



INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE AND MANAGEMENT

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A STUDY ON FACTORS CRITICAL IN SELECTION OF HUMAN RESOURCE FOR NEW PRODUCT DEVELOPMENT IN ACHIEVING QUALITY, COST AND DELIVERY - WITH REFERENCE TO SELECTED AUTOMOBILE INDUSTRIES

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ABSTRACT

The customer expectations from an auto 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 automated, and work teams are reorganized and redeployed for higher productivity on quality, delivery time and 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 been a major component of competitive strategy to enhance organizational productivity and profitability. There exist human resource impact on the competitive advantage of new product development management - for speed, for creating an enhanced environment to an interactive role and for breaking the barriers on increasing reliability and dependability of new product & development. The lateral and proactive thinking approach in human resource has to be identified, provoked and nurtured towards new product development activities. The Talent is on Demand. There is good amount of Human Resource role in developing a high performance culture. It is to be made sure of ensuring right talent at the right time and making it part of driving culture for new product development. The interest has to be, towards shaping the culture in a natural evolution.

KEYWORDS

New product development, Talent on demand, Automobile industry, Advanced Product Quality Planning, factors, factors frame work.

INTRODUCTION

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.¹ Despite substantial prior research on new product success, there are still high failure rates.²

For this response to competitive pressures to meet the expectation of the customers, companies are focusing on the reengineering of operations – covering all the areas. Processes are being streamlined and automated, and work teams are reorganized and redeployed for higher productivity on quality, time and cost. Together with these changes, companies are looking for ways to better plan and control their operations. They are shifting away from a company with rigid and preplanned activities to one that is able to react quickly and appropriately to changes.³

Improving performance in new product development has become one of the critical issues for gaining competitive advantages for companies.⁴

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.³

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. The role of these measures and metrics in the success of an organization cannot be overstated because they affect strategic, tactical and operational planning and control. Performance measurement and metrics have an important role to play in setting objectives, evaluating performance and determining future courses of actions. Performance measurement and metrics pertaining to new product development management, specifically covering new product development have not received adequate attention.⁵

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 critical factors in selection of Human resource for new product development will enhance quality, cost and delivery of the product built.

The multiple sections in this Paper deal with the following aspects:

- Purpose of the study
 - Talent on demand
- Critical factor – definition
- Scope of the study
 - Scope of new product development professionals in Indian automobile OEMs
 - New product development professionals
 - Roles and responsibility of development professionals
- Overview of Indian automobile industry
 - Industry overview
 - Automotive industry in India
 - Supply chain of Indian automobile industry
- Significance of the study
 - The need – Real and sustainable
 - The concern
- Literature survey and analysis
 - Theoretical basis for the study
- Research Process

- Research frame work
 - The variables
 - Independent variables
 - Dependent variables
- Objective of the study
- Hypothesis
- Research design and sampling design
- Conclusion
- Literature review

PURPOSE OF THE STUDY

The study attempts to contribute to the knowledge pool for the new product development. It seeks to understand the critical factors for the professionals getting selected for new product development team.

The data collected were examined to discover the acceptance by experts and practitioners on the factors critical for the engineers getting inducted for new product development team.

The result is expected to create an improved quality level in the induction of the new product development engineers which will be enhancing the speed, technologies, customer understanding and team working with a resultant improvement in quality, cost and delivery.

The review of the literatures did not reveal any studies aimed at identifying the critical factors which are to be identified during intake in new product development team and further nurtured during the course of the new product development itself.

The few efforts that have been undertaken to identify the critical factors that are to be essentially identified during the intake of new product development professionals for developing new products in automobile industry OEM.

By focusing on the critical factors, companies will be able to develop their plans and structure themselves to the dynamically changing pace of innovation and learning in automobile OEMs.

TALENT ON DEMAND⁶

Failing to manage the company's talent needs is equivalent of failing to manage the new product development says Wharton management professor Peter Cappelli. Yet the majority of employers have bad track records when it comes to the age-old problem of finding and retaining talent.⁶

HR practices have typically been about meeting individuals' needs, figuring out what psychological profile they fit and what should be done to help them grow and advance. But if an employer who is worried about issues like the finances of the company, HR would like to think about personnel from the perspective of money and costs, and may end up with not having the right people in right place.⁶

New product development management tackles these kinds of questions all the time. Managing new product development is about managing uncertainty and variability. This same uncertainty exists inside companies with regard to talent development. Companies rarely know what they will be building five years out and what skills they will need to make that happen. They also don't know if the people they have in their pipelines are going to be around.⁶

Part of the problem is that many companies are locked into an older paradigm based on the assumption that they can accurately meet their talent needs through static forecasting and planning models, even though the global marketplace is an increasingly unpredictable, unforgiving environment. The idea that we can achieve certainty through planning is no longer true; instead, we have to deal with uncertainty by being more responsive and adaptable.⁶

"Talent management" which simply means "trying to forecast what we are going to need, and then planning to meet that need. New product development management is essentially defining the same: "We think that demand for our products next year is going to be 'X'. How do we organize internally to meet that demand?"⁶

The role of human resource management is to be refocused from the "traditional HR focus on attracting, selecting, and developing individuals to a new focus on developing an organisational context which will attract and develop leaders as well as facilitate teamwork".⁷

This new global leadership focus of HR encompasses new approaches to decision making, as well as innovative approaches to organising and managing people.⁷

