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MASTER THESIS

An Analysis of the State of the Project Management Maturity in Automotive Industry

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for the degree of Master of Management and Engineering*

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Declaration of Authorship

I, Muhammad Imran, declare that this thesis titled, “An Analysis of the State of the Project Management Maturity in Automotive Industry” and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

Signed:

Date:

Preface

From the initial days of industrial age until the present time, the development of Project management has radically changed structures and processes within automotive sector. We also observe that Project Management has been improved by its implementation within technical manufacturing context in terms of techniques, tools, strategic and organizational approaches. Although the auto sector was a latecomer to Project Management as compared to other sectors but it now continuously trying to transform its Project Management tradition and adopt the Project Management practices that were developed in the late 1980s and 1990s. The auto industry has learned more than the dominant theories on the management of inventory (like JIT) and Quality (TQM). It created various schools of thoughts highlighting the relative importance of discipline of management in auto industry.

In this write up, we tried to get insight into current state of maturity of Project Management in Auto motive industry. To serve the purpose, a survey questionnaire was designed and circulated to the companies in auto sector. Later chapters of this write-up represent the data provided by respondents and conclude with our observations, remarks and analysis. However initial chapters deal with the Definitions, background, Research questions and justification, historical background, step by step evolution of Project Management in the auto sector.

Although the chapter 2, "Project Management in Auto Industry" does not discuss literature in conventional style but it gives the course of historical events regarding development of Project Management in auto industry. The purpose is to understand the learning path of the main car producing companies and to observe if the OEMs (small and medium size companies) are following the same path or there is a deviation in learning model in the context of Project Management. In addition to summarizing the project management development path in general, this chapter explains the transformation of project manager from a "light weight PM" to "heavy weight project director. It also introduces the various management techniques like simultaneous engineering,

platform management and total quality management. We have used these terminologies in design of research survey questionnaire. However, in order not to undermine literature review academic and literary references have been provided throughout the write up, as the basis of points made or questions posed in the survey questionnaire.

Owing to the fact that size of the company somehow provides the information about the length of the time and experience of a company in the business, comparisons have been drawn to find the learning path of a firm. It also helped to find if the progressing companies are following the same curve what big companies like Renault, Chrysler, and Toyota had gone through (explained in chapter 2). Another way to find the length of experience of a firm in market was to know the length of experience of the survey responding individual, but that view was not taken for its obvious anomalies and shortcomings like individual's length of experience does not necessarily reflect the length of the company in business.

Suggested chapters for executive review are chapter 1, 3 and 5.

Finally, I thank my Supervisors Professor Alberto DeMarco and Professor Paolo E. Demagistris for their step by step guidance in completion of this Thesis right up.

Abstract

Extensive research about the utility of Project Management has already been accomplished in various sorts of industries such as construction, engineering, and information technology, and these larger industry sectors have been able to increase the value of organizational processes with the application of formalized project management methods.

These organizations have also seen that improved project success can result in fewer business disruptions, allowing them to concentrate on their primary objectives. Not only are organizations benefiting from using project management for building products and delivering solutions for external clients, but internally the value of project management for the control of project delivery and execution has been improved.

In Auto industry, though it started very late, but a lot of work has already been done in Japanese, North American and European car industries. Toyota, Chrysler and Renault have defined history in creating specialized PM knowledge. However not much work has been observed in OEMs that is constituted majorly by small and medium sized auto industry. Therefore, it is reasonably important to track the level of maturity and direction of Project Management implementation in the said sector.

Survey research methodology was selected as the research methodology and a survey questionnaire was developed after consulting industry, university and a PM standardization body. Finalized Questionnaire was sent to the companies and responses were analyzed after statistical representation of data received.

Data analysis revealed that implementation of Project Management practices in automotive sector is in the mid-way and is tactical in nature. Car makers are happy by the results produced by PM techniques in implementation of various other management methodologies and are satisfied with the outcome whenever and in whatever capacity PM was used. Project management also helped the organizations to improve their reputation in the market and in attaining competitive edge over competitors.

Automotive companies have shown their resolve to further strengthen PM practices in future and convinced to share their experience and knowledge about PM implementation with rest of the industry stakeholders to help creation of new knowledge.

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Chapter 1

Introduction

This introductory chapter provides a summary of the background to the research, before introducing the research problem and specific details related to the research, including Delimitations and key assumptions.

1.1 Background

The introductory chapter is constructed according to the recommendations proposed by Perry [18] as depicted in the following chart.



FIGURE 1.1: Structure of Introductory Chapter

Project management methods have been developed from industry practices and international standards to ensure a higher rate of success for all sorts of

projects. These methods have been widely used in all types of technical organizations effectively.

This research will investigate the current state of formalized project management and how these methods could improve the performance of automotive OEMs particularly for small and medium sized automotive industry.

1.2 Research Questions and Propositions

This research will be conducted using survey research methodology, with the aim to analyze the status of Project management implementation as a tool for organization and improving the efficiency of the organization. The efforts to achieve this goal will be guided by endeavoring to answer the following research questions:

Research Question 1: To what extent project Management methods and practices have been implemented in automotive industry?

There may not be an accurate answer to this question. May be this question is answered on the basis of perceptions. In order to introduce some degree of correction, the department wise implementation of project management is sought out.

Research Question 2: To what extent the policies and the actions of the Industry are aligned with the concept of Project Management as a strategic tool?

To find the answer of this question, few secondary questions have been asked about existence, size and authority of PMO and on the number of Project management trained staff.

Research Question 3: To what extent the industry is satisfied with the results produced by using Project management in achieving its goals and objectives?

Certain management methodologies (CPM, WCM, PFM, ISO, TQM) that are specific to automotive industry have been mentioned and few secondary questions are posed aiming if Project Management helped their implementation. More over does the organization is convinced about the effectiveness of PM practices in achieving certain industry key performance indicators, like "Time to market time", "Budgeting performance", "Product Quality", "Firm's repute" and "competitive advantage" over competitors.

Research Question 4: To what extent Project Management remains a relevant tool in auto industry in future?

Another way of finding the satisfaction level of the organization with Project Management is to learn about their future plan and policies. This question also investigates the relevance of certifying organizations and knowledge centers in the life cycle of PM implementation. Moreover, is it a convincing idea to share experience pertaining to PM implementation with other stakeholders?

1.3 Justification for the Research

Extensive project management research has already been accomplished in specialized industries such as construction, engineering, and information technology, and these larger industry sectors have been able to increase the value of project processes with the application of formalized project management methods [22].

More recently industry sectors that do not traditionally have a history of project management are also investigating whether these management practices can bring about improved project success [16]. This is primarily due to the fact that practitioners in these emerging fields have witnessed the results achieved through the use of project management, such as better utilization of resources and scheduling. These organizations have also seen that improved project success can result in fewer business disruptions, allowing them to concentrate on their primary objectives [22].

Not only are organizations benefiting from using project management for building products and delivering solutions for external clients, but internally the value of project management for the control of project delivery and execution has been acknowledged, and has also become a topic of research in the past few years. Many of these recent studies have centered around researching large and complex projects [20], [10].

In Auto industry, though it started very late, but a lot of work has been done in Japanese, North American and European car industries. We have already read the case studies of Toyota, Chrysler and Renault. However not much work has been observed in OEM,s that is small and medium sized auto industry, especially in the Italian context. Therefore, it is reasonably important to track

the level of maturity and direction of Project Management implementation in the said sector.

1.4 Research Methodology

After framing the research questions to determine the exact nature of the problem at hand, three major research requirements became obvious to be addressed.

The first requirement is to make the literature review of project management in industry particularly in automotive industry. A review will be made of the pertinent literature to gain a full understanding of the current status of the research regarding project management. This part may not look like the traditional way of literature view but it provides step by step progress of PM in car making industry.

The literature review will then be used in two main roles. Firstly, the role of the review is to provide a solid foundation upon which the research action plan can be designed. In our case we decided to use industry survey as a research methodology. The fundamental requirement is to develop an overall plan, to ensure that the survey research can proceed in an organized and structured manner.

Secondly, the literature review will also be used in the development of the survey questionnaire to be answered by the participants of the organization. This will provide not only an academic insight into the research problem, but also specialist knowledge supplied by the participants.

1.5 Outline of the Research Report

Chapter 1 - Introduction

Chapter 2 - Project Management in Auto Industry

Chapter 3 - Industry Survey Design

Chapter 4 - Survey Results

Chapter 5 – Survey Analysis & Discussion

Chapter 6 - Conclusions

Bibliography

Appendices

1.6 Key Definitions

Size of the Companies:

Following Criteria have been used to categorize the size of the companies.

- Small sized companies: Less than 200 employees
- Medium sized companies: Between 200 to 500 Employees
- Large sized companies: More than 500 employees

Project: The definition of a project for the purpose of this research is a condensed version of that established by the Project Management Institute (PMI 2008):

A project is a temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates a definite beginning and end. The end is reached when the project's objectives have been achieved or when the project is terminated because its objectives will not or cannot be met, or when the need for the project no longer exists.

Project Management: Project management, as defined by the Project Management Institute (PMI 2008): '...is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.' The majority of current project management standards agree with the fundamentals of this definition, and for the sake of this research project management will be defined as a system of management designed to ensure project success.

PMO: A project management office, abbreviated as PMO, is a group or department within a business, agency or enterprise that defines and maintains standards for management within the organization. The PMO is the source of documentation, guidance and metrics on the practice of project management and execution.

Collaborative Project Scorecard (CPS): It is a management system that incorporates a balanced set of financial and non-financial measures and translates "a business unit's mission and strategy into tangible objectives and measures". Alignment of project goals with business strategies, improves transparency in

networked project organizations. It improves the achievement of long term strategies in a project partnership.

Platform Concept of management: Car manufacturers use a common base where they build entire car or some parts of various types / models of cars. This common base is called platform. Car manufacturer share it among different models in order to reach higher volumes and to achieve economies of scale. Several brands, owned by major car manufacturers build on platform enabling larger volumes.

World Class Manufacturing (WCM): World Class Manufacturing is a concept which has proven effective in regaining competitive edge; the focus is on continuous improvement. As organizations adopt world class manufacturing, they need new methods of performance measurement to check their continuous improvement.

Simultaneous Engineering (SE): Adopted in most of the projects in the automotive industry, within the SE core team, specifications, solutions and decisions are coordinated that are related to the whole vehicle and its interfaces between the modules and main functional groups at the level of technical project management. Each module includes a sub structure that requires another team, the coordination of those teams is managed by an interdisciplinary and process oriented SE team.

ISO/TS 16949: The ISO/TS 16949 international standard establishes the particular requirements of the implementation of ISO 9001:2000 in the automobile production. It's a Technical Specification that defines the quality management system requirements for the design and development, production and, installation and service of automotive-related products. The purpose is to assist organizations supplying product or service into the automotive sector to operate systems that not only ensure whether these products and services meet customer requirements but also provide continual improvement and reduce variation and waste in the supply chain.

Total Quality Management (TQM): Total Quality is a description of the culture, attitude and organization of a company that strives to provide customers with products and services that satisfy their needs. The culture requires quality in all aspects of the company's operations, with processes being done right the first time and defects and waste eradicated from operations. Total Quality Management is a method by which management and employees can become

involved in the continuous improvement of the production of goods and services. It is a combination of quality and management tools aimed at increasing business and reducing losses due to wasteful practices.

International Automotive Task Force (IATF): The IATF is an “ad hoc” group of automotive manufacturers and their respective trade associations, formed to provide improved quality products to automotive customers worldwide. Specifically, the purposes for which the IATF was established are:

1. To develop a consensus regarding international fundamental quality system requirements, primarily for the participating companies’ direct suppliers of production materials, product or service parts or finishing services (e.g. heat treating, painting and plating). These requirements will also be available for other interested parties in the automotive industry.
2. To develop policies and procedures for the common IATF third party registration scheme to ensure consistency worldwide.
3. To provide appropriate training to support IATF 16949 requirements and the IATF registration scheme.
4. To establish formal liaisons with appropriate bodies to support IATF objectives.

IATF members include the following vehicle manufacturers: BMW Group, FCA US LLC, Daimler AG, FCA Italy Spa, Ford Motor Company, General Motors Company, PSA Group, Renault, Volkswagen AG and the vehicle manufacturers respective trade associations – AIAG (U.S.), ANFIA (Italy), FIEV (France), SMMT (U.K.) and VDA QMC (Germany).

1.7 Delimitations of Scope and Key Assumptions

One of the delimitations to this research concerns the type of industry that is automotive industry. Our sample consists of the companies that could be considered as the OEMs (Original Equipment Manufacturers) or automotive support industry as it does not include the major manufacturers.

Second delimitation is size of industry; our sample consists mostly of small and medium sized companies. Third delimitation is the method of research. We chose a survey questionnaire as a method of research and a large variation

was noticed in the qualification, capacity and experience of the respondent individual.

1.8 Conclusion

This chapter has established the foundation for the rest of the thesis. It included a graphical structure of how the chapter is structured. It then progressed to briefly outline the background of the associated fields related to the problem, and what this research hopes to achieve. The research questions were then introduced, asking:

Research Question 1: To what extent project Management methods and practices have been implemented in automotive industry?

Research Question 2: To what extent the policies and the actions of the Industry are aligned with the concept of Project Management as a strategic tool?

Research Question 3: To what extent the industry is satisfied with the results produced by using Project management in achieving its goals and objectives?

Research Question 4: To what extent Project Management remains a relevant tool in auto industry in future?

