



# Product Lifecycle Management Importance and Approach

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## ABSTRACT

This paper aims to throw light on the significance and different approaches of Product Lifecycle Management (PLM) in typical engineering environments. Product Lifecycle Management has proven to be a value based added service in engineering departments of different industries like Aerospace, Automotive, Life sciences, and Retail etc. The Different OEMs have different approaches towards utilizing PLM based services in order to increase their productivity; this paper aims at expanding at those different industry specific approaches and their benefits in terms of increase in productivity.

## General Terms

Product Lifecycle Management

## Keywords

PLM, OEMs, PLM Approaches, Fundamentals of PLM, PLM Execution, Advantages of PLM, Optimization, Configuration Management (CM).

## 1. INTRODUCTION

Product Lifecycle Management is managing the different phases of the Product as it passes through its lifecycle stages of conception, initiation, evolution, execution, maturity and end. Product Lifecycle Management is an engineering management principle which when applied to any product from start to finish produces tangibly better results in production efficiency and quality[5][6]. PLM Tools & Processes when applied to different products from a range of industries like aerospace and automotive results in a better managed and quality product with lesser errors.

Different industries use different approaches of PLM. Different approaches of PLM involve different PLM philosophies and usage of different PM tools like ENOVIAV5, ENOVIA LCA (Lifecycle Application), ENOVIA VPM Navigator popularly known as VPM Navi etc. These are tools designed for the purpose of delivering PLM approaches designed by Dassault Systems. Some companies also use Teamcenter, Unigraphics etc. designed by Siemens Software Company [5][6].

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## 2. PLM and OEMs

In this age of ever-changing technology Original Equipment Manufacturers or OEMs have become more of Assemblers from different Tier 1 and Tier 2 Suppliers. For Instance in the Aerospace Industry a pioneer OEM like Boeing, Assembles a

lot of components and products that are engineered and designed in different locations of the world like, India, China etc. Europe etc. Typically Boeing Assembles at the FAL – Final Assembly Line, the different components and sections of the plane. OEMs are increasingly being seen as Assemblers in today’s age and technology. Figure.1 also illustrates the same ideology that the OEMs are increasingly becoming Prime Integrators in the past 20 years of evolution of technology and processes.

OEMs in the automotive space also are increasingly fitting in the same scenario of being more of assemblers and integrators. Thus the approach of PLM to their design and form, fit or function has become very important.

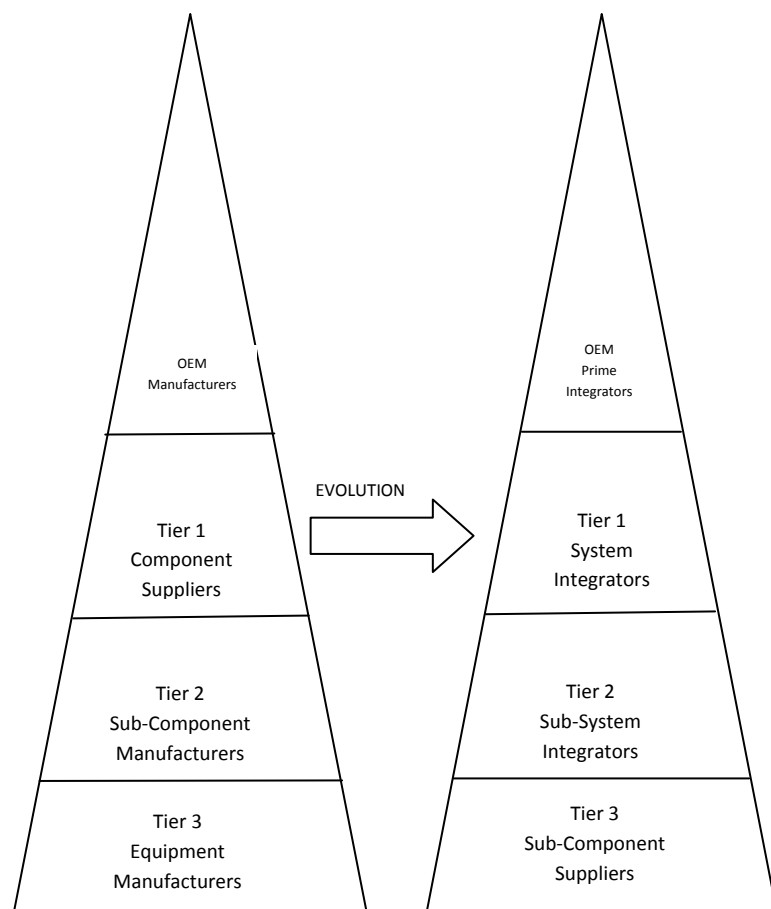


Figure.1 Evolution of OEMs from Original Equipment Manufacturers Function to Prime Integrators.