CRITICAL FACTOR - DEFINED

Any of the aspects of a business that are identified as vital for successful targets to be reached and maintained may be critical factors. Critical factors are usually identified in such areas as production processes, employee and organization skills, functions, techniques, and technologies. The identification and strengthening of such factors may be similar to identifying core competences, and is considered an essential element in achieving and maintaining competitive advantage.⁸

Critical success factor is the term for an element that is necessary for an organization or project to achieve its mission. It is a critical factor or activity required for ensuring the success of a company or an organization. The term was initially used in the world of data analysis, and business analysis.⁸⁻¹ "Critical success factors are those few things that must go well to ensure success for a manager or an organization, and, therefore, they represent those managerial or enterprise area, that must be given special and continual attention to bring about high performance. Critical success factors include issues vital to an organization's current operating activities and to its future success."⁸⁻²

The concept of "success factors" was developed by D. Ronald Daniel of McKinsey & Company in 1961.⁸⁻³ The process was refined by John F. Rockart in 1981.⁸⁻⁴ In 1995, James A. Johnson and Michael Friesen applied it to many sector settings, including health care.⁸⁻⁵

Key success factors (KSFs), or critical success factors, are those areas, processes or activities that organizations must focus on in order to achieve success. They allow a firm to focus on meeting its desired objectives, which are critical to its success. Examples of KSFs are employee attitudes, product quality, brand awareness, technological advancements and manufacturing flexibility.⁹

SCOPE OF THE STUDY

SCOPE OF NEW PRODUCT DEVELOPMENT PROFESSIONALS IN INDIAN AUTOMOBILE OEMS

The scope of the new product development is shown in Fig.1. The automobile industry in India works with the base from its experience and also has got enhanced from Advanced Product Quality Planning (APQP) and its related systems. This system APQP had been framed by Ford, Chrysler and General Motors, generally called as the 3Bs. The flow in the figure below shows the generally followed new product development flow and also has been aligned with APQP stages.

The scope of our study is restricted from the conceptual design till mass production, as shown in the figure below. To be more specific, it is in this scope of study it had been planned to list out the factors that are critical for the development professionals to possess (basically techno commercials).

FIG 1: A GENERAL FLOW OF NEW PRODUCT DEVELOPMENT ALIGNED WITH ADVANCED PRODUCT QUALITY PLANNING SEQUENCE

A General flow of New Product Development aligned with Advanced Product Quality Planning Sequence



NEW PRODUCT DEVELOPMENT PROFESSIONALS

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

ROLES AND RESPONSIBILITY OF DEVELOPMENT PROFESSIONALS

Typical development professionals with an engineering qualification from 2 to 20 years experience in automobile OEMs generally takes a role of engineer to deputy general manager.

It is spread with either full or partial responsibility from concept design, detailed design, product development, process development, process and product validation and mass production.

The following skills are essential to ensure their contribution in the above said responsibilities.

1. Understand customer and customer requirements.
2. Understand and comment on design and design concepts.
3. Benchmark, compare and analyze concepts.
4. Ability on de-skilling from the concept stage of development.
5. Ability to understand and analyze business requirements & customer expectations.
6. Ability of working concurrently with design during concept development.
7. Knowledge in different material.
8. Knowledge on ways of product development with minimal cost and precise quality.
9. Knowledge in process design and validation.
10. Knowledge of various processes which are to convert the raw material to finished parts.
11. Ability to understand the jig and fixture design and finalization.
12. Knowledge in manufacturing and tooling technology.
13. Knowledge on deriving gauge concept and finalization for checking the parts developed.
14. Skill on statistical techniques of solving problems during process establishment and after.
15. Conversant with statistical process control and process stabilization.
16. Knowledge in systems implementation and checking – this includes Advanced product quality planning (APQP), Production part approval process (PPAP), Failure mode effect analysis (FMEA), Control plan etc.,
17. Knowledge on what tests conducted on the parts developed during product validation.
18. Selection of suppliers – right part with the right supplier – on various capabilities through supplier onsite audits.
19. Knowledge on costing and analysis of costing with competitor's system.
20. Negotiation with suppliers on tool cost and on part cost, part quality and part development time.
21. Strong communication, Leadership and interpersonal skills.
22. Knowledge on project management.
23. Be a team player, continuous learner.

OVERVIEW OF INDIAN AUTOMOBILE INDUSTRY

INDUSTRY OVERVIEW¹⁰

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 (then Bombay) in 1898, the Automobile Industry of India has come a long way. During its early stages the auto 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 auto industry, which is currently growing at the pace of around 18 % per annum, has become a hot destination for global auto players like Volvo, GM and Ford.

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 Automotive Industry of India is also growing at rapid speed, occupying an important place on the 'canvas' of Indian economy.

Today Indian automotive industry is fully capable of producing various kinds of vehicles and can be divided into 03 broad categories:

Cars, two wheelers and heavy vehicles.

AUTOMOTIVE INDUSTRY IN INDIA¹¹

The Automotive industry in India is one of the largest in the world and one of the fastest growing globally. India manufactures over 11 million vehicles (including 2 wheeled and 4 wheeled) and exports about 1.5 million every year.¹ It is the world's second largest manufacturer of motorcycles, with annual sales exceeding 8.5 million in 2009.² India's passenger car and commercial vehicle manufacturing industry is the seventh largest in the world, with an annual production of more than 2.6 million units in 2009.³ In 2009, India emerged as Asia's fourth largest exporter of passenger cars, behind Japan, South Korea and Thailand.⁴

As of 2009, India is home to 40 million passenger vehicles and more than 2.6 million cars were sold in India in 2009 (an increase of 26%), making the country the second fastest growing automobile market in the world.^{5,6} According to the Society of Indian Automobile Manufacturers, annual car sales are projected to increase up to 5 million vehicles by 2015 and more than 9 million by 2020.⁷ By 2050, the country is expected to top the world in car volumes with approximately 611 million vehicles on the nation's roads.⁸

A chunk of India's car manufacturing industry is based in and around the city of Chennai, also known as the "Detroit of India".⁹ with the Indian city accounting for 60 per cent of the country's automotive exports.¹⁰ Gurgaon and Manesar near New Delhi are hubs where all of the Maruti Suzuki cars in India are manufactured.¹¹ The Chakan corridor near Pune, Maharashtra is another vehicular production hub with General Motors, Volkswagen/ Skoda, Mahindra and Mahindra, Tata Motors in the process of setting up or already set up facilities.^{12,13} Ahmadabad with Tata Motors Nano plant and Halol with General Motors in Gujarat, Aurangabad in Maharashtra, Kolkata in West Bengal are some of the other automotive manufacturing regions around the country.^{14,15,16}

SUPPLY CHAIN OF INDIAN AUTOMOBILE INDUSTRY

The supply chain of automotive industry in India is very similar to the supply chain of the automotive industry in Europe and America. The orders of the industry arise from the bottom of the supply chain, i. e. from the consumers and goes through the automakers and climbs up until the third tier suppliers. However the products, as channeled in every traditional automotive 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.¹¹

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, breaks-axel-suspension, seats, or cockpit but also for the management of second-tier suppliers.

Automakers/Vehicle Manufacturers/Original Equipment Manufacturers (OEMs): After researching 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 automotive industry. Examples of these companies are Tata Motors, Maruti Suzuki, Toyota, and Honda. 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 Accessory: These companies provide products like tires, windshields, and air bags etc. to automakers and dealers or directly to 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.

SIGNIFICANCE OF THE STUDY

In today's environment where there exists a situation where the "change" is anticipated and accepted in any field, the automobile OEMs had been gearing up for a rapid growth for which they have relied and relying upon human resource - the right human resource at the right time.

The study attempts to identify the key factors that will be, when identified for its presence and level in an engineering professionals, during the induction into new product development team, will enable an organisation to get identified separately from competition.

THE NEED: REAL AND SUSTAINABLE GROWTH

The New product development in automobile OEMs demands for real and sustainable competencies and growth. This is essential to ensure they are not pushed back in the competition of offering the unimaginable, delightful, innovative features for the CUSTOMERS. 2

The most important determinants (the proficiency of development activities, product advantage, marketing synergy, and top management support) of new product success involve managerial behavior and therefore a need exists to examine the influence of innovation orientation of human resource management (IO-HRM) on determinants.2

THE CONCERN

Most NPD methods don't lead to real innovative new products. 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 far between, and can involve extremely high costs. Looking to your competition or your customers can generate interesting ideas, but involves a major drawback: the information you get from them is equally available to everyone else in your industry. And 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. As Henry Ford said: "If I had asked my customers what they wanted, they would have said 'A faster horse'."12

LITERATURE SURVEY AND ANALYSIS

In literature survey lot of journals have been referred to understand the various factors that have role to play in new product development professionals. It has been noted that various factors has been reported individually as important in various

Important factors that were noticed in the survey report are listed below:

- Technical and commercial skill
- Communication and Interpersonal skill
- Innovative and positive lateral thinking
- Team and cross functional working
- Leadership and supplier management

THEORETICAL BASIS FOR THE STUDY

MOVING WORK TEAMS TO THE NEXT LEVEL

Bill Simpson, North Carolina State University. CH3458-7/94/0000-0043 – 1994 IEEE.

Team building and team working is key to success of any organisation which are into new product development. It has become a key strategy for success. Bill Simpson has provided few **Team compositions**.

HETEROGENEITY OF MEMBERS

This refers to individual team members bringing a variety of work abilities, experiences and skills to bear on continuous improvement opportunities. Of course there may be some tension among such diverse individuals and subcultures but the potential advantages outweigh the disadvantages. Many tasks are of such complexity that a wide range of competencies are required. Further, when a variety of skills are represented among the membership, each member has an opportunity to learn new skills from each other. Task variety has been shown to increase job interest and motivation among team members. The first challenge

when dealing with diversity is to create an atmosphere that value and appreciates such differences in order to minimize divisiveness. The second challenge is to mold such a diverse pool of talent into a cohesive and focused team. Diversity is a potential strength that may not be fully appreciated by all team members.

LEADERSHIP POTENTIAL

Most work teams are expected to operate with a minimum of management direction, thus some degree of internal leadership must either be present at inception or develop as the team matures. Often team leaders are elected by and from the membership. If this is a role that is either avoided or rejected by all members, the team will have difficulty in developing. Conversely, if there is too much internal leadership a power struggle between formal and informal leaders may occur creating "us vs them" standoffs. Several psychological testing Instruments such as the Meyers-Briggs Type Inventory, FIRO-B and others can help to determine the extent a team has leadership potential among its membership. It is suggested that such an inventory be taken early in the team's formative stages. However, it is also helpful in working with established teams to identify Leadership inequities that may be impacting performance.

DIVERSITY OF ROLES

Roles refer to the various work behaviors (in addition to work skills) that must be exhibited by team members in order to reach team goals. Research by Mamma, Belbin and others suggest a variety of roles are often needed among the membership in order to reach a particular goal. In addition to a leadership role, it is often helpful to have one or more members fill a creative or innovative role. Other important roles include being able to objectively analyze data and proposals, being able to monitor time, guide teams to closure, etc. Rarely does one person exhibit an ability and preference to fill such a variety of roles alone. Thus, it is important that among the membership there are those that are comfortable assuming one or more of these critical roles. Inventory instruments such as What Makes Your Team Tick are helpful in identifying roles that various members prefer and those they tend to avoid. This information can then be used to develop a role balanced team.

AFFINITY FOR TEAMWORK

Not everyone is comfortable working in a team environment. A few not only prefer working as an individual contributor but find their effectiveness compromised if forced to interact with others on a regular basis. This does not refer to a preference for a particular team but rather a dislike in working with any team. Teams can usually adjust to one or two such members but if virtually all members fall into this category, the chances of a fully functioning team developing is almost nil. If membership in a team is voluntary it may be possible to include only those on teams who are comfortable in a work group. Not only will each member reach a higher level of job satisfaction but the team itself will usually be more productive. If membership is mandatory, it becomes important to try to minimize the number who prefer to work alone on any one team by assigning them to different teams. This characteristic can be predicted fairly accurately by administering the FIRO-B or Meyers-Briggs instruments mentioned above.

SIZE

Teams need to be large enough to accommodate the work load but may become dysfunctional if too large. Though there is no firm upper limit, teams often experience more difficulty in reaching group consensus, the backbone of team decision making, as the size grows beyond 10 and approaches 15 or 20. Additionally, effective coordination, communication and full participation becomes less likely above this number. Since full participation is key to consensus decisions, excessive size can be counterproductive. At the other end of the size spectrum, groups of 3 or 4 may permit a quicker consensus but be too small to introduce the variety of skills and roles needed. In self-directed teams, the group size is often dictated by the complexity of the product or service for which the team is responsible. Organizations may wish to experiment with sub teams if their size exceeds 10 to 15. The size of problem solving teams is easier to control because it is usually determined by the kinds of expertise needed to solve the problem.

LINKING TECHNOLOGY AND NEW PRODUCT

Development Tugrul Daim, Portland State University, tugrul@etm.pdx.edu Neslihan Sener, Portland State University, neslido@yahoo.com Chris Galluzzo, Intel Corporation, chris.galluzzo@intel.com Proceedings of the 42nd Hawaii International Conference on System Sciences – 2009.

It has become vital for an organisation to link technology and new product which is going to help in ensuring the retainment of the core of the organisation. For high-technology companies or companies that are dependent on technology, it is important to link technology development with product development processes for competitive advantage and organizational growth. Even in well established organizations, product development under a technologically changing environment many times results in failure. Developing technologies without having a product in mind, or developing products which require technologies that are not ready to be integrated in them could lead to failure. On the other hand, selecting the appropriate technologies to introduce in new products, validating these technologies and integrating them into the existing product development processes are very challenging. Newer technologies may offer improved performance, but also can create a more challenging and risky product development process. Our findings show that technology integration is affected by both external forces and internal forces of the company. External forces could be defined as; available technologies outside of the company, technological strategies of competitors, and customers' perceived value of new technologies. Internal forces could be defined as; technology capabilities of the company, technology selection and funding decisions within the company, existence of a separate technology integration unit, company goals, and organizational structure, cross-group collaboration and behavior for change.

IDEAS ABOUT THINKING: EXCERPTS FROM EDWARD DE BONO'S "LETTER TO THINKERS"

Edward de Bono. J. PROD INNOV MANAG 1986; 1:57-62. Address correspondence to Dr. Edward de Bono, L2 Albany, Piccadilly. London W1V 9RR, United Kingdom.

Sense of Purpose

Edward de Bono has clearly stressed that "a strong sense of purpose is one of the most important aspects of thinking skill". Edward de bono, who coined the term "lateral thinking" says, richness is what matters, richness in thinking, thinking laterally and turning problems around and look at them from a fresh perspective.

WERE YOU BORN TO LEAD?

Tomorrow's captains of industry are likely to need very different skills to their predecessors. Young engineers who think they've got what it takes to reach the top, read on... By Dr Robert Hawley

Truly inspirational leadership comes from within—from tapping into who we really are and combining that with skills and knowledge

It's important to distinguish between management and leadership. A simple contrasting definition helps: 'Managers do things right, leaders do the right thing'. In other words, a leader knows what's best to do, while a manager knows how best to do it. Successful leaders must recognise the worth of their people and motivate them to perform to their best ability by giving them a clear direction. Get good people around you and leadership is easy.

Other leadership requirement ---

- the ability to communicate,
- honesty and integrity,
- Innovation and vision,
- the ability to inspire trust,
- the ability to motivate,
- a personal drive and sense of purpose,
- self confidence, and
- the ability to make decisions.