This chapter then progressed to justify why there is a need for this research, and the proposed research methodology was summarized. Next the format of the report was presented, with minor changes introduced. A few key terms were defined, before establishing the delimitations of the research and explaining the situation in which this research will occur.

The chapter has introduced the research study, and has provided the basis upon which the rest of the thesis can be constructed. The next chapter will discuss the academic review that relates to this work, and introduce the relevant industry standards.

Chapter 2

Project Management in Auto Industry

While thinking back to “Fordism” and “Solanism” and the “Toyota Model” (Japanese Model of Manufacturing) we find the automotive industry as a testing ground for the managerial innovation. The production management in car plants is characterised by the managerial techniques like “Total Quality Management(TQM)” and “Just in time (JIT)”. However the industry has learned more than the dominant theories on the management of inventory and Quality. It created various schools of thoughts highlighting the relative importance of discipline of management in auto industry.

This Chapter explains how and why the concept of the project management was adopted and deployed in automotive companies and how this practice changed the sector directly or indirectly in following areas.

1. Corporate Structure
2. Professional practices in technical areas
3. The relationship between manufactures and their subcontractors

In summary, it gives a detailed view, how the development of project management transformed the car making industry. Project management in fact, have a great impact on strategies and competitive environment. The mass production of a small number of standardized, relatively undifferentiated products with a long life cycle does not require mastery of very sophisticated project management skills. Conversely, mass production of a large number of differentiated products has as a direct consequence the fact that the design and marketing of a large number of distinct products is hardly conceivable in the absence of the concomitant development of very sophisticated project management skills.

This chapter also explains the transformation of project management in auto sector from "light weight project manager" to "heavy weight project director." In between the lines it introduces the important concepts like simultaneous engineering, platform management and TQM.

2.1 Evolution of Project Management

The evolution of Project Management in the automotive industry can be divided into four stages.

1. First Phase (1945-1970)
2. Second Phase (1970-1985)
3. Third Phase (1985-1995)
4. Fourth Phase (1995- to date)

2.2 First Phase (1945-1970)

This Phase was characterized by no differentiation between the “product strategies” of the car makers in North America and Europe. Disciplined management of projects was almost non-existent as a core component in competitive strategy. The management of projects for new vehicles operated via functional structures, coordination was informal, and learning occurred within development projects. [19].

Car Makers in Europe and North America were using a conventional approach to mass production at strategical level during 1950s and 1960s. Car industry was focused on a small number of models, long life cycles, little product diversification and cost reduction through standardization. Organizations were incorporating a kind of project management inside the function oriented corporate structure.

Firms were divided into powerful, compartmentalized, trade focused entities: the product engineering office, the process engineering department, manufacturing, and so on.

There was no direct linkage between functions. Projects were sequentially passed from one function to next. Number of projects were coordinated between various functions by the CEO office itself.

By operating these individual projects, technical learning took place in the projects. It started to develop project expertise in that area and some processes started to develop. The performance in terms of duration, cost and quality was average. Development times were long (5 to 7 years), Often delayed by 1 to 2 years, It used to take several years to achieve nominal production rates. As the market was facing lack of availability, a large number of unsuitable products were reaching the market showing ineffective project testing and evaluation process in upstream.

2.3 Second Phase (1970 - 1985)

During this period markets started to get saturated gradually' Japanese car makers broke through American market by using their novel marketing and management strategies. It resulted in large number of projects to be managed. Project Management was now being realized of strategic importance. Firms leaned how to manage their projects more efficiently.

In late 1960s, both in Europe and in the United States, new strategies were deployed to produce modern, multi product vehicle model range. It included diversification of models and international deployment of companies. In such circumstances the practices of the preceding period were not able to coup up with the new age complexities. The answer of the problem was the professionalism of Project Management:

- Project Functions were created in 1970s. for the first time. Moreover a periodic review was also devised.
- Guidance and controlling systems for the project execution were also put in place along with time tables and economic reporting tools.
- This period can be characterized as that of the "light weight project manager" a name given by [12].

This new kind of project organization improved the new vehicle projects but I lacked coordination, a known reason of project failures.

It also resulted in:

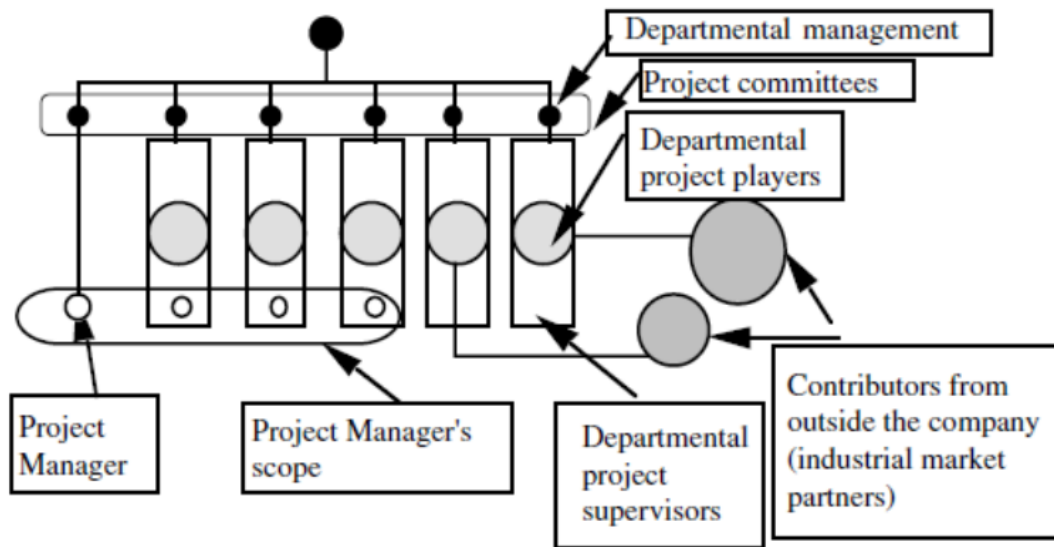


FIGURE 2.1: Project Coordinated Structure (source: adopted from Clark, Hayes, and Wheelwright, 1988.)

1. Loss of Control of project profitability and lead times, signposting the limitations of the use of sequential input of trade-focused logic and an excessively hierarchical approach to the negotiation of compromises [9];
2. Low quality as a result of in capability of measuring and managing risks generated by innovative strategies.

	1955	1973	1986	1989
American Products:				
Number on Sale	25	38	47	50
Sales/product(000s)	309	322	238	219
European Products				
Number on sale	5	27	27	30
Sales/product(000s)	11	35	26	18
Japanese Products				
Number on sale	0	19	41	58
Sales/product(000s)	0	55	94	73
Total:				
Product on sale	30	84	117	142
Sales/product(000s)	259	169	136	112
Market share captured by six largest-selling products	73	43	25	24

TABLE 2.1: Fragmentation of American Auto Market

Although few hesitant attempts were made by European and American car

makers but no innovation was seen in the area of Project Management. However, real innovation was brought by Japanese automakers like Toyota and Honda.

Stalk and Hout [21] have shown that by the end of the 1980s, certain Japanese firms were implementing highly aggressive product proliferation strategies, the principle of which was to drown competitors in a flood of very rapidly replaced products. In such an environment, the products of slower competitors quickly go out of fashion. Stalk and Hout show how the use of such strategies by Honda and Yamaha won them dominance in the motorcycle market.

A similar approach by Japanese carmakers was observed in conquering the North American Market. See the table.

1. The number of vehicles available in the market was increased by five times
2. In 1955, The Japanese Carmakers, who were non existent in the American Marker, were now offering even better variety car range as compared with their North American Competitors, in 1980s
3. European Manufactures did not even enter in North American Market

Such achievements by Japanese manufacturers were based on highly effective project management methods. Comparative studies by Clark and Fujimoto [7], updated in 1990 and published in 1995, highlight a significant differential in relation to the development performance achieved by Japanese firms according to the three metrics chosen by the researchers: lead time, project team productivity as measured by the number of engineering hours required to develop the projects, and the quality of the vehicles placed on the market [19].

2.4 Third Phase (1985-1995)

A new template called “Concurrent Engineering” emerged at the end of 1980. Concurrent Engineering included more project Functions in deployment of development methodologies. That gave rise to the post of “Project Director” described as “Heavy weight project manager” by Clark, Hayes, and Wheel Wright[12].

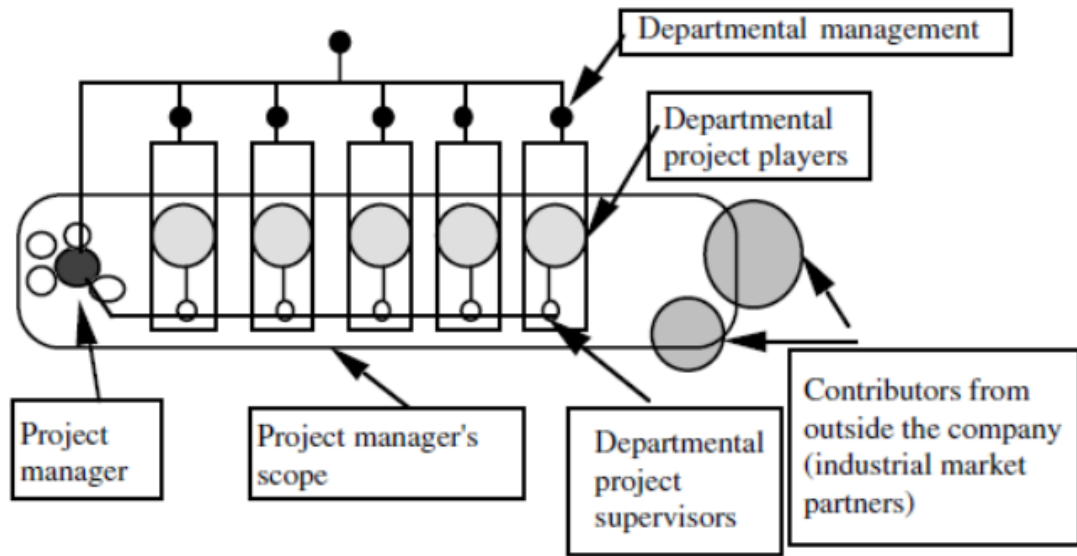


FIGURE 2.2: The Project Director Structure (source: adopted from Clark, Hayes, and Wheelwright, 1988)

The heavy weight project manager was already present in the Japanese technology Firms with the title of “Susha”. (The First Susha was appointed at Toyota, in 1953) Susha was an independent Project manager having wide range of powers and authority.

In US, Chrysler was the first company to adopt the heavy weight project manager template. In Europe, Renault was first to adopt this model in 1980s [4]. These structural Improvements changed project communication and decision making processes a great deal.

The aforementioned modifications are explained as under:

2.4.1 Improvements in Project Control Processes

In stage 2, more attention was given to the sophisticated control of planning and costs. However in stage 3, overall vision and meanings of projects were addressed.

There was a shift from burdensome controls that removed any sense of personal accountability to an encouragement for individual responsibility and self-regulation by project participants, within a framework defined by “meta-rules” guaranteeing minimum coherence (Jolivet and Navarre, 1993). At Chrysler,

the new compact organization based on clear leadership created a new feeling of solidarity, favoring early resolution of problems, encouraging calculated risk taking, and reducing the inertia in decision making inherent in structures of the matrix type.

In Europe, at Renault, followed by PSA Peugeot Citroën, this logic of personal accountability for overall objectives, quality-cost-duration, was rolled out for all vehicle sub assemblies: seats, engine, dashboard, and so on [19].

2.4.2 Concurrent Engineering

Project actors in this age set up new rules for the project contributors. These modifications were at three levels.

- (i) Various specialists were involved at early stage for maximum anticipation of problems. Prototyping was encouraged to prepare for validation of process feasibility.
- (ii) Previously inter-function consultations had occurred mostly at top level. However at that time project management teams started to coordinate at all levels.
- (iii) Organization of work was improved through co-location of teams and use of tools to accelerate inter-function communications.

These changes can be understood properly by considering the example of Chrysler. In that period company was following the conventional functional organization consisted of design, engineering, maturity, marketing and sales departments having their goals and objectives. It was difficult to get agreement among them and the president of the company used to end up arbitrating between the functions.

The implementation of integrated multi-functional “Platform design teams” helped Chrysler to set up “Simultaneous Engineering” replacing conventional “Sequential Engineering”. Although decision of locating all engineering teams under one roof, was a costly one, but it paid finally. The company implemented the tools of SE with Transverse communication systems. It also hired young engineers and introduced co-worker evaluation system.

2.4.3 Relations with Subcontractors

The novel ideas of project management made possible the development of new types of co-development between car manufacturers and suppliers.

Calls for bids were issued from the outside of project and selected supplier then got associated close with the project team. Suppliers participated regularly in project progress meetings.

Compared with the conventional template for competition between suppliers based around detailed project specifications, this new template for the relationship involves, for those taking part in it, the need to modify their organizational and contractual frameworks [5], [14], [8], [13].

Once again, Chrysler can be seen to be, in North America, a precursor in its implementation of the “extended enterprise” concept, closely involving suppliers in projects. In Europe, Renault also consciously committed to co-development policies [4], [13].

2.4.4 Project Management Professionalism

The processes of Project Management professionalization were required in the result of empowerment and generalization of project function.

A variety of the programs and professional patterns were developed in the late 1980s and 1990s. Human relations rules were organised by mixing skill-based and project-based roles. This was important because it was found difficult to maintain solidarity between project and functional experts. The alternating and mixing the roles enhanced the inside project learning. It was more important to develop the collective project management competency as compared to individual PM expertise.

