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"IMPROVE THE BUSINESS PERFORMANCE BY USING PRODUCT LIFE-CYCLE MANAGEMENT: A REVIEW"

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ABSTRACT

The goals of product life cycle management (PLM) are to reduce time to market, improve product quality, reduce prototyping costs, identify potential sales opportunities and revenue contributions, and reduce environmental impacts at end-of-life. At present, a wide range of stakeholders including consumers, regulators, shareholders and public bodies are demanding that companies address product management through all life cycle in a more comprehensive and sustainable way. However, even if a company actually wishes innovate its processes for improving the way to account for project management, it will face relevant difficulties to deal with different guidelines, tools and methods currently addressing the matter from various points of view. The purpose of this paper is to review literature on PLM from an operational point of view with the objective to help companies to answer to the main market needs.

KEYWORDS : *Product life cycle, Business , Management,Improve product quality.*

I. INTRODUCTION

Product Life Cycle Management addresses the full life cycles of products, from conception until disposal. The creation of the product determines largely what can be done with the product in the later life cycle phases. From business perspective the installed base, all systems that are operational in the field, is an asset that provides many opportunities. PLM is a strategic business approach that applies a consistent set of business solutions in support of the collaborative creation, management, dissemination and use of product definition information across the extended enterprise from concept to end of life – integrating people, processes, business systems and information. PLM is an integrated, information-driven strategy that speeds the innovation and launch of successful products, built on a common platform that serves as a single repository of all product-related knowledge, data, and processes. PLM is the process of managing the whole life cycle of a product starting from generating an idea, concept description, business analyzes, product design and solution architecture, technical implementation and product testing, to the successful entrance to the market, service, maintenance and product improvement. PLM gathered and make accessible data and information of all stages of this process.

PLM is an activity that can transform a business. PLM is not an engineering-only initiative, it is about transparency and management across the whole value-chain. Product Lifecycle Management (PLM) integrates people, data, processes and business systems. It provides product information for companies and their extended supply chain enterprise. PLM solutions

help organizations overcome the increased complexity and engineering challenges of developing new products for the global competitive markets.

II. PLM APPROACH

The PLM concept gives the strategies to organize and to manage product information the entire life cycle, from concept to re-cycling of the product through:

- Share the updated product information's within the organization to design, manufacturing, marketing and procurement divisions,
- Collaborate internal team with external users, suppliers and customers for iterating new designs,
- Maintain a repository of product information for design reuse and to reduce part redundancy,
- Systematically gather and analyze customer or market product requirements,
- Streamline sourcing team to identify a list of preferred suppliers for purchasing custom and standard parts,
- Streamline resource management and analyze the cost-benefits of allocating resources for specific projects.

In such an environment, it's easy for companies that develop, produce and support products to lose control over a product. But, if a company loses control, the consequences can be serious. If it loses control during product development, the product may be late to market and exceed the targeted cost. The results of losing control during use of the product may be frustration and a lack of satisfaction for the customer, or much worse, injury and death. For the company, the results may be damage to the company's image and loss of customers concerned about product problems. They could also include loss of revenues to companies that bring products to market faster, and reduced profit due to costs of recalls and legal liabilities resulting from product use.

Within PLM there are five primary areas;

1. Systems engineering (SE) is focused on meeting all requirements, primarily meeting customer needs, and coordinating the systems design process by involving all relevant disciplines. An important aspect for life cycle management is a subset within Systems Engineering called Reliability Engineering.

2. Product and portfolio m² (PPM) is focused on managing resource allocation, tracking progress, plan for new product development projects that are in process (or in a holding status). Portfolio management is a tool that assists management in tracking progress on new products and making trade-off decisions when allocating scarce resources.

3. Product design (CAx) is the process of creating a new product to be sold by a business to its customers.

4. Manufacturing process management (MPM) is a collection of technologies and methods used to define how products are to be manufactured.

5. Product data management (PDM)is focused on capturing and maintaining information on products and/or services through their development and useful life. Change management is an important part of PDM/PLM.

Product Lifecycle Management (PLM) is generally defined as a strategic business approach for the effective management and use of corporate intellectual capital. Today, challenges faced by product development teams include globalisation, outsourcing, mass customisation, fast innovation and product traceability. These challenges enhance the need for collaborating environments and knowledge management along the product lifecycle stages. PLM systems are gaining acceptance for managing all information about the corporation's products throughout their full lifecycle, from conceptualisation to operations and disposal. The PLM philosophy and systems aim at providing support to an even broader range of engineering and business activities (Pol et al., 2008; Stark, 2004).

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technical implementation and product testing, to the successful entrance to the market, service, maintenance and product improvement. PLM gathered and make accessible data and information of all stages of this process.