CONCURRENT ENGINEERING –KEY TO COST-EFFECTIVE PRODUCT RELIABILITY, MAINTAINABILITY, AND MANUFACTURABILITY

Dean F. Poeth, Ph.D., P.E., Battelle Memorial Institute, Columbus, 1990 Proceedings R&M CAE in Concurrent Engineering Workshop

Serial path of new product generation has been found to be too time consuming and costly. Realization of reliability, maintainability, and cost-effective manufacturability of a product at the early stage is a sign of betterment. Product reliability and maintainability are also determined and fixed during the initial design phase.

New product design team is a multidiscipline group, highly skilled in design, manufacturing, reliability, and maintainability. Even more important, the team leader must be a skilled engineering generalist with sufficient detailed technical knowledge in each area to skillfully lead the specialists

OVERCOMING THE 90% SYNDROME: ITERATION MANAGEMENT IN CONCURRENT DEVELOPMENT

Projects David N. Ford^{1,*} and John D. Sterman² ¹Department of Civil Engineering, Texas A&M University, College Station, TX 77843-3136, USA ²Sloan School of Management, Massachusetts Institute of Technology, 50 Memorial Drive, E53-351, Cambridge, MA 02142 USA, Volume 11 Number 3 September 2003 177 1063-293X/03/03 0177-10 \$10.00/0 DOI: 10.1177/106329303038031, 2003 Sage Publications

Due to unanticipated iterations Concurrent development, though successful in reducing cycle time, has proven difficult. Developing products faster than competitors increases market share, profit and long term competitive advantage.

DESIGN OF THE NEW PRODUCT INTRODUCTION PROCESS TO ACHIEVE WORLD CLASS BENCHMARKS

J. Parnaby - IEE Proc.-Sci. Meas. Technol., Vol. 142, No. 5, September 1995

Management of innovation in new products is a fundamental operational core that is essential for survival in competitive global market. The target is to introduce new products on-time, within target cost and with negligible post-introduction cost of quality and support

Critical objectives of product introduction process:

1. Increasing customer satisfaction and ensuring higher perceived value
2. Reducing lead time to market
3. Reducing manufacturing cost through improved design for manufacture
4. Reducing engineering and manufacturing change costs and delays during development
5. Reducing the size of resources required
6. Improving the cost effectiveness of research, development and engineering
7. Focus on product and market strategy and fit to manufacturing strategy
8. Ensuring product specification and target cost are both achieved
9. Making full effective use of supporting tools - QFD, DFA, CAD, Project Management system.

The Ability to Minimize the Timing of New Product Development and Introduction: An Examination of Antecedent Factors in the North American Automobile Supplier Industry

Cornelia Dro^oge, Jayanth Jayaram, and Shawnee K. Vickery. J PROD INNOV MANAG 2000;17:24-40 © 1999 Elsevier Science Inc. All rights reserved. 0737-6782/00/\$—see front matter. 655 Avenue of the Americas, New York, NY 10010 PII S0737-6782(99)00009-0

There is a wide recognition on the importance of overall timing in the new product development and commercialization processes. Four factor influences the ability to minimize new product development and introduction time Dro^oge et al. (2000)* –

- (1) Human resource management,
- (2) Synergistic integration,
- (3) Supplier closeness, and
- (4) The design-manufacturing interface

Reducing cycle time and first to market in NPD and commercialization is key to innovation success and profitability.

The effect of new product development acceleration approaches on development speed: A case study

1. Fred Langerak a,^{*}, Erik Jan Hultink b, 1.

2. Rotterdam School of Management, Erasmus University, Department of Marketing Management, Office F1-46, P.O. Box 1738, NL-3000 DR Rotterdam, The Netherlands.

3. Delft University of Technology, Faculty of Industrial Design Engineering, Landbergstraat 15, NL-2628 CE Delft, The Netherlands. J. Eng. Technol. Manage. 25 (2008) 157-167. 2008 Elsevier B.V.

Millson et al. (1992) developed the earliest knowledge on the use of techniques to accelerate NPD by suggesting a hierarchy of approaches. Each approach is composed of similar techniques aimed at

- (1) Simplifying NPD operations;
- (2) Eliminating unnecessary NPD activities;
- (3) Paralleling NPD activities;
- (4) Eliminating delays in the NPD process;
- (5) Speeding up NPD operations

Later Dro^oge et al. (2000) specified 14 techniques and clustered into four groups which are shown above.* Dro^oge et al. (2000) found two of the four synergistic integration and supplier closeness had significant relation to development speed.

Langerak et al. (1999), clustered 50 individual techniques to 9 which are as follows.:

- (1) Supplier involvement;
- (2) Lead user involvement;
- (3) Speeding up activities and tasks;
- (4) Reduction of parts and components in the new product;
- (5) Training and rewarding employees;
- (6) Implementing support systems and techniques;
- (7) Stimulating inter-functional cooperation;
- (8) Emphasizing value for customers;
- (9) Simplifying the organizational structure

AVOIDING ENGINEERING CHANGES THROUGH FOCUSED MANUFACTURING KNOWLEDGE

Baruch I. Saeed, David M. Bowen, and Vinay S. Sohoni. IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT, VOL. 40, NO. 1, FEBRUARY 1993

There is demand focused manufacturing knowledge on engineers to develop knowledge to achieve the benefits of engineering change avoidance.

To strengthen the consideration of manufacturing knowledge in the product-development process, companies have used

- Quality-function deployment
- Cross-functional teams for concurrent product and process development
- Departments composed of both product- and process-development engineers

Some proposals call for product-development engineers to develop firsthand manufacturing knowledge by actually working in manufacturing.