2.4.5 Success of Western Manufacturers

The implementation of new Project Management models enhanced the performance of western car makers in terms of new product launches. Ellison, Clark, Fujimoto and Hu again demonstrated engagement with response metrics indication PM Performance such as Adjusted Lead-time, Engineering hours and TQM.

At Chrysler, the results were initially impressive. "The . . . Neon compact car model took 31 months to bring to market, while the current Dakota pickup truck made it in only 29 months." [19].

By setting up new structures, Chrysler brought more new models in 5 years than in the last 20 years. On the other hand in Europe, during the first half of 1990s, Renault had maximum advantages by participating new developments in Project Management by bringing innovative product range in the market and restored its image in terms of quality.

2.5 Forth Phase (Post1995)

This phase is characterised by intensification of Innovation based competition in auto industry, -innovation that is both radical in context and repeated at the faster rate [11],[3].

The best practices of the previous stages were quickly adopted by the competitors and thus lost their reason of competitive edge. Heavy weight Project Management template came under pressure as number of projects in an organization increased many times. Toyota started to have a critical look at its Susha system [6].

Till 1992, the number of platforms increased from 8 to 18 and avg. production per platform decreased. Communication and coordination also became critical. In 1991, a Susha was observed to be communicating with 48 departments in 12 engineering divisions [19]. The relationship between sushas and senior management got strained due to the lot of burden. The increase in number of projects led to the appointment of young, inexperienced sushas. The increased number of departments made it more difficult for engineer to understand cross functional activities and result in less thought out, less integrated products.

1990s saw more and more alliances in auto industry. Multiple alliances became a source of further difficulty. Such strategic changes eventually led to new trends in automotive project management, summarized as under.

1. 1. Project function deployment in downstream of product development.
2. 2. Implementation of a system to take care of radical innovations between programme development programs.

3. 3. Increased number of projects done by various manufacturers' partnerships.
4. 4. Development of platform projects as a way of managing multi brand product development programs.
5. 5. Increase in supplier – manufacturer cooperation fields.

2.5.1 Use of Project Management in Commercial Tasks in Down Stream

The intensification of innovation based competition in car industry undermined the stability of the commercial life of product in the downstream of development projects. This happened because contrary to earlier stages, in mid 90s, the price war compelled the manufacturers to bring the product to market as soon as possible to reap the maximum benefits of the innovation. Transverse integration, that was limited to the development phase in earlier stages, now spread to the entire life cycle of the product.

Such a situation gave rise to the need of new actors like the "Program Director" to coordinate the various trade components within a manufacturing range throughout the life cycle.

2.5.2 The Management of Radical Innovation Projects

In recent developing circumstance, quality-cost-Time triangle remained no longer enough. It was necessary to introduce radical innovations in the product and in the services offered to the customers. In 1990s, Renault totally overhauled the research division by strengthening it and tightly interfacing with initial project design departments.

The function's activities now were no longer based on scientific discipline but guided by programs focussed on innovations in services and technology. For such reasons the post of "Innovation Project Manager" was created to manage complex technical innovations. A novel form of project organization was gradually put in place in early 2000s, to guide the upstream of vehicle projects [15].

2.5.3 The Management of Partnerships

Auto Industry saw a lot of corporate restructure in the form of mergers, acquisitions, strategic alliances, industrial cooperations and exits in 1990s. Piron (2001) and Midler, monnet and Neffa (2002) have emphasized the importance of three problem sets that exist in cooperative projects, compared to the traditional automotive project culture.

- i. Mutual understanding within joint project teams.
- ii. The management of fair and equal treatment of the partners.
- iii. Regulation of tensions between the project and the strategies of the parent companies.

2.5.4 Growing Importance of The Platform Concept

Product standardization and Product differentiation have been the main concerns in the automotive industry. In early 1990s, entrepreneurial project managers made possible the rapid launch innovative products. Platform concept helped to bring such innovative products to market quickly.

One of the issue concerning platform is linking up the replacement cycles for platform and products. If a product is required to use the platform then it becomes very difficult to introduce the recent innovations. One way to solve this issue is to evolve platform at the same speed as the product.

2.5.5 Manufacturer-supplier Relationship

Thanks to the efforts made for co-development, in 1990s, some of the suppliers could broaden their field of competence and learn the high end car making traders that ere specialised for manufacturers only. Co-development and co-learning resulted in extension in supplier responsibilities and involvement of suppliers. In the 1990s, it became gradually possible to define effective arrangements for co-development [8], [13] —that is to say, cooperation between the carmaker and its suppliers on the basis of overall functional objectives [19].

Chapter 3

Industry Survey Design

The main objective of the industry survey was to find the first hand information about the state of Project Management maturity in the automotive industry. To achieve this objective a comprehensive survey questionnaire was designed. Survey questionnaire was divided into five parts.

1. Respondent's Data
2. Section 1: Current State of Project Management
3. Section 2: Strategic Alignment
4. Section 3: Effectiveness of Implementation of Project Management Practices (Firm's Experience)
5. Section 4: Future Plans

The draft of survey questionnaire is attached as appendix [A](#) on page [55](#).

3.1 Respondent's Data

This section aims to assess the size and capacity of the respondent firm. Moreover designation of the respondent person is also asked to assess the authority and experience of the respondent individual.

3.2 Current State of Project Management (Sec. 1)

Section 1, of the questionnaire is comprised of two questions. First question provides the information about the overall state of the implementation of

project Management practices in the firm. However the second question gives in depth insight about the implementation of PM in Various key departments.

It has been observed that some firms start with experimenting PM practices by introducing it in certain functional departments and then extend its use to other departments provided it achieves its objectives of usefulness. This often start with creation of a small Project teams inside a functional department as matrix topology of organizations as a route to a complete projectized organization. Project Management evolved in automotive sector attesting the same strategy [17].

Another important concept in automotive industry is “Platform” concept where various tasks under various functions can use the shared resources.

Car manufacturers use a common base where they build up the entire car. This common base is known as platform. The car manufacturers share it among different models in order to reach higher volumes and to achieve economies of scale. Several brands, owned by major car manufacturers, are built on common platforms thus enabling larger volumes.

In order to be competitive, the cost and time of the projects must be kept under control. Furthermore, the project teams have to innovate, in order to put on the market attractive products while keeping under control the underlying risks. Hence, competing in this context necessitates moving from a management of unique projects leading to “hits products” to the management of product families based on a multi-project management [6]. The platform strategy is one way to implement the multi-project management approach [2].

The second question also verifies the correctness of the answers provided in question 1 by inquiring about the various departments explicitly. Following is the list of tasks that may share a platform or may have a project team to operate.

- i. ICT management tasks
- ii. Logistics tasks
- iii. Purchasing Procedures
- iv. HR management tasks
- v. Process Management tasks
- vi. Sales Functions

- vii. Quality tasks
- viii. Engineering & Design functions
- ix. Research & Development functions

Indirect Information sought in this section was

- i. Percentage /extent of implementation of PM Practices.
- ii. Gap between actual implementation and perception of implementation

3.3 Strategic Alignment (Sec. 2)

Section 2 addresses the issue of strategic alignment of PM Practices in the organization. It means how important the PM Practices are considered by the organization in achieving its strategic goals. After the introduction of the definition of PMO, question 3 strives to assess the existence, authority and size of a PMO in an organization.

Definition of PMO: A project management office, abbreviated as PMO, is a group or department within a business, agency or enterprise that defines and maintains standards for management within the organization. The PMO is the source of documentation, guidance and metrics on the practice of project management and execution.

Based on the PMO literature, PMO tasks can be grouped into five distinctive categories: (1) managing practices, (2) providing administrative support, (3) monitoring and controlling projects, (4) training and consulting, and (5) evaluating, analysing and choosing projects. 'Managing practices', focuses on developing standard procedures, information systems, and tools to help with project management within the organization [1].

One of the main objective of a PMO is to coordinate the project Management related activities and sharing of resources.

When a formal PMO does not exist, there are different organizational arrangements and activities which serve a similar role [1].

In case of non-existence of a PMO, question 3 also meant to learn the means of PM activities coordination inside the firm between various functional departments. Question 4 and 5 deal with the systematic and certified knowledge of project Management in the organization. One way to assess the existence of standardized knowledge in an organization is to find out the number of

certified human resource obtaining certifications and qualifications from the certifying bodies like IPMA, PMI and others.

Owing to the fact that agile project management is gaining importance in managing the larger complex projects, It is interesting to find that how effective agile techniques are being considered in the industry. However some auto industry experts have a view that agile and lean are seen synonymous in car manufacturing industry. Therefore we used the term lean instead of agile in the questionnaire.

The indirect information sought in this section is

- i. Existence, role, size and authority of a PMO
- ii. Existence of certified / standardized Project Management knowledge base
- iii. Which PM body is more relevant in auto sector?
- iv. Use of agile PM Practices in auto sector

3.4 Effectiveness of Implementation of Project Management Practices - Firm's Experience (Sec. 3)

Desktop studies and interviews with industry experts introduced certain key techniques and methodologies specifically used in automotive sector. Such techniques have proved to be effective in the quality and cost effective manufacturing.

It includes collaborative project score board (CSB), world class Manufacturing (WCM), platform management, Simultaneous Engineering(SE), ISO/TS16949 standards and Total Quality Management (TQM) methodologies. Here are the brief definitions of these methodologies.

- **Collaborative Project Scorecard (CPS)** It is a management system that incorporates a balanced set of financial and non-financial measures and translates "a business unit's mission and strategy into tangible objectives and measures". Alignment of project goals with business strategies, improves transparency in networked project organizations. It improves the achievement of long term strategies in a project partnership.

- **World Class Manufacturing (WCM)** World Class Manufacturing is a concept which has proven effective in regaining competitive edge; the focus is on continuous improvement. As organizations adopt world class manufacturing, they need new methods of performance measurement to check their continuous improvement.
- **Simultaneous Engineering (SE)** Adopted in most of the projects in the automotive industry, within the SE core team, specifications, solutions and decisions are coordinated that are related to the whole vehicle and its interfaces between the modules and main functional groups at the level of technical project management. Each module includes a sub structure that requires another team, the coordination of those teams is managed by an interdisciplinary and process oriented SE team.
- **ISO/TS 16949** the ISO/TS 16949 international standard establishes the particular requirements of the implementation of ISO 9001:2000 in the automobile production. It's a Technical Specification that defines the quality management system requirements for the design and development, production and, installation and service of automotive-related products. The purpose is to assist organizations supplying product or service into the automotive sector to operate systems that not only ensure whether these products and services meet customer requirements but also provide continual improvement and reduce variation and waste in the supply chain.
- **Total Quality Management (TQM)** Total Quality is a description of the culture, attitude and organization of a company that strives to provide customers with products and services that satisfy their needs. The culture requires quality in all aspects of the company's operations, with processes being done right the first time and defects and waste eradicated from operations. Total Quality Management is a method by which management and employees can become involved in the continuous improvement of the production of goods and services. It is a combination of quality and management tools aimed at increasing business and reducing losses due to wasteful practices

Question 7, is meant to investigate that whether these techniques / methodologies are being used in a firm, and if so, does implementation of PM techniques help the effectiveness of these methodologies?

Question 8, 9 and 10 address the experience of the firm regarding performance

improvement after the implementation of PM practices. Key performance indicators required to improve, include Time to market performance, budget performance, firm's reputation among customers and suppliers, and the firm's competitive advantage over its competitors. In summary section three addresses the firm's experience about the usefulness of the implementation of PM practices.

Indirection information sought in this section was

- i. Have PM proved to helpful in implementation of the key mythologies used in automotive sector?
- ii. Have implementation of PM practices helped to gain required advantages in business?

3.5 Future Plans (Sec. 4)

Section 4 has been designed to assess the future plans of an organization about implementation and means of making progress in the further incorporation of PM practices in organizational processes.

Question 11 and 12 asks about continuation and enhancement of PM practices in the company.

Question 13 and 14, tries to investigate the means of improving PM practices by collaborating with universities, for authentic knowledge or with PM standardizing bodies for standard practices.

Question 15 is a suggestive question whether firms would like to share their experience with partners and competitors in the industry.

Indirect Information sought in this section is:

- i. Future of PM practices implementation in auto sector.
- ii. Future of larger collaboration with industry, PM bodies and knowledge centers like universities.

Chapter 4

Survey Results

This chapter mainly presents the quantitative results obtained from the survey questionnaire. The results are well described using tables.

4.1 Respondent Data (Sec. 0)

Total Number of Companies Responded	80
Companies filled survey	71
Automotive sector companies	51

TABLE 4.1: Data of responding companies

Size of Company

Size of the Company	No. of Responding Companies
Small (less than 200 employees)	39
Medium (between 200 to 500 employees)	9
Large (more than 500 employees)	3
Total	51

TABLE 4.2: Size distribution of the responding companies

4.2 Current State of Project Management (Sec. 1)

		Not at all	At very basic level	At moderate level	Moderate to advance level	Complete Implementation	
		1	2	3	4	5	Total
Number of Responding Companies							
1	To what extent Project Management practices are being implemented in your organization? (over all)	6	4	26	11	4	51
	ICT Management Taks	16	11	14	8	2	51
	Logistics Tasks	4	10	25	11	1	51
	Purchasing Procedures	7	8	22	12	2	51
	HR Management Tasks	8	19	12	10	2	51
2	Process Management Tasks	6	4	20	18	3	51
	Sales Functions	6	8	20	15	2	51
	Quality Tasks	6	5	21	14	5	51
	Engineering and Design Functions	6	11	14	15	5	51
	Research and Development Functions	9	10	13	13	6	51

TABLE 4.3: Current state of Project Management

Correlation of Results with respect to Size of Companies

Level of Implementation	Not At All	At Very Basic Level	At Moderate Level	Moderate to Advance Level	Complete Implementation
Responding Companies	6	4	26	11	4
Breakdown w.r.t. size of companies	Small: 6 Medium: 0 Large: 0	Small: 3 Medium: 0 Large: 1	Small: 20 Medium: 6 Large: 0	Small: 8 Medium: 3 Large: 0	Small: 2 Medium: 0 Large: 2

TABLE 4.4: Co-relation of results w.r.t. size of companies

Take Away Set 1

1. PM Practices status in most departments are at Moderate and Moderate to advance levels.
2. Most of the large companies (66.66% of the sample) have already attained complete implementation of PM practices.
3. 100% of Medium sized companies have achieved Moderate and Moderate to advanced levels of PM Implementation.
4. ICT is lagging behind other departments in implementation of PM Practices.
5. Process Management and Engineering & Design are most PM Practicing departments, followed by Research & Development and quality functions.
6. Over all it seems that auto companies are in the mid-way to complete projectization.

4.3 Strategic Alignments (Sec. 2)

Existence, size and authority of PMO

3	Do you have a dedicated PMO in your organization?	Yes	No	
	Response	19	32	
	Distribution w.r.t. size of company	S:13 M: 3 L:3	S:26 M:6 L:0	Correlation w.r.t. size of companies
	If Yes, does the head of PMO directly reports to the top management level?	Yes	No	
	Response	18	1	
	Distribution w.r.t. size of company	S: 12 M: 3 L: 3	S:1 M:0 L:0	Correlation w.r.t. size of companies
	Please rate the size of PMO in your organization	1	Very small	2 S:1, M:0, L:1
		2	Small	7 S:5, M:2, L:0
		3	Medium	7 S:6, M:0, L:1
		4	Large	3 S:1, M:1, L:1
		5	Very large	0 S:0, M:0, L:0
	If No, which of the following departments are taking care about aligning procedures and improving organization?			
	CEO office	YES	No	Only CEO office: 2 Only Quality Dpt. 4 Only HR: 1 coordinated by all: 6 coordinated by none: 2
	Response	10	7	
	Quality Department	Yes	No	
	Response	12	5	
	HR Department	Yes	No	
	Response	8	9	

TABLE 4.5: Existence, size and authority of PMO

Take away Set 2

1. 100% of large companies have dedicated PMOs.
2. In 100% of large companies, head of PMOs report to higher management.

3. Overall Only 37% of Companies have dedicated PMOs. However 95% of PMOs have maximum authority and there is great probability that they get involved at strategic level.
4. 68% of companies who does not have a dedicated PMO, get coordinated from CEO office and Quality departments. We can say that they are passing through the intermediate levels of projectization.

4	Which organization certifies the project managers in your company?	IPMA	PMI	Others	None
	Responding Companies	2	5	4	40
	Distribution w.r.t. size of company	S:1 M:1 L:0	S:1 M:2 L:2	S:3 M:1 L:0	S:34 M:5 L:1
	Distribution w.r.t. extent of projectization	Not at all: 1 Moderate level: 1	Moderate level: 2 Complete Implementation: 2	Moderate and Advanced level: 4	

TABLE 4.6: Project Management certifying organizations

		Responding Companies	Distribution w.r.t. size of company
5	Please rate the number of Project Management trained staff in your organization.		
1	No Record available	16	S:16 M:0 L:0
2	Very Few Staff	19	S:14 M:4 L:1
3	Moderate Number	11	S:7 M:4 L:0
4	Good Number	5	S:2 M:1 L:2
5	Fairly Good Number	0	S:0 M:0 L:0

TABLE 4.7: Project Management trained staff

Take Away Set 3

1. For almost every field of industrial knowledge, there exist standardization and certifying, knowledge organizations. In this survey, we selected to include PMI for its global and IPMA for its regional existence.
2. For our sample, Overwhelming majority about 78% of the companies say that their Project Managers do not have any kind of PM certification.

3. More project managers who get certifications prefer PMI as compared to IPMA. About 67% of large companies in our sample prefer PMI.
4. 31% of companies do not keep any record of their PM trained staff.
5. Over all the auto sector seems lacking in Project Management Training.
6. However, 39% companies are convinced about the importance of Project Management Training & certification and plan to encourage their staff to get training/certification in Future. (See Response section 4, question13)

6	Are you using Lean Project Management techniques in managing some of your projects?	Yes	No
	Responding Companies	21	30
Distribution w.r.t. size of company		S:13	S:26
		M:5	M:4
		L:3	L:0

TABLE 4.8: Use of lean project management

Take Away Set 4

1. Only 41% of the companies are using Lean (Agile) Project Management techniques as compared to 59% of companies who have not yet tried lean way of Project Management.
2. 100% of large sized companies in our sample are using lean way of Project management and are determined to keep using in future as well. 67% of among these Large sized companies have already attained complete implementation of PM Practices.
3. 47% companies agree or strongly agree that they will try to use Lean PM in future, however, exactly the same amount remains uncertain about the idea. (See Response section 4, question12)

4.4 Effectiveness of Implementation of Project Management Practices - Firm's Experience (Sec.3)

			1	2	3	4	5
			Strongly Disagree	Disagree	Don't know	Agree	Strongly Agree
7	Which of the following management techniques are being used in your organization and how project management helps its implementation?		Does PM help to implement?				
	Collaborative Project Scoreboard (CPS)	Yes 4	0	0	1	3	0
		No 47	2	0	39	5	1
	World Class Manufacturing (WCM)	Yes 19	0	0	1	15	3
		No 32	1	0	26	4	1
	Platform Management	Yes 14	0	1	2	8	3
		No 37	2	0	29	5	1
	Simultaneous Engineering (SE)	Yes 14	0	0	3	9	2
		No 37	1	0	31	3	2
	ISO/TS16949	Yes 37	0	0	8	23	6
		No 14	1	0	12	0	1
	Total Quality Management	Yes 17	0	0	1	15	1
		No 34	2	0	31	0	1

TABLE 4.9: Role of project management in implementing various methodologies

Take Away Set 5

1. ISO/TS16949 remains the most widely used Methodology in automotive sector for obvious reasons and about 78% of the respondents, using the methodology, agree and /or strongly agree that Project Management practices have helped them in implementation of the said methodology.
2. It can be easily inferred from the answers of the respondent companies that project management practices, actually help in implementation of various other production methodologies, to whatever extent they are applied in organizations.

			1	2	3	4	5
			Strongly Disagree	Disagree	Don't know	Agree	Strongly Agree
8	Has implementation of Project Management practices improved your						
	"Time to market" performance ?		1	3	16	27	4
	Budgeting Performance / Cost Deployment		1	2	18	24	6
	Quality of the Product		2	1	14	27	7
	Utilization of human and material resources		2	1	14	28	6
9	Has implementation of Project Management practices improved your firm's reputation among your customers and suppliers?		1	3	18	27	2
10	Has implementation of Project Management practices helped your company in attaining competitive edge over your competitors?		1	2	14	31	3

TABLE 4.10: Role of PM in achieving various targets

Take Away Set 6

1. 65% of respondent companies agree that use of Project management have helped them in attaining the competitive edge over their competitors in the market.
2. 57% of the respondents are convinced that Implementation Of project Management have improved their reputation among their customers and suppliers, thus adding value to the supply chain.
3. A significant majority of 60 -67% respondents think that implementation of PM practices have improved their performance in terms of three vital indicators, Time, cost and quality.
4. The overall satisfaction level shown companies feedback ranges from 57-67% in effectively achieving various targets by using PM practices, in contrast with dissatisfaction level , that remain about 8% . However, 27 to 35% respondents remain unsure, because yet they lag in implementation of PM practices. We observe in section 1 that about 20% of companies either have not tried PM yet or at very basic level of PM practices.

4.5 Future Plans (Sec.4)

		1	2	3	4	5
		Strongly Disagree	Disagree	Don't know	Agree	Strongly Agree
11	Will,you further strengthen the implementation of Project Management practices in your organization?	1	1	16	24	9
12	Will,you continue practicing Lean project management techniques?	1	2	24	18	6
13	Will,you encourage your staff to obtain Project Management certifications to be able to apply industry standards of Project Management?	1	6	24	17	3
14	Will,you look forward to collaborate with any university for in depth research and development regarding Project Management?	2	4	28	15	2
15	Do,you think that sharing information and experience along the supply chain would increase the value of the supply chain itself?	0	4	21	20	6

TABLE 4.11: Future Plans

Take Away Set 7

1. Feedback indicates that 65% of companies will continue to use Project management as an improvement and managerial tool in future. The

trend is very encouraging because only about 30% have achieved advanced to complete implementation (reference section 1) of Project Management.

2. 30% of the respondents remain unsure about the future of Project Management for the obvious reasons as about 59% (reference section 1) of the companies are found to be at moderate and /or at very basic level of project management implementation.
3. Lean (Agile) project management is also seems to be making its way, as 47% respondents plan to continue with it however 41% are already using it along with traditional way of project management.
4. 41% of companies will encourage their staff to get training and obtain industry certifications however currently only 31% of companies have moderate to good number of trained staff.
5. 33% of companies plan to collaborate with universities for research and development however about 55% remains clueless.
6. 51% responding companies consider that sharing information and experience about PM implementation will add value to the supply chain itself.

Chapter 5

Survey Analysis and Discussion

In this chapter, survey results presented in chapter 4 on page 26 will be discussed and analyzed keeping in view the research questions presented in chapter 1 sec. 1.2 on page 2 and consequently deductions will be made.

5.1 Status of Current PM Implementation

It is evident from the survey results that overwhelming majority of the companies from all categories has started their journey towards implementation of Project Management practices. This is a very encouraging trend.

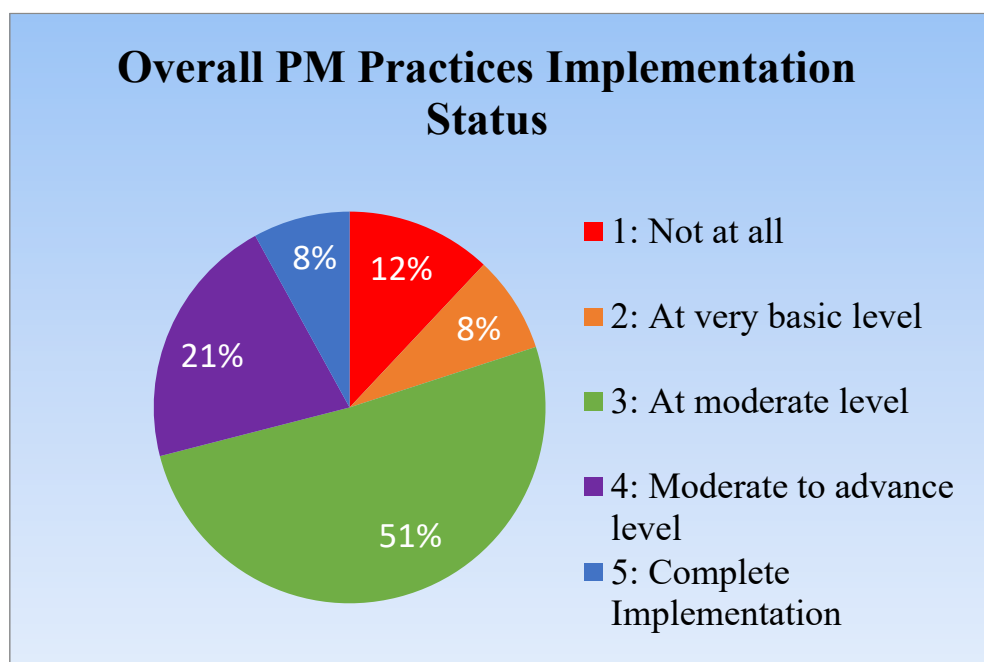


FIGURE 5.1: Overall PM Practices Implementation Status

Highlights

1. Most of the large companies (66.66% of the sample) have already attained complete implementation of PM Practices.
2. 100% of Medium sized companies have achieved Moderate and Moderate to advanced levels of PM Implementation.
3. Over all it seems that auto companies are in the middle way towards complete projectization .
4. ICT is lagging behind other departments in implementation of PM Practices.
5. Process Management and Engineering & Design are most PM Practicing departments, followed by Research & Development and quality functions.
6. PM Practices status in most departments are at Moderate and Moderate to advance

A distinct trend is noticed that all Medium sized companies are successfully making their way ahead and have achieved either moderate level or moderate to advance level in PM implementation. The reason may be that they have realized the advantages gained through PM and their company size and budget allow them to invest before they reap the fruit.

Same is the trend in large companies; they seem to be even ahead of medium sized companies and about 67% of them have already achieved complete implementation of PM.

Although, this is the dominant trend, but OEM sector of automotive industry that mostly comprised of small sized organizations have still a long way to go. Most of their presence is in the moderate level section of the graph, therefore over all focus remains in the same area, i.e. about 51%.

To find the spread of the PM implantation inside the companies, we investigated further the status of key departments.

Process Management and Engineering & Design are most PM Practicing departments, followed by Research & Development and quality functions. This trend is understandable thanks to the fact that auto sector is characterized by engineering and quality requirements. ISO/TS16949 provides mandatory requirement to comply and aforementioned departments are means to achieve these standards.

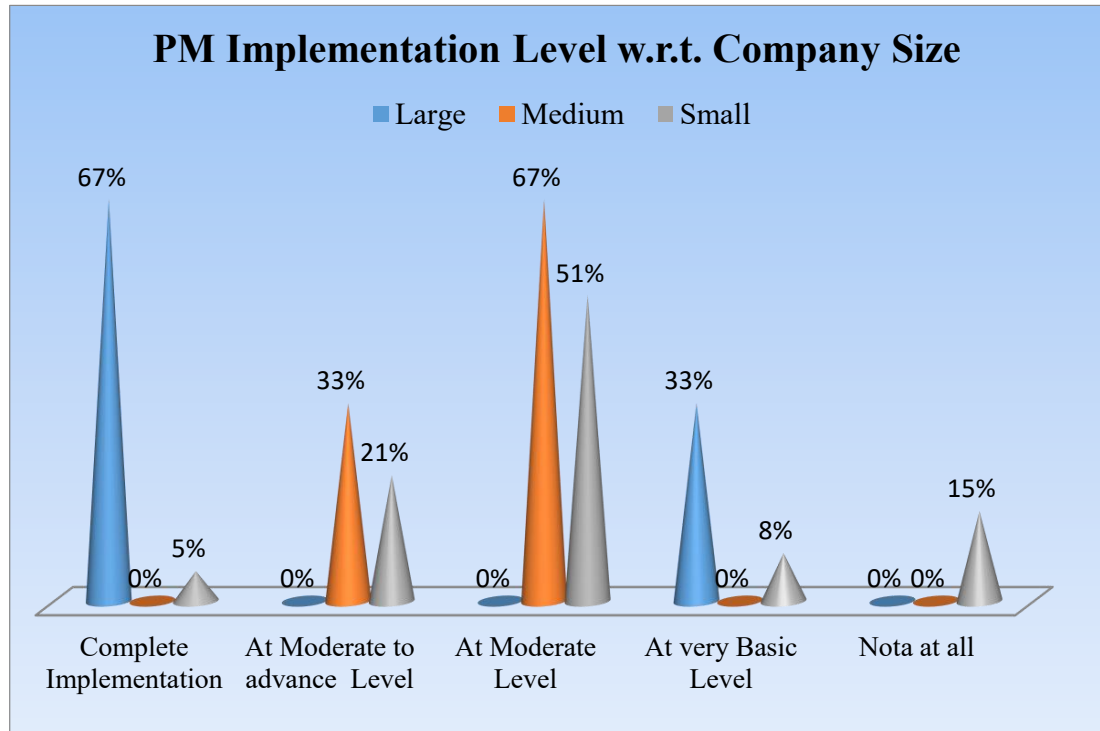


FIGURE 5.2: PM Implementation Level w.r.t. Company Size

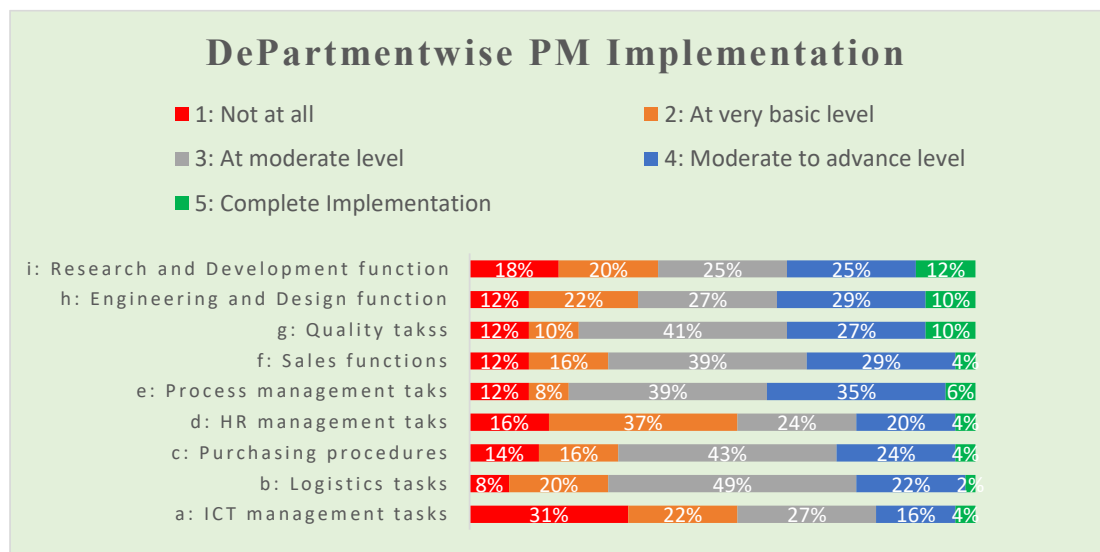


FIGURE 5.3: Department wise PM Implementation

It is worth mentioning, that ICT is lagging behind a great deal as compared to other key departments in PM implementation. This trend is quite alarming as it is a proven fact that Project Management practices are largely helped by ICT management tools. Therefore, it is high time to raise awareness about the importance of ICT in implementation of Project Management. This may be

regarded a corrective action in order to correct the direction of the actions.

5.2 Strategic Alignment

Once we know where we perceive to be standing on the way to complete projectization, it becomes important to find if we are heading in a right direction and equipped with right tools. In other words, we must know, if we are strategically aligned?

5.2.1 PMO

Majority of project management tasks deal with the control and coordination. The best way to achieve aforementioned goals is to set up a Project Management office in an organization.

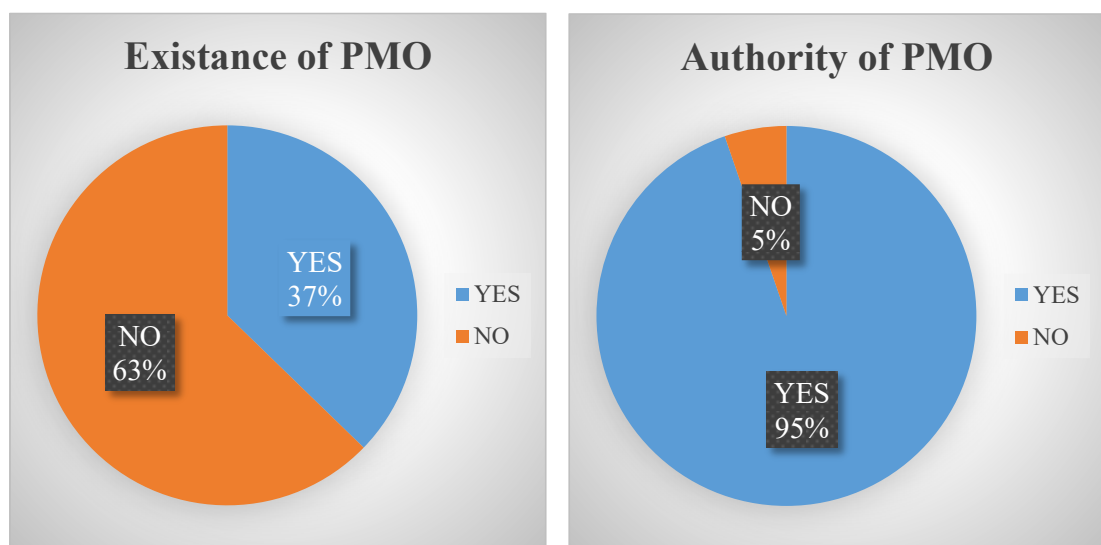


FIGURE 5.4: Existence and Authority of Project Management Office

In this section it was intended to investigate if companies are following the proven track? Is PM in auto sector is strategic or tactical? Results show that 100% of large companies have already had a dedicated PMO in their organization and that directly reports to the CEO or the higher management of the organization. On the other hand, small and medium sized companies are following the same positive trend but with lesser ratios of 33% each.

Highlights

1. 100% of large companies have dedicated PMOs.
2. In 100% of large companies, head of PMOs report to higher management. .
3. Overall Only 37% of Companies have dedicated PMOs. However 95% of PMOs have maximum authority and there is great probability that they get involved at strategic level.
4. 69% of companies who does not have a dedicated PMO, get coordinated from CEO office and Quality departments. We can say that they are passing through the intermediate levels of projectization.

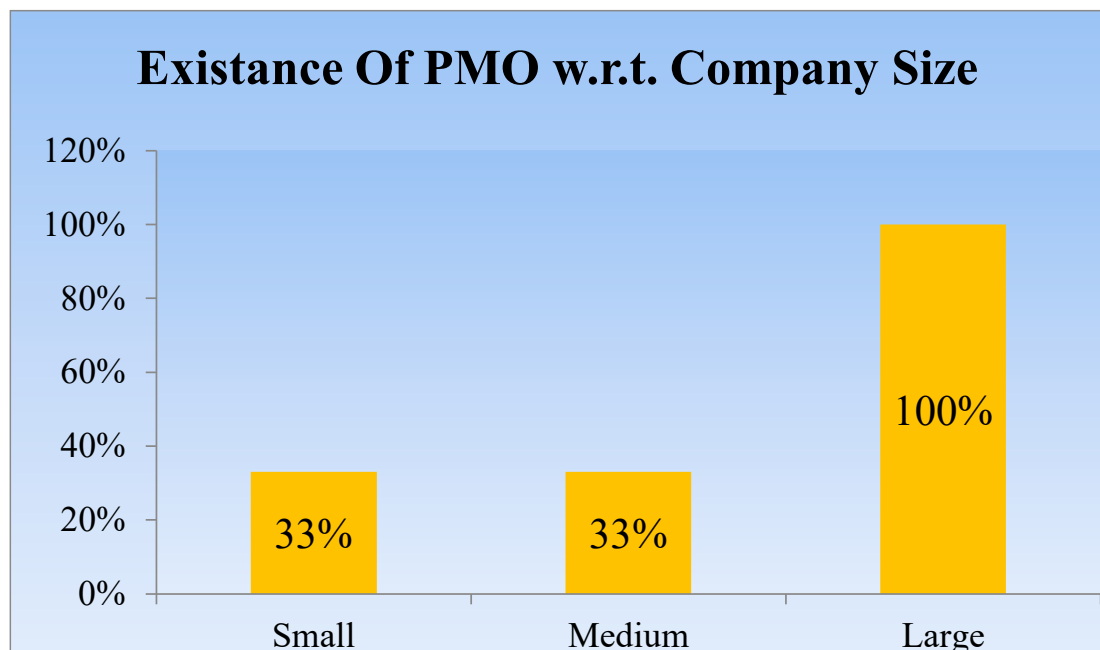


FIGURE 5.5: Existence of PMO w.r.t. Company Size

When we see that overall only 37% of the companies have dedicated PMO, we reach to a conclusion that PM in auto sector is still in tactical mode. The reason is absence of compelling force and lack of experience. Another factor behind this situation may be the resources particularly in case of small and medium size companies.

Digging down further, the survey report reveals that about 47% of the companies who claim to be having a dedicated PMO, the size of PMO is either very small or small. That means, PMO in those companies has only a symbolic value. However, rest of the PMO embodying companies have moderate to large size PMO, indicating a positive trend.

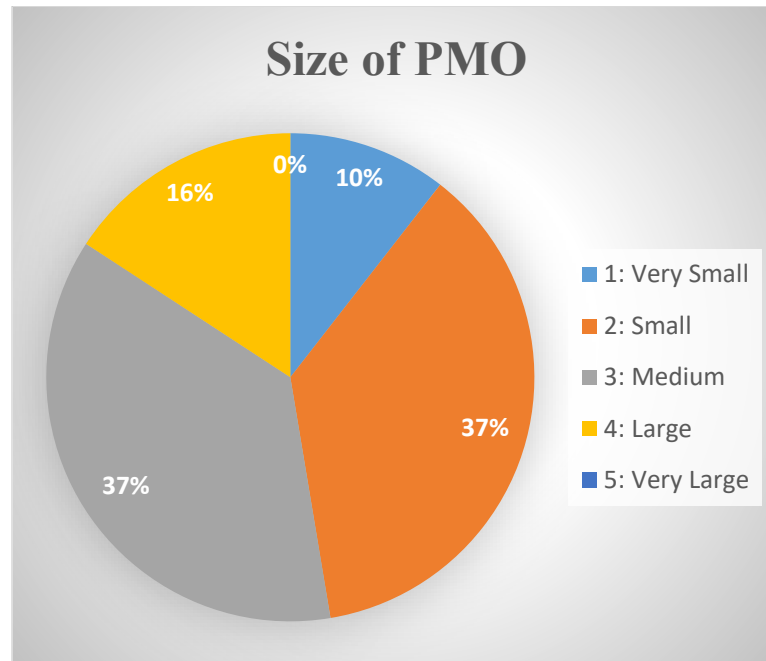


FIGURE 5.6: Size of Project Management Office

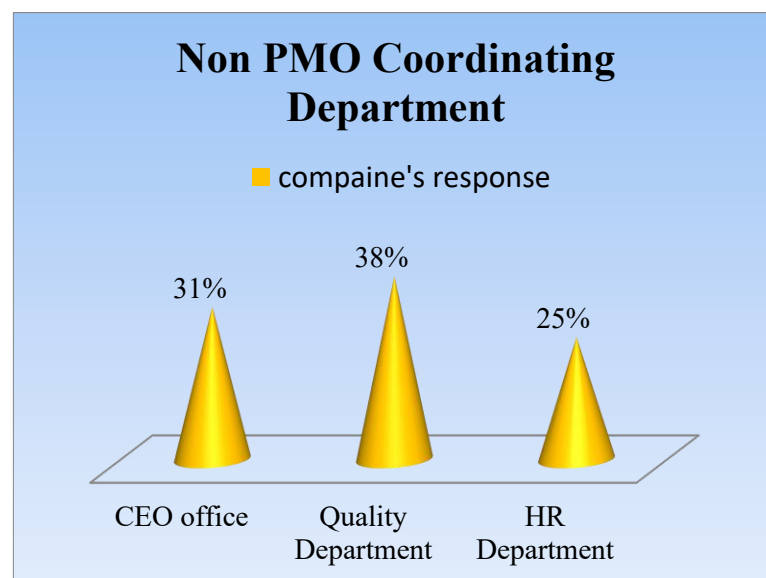


FIGURE 5.7: Non Project Management Office Coordinating Department

As it is mentioned earlier, that the main objectives of a PMO is control resources & progress and coordination between projects, therefore in case of a non-existent PMO, some other department has to do the job. Data reveals, that quality department has been assigned job of coordination if no PMO exists and in other cases it is CEO office itself. Both trends are fairly understandable.

Thanks to the strict requirements of IATF, Quality is the most important aspect in auto manufacturing, making the department most suited for the coordination tasks. However in other case, being business owned by families, it sounds natural if direction and coordination comes from the CEO office itself.

5.2.2 Project Management Knowledge

Another way to make PM a strategic tool is to create culture of knowledge and practice within the company. To investigate the state of culture and tradition of knowledge within the company let us have a look at the following chart.

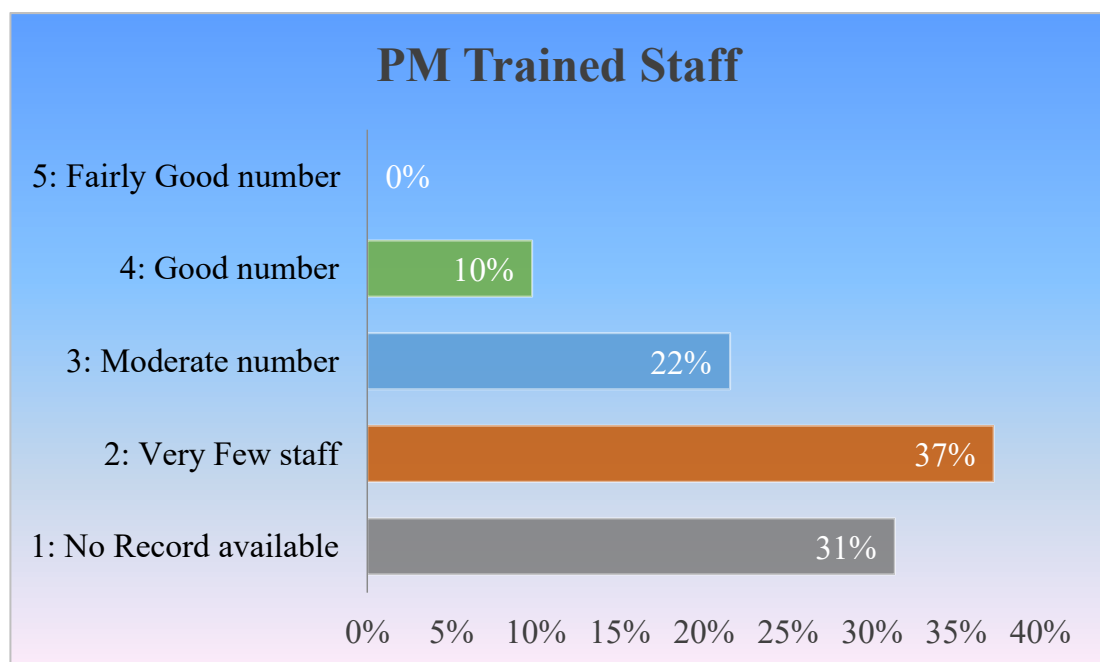


FIGURE 5.8: Project Management Trained Staff

About 31% companies do not care to keep the records of the Project Management trainings and trained staff. Surely, this is not an encouraging trend. Therefore we see severe lack of knowledge and culture that actually is required to make Project Management a strategic tool. Such situation results in difficulty to bring solutions of problems from within. The same gloomy situation is reflected in the future trends, where 61% of the companies have no plan to adopt trainings & Certifications in future.

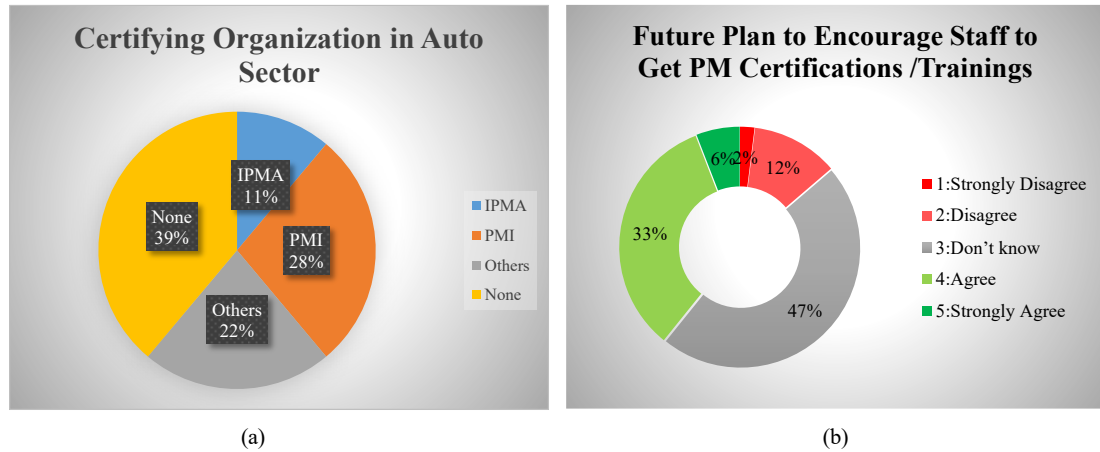


FIGURE 5.9: (a) Certifying organization in auto sector.
(b) Future plan to get certifications/trainings

Highlights

1. For our sample, Overwhelming majority about 78% of the companies say that their Project Managers do not have any kind of PM certification.
2. More project managers who get certifications prefer PMI as compared to IPMA. About 67% of large companies in our sample prefer PMI.
3. 31% of companies do not keep any record of their PM trained staff.
4. Over the entire auto sector seems lacking in Project Management Training.
5. 39% of companies will encourage their staff to get training and obtain industry certifications however currently only 31% of companies have moderate to good number of trained staff.

Because of its strong regional presence, IPMA was expected to be most popular standardization organization but data results differ with our expectation. PMI stands ahead with the choice of 28% of the companies as compared to IPMA with 11%. Though it is beyond the scope of the research to find the reason behind this trend, however for a curious mind, perhaps it is because of PMI's better marketing practicing and strong global presence.

5.2.3 Lean Project Management

Lean Project Management has been proved to be very effective in Japanese automotive sector and rest of the world has recognized it too.

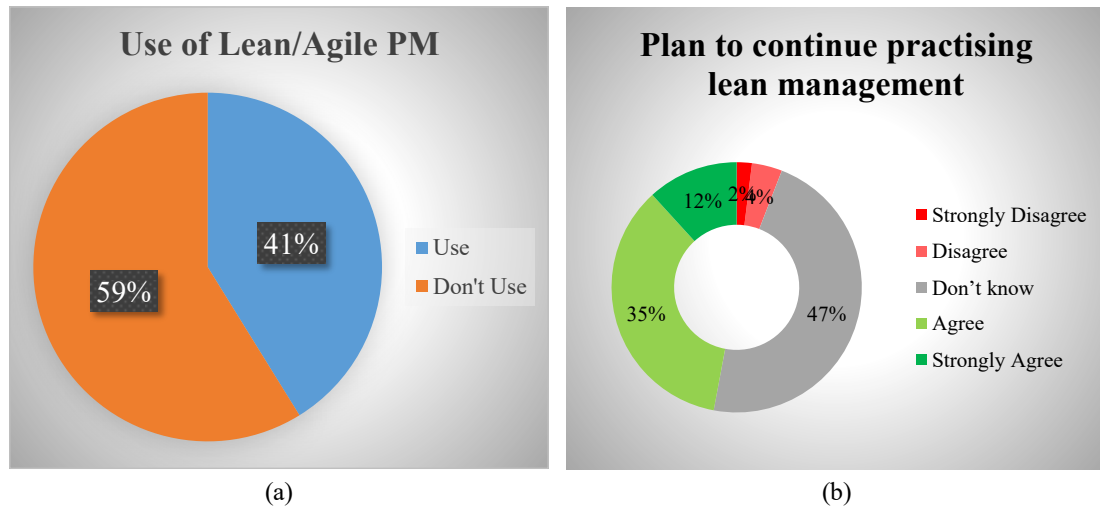


FIGURE 5.10: (a) Use of lean/agile project management.
(b) Plan to continue practicing lean management

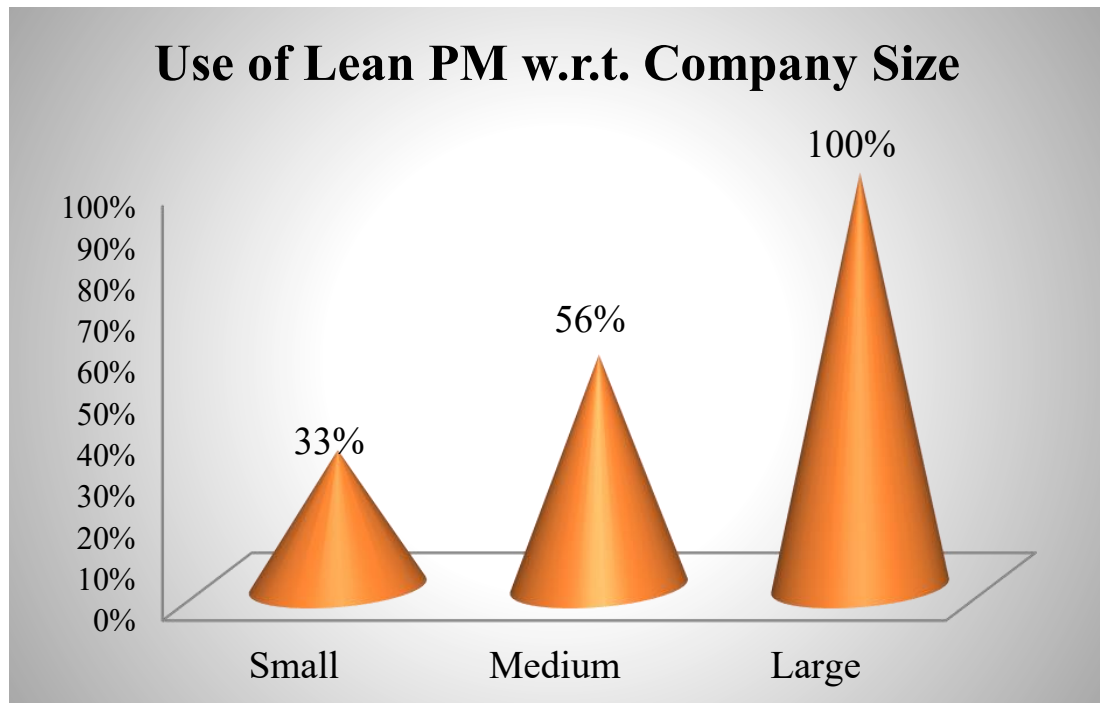


FIGURE 5.11: (a) Use of lean project management w.r.t. company size

Highlights

1. Only 41% of the companies are using Lean (Agile) Project Management techniques as compared to 59% of companies who have not yet tried lean way of Project Management.
2. 100% of large sized companies in our sample are using lean way of Project management and are determined to keep using in future as well. 67% of among these Large sized companies have already attained complete implementation of PM Practices.
3. 47% companies agree or strongly agree that they will try to use Lean PM in future, however, exactly the same amount remains uncertain about the idea.

Lean culture transforms an organization agile and ready to adopt change. We find through the survey that about 41% of the organizations in auto sector are using lean management. Further probe into data, clarifies that large sized companies are leading the trend again, followed by the medium sized companies. The trend demonstrates that large and medium sized companies are marching ahead than small sized companies. This is the common trend that we have been observing so long.

Although few large and medium sized companies are performing well as far as Project Management is concerned, however owing to the fact that the OEM's automotive sector is mostly comprised of small sized companies who are lagging behind, bring down the overall progress.

Concluding from the data, we can say that to date, overall Project Management in automotive sector is tactical in nature. However, we read between the lines that the sector understands the importance of a PM as a strategic tool and can adopt with some effort, provided there is market need.

5.3 Effectiveness of Project Management (Firm's Experience)

A number of management methodologies that are specific for automotive manufacturing sector were listed and respondents were asked if their respective organizations were using and in either cases what was their experience / expectation about PM role in implementing those methodologies.

This question addresses experience as well expectations of the respondent companies and helps to understand role of PM in either case. The chart illustrates that overwhelming majority of the organizations in the auto sector believes that Project Management techniques do help in implantation of various methodologies used in this sector.