### 3. Benefits of PLM

#### 3.1 PLM and Quality

Application of PLM Tools and Processes to different products in development helps improve the end product quality and overall quality of the development processes as well. Once the quality is improved and there is reduction in the errors in Engineering and Design, PLM promises a huge potential in large-scale utility and longevity [5][6].

#### 3.2 PLM and Cost Saving(s)

An experimental Approach to analyze the benefits of PLM was investigated and it was found that the level of existing processes within Engineering, Quality, Training, Research and Development was leveraged to a much higher level on a Before-After scenario of application of PLM Tools and Processes. This significant improvement directly translates as cost saving. PLM helps in bridging the gap between OEM's and Tier 1's and Tier 2's. Usually OEM's hand over the contract of a component/ service to a TIER1 without providing additional support on how to fulfill their requirements on resources. Product Lifecycle Management aids the Product development of this Component or Service at the Tier1/2 level. A Gap Analysis of the as-is situation and the optimum performance targets conducted also proves that PLM Processes reduces this Gap largely [5][6].

#### 3.3 PLM and Training in R&D

Application of PLM techniques can enhance performance targets of an organization by strengthening the efficiency of in-house tools and processes. PLM professionals can serve the Training Sector demands of the changing business requirements of giant OEM's [7]. Constantly Updating the to the trends of evolving PLM for example migration to ENOVIA V6 from ENOVIA V5, is a huge upgrade and extension of the existing functionality of the available PLM technology. A sound training and Research and Development department of an organization can be proactive in adopting these new trends in PLM Technology and taking advantage of these advancements for their benefit. Burden of Applying new and latest PLM tools and technologies rests on the Training department on recommendation of the R&D department(s).

#### 3.4 PLM and Configuration Management

Configuration Management or CM is nothing but an extension of PLM Tools and Processes to achieve configuration control of the product during its development phases. CM of the product be it aerospace, automotive retail, life sciences helps in catching the errors in design or engineering phases of the product before its inception itself [2][3]. This added icing on the cake aids OEMs to reduce the design errors at a much earlier stage even before the product goes into manufacturing. Several OEMs like Boeing have a very sophisticated CM methodology and several others are still in the process of developing one. CMMI and many such institutions aid in professing the CM Approach of PLM in their product development process.

### 4. Different Approaches of PLM

There are different Approaches of PLM based on different types of organizations. Aerospace OEMs and Tier 1 and Tier 2 Suppliers usually use PLM with the Engineering and Design phase of the Product to enhance the Product Development process and minimize the errors. Dassault Systems Suite of Tools makes a complete 360 Degree of Available PLM Tools and Processes for the Engineering Product Development,

Design and Manufacturing Phases of the Product Lifecycle. Aerospace Industry uses several Design Tools like CATIA Unigraphics, Solidworks, which are Interoperable with the PLM Tools.

Manufacturing PLM Tools like DELMIA are used for the Management of the Manufacturing Processes applicable on the Designed Product on the Shopfloor. PLM systems are also interoperable with the Manufacturing side of the Lifecycle Development [4].

This PLM approach that spans through the different departments and phases of the Product during its Lifecycle is called the Cross Functional Approach of the PLM Systems. This is illustrated in Figure.2 and is also common for most Aerospace and Automotive OEMs.

#### 4.1 Engineering PLM Approach

When PLM Approach is applied only during the Engineering or Design Phase of the Product Development, It is defined as the Engineering PLM Approach. In many industries the Infrastructure and Resources to get 360 Degree PLM solutions is lacking and therefore it is most feasible to apply the PLM solutions in the Engineering or the Design phase where there is a chance of creeping in of maximum errors that affect the overall quality of the product and take a huge toll on production costs in the long run. Therefore it is imperative to apply PLM atleast during the Engineering Life Cycle [5][6].