INSIGHT FROM INDUSTRY

HOW TO MOVE SUPPLY CHAIN BEYOND CLEANING UP AFTER NEW PRODUCT DEVELOPMENT.

Remko van Hoek and Paul Chapman, Cranfield School of Management, Cranfield, UK

Improving alignment between supply chain and new product development (NPD) can enhance market impact and revenue growth and can remove a lot of frustration for supply chain managers, who currently are often the last to find out about NPD.

The need for NPD and supply chain to align is only increasing, at least for four reasons:

- 1 NPD is accelerating;
- 2 greater customization of NPD;
- 3 greater dependency on NPD; and
- 4 short-lived new products.

Four areas, where alignment improvement efforts could be focused:

- 1 in interactions with peers from other functions;
- 2 in interactions with their bosses and the board;
- 3 in interactions with their teams; and
- 4 in their own day-to-day behavior.

SUPPLY CHAIN MANAGEMENT: A MODULAR FUZZY INFERENCE SYSTEM APPROACH IN SUPPLIER SELECTION FOR NEW PRODUCT DEVELOPMENT.

Diego A. Carrera · Rene V. Mayorga. Received: April 2006 / Accepted: January 2007 / Published online: July 2007. Springer Science+Business Media, LLC 2007. J Intell Manuf (2008) 19:1–12. DOI 10.1007/s10845-007-0041-9

The critical objectives of purchasing departments include obtaining the product requested, at the right cost, in the right quantity, with the best quality, at the right time, from the right supplier. These goals require effective decisions concerning supplier selection at the early stage of product development.

Supply chain management has become a strong force and it is having implications for effective and efficient management of industrial interactions. It has also become an important focus on competitive advantage for firms and organizations.

Most of the companies have reduced their supply base to more effective management relationships with strategic suppliers and developed cooperative, mutually, beneficial relationships with all suppliers.

By exploiting supplier's capabilities, improvements in product quality, integration of technology and reduced lead-times of product development, are some of the expected outcomes.

INNOVATION IN RESEARCH AND DEVELOPMENT: TOOL OF STRATEGIC GROWTH

Yair Holtzman. Deloitte Tax LLP, West Hempstead, New York, USA.

Journal of Management Development Vol. 27 No. 10, 2008 pp. 1037-1052 q Emerald Group Publishing Limited 0262-1711 DOI 10.1108/02621710810916295.

The world's top performing companies share a common characteristic: their superior ability to develop and introduce new products faster and cheaper than their competitors. As a matter of fact, effective product innovation is the key to growth, even survival, for almost any business.

Innovation is something we need to continuously nurture and develop. The need to build and deploy a deep capacity for innovation is as vital to the organization as any other firm wide initiative.

FASTER NEW PRODUCT DEVELOPMENT: INVESTIGATING THE EFFECTS OF TECHNOLOGY AND CHARACTERISTICS OF THE PROJECT LEADER AND TEAM

Edward F. McDonough III. J PROD INNOV MANAG. 1993;10:241-250

The characteristics that affect speed differ for different types of projects and are different for team members and the team leader.

Earlier studies suggest that the characteristics of individuals who work on a project play a crucial role in its successful development.

This prior research indicates that such factors - as how long team members and their leaders have been with the company, their tenure in their present positions, their age, and how much education they possess are important to effectiveness and success.

More recently, studies that have focused on faster product development suggest an association between speed and individual characteristics.

Mc- Donough and Spital, for example, found that the successful development of projects was associated with characteristics that included what they termed a *general business orientation*.

In another study, Gupta and Wilemon found that creativity and flexibility were related to accelerate new product development.

Most recently, McDonough and Barczak found that problem-solving orientation influenced how quickly a product was developed.

SUCCEEDING AT PRODUCT DEVELOPMENT INVOLVES MORE THAN AVOIDING FAILURE

AXEL JOHNE, Professor of Marketing, City University Business School, London. European Management Journal Vol. 14, No. 2, pp. 176--180, 1996. Copyright © 1996 Elsevier Science Ltct. Printed in Great Britain

Four are typified by varying forms of newness in terms of their operational newness to the supplier, and also in terms of the newness of the customer base to the supplier:

- Improvements and Revisions to Existing Products.
- New-Product Lines.
- Additions to Existing Product Lines.
- New-to-the-World Products.

Turning New Product Development into a Continuous Learning Process G. David Hughes and Don C. Chafin J PROD INNOV MANAG 1996; 13:89-104. © 1996 Elsevier Science Inc. 655 Avenue of the Americas. New York, NY 10010

Product developers understand the difficulties of trying to hit a moving target from atop a runaway train.

Competitors come and go, technological change occurs at an ever-increasing rate, customer wants and needs are constantly shifting, and a product's life cycle may be shorter than its development time.

In such a fast-paced environment, product development must be transformed into a continuous, iterative, learning process focused on customer value

G. David Hughes and Don C. Chafin describe one means for making this transformation: the value proposition process (VPP).

The VPP consists of a framework of continuous planning cycles, culled the value proposition cycle (VPC), and an integrated screening methodology, called the value proposition readiness assessment (VPRA).

The VPC comprises four iterative loops, addressing the following activities:

Capturing the market value of the proposition (Does the customer care?);

Developing the business value (Do we care?);

Delivering a winning solution (Can we beat the competition?); and,

Applying project and process planning (Can we do it.).