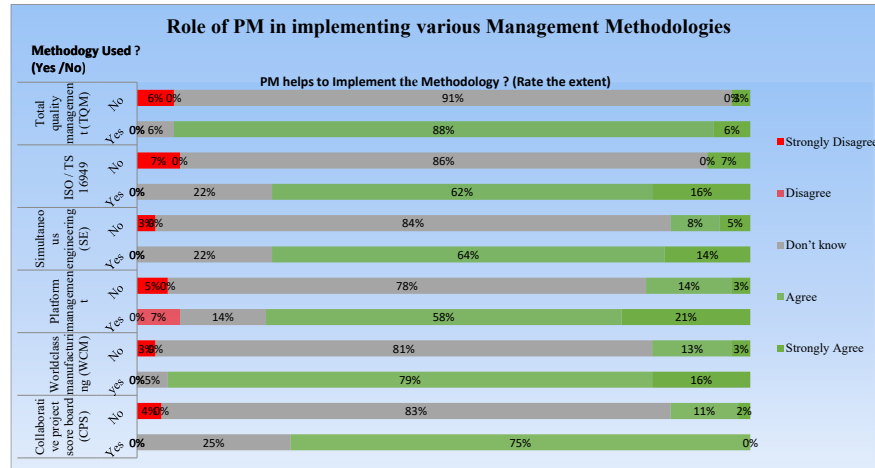


FIGURE 5.12: Role of project management in implementing various management methodologies

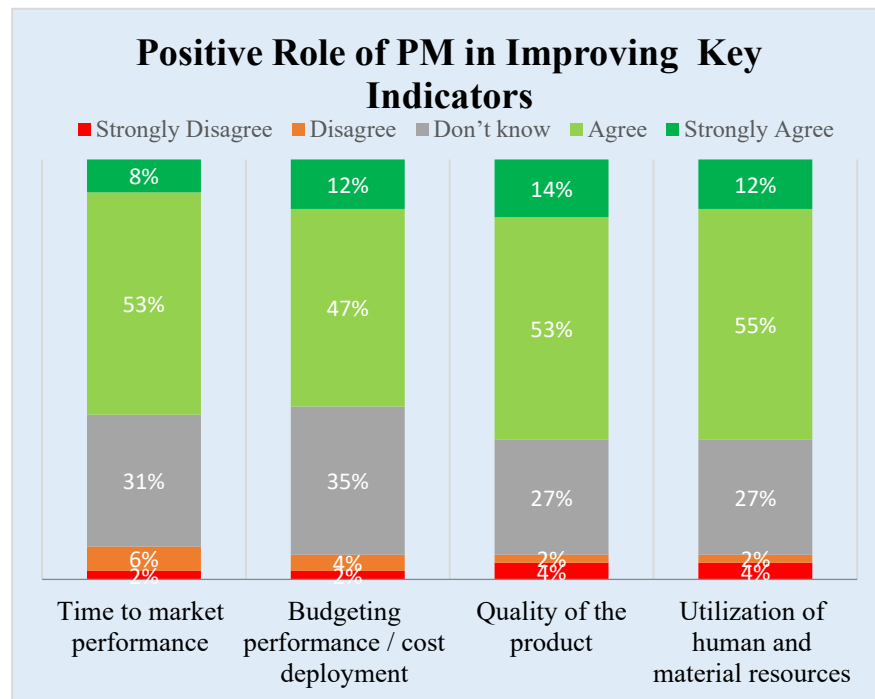


FIGURE 5.13: Positive role of project management in improving key indicators

Highlights

1. ISO/TS16949 remains the most widely used Methodology in automotive sector for obvious reasons and about 78% of the respondents, using the methodology, agree and /or strongly agree that Project Management practices have helped them in implementation of the said methodology.
2. It can be easily inferred from the answers of the respondent companies that project management practices, actually help in implementation of various other production methodologies, to whatever extent they are applied in organizations

The Auto sector further reiterates its confidence on PM techniques to be useful in improving various key indicators like “Time to Market”, “Budgeting performance/Cost deployment”, “Quality of the product” and “utilization of human and material resources”.

The positive trend continues in answering whether PM implementation helps in achieving key performance indicators like attainment of competitive edge over competitors and improvement in reputation among customers and suppliers.

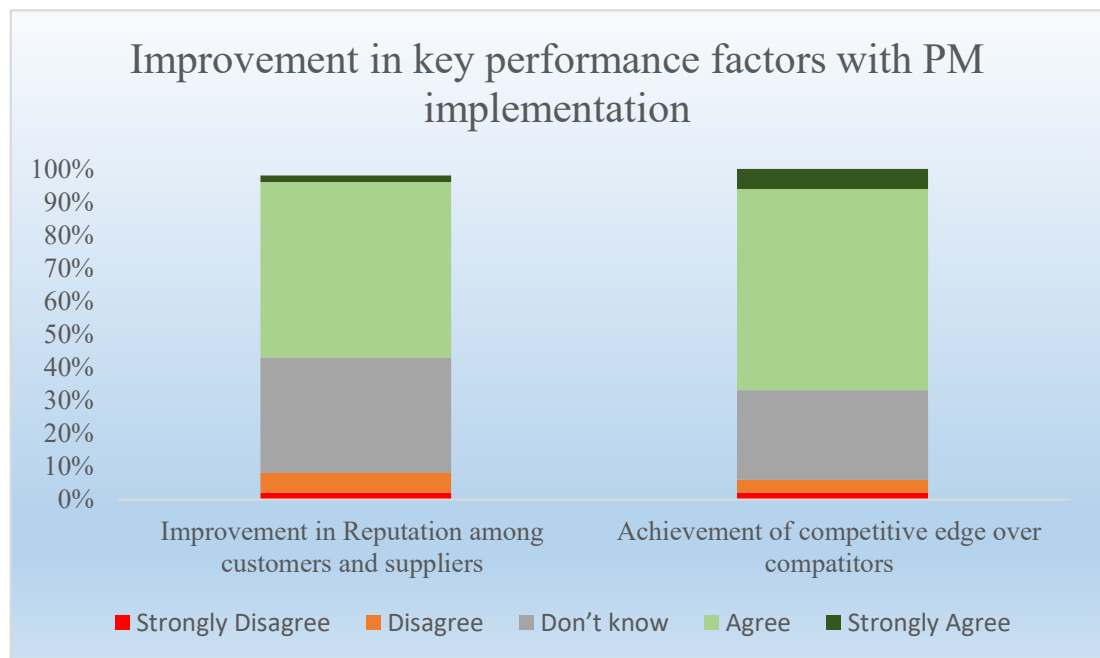


FIGURE 5.14: Improvement in key performance factors with project management implementation

Highlights

1. A significant majority of 60 -67% respondents think that implementation of PM practices have improved their performance in terms of three vital indicators, Time, cost and quality.
2. The over satisfaction level shown companies feedback ranges from 57-67% in effectively achieving various targets by using PM practices, in contrast with dissatisfaction level , that remain about 8% . However, 27 to 35% respondents remain unsure, because yet they lag in implementation of PM practices. We observe in section 1 that about 20% of companies either have not tried PM yet or at very basic level of PM practices.
3. 67% of respondent companies agree that use of Project management have helped them in attaining the competitive edge over their competitors in the market.
4. 55% of the respondents are convinced that Implementation Of project Management have improved their reputation among their customers and suppliers, thus adding value to the supply chain.

In summary, this section concludes that auto sector believes on the usefulness of the Project Management implementation based on the experience on their respective organizations, in whatever capacity they have employed it.

Same confidence is reflected in their future plan and about 65% of the companies plan to further strengthen the Project Management development plan as compared to minority of mere 4% who disagree with the idea. However, a good number of 31% respondents who remain uncertain about the future of the project Management Implementation.

5.4 Future Plans

Future plans of action can be considered a means of measure of the importance of Project management practices in the minds of respondents. It can be noted from the charts that majority of the companies resolve to further strengthen the implementation of both (Traditional and Lean (Agile)) project Management styles. This is an encouraging trend that demonstrates trust of the sector on the Project Management practices.

It is worth noticing that currently about 30% companies have attained advanced to complete implementation level, however about 65% are willing to use it in future.

Auto sector is yet not much keen to train their staff on Project Management. It shows lack of awareness about the importance of the knowledge culture.

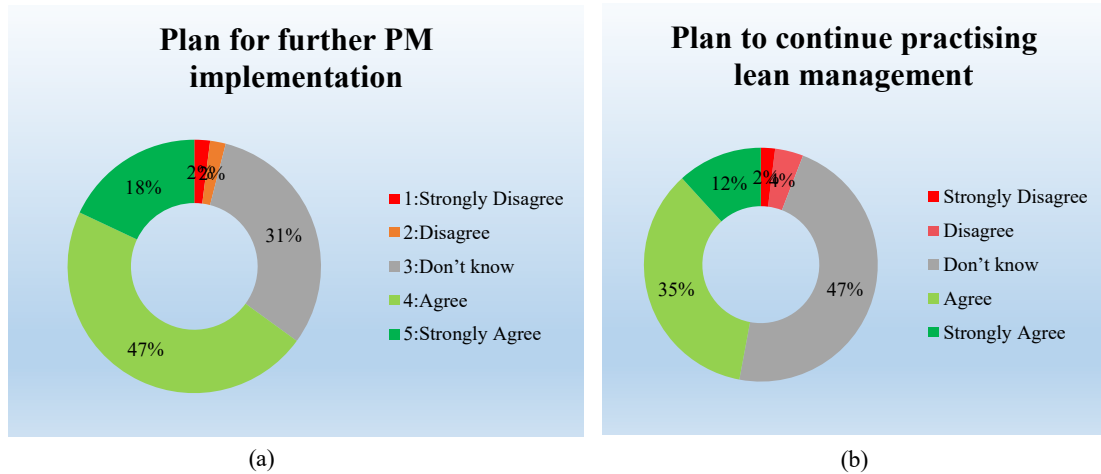


FIGURE 5.15: (a). Plan for further PM implementation
(b). Plan to continue practicing lean management

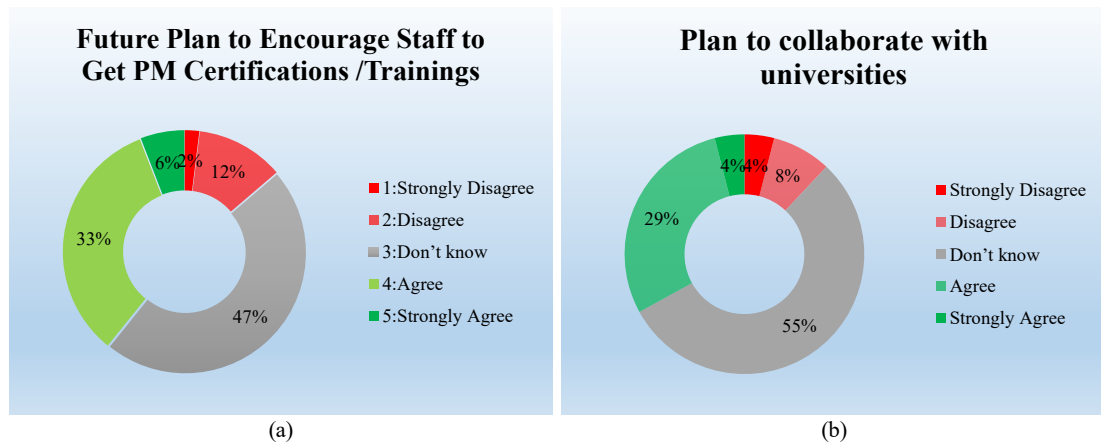


FIGURE 5.16: (a). Future plan to encourage staff to get PM certifications /trainings (b). Plan to collaborate with universities

Highlights

1. Feedback indicates that 65% of companies will continue to use Project management as an improvement and managerial tool in future. The trend is very encouraging because only about 30% have achieved advanced to complete implementation (reference section 1) of Project Management.
2. 31% of the respondents remain unsure about the future of Project Management for the obvious reasons because about 59% (reference section 1) of the companies are found to be at moderate and /or at very basic level of project management implementation.
3. Lean (Agile) project management is also seems to be making its way, as 47% respondents plan to continue with it however 41% are already using it along with traditional way of project management.
4. 41% of companies will encourage their staff to get training and obtain industry certifications however currently only 31% of companies have moderate to good number of trained staff.
5. 33% of companies plan to collaborate with universities for research and development however about 55% remains clueless.
6. 51% responding companies consider that sharing information and experience about PM implementation will add value to the supply chain itself.

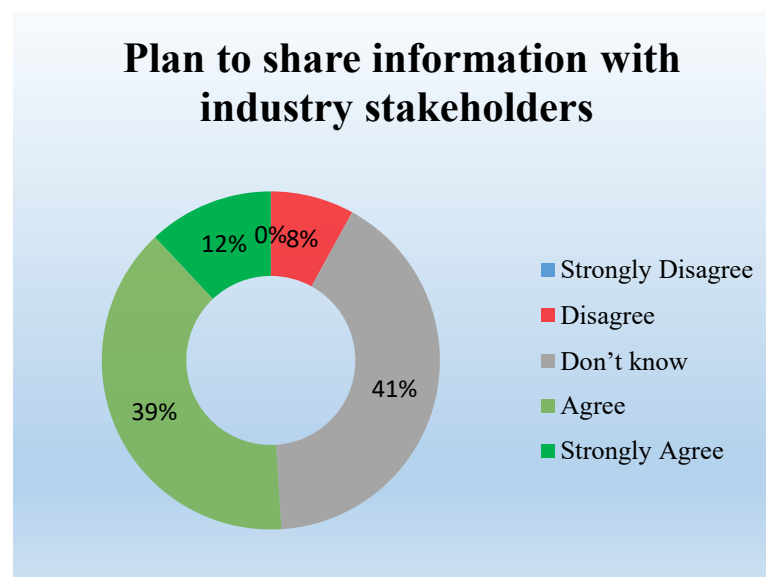


FIGURE 5.17: Plan to share information with industry stakeholders

Same trend is reflected in response to another question asked about starting collaboration with universities.

