to the supply chain of the automobile industry. Examples of these companies are Tata Motors, Maruti Suzuki, Toyota, Honda etc. Innovation, design capability and branding are the main focus of these companies.

Dealers: Once the vehicles are ready they are shipped to the regional branch and from there, to the authorized dealers of the companies. The dealers then sell the vehicles to the end customers.

Parts and Accessories: These companies provide products like tyre, windshields, and air bags etc. to automakers and dealers or directly to the customers.

Service Providers: Some of the services to the customers include servicing of vehicles, repairing parts, or financing of vehicles. Many dealers provide these services but, customers can also choose to go to independent service providers (Humphrey & Memedovic, 2003).

1.16 NEW PRODUCT DEVELOPMENT IN AUTOMOBILE INDUSTRY – A BRIEF

Indian automobile industry works with an organizational structure similar to as shown in Figure 1-4. The structure shown is a basic one and presently organisations are using the organisation structure as one of its key strategy for business growth.

The Head of the New Product Development department and the team will be having its peers in the Research and Development, Marketing & Sales, Quality, Manufacturing, Finance and Human Resources. Organisation may have a change in the given structure depending on their commodity and size of the organisation.

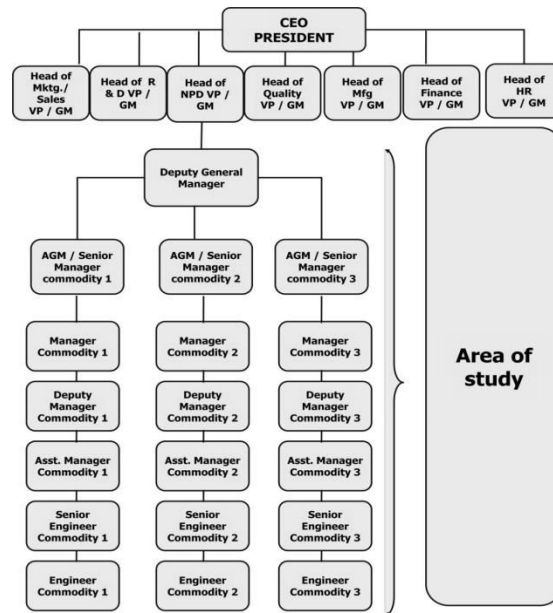


Figure 1-4. Organizational structure of Indian automobile industry

The top level executive teams, after checking the market strategies, position the organisation with a product which is unique and competitive. The team at the next level proceeds to execute further. Marketing conducts market survey to understand and consolidate the customer requirements.

The quality functional deployment is performed after a detailed survey of the target market. The trade off and performance, specification targets are fixed and the next stage of vehicle layout is done matching the specification targets and performance targets from quality functional deployment by product development department. The layout gets the approval with budgets from the top management and the further divided to sub assemblies.

The sub-assemblies are then grounded to parts and detailed drawings are released by design department. The proto type and mock up is done for checking the fitment and style. Once the gate is cleared with the above the drawings are released for tooling up for new product development department. In the above activities all the departments shown in the organisation structure gets involved to ensure things are in right track with respect to design to cost, target cost, design for manufacturing, design for assembly, design for service, quality, tooling and gauging aspects etc.,

The new product development team mainly should be with the experience of understanding basics of design concepts, process, and quality aspects. Before the release of the drawings for final tooling up, the suppliers are involved to ensure an early involvement which is expected to eliminate late changes due to issues in manufacturing or with respect to measurements or even with respect to high cost. After mutual sign off, the drawing is released for tooling up. The drawing is sent to suppliers with request for quote. Quotation is received from two or three suppliers for ensuring unbiased comparison and decision. A discussion with

suppliers on their quotes is carried out before final negotiation with a parallel action of finalizing the process sequence by the development engineer.

The cost is analyzed and the cost drivers understood. There is a negotiation of tools, gauges and parts cost with the packaging and transportation requirement. The negotiation is always intended for a win-win situation. The supplier is finalized, if required even after a visit by the new product development team to the supplier site for final assessment before purchase agreement is signed.

1.17 SIGNIFICANCE OF THE STUDY

In today's environment, there exists a situation where the "change" is anticipated and has to be accepted in any field. The automobile industry has been gearing up for a rapid growth for which they have been relying upon human resource – the right human resource at the right time. Employing the professionals who are required for the development of the new product development has been a challenge for the organisations involved in new product development. The development of new product needs multi faceted professionals who will be able to take up the challenge of making a new automobile.

1.18 REQUIREMENT

The new product development in automobile industry demands for real and sustainable competencies and growth. This is essential to ensure they are not pushed back in the competition of offering the inconceivable, delightful, innovative features for the customers. The most important determinants (the proficiency of development activities, product advantage, marketing synergy, and top management support) of new product success involve the influence of human resource management (Gima, 1996). The factors which are in focus in this research will be critical for the individuals, organisation as well as the society in uplifting the standard of the products and the demands as well.

1.19 CONCERN

Most new product development methods don't lead to real innovation. When developing new products or services, most companies look to three sources:

- └ New technologies (developed internally or found externally),
- └ Industry competitors (for "me too" offerings),
- └ Customers (through market research, focus groups and direct feedback)

Although all three are clearly crucial for a company that wishes to serve its customers, relying solely on these sources will not lead to real innovation. Here's why new technological breakthroughs can be a powerful source of innovation, but they are usually few and can involve extremely high costs. Looking to your competition or your customers can generate interesting new things which are equally available to everyone else in your industry. While customers can of course be an invaluable source of new ideas – capable perhaps of generating even 90% of a company's new ideas – they don't actually innovate.

A society is a formal association of people with similar interest. A community with a social interaction, laws and traditions framed the way they behave towards one another. The people in society are expected to contribute to their society – one form is sharing and adding to the knowledge pool and thereby benefiting the society.

What is this thesis for the society? - This thesis deals with the human resources who work for the development of new products in automobile industry. There has been demanding growth for an automobile in the society.

To fulfill the requirement, there is always a demand for the best team, for a best extraction of individual's excellence, for a team consisting of engineers who breathe automobile. On the evolution, to identify the solution, it was few key factors which has been critical and has to be consolidated to have a leap of success in development of an automobile.

REFERENCES

- Aaker, D. A., & Jacobson, R. (1994, May 31). The financial information content of perceived quality. *Journal of Marketing Research*, 191 - 201.
- AIAG-team. (2005, September 14). *Advanced product quality planning*. Retrieved June 21, 2010, from AIAG.ORG:<http://www.aiag.org/source/Orders/index.cfm?search=APQP#.UeBEazs9ErN>
- Albright, J. J., & Park, M. H. (2009, April). *Confirmatory Factor Analysis Using Amos, LISREL, Mplus, and SAS/STAT CALIS*. Working Paper. The University Information Technology Services (UITS), Center for Statistical and Mathematical Computing. Indiana University. Retrieved December 26, 2011, from <http://www.indiana.edu/~statmath/stat/all/cfa/cfa.pdf>
- Allred, B. B., Snow, C. C., & Miles, R. E. (1996). Characteristics of managerial careers in the 21st century. *Academy of Management Executive*, 10(4), 17-27.
- Amabile, T. M. (1996). Assessing the Work Environment for Creativity. *Academy of Management Journal*, 39(5), 1154, 1184.
- Arbuckle, J. L. (2007). *Amos 16.0 user's guide*. Chicago: SPSS, Inc.
- Bagozzi, R. P., & Phillips, L. W. (1982). Representing and testing organizational theories: A Holistic Construal. *Administrative Science Quarterly*, 27(3), 459-489.
- Bartlett, J. E., Kotrlik, J. W., & Higgins, C. C. (2001). Organisational Research: Determining Appropriate Sample Size In Survey Research,. *Information technology, learning and performance journal*, 19 (1), 43-50.
- Birkinshaw, J., Hamel, G., & Mol, M. J. (2008). Management innovation. *Academy of Management Review*, 33, 825-845.
- Bono, E. (1970). *Lateral thinking*. United Kingdom: Penguin Group, 131-133.
- Bono, E. (1986). Ideas about thinking: excerpts from Edward de Bono's 'letter to thinkers'.
 - *Journal of Product Innovation Management*, 3(1), 57-62.
- Bono, E. (1999). *Six thinking hats*. England: Penguin Group.
- Bradley, D., Bruns, M., Fleming, A., Ling, J., Margolin, L., Roman, F., & Alan, F. (2005, December 5). *Automotive industry analysis, Principles of Management for Engineers*.

- Retrieved November 20, 2010, from srl.gatech.edu:
 - <http://www.srl.gatech.edu/Members/bbradley/me6753.industryanalysis.teamA.pdf>
- Braunstein, J. W. (2007). *Research Consultation*. Retrieved May 19, 2012, from <http://www.researchconsultation.com/multiple-regression-statistics.asp>
- Brethauer, D. M. (2002). *New product development and delivery: Ensuring successful products through integrated process management*. AMACOM. p XI,XV. Retrieved June 12, 2010,
 - from http://www.amazon.com/New-Product-Development-Delivery-Successful/dp/0814407137#reader_0814407137
- Brown, S. L., & Eisenhardt, K. M. (1995). Product development: Past research, present findings and future. *The Academy of Management Review*, 20(2), 343-379.
- Bunderson, J. S., & Boumgarden, P. (2010). Structure and learning in self-managed teams: why “bureaucratic” teams can be better learners. *Organization Science*, 21, 609–624.
- Buzzell, R. D., & Gale, B. T. (1987). *PIMS Principle*. New York: The Free Press.
- Cai, J., Liu, X., Xiao, Z., & Liu, J. (2009). Improving supply chain performance management: A systematic approach to analyzing interactive KPI accomplishment. *Decision support systems*, 46(2), 512-521. doi:10.1007/s10845-007-0041-9
- Carrera, D. A., & Mayorga, R. V. (2007). Supply chain management: a modular fuzzy inference system approach in supplier selection for new product development. *Journal of Intelligent Manufacturing*, 19(July 2007), 1. doi:10.1007/s10845-007-0041-9