COLLABORATIVE INNOVATION CAPABILITY. BUILDING COLLABORATIVE INNOVATION CAPABILITY

Morgan Swink. Research Technology Management; Mar/Apr 2006; 49, 2; ABI/INFORM Global pg. 37.

PRODUCT innovation and supply chain process innovation have traditionally been separately managed.

To fully develop and exploit supply chain capabilities it is necessary to have a collaborative innovation approach to integrate them.

Collaborative innovation projects have produced benefits far beyond earlier concurrent and cooperative efforts.

- Cutting cycle times by as much as 50%
- Improving development cycle time from 15 to 25 %
- Reducing new product introduction time by 15%
- Boosting first pass yield up to 90% from as low as 10%
- Raising performance-to-schedule 95% from an industry average of 50 to 60^
- Reducing non-value-added work up to 605

- Cutting new part number introductions up to 10% and increasing design reuse by 20%
- Paring new part number introduction costs up to 20%
- Reducing the number of engineering change orders up to 25%, with cycle time reduction from 20 to 60%
- Eliminating manufacturing scrap and reducing rework from 10 to 15%

Reduced time to market and increases the in-market life of a new product.

Design rework from incomplete knowledge is reduced.

Product delivered cost is reduced as existing product and process knowledge is leveraged across product platforms, global product designs and product generations.

70 to 80 % of the product life cycle cost is fixed by decisions made in product design and development.

It improves development quality and quality of design solutions – in terms of customers (value through design) and producibility (value through execution)

Finally increases product reliability and reduce risks in product introduction.

COMPETENCY REQUIREMENTS OF PURCHASING AND SUPPLY MANAGEMENT PROFESSIONALS FOR THE BEGINNING OF THE 21ST CENTURY

UMI Microform 3118886. Copy right 2004 by proquest information and learning company. BY Kenneth L.Volker. Walden University, August 2003.

A study has been done to understand those competencies that purchasing and supply management (PSM) professionals should be possessing.

Tasks during the beginning of 21st century:

- Select suppliers
- Manage supplier relationships
- Manage supply chains
- Digitize transactions
- Demonstrate PSM s functional impact on corporate profitability, and
- Conduct other functional and administrative responsibilities.

PSM professionals must know:

- the requirements of the processes in their firm
- the supply bases of the firm.

Must understand:

- Cost analysis
- Legal issues
- Global sourcing
- Finance
- Cost drivers and
- Flow of material through supply chains.

Must demonstrate

- Leadership
- Interpersonal
- Problem solver
- Communication skills.
- Negotiation skills
- Decision making
- Goal orientation
- Risk taking

Must be with attitudes:

- Openness
- Fairness
- Patience
- Diplomacy
- Honesty
- High ethical standards
- Continuous learning.
- Speed and sense of urgency.
- Spirit of cooperation

In sum, they must be lifelong learners, should have a hunger to look into better or newer things.

They should be a change makers and not just managing change, but making change happen.

INVOLVING SUPPLIERS IN NEW PRODUCT DEVELOPMENT

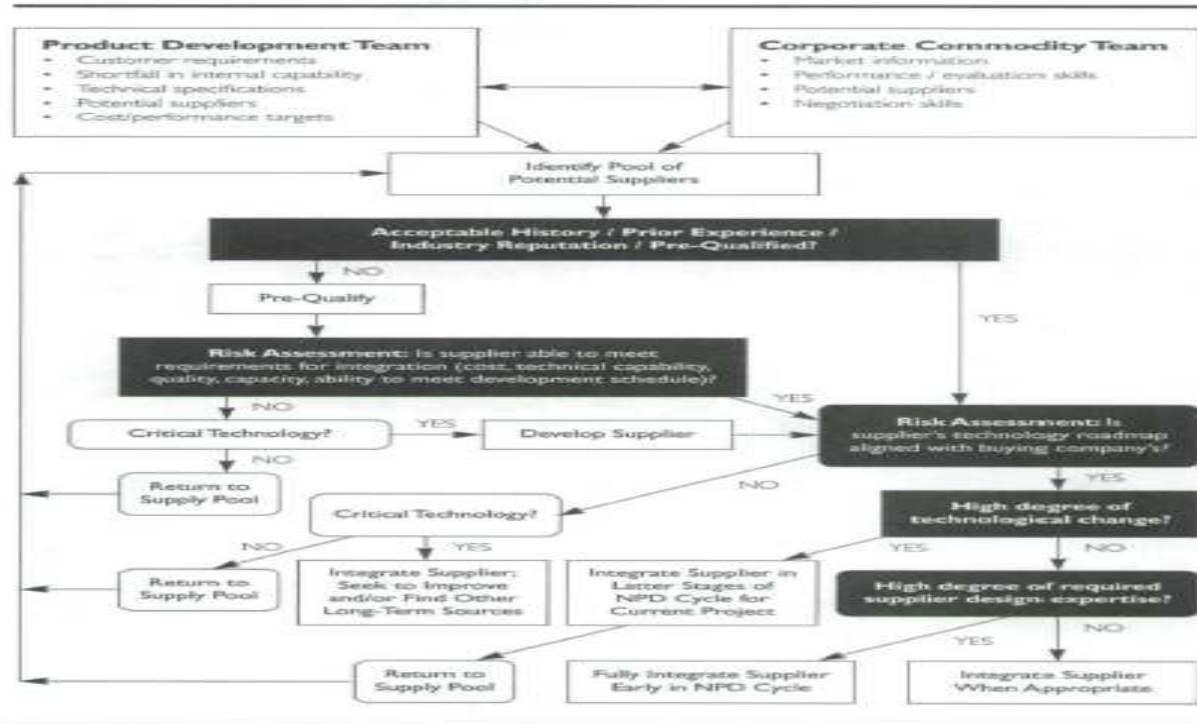
Robert B. Handheld, Gary L. Ragatz, Kenneth J. Petersen, Robert M. Monczka