Good news is that more than 50% of the automotive sectors is willing to share their experience about the implementation of Project Management practices. Sharing knowledge and experience definitely will increase the pace of project Management implementation and will help to create new knowledge and culture.

5.5 Extended Discussion

Now in the light of above discussed analysis we try to answer some advanced yet fundamental questions.

Where we are?

The automotive giants like Toyota, Chrysler and Renault have an impressive history of implementing Project Management Principles in organization and the internal processes thus making PM a strategic tool. Their success has well established the relevance and importance of PM in achieving the strategic goals.

It can be reasonably deduced from the survey results that OEMs in automotive sector are following the same proven course of project management learning as most of the mature industries have historically followed. However their progress is too slow. Gartner Hype cycle may be used to track the progress of projectization in automotive sector.

It can be inferred from the survey that the average maturity position of PM implementation in auto sector is around peak of inflated expectations. There are few large and medium sized company clusters, leading the way on the slope of enlightenment, some are facing disillusionment but major cluster is in between technology trigger and peak of inflated expectations. However it is approaching fast to the peak of inflated expectations because a significant majority of 60 -67% respondents expect that implementation of PM practices can Improve their performance in terms of three vital indicators, Time, cost and quality.

PM implementation is strategical or tactical?

Currently the nature of PM implementation seems to be tactical. There exist

positions like Project Manager, Programme managers and Programme directors etc. but at the same time we do not see any policy to define the aim and strategy to get that aim. This can be inferred from a number of indicators in the survey, for example, more than 70% companies are without a dedicated PMO and 68% companies either keep no record or they have very small numbers of PM trained staff. That indicates the lack of professional direction and culture. On the same note, it is observed that many of the departments are not yet projectized and among them, ICT is the least projectized. As ICT plays most important role in implementation of Project Management, therefore lag of ICT is not a good sign.

It is evident from the survey results that 73% of companies are using ISO / TS 16949 methodology, being it a mandatory requirement of auto sector.

This mandatory requirement acts as a compelling force for the adoption of ISO/TS16949. ISO is mandatory; therefore if you want to sell a product you have to have it. This makes it a tactical move. Furthermore it is also deduced that about 95% of the respondents agree that Project Management practices help in implementing this methodology. These statistics suggest us a requirement of standard like ISO/TS16949 or a task force like IATF, that can compel the organizations to take Project Management seriously and can create appeal for the Project Management implementation.

We can infer from statistical data that PM in auto sector is yet in “Growth by direction” phase on Greiner’s Growth Model.

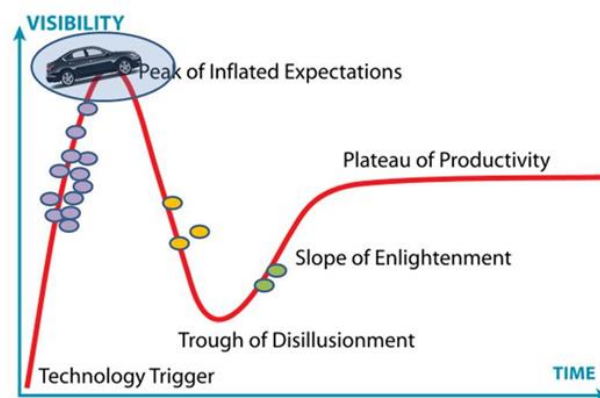


FIGURE 5.18: Project Management maturity in automotive sector on Gartner Hype cycle

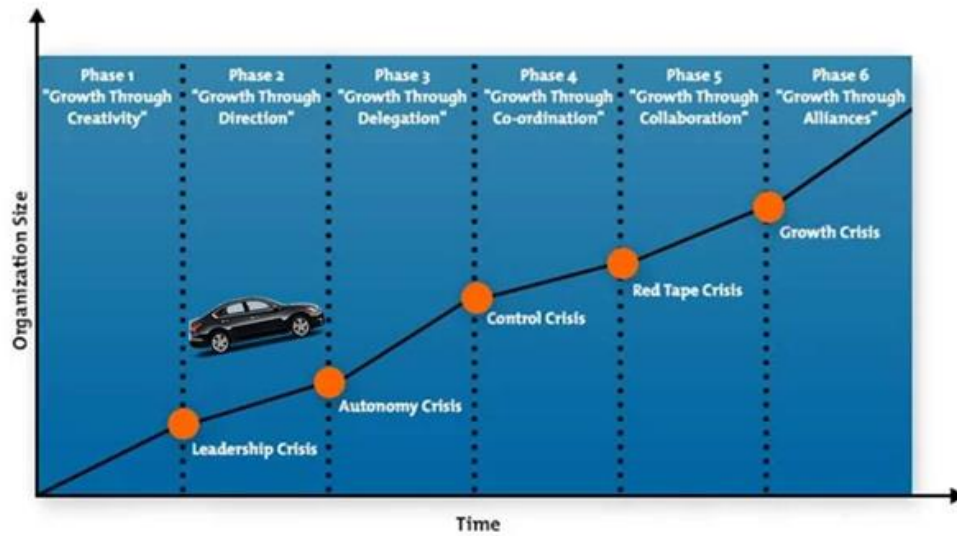


FIGURE 5.19: Project Management maturity status on Greiner's growth model

Have we surveyed expectations or measurements?

Well, we have investigated from the both angles. In questions like "To what extent Project Management practices are being implemented in your organization?" can be categorised as a question, finding perception however to measure the correctness, few more questions about department wise implementation have been asked.

Similarly, section 3 of the questionnaire also poses questions from two approaches, where a number of methodologies are mentioned and respondents have to share experience, in case they are using that methodology or their expectations otherwise (in case the said methodologies are not being used).

Is there a real culture of knowledge?

Unfortunately, OEMs automotive sector largely, is lacking the culture of knowledge. In section 2, it has been observed that most of the companies do not encourage their staff to get trainings or certifications. On the same note, in section 4, most of the companies are still not thinking to collaborate with universities for standardized knowledge of Project Management.

What can foster Project Management Implementation?

As we have discussed earlier that there is no compelling force that can pursue organizations to implement project Management practices, in contrast with ISO/TS16949 implementation where a strong market compelling force exists. One way to foster the PM implementation is make PM a part of ISO/TS16949

regulation under IATF (International Automotive Taskforce). Alternatively, another taskforce for PM implementation may be created that should coordinate between knowledge centres (like universities) and automotive industry.

We also observe the lack of trickledown effect from main manufacture companies (like Toyota, Chrysler, Renault who have mastered in PM implementations) to OEMs (small and medium size companies in our sample). Such main manufacturers may also convince and demand their subcontractors to apply PM practices in their processes. Such an action will serve as favourably effecting market force.

Chapter 6

Conclusions

The automotive giants like Toyota, Chrysler and Renault have an impressive history of implementing Project Management Principles in the internal organizational processes, organization and making PM a strategic tool for achieving efficiency and market leadership. However, no trickle down effect has been observed when it comes to OEMs (Original Equipment Manufacturer) of small and medium size.

By using survey research methodology it was tried to find the answers of following research questions.

Research Question 1: To what extent project Management methods and practices have been implemented in automotive industry?

Research Question 2: To what extent the policies and the actions of the Industry are aligned with the concept of Project Management as a strategic tool?

Research Question 3: To what extent the industry is satisfied with the results produced by using Project management in achieving its goals and objectives?

Research Question 4: To what extent Project Management remains a relevant tool in auto industry in future?

It was found that automotive sector is in the mid way in process to achieve complete projectization. While probing further it was found Quality department to be most projectized while ICT be least projectized in the sector. That is not encouraging because PM today, depends a great deal on ICT tools and techniques. The overall position of (OEM) automotive sector found to be around the “peak of inflated expectations” on the Gartner Hype Cycle.

While analysing the alignment of firms’ policies and actions with the PM as a strategic tool, it was noted that most of the sector is somehow lacking the

motivation. Dedicated PMOs are not present in most of the companies, therefore lacking control and coordination. Although there is an understanding about the usefulness of Project Management effectiveness but the sector lacks the culture and knowledge of Project management. In light of aforementioned points, PM found to be tactical rather than strategic. The sector, in regard to PM implementation, seems to be falling in phase 2 (Growth by Direction) on Greiner's Growth Model.

As far as the satisfaction of the automotive sector on the positive role of PM is concerned, there is a good news. Auto motive sector is overwhelmingly happy and satisfied with the results produced by PM in achieving key organizational and market goals. The car making companies believe that PM has helped them a great deal in implementing methodologies like, world class Manufacturing (WCM), collaborative scoreboard (CSB), platform Management, Simultaneous Engineering, TQM and ISO / TS 16949. Moreover, auto sector also trusts PM for improving the companies' reputation among customers and competitive advantage over competitors.

The data from the research indicates that Project Management will remain a relevant and valid tool for progress in future. The car making companies are determined to not only further strengthen the implementation of PM but also willing to share their experience with other stake holders. Sharing knowledge and experience definitely will increase the pace of project Management implementation and will help to create new knowledge and culture.

Appendix A

Survey Questionnaire

State of Project Management Practices in Automotive Industry

A survey Questionnaire

Respondent's Data

Name of the Organization/Company			
Is Automotive a relevant part of the business of your company.	Yes	No	
Please rate the size of your company in terms of number of Employees. Please consider your company as standalone and not the part of a bigger group, if in case.	Small	Medium	Large
	Less than 200 employees	Between 200 to 500 Employees	More than 500 employees
Designation of the respondent			
Date			

Section: 1 Current state of Project Management

Please refer the following response table to answer the questions 1 & 2.

1	Not at all.
2	At very basic level
3	At Moderate Level
4	Moderate to advance level
5	Complete implementation

1	To what extent Project Management practices are being implemented in your organization?	1	2	3	4	5
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If your answer is 2,3,4, or 5, please answer question 2.

2	To what extent the functional /Departmental activities have already been transferred at the Project teams or platform level?					
	ICT management tasks	1	2	3	4	5
	Logistics tasks	1	2	3	4	5
	Purchasing Procedures	1	2	3	4	5
	HR management tasks	1	2	3	4	5
	Process Management tasks	1	2	3	4	5
	Sales Functions	1	2	3	4	5
	Quality tasks	1	2	3	4	5
	Engineering & Design functions	1	2	3	4	5
	Research & Development functions	1	2	3	4	5

Section: 2 Strategic Alignments

Definition of PMO: A project management office, abbreviated as PMO, is a group or department within a business, agency or enterprise that defines and maintains standards for management within the organization. The PMO is the source of documentation, guidance and metrics on the practice of project management and execution.

3	Do you have a dedicated PMO in your Organization?	Yes	NO
	If yes, does the Head of the PMO directly reports to the top management level?	Yes	NO
	Please rate the size of the PMO in your organization.	1	Very Small
		2	Small
		3	Medium
		4	Large
		5	Very Large
	If No, which of the following departments are taking care about aligning procedures and improving organization?		
	CEO Office	Yes	No
	Quality department	Yes	No
	HR department	Yes	No

4	Which organization certifies the project managers in your company?	IPMA	PMI	Others	None
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5	Please rate the number of Project Management trained staff in your organization.	1	No Record available
		2	Very Few staff
		3	Moderate number
		4	Good number
		5	Fairly Good number

6	Are you using Lean Project Management techniques in managing some of your projects?	Yes	NO
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Section:3 Effectiveness of Implementation of Project Management Practices (Firm's Experience)

Please refer the following response table to answer the questions 7 to 10.

1	Strongly Disagree
2	Disagree
3	Don't know
4	Agree
5	Strongly Agree

7	Which of the following management techniques are being used in your organization and how Project Management helps its implementation?					
	Collaborative Project scoreboard (CPS)	Yes		No		
	Does PM help in implementation of CPS Methodology?	1	2	3	4	5
	World Class Manufacturing (WCM)	Yes		No		
	Does PM help in implementation of WCM Methodology?	1	2	3	4	5
	Platform Management	Yes		No		
	Does PM help in implementation of Platform Methodology?	1	2	3	4	5
	Simultaneous Engineering (SE)	Yes		No		
	Does PM help in implementation of SE Methodology?	1	2	3	4	5
	ISO/TS16949	Yes		No		
	Does PM help in implementation of ISO/TS16949 Standards?	1	2	3	4	5
	Total Quality Management	Yes		No		
	Does PM help in implementation of TQM Methodology?	1	2	3	4	5

8	Has Implementation of Project Management practices improved your "Time to market" performance?	1	2	3	4	5
	Budgeting Performance / Cost Deployment	1	2	3	4	5
	Quality of the Product	1	2	3	4	5
	utilization of human and material resources	1	2	3	4	5
9	Has Implementation of Project Management practices improved your firm's reputation among your customers and suppliers?	1	2	3	4	5
10	Has Implementation of Project Management practices helped your company in attaining competitive edge over your competitors?	1	2	3	4	5

Section: 4 Future Plans

Please refer the following table to answer the questions 11 to 15..

1	Strongly Disagree
2	Disagree
3	Don't know
4	Agree
5	Strongly Agree

11	Will you further strengthen the implementation of Project Management practices in your organization?	1	2	3	4	5
12	Will you continue practicing Lean project management techniques?	1	2	3	4	5
13	Will you encourage your staff to obtain Project Management certifications to be able to apply industry standards of Project Management?	1	2	3	4	5
14	Will you look forward to collaborate with any university for in depth research and development regarding Project Management?	1	2	3	4	5
15	Do you think that sharing information and experience along the supply chain would increase the value of the supply chain itself?	1	2	3	4	5

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