#### 4.2 Manufacturing PLM Approach

Some organizations are heavily dependent upon their manufacturing processes. Manufacturing Departments form the life-line of the Business and existence. Such systems cannot and should not function without Effective PLM solutions during their manufacturing cycle. Due to the nature of the business such Organizations like those which manufacture say wiring of the aircrafts, vehicles etc. which involve a lot of tooling and machining processes need efficient PLM manufacturing systems. This is the Manufacturing PLM Approach [3][4].

#### 4.3 PLM with PMs

PLM 2.0 or second generation PLM solutions also include a very special tool and technology place for Project Managers. PMs often use the inbuilt functionality of the Project Management side of the PLM tools like ENOVIA Matrixone and ENOVIA V6 by Dassault Systems for reporting Project Status to management meetings. Project Stakeholders identify with the reporting capabilities of such tools to report Project status, gauge the project progress and also estimate costs and any business overheads. This is PLM Approach with PMs to leverage the Project Management Side of the PLM.

#### 4.4 PLM with Retail, Life Sciences and Bio Technology

PLM Approaches is not restricted to Engineering and Manufacturing Organizations but is also finding its place with more Industry bases that were initially not even considered as projected market for the PLM. Retail Industry and Apparel Industry utilizes PLM to manage the entire catalog of Apparels across different departments and clothing line [1][2].

Life sciences and Biotechnology oriented firms also use different PLM tools in today's world to manage the lifecycle of different Bio Product's. Ultimately Product Quality and Interaction with Different Phases of the Product are the



commonalties these earlier-thought-obsolete Industries are using PLM for these days [1].

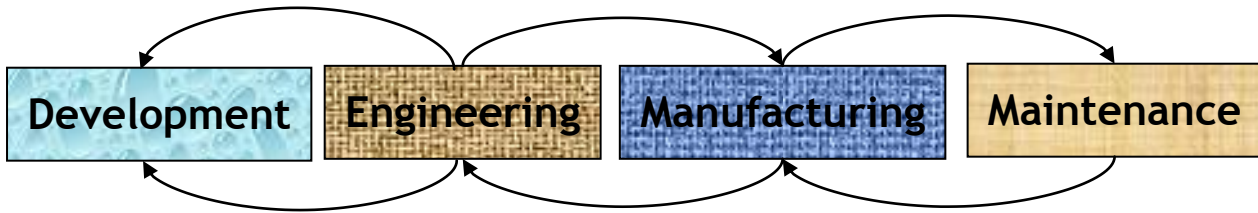


Figure 2. Cross-Functional PLM Approach

## 5. CONCLUSION

This Paper draws a conclusion on the different benefits of utilizing PLM at different phases of the Lifecycle of the Product [6]. This paper also highlights the different approaches of the PLM based on different goals and objectives of organizations [6]. PLM continues to be the most effective way of product data management and evolution through the different lifecycle phases of the product [5]. This paper also highlights the different approaches of the PLM based on different goals and objectives of different organizations. PLM continues to be the most effective way of product data management and evolution through the different lifecycle phases of the product [7].

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## 7. REFERENCES

- [1] [http://en.wikipedia.org/wiki/Product\\_lifecycle\\_management](http://en.wikipedia.org/wiki/Product_lifecycle_management).
- [2] Gunther Schuh , Henrique Rozenfeld , Dirk Assmus, Eduardo Zancul, by Process oriented framework to support PLM implementation, Science Direct, Computers in Industry 59 (2008) 210–218, Available online 21, August 2007
- [3] Farhad Ameri<sup>1</sup> and Deba Dutta<sup>2</sup> (2005), “Product Lifecycle Management: Closing the Knowledge Loops” The University of Michigan, Ann Arbor, Computer Aided Design & Applications, Vol. 2, No. 5, pp. 577-590
- [4] John Stark “Product Lifecycle Management” 21st Century Paradigm for Product Realization Second Edition, springer
- [5] Xu, X. William, Liu, Tony (2003), "A Web-Enabled PDM System in a Collaborative Design Environment", Robotics and Computer-Integrated Manufacturing, vol. 19, pp.315-328
- [6] Understanding Product Lifecycle Management, Datamation Limited, 2002
- [7] Grieves, Michael, Product Lifecycle Management, (2006), McGraw Hill.