As a business strategy (Pol et al., 2008; Saaksvuori & Immonen, 2008; Grieves, 2009; Bernard & Tichkiewitch, 2008), PLM lets distributed organizations innovate, produce, develop, support, and retire products, as they were if they were a single entity. It captures best practices and lessons learned, creating a storehouse of valuable intellectual capital for systematic and repeatable re-use. As an information technology strategy, PLM establishes a coherent data structure that enables real-time collaboration and data sharing among geographically distributed teams. PLM lets companies consolidate multiple application systems while leveraging existing legacy investments during their useful lives. Through adherence to industry standards, PLM minimizes data translation issues while providing users with information access and process visibility at every stage of the product's life.
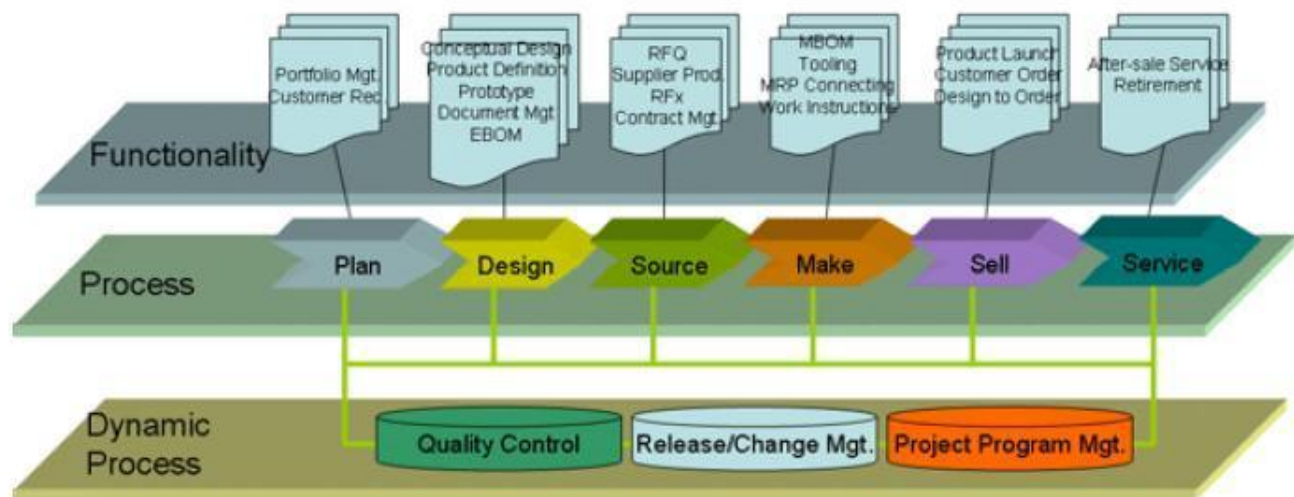

Fig. 1. "Structure of PLM System". Source: Siemens PLM, 2009.

III. PLM PARADIGM

The PLM Paradigm emerged, as a way to avoid such problems, in the early 21st Century. It was driven by changes in the business environment that required better management of products. Improvements in technology made its emergence possible. The PLM Paradigm sees PLM as one major business activity with business objectives. It differs in many ways from the previous paradigm. PLM is "joined-up". With PLM, the organisation manages the product in a coherent joined-up way across the lifecycle. PLM brings together what was previously separate, for example, product development and product support . PLM joins up many previously separate and independent processes, disciplines, functions and applications, each of which, though addressing the same product, had its own vocabulary, rules, culture and language. Use of the term PLM implies that the activity of managing products across the lifecycle is clearly-defined, well-documented, proactive, and carried out according to a particular design. It's carried out to meet specific objectives of increasing product revenues, reducing product-related costs, maximising the value of the product portfolio, and maximising the value of current and future products for both customers and shareholders.

IV. PLM GRID

The PLM Grid helps show why the environment of the product can be so difficult to manage. The scope of the environment is broad. Many subjects are addressed, ranging from methods for identifying ideas for new products, through organisational structure, to end-of-life recycling equipment. The scope is wide, but that reflects the reality of managing products. The PLM Grid is useful in many PLM activities. The most basic of these is communication of the scope of PLM. The Grid can also be used in many other circumstances such as for: increasing PLM awareness; discussing with PLM project team members;

communicating with business executives; documenting the current situation of PLM; defining the PLM Vision, Strategy and Plan; and discussing with vendors of PLM products and services.

V. APPLICATION OF PLM

In the current economic climate, addressing global business challenges is the top priority of most medium and large enterprises. Whether they want to expand their customer base in new markets, or to leverage more cost competitive resources, conducting their business globally is a necessity (Pol et al., 2008). To sustain an advantage, they have to overcome the challenges of a dispersed organization, while still empowering individual team members to excel. PLM concept offers comprehensive solutions to help enterprises address their challenges and create competitive advantage. Five areas where medium and large enterprise should have achieved success include:

- Managing new product introduction, to create a winning product portfolio.
- Achieving concurrent engineering globally, to be faster to market.
- Creating platforms for reuse, to reduce cost and speed product customization.
- Managing product and manufacturing complexity.
- Supporting products currently in-service, to ensure they are available for use at minimum cost.

V. CONCLUSION

Although a quite new method with short history PLM has proven itself to be useful for all management levels within the company in both vertical and horizontal organization. By making relevant historical information structured and available PLM is used both for those who are doing execution and decision makers within the organization answering to the rapid changes in the business environment. A business approach for coordinating design process through the implementation of PLM systems is proposed for improving design coordination in SMEs. Firstly, this business approach is based on a method for analysing informal collaborative practices and modelling detailed design processes. Secondly, these processes are implemented by using PLM technologies. Multi-level workflows are implemented to control progress of design schedule from project management level to document lifecycle management level.

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