Within the last decade, the rapid rate of technological change, shortened product life cycles, and globalization of markets have resulted in renewed executive focus on new product development processes. In a competitive environment, suppliers are an increasingly important resource for manufacturers. Across all worldwide manufacturers, purchased materials account for over 50 percent of the cost of goods sold. In addition, suppliers have a large and direct Impact on the cost, quality, technology, and time-to-market of new products. Effective integration of suppliers into the product value/supply chain will be a key factor for manufacturers in achieving the improvements necessary to remain competitive.

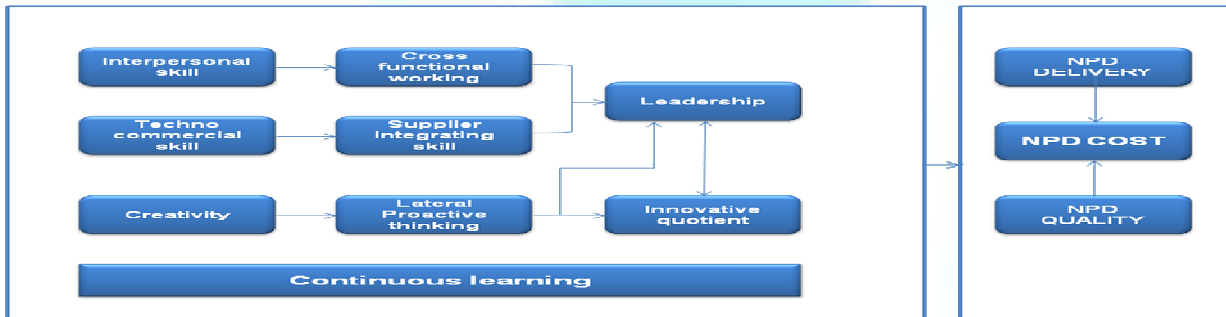
NEW PRODUCT DEVELOPMENT PROCESS



PROCESS MODEL FOR REACHING CONSENSUS ON SUPPLIERS TO INTEGRATE INTO NEW PRODUCT DEVELOPMENT PROJECT



RESEARCH PROCESS
RESEARCH FRAME WORK



THE VARIABLES

The dependent variable and the independent variable in the Hypothesis are shown below:

INDEPENDENT VARIABLE (CAUSE)

- Techno commercial
- Interpersonal
- Lateral proactive thinking
- Innovative quotient
- Cross functional working
- supplier integrating skill
- Leadership
- Creativity
- Continuous learning

DEPENDENT VARIABLE (EFFECT)

- NPD delivery
- NPD quality
- NPD cost

OBJECTIVES OF THE STUDY

To ascertain the factors which are important for selection of human resource in achieving Quality, Cost and Delivery of new product development.

HYPOTHESIS

The hypothesis may be stated as:

- There exists positive relationship between the experienced techno commercial human resource and NPD cost
- Executive's interpersonal interaction positively influences NPD delivery.
- There is a positive relationship between lateral proactive thinking in NPD and NPD quality.
- Innovative quotient in NPD personal positively influences NPD quality
- NPD cross functional working has positive influence on NPD delivery.

- Higher the supplier integrating skill in NPD personal higher is the influence on NPD delivery
- A positive influence exists between a Leadership in NPD and NPD delivery
- There is a positive influence of creativity and NPD quality
- Higher the continuous learning higher is the NPD quality

RESEARCH DESIGN AND SAMPLING DESIGN

RESEARCH DESIGN

Descriptive research has been planned for this study to start. The study is a fact finding investigation which is aimed at describing the characteristics of individual, situation or a group (or) describing the state of affairs as it exists at present. The plan of this descriptive research is to evolve with a frame work which will be used to predict the intake of human resources for new product development.

Sampling Design

Type of Population – finite universe: In our study we are planning to cover automobile industry in India.

Sampling Unit – social unit: Organisation which is producing new product automobile in India with a minimum turnover of above 1000 crores.

Sampling Frame or Source List – The source list will be middle and top management of the organisation in India which is producing new product automobile.

Population Parameters – Middle and top management executives working in India for new product development (techno commercials) handling drawings from designers (internal customers) and responsible for the development at cost, delivery and quality of the finished product through suppliers.

Size of Sample – 10 organisations which are in the business of producing automobile. 25 of middle management executives and 5 of top management executives. A total of 250 middle management executives and 50 top management executives.

Sampling Plan - Probability, purposive / judgmental sampling plan selected in such a way that only the important item representing the true characteristics of the population are included in the sample.

CONCLUSION

This study is expected to bring a chance to find the critical factors in new product development. It may enable in profiling human resource with a system framed in recruiting and positioning resources that will be able to manage the new product development in a way that provides the organisation a chance to serve the customer as they wish and beyond.

The goal is to rise to the standard and raise the standard. A proper implementation of Human resource induction management provides sustainable competitive advantage to an organisation, even when competitors adopt similar new product development management "best practices".

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