

Product Lifecycle Management

Lesson 1: Introduction

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Outline

- Defining PLM
- The lifecycle of a product
- The need of PLM
- PLM core
- Business benefits of PLM

Objectives

Students will be able to

- Describe the major lifecycle activities of a given product
- Recognize the value of PLM
- Pinpoint the impacts of PLM

What is PLM?

- A [buzzword](#) or the future?
 - Tracking of a product's lifecycle: [Ford's example](#)
- Product Lifecycle Management
 - Product
 - What is a product? Is mobile service a product?
 - Lifecycle
 - A series of stages of a life? Will the whole thing go over again and again?
 - Management
 - What do we need to manage? Data, information, or knowledge?

Defining PLM

- CIMData
 - A strategic business approach that applies a consistent set of business solutions that support the collaborative creation, management, dissemination, and use of product definition information
 - Supporting the extended enterprise (customers, design and supply partners, etc.)
 - Spanning from concept to end of life of a product or plant
 - Integrating people, processes, business systems, and information

Defining PLM

- John Stark's collection of PLM definition
 - "PLM : A set of technologies and processes ..."
 - "PLM is an extended enterprise solution ..."
 - "... PLM is a business initiative, rather than an application or even a set of applications."
 - "PLM, ... It's a business approach, a strategy to solve the problem of managing the complete information set that defines a product"
 - "PLM : A business strategy that helps companies share product data, apply common processes, and leverage corporate knowledge... "

IT driven PLM definition

- PCMag.com
 - (**P**roduct **L**ifecycle **M**anagement) A comprehensive information system that coordinates all aspects of a product from initial concept to its eventual retirement. Sometimes called the "digital backbone" of a product, it includes the requirements phase, analysis and design stages, manufacturing, product launch, distribution, quality assurance, in-service maintenance and spare parts provisions.
- Cambashi.com
 - Product Lifecycle Management (PLM) systems support the management of a portfolio of products, processes and services from initial concept, through design, launch, production and use to final disposal. They co-ordinate products, project and process information throughout new product introduction, production, service and retirement among the various players, internal and external to the OEM, who must collaborate to bring the concept to fruition.

What is and what is not

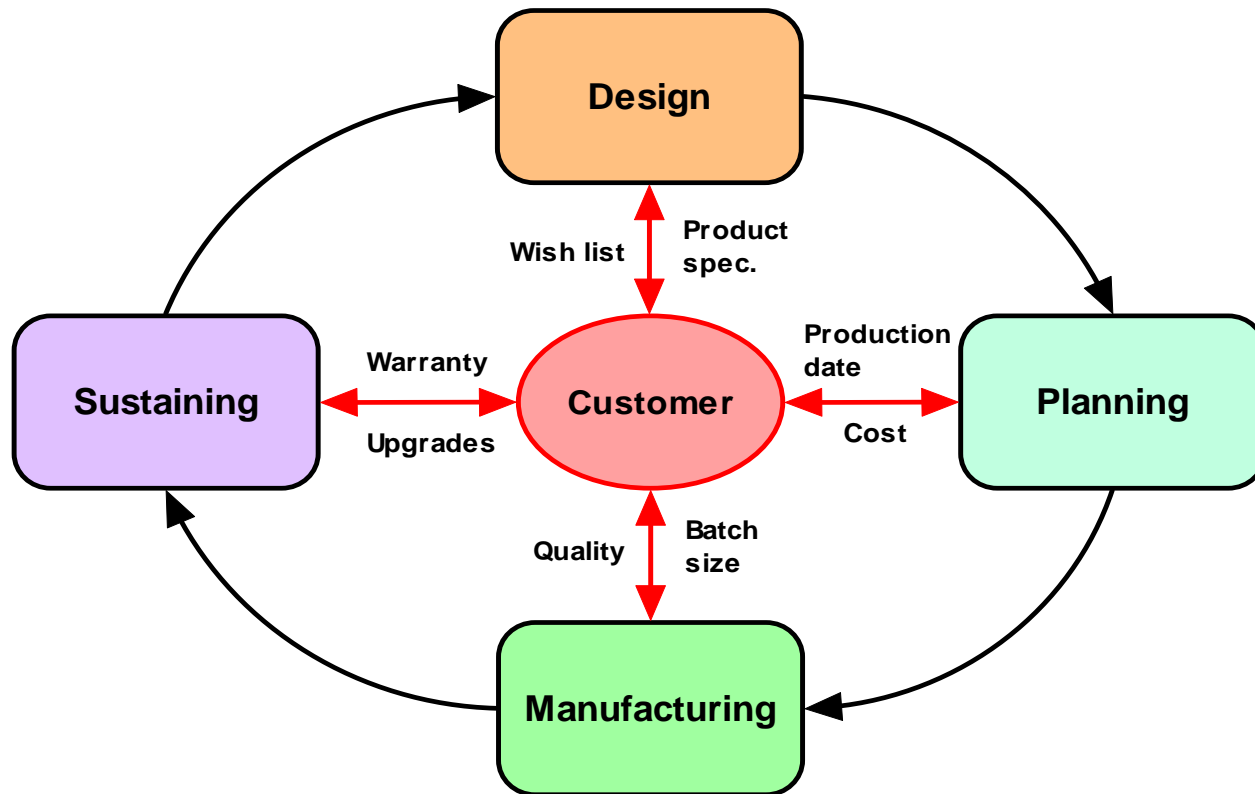
- What PLM is
 - A vision or a strategy
 - A different way to think and to do business
 - ...
- What PLM is not
 - A series of computer products (islands of automation)
 - A plug-n-play service
 - The ability to add a new component to a system and have it work *automatically* **without** having to do any technical analysis or manual configuration
 - ...

PLM and value chain

- Industry trends
 - A networked economy
 - A customer centered business model
- Value chain vs. supply chain
 - Supply chain: from OEM's viewpoint
 - Value chain: from customer's viewpoint
- Position your business in the value chain (from BBT article)
 - Increasing competition and an increasing focus on innovation as an element of strategy
 - Evolving governance models for the extended enterprise
 - The trend towards globalization of supply and production
 - Benefits already wrung out of manufacturing and the supply chain
 - Trends in Management Discourse

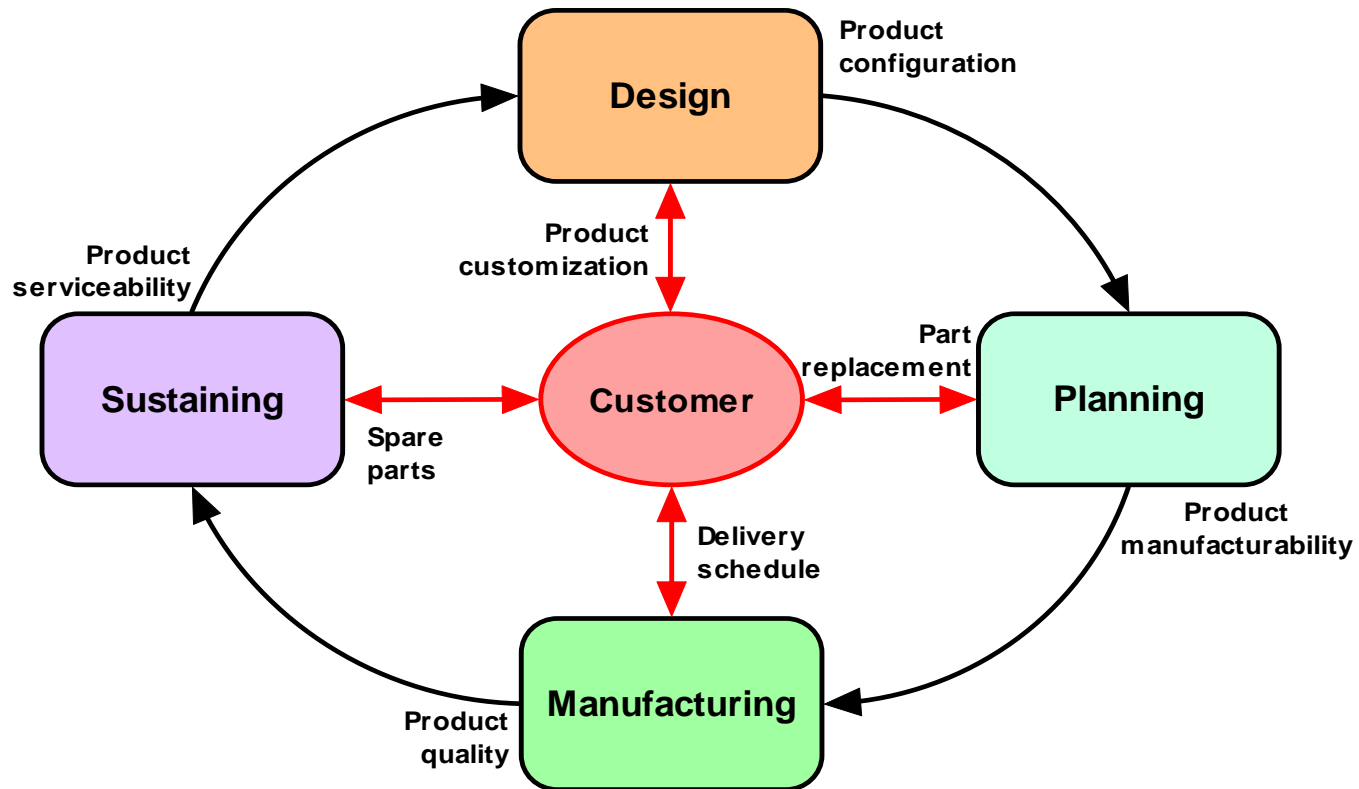
The lifecycle of a product

- From a customer's viewpoint



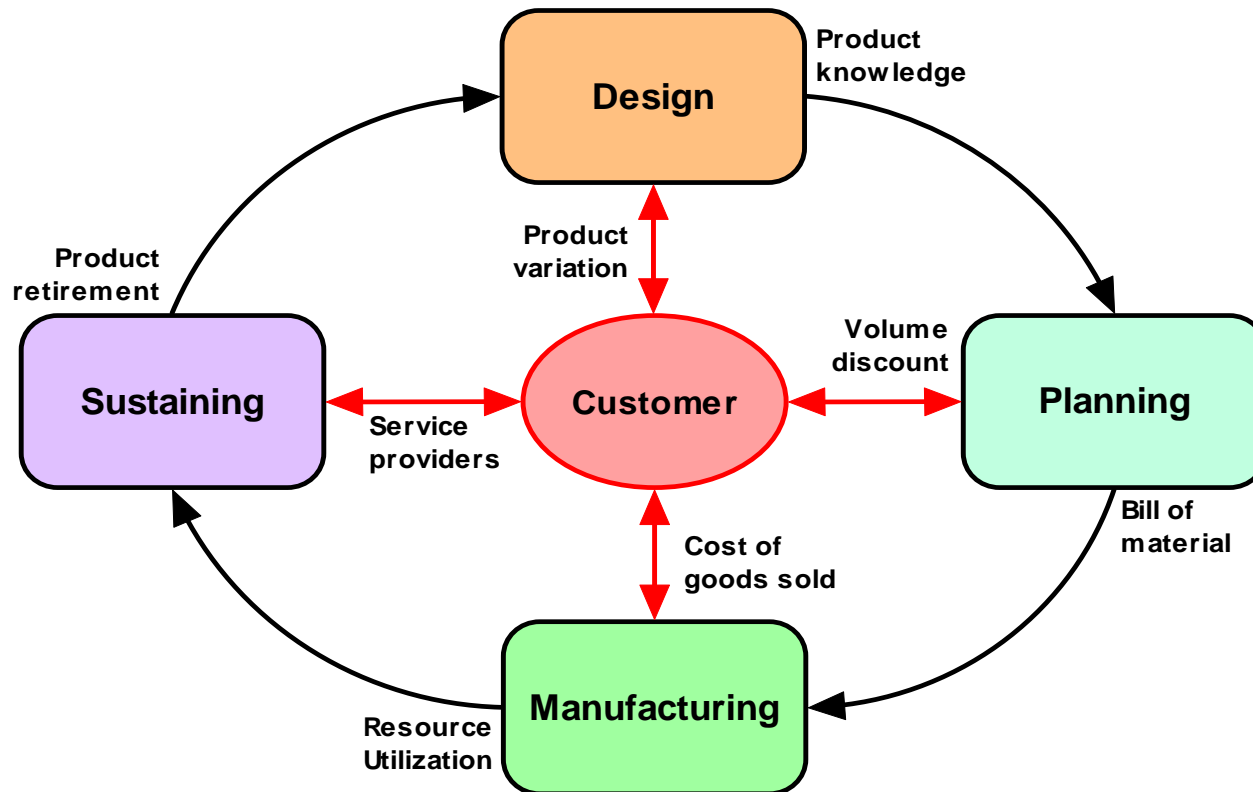
The lifecycle of a product

- From an engineer's viewpoint



The lifecycle of a product

- From a business manager's viewpoint



The need of PLM

- Increasing product variety
 - [Mass customization](#)
 - [Make-to-order](#) rather than [Make-to-stock](#)
 - [MTS merge with MTO](#)
 - ...
- Shortening time to market
 - [Internet-driven economy and innovation](#)
 - Global competition
 - ...

A new perspective

- Causes of expanding product lifespan
 - Design
 - Variety in product features
 - Planning
 - Better forecast accuracy
 - Manufacturing
 - Improved product quality
 - Service
 - Post-sale service

Why PLM

From [Dr. DWG Knowledge Center](#)

- Organize and manage product information the entire life cycle, from concept to re-cycling of the product
- Share the updated product information's within the organization to design, manufacturing, marketing and procurement divisions
- Collaborate internal team with external users like OEM's, 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

PLM core

- Goal driven - CIMData.com
 - Universal, secure, managed access and use of product definition information
 - Maintaining the integrity of that product definition and related information throughout the life of the product or plant
 - Managing and maintaining business processes used to create, manage, disseminate, share and use the information.

PLM core

- Technology driven - PCMag.com
 - Requirements Management
 - Used throughout creation, manufacturing and distribution. Keeps track of total costs ("cost rollup") and manages constraints (if one part is changed, what are effects on others). Also provides collaboration and feedback.
 - Product Data Management
 - Manages data in all phases and interrelationships between all databases (see PDM).
 - Configuration Management
 - Provides sophisticated change control for as-designed, as-manufactured and as-serviced product structure databases. Shows interrelationships between data; for example, if a part has to be replaced in a product years later, it can locate original requirements.
 - Program and Project Management
 - Program management provides the overall schedule for building multiple products, while project management provides the individual timelines for each team building a part.
 - Authoring Tools
 - CAD (computer-aided design), CAM (computer-aided manufacturing), CAE (computer-aided engineering) and process planning applications.

Key benefit 1

- Reducing the total cost
 - Total cost vs. cost of goods sold (COGS)
 - COGS: Determined by inventory and sale
 - Total cost (TCO): Costs in addition to COGS, including training, maintenance, etc..
- Example
 - IBM's model for SAP

Key benefit 2

- Quicker response toward the market
 - Collecting and predicting customer preference
 - Dell's [direct buy model](#)
 - Better [integration](#) of information
- Enabling mechanism
 - Advanced computer-based analysis
 - Push strategy through information technology
 - Cross-border collaboration
 - Extended enterprise that operates 24-7

Key benefit 3

- Reuse of business intelligence
 - Automobile design philosophy: Innovation vs. reliability (Ikujiro & Takeuchi, 1995)
 - US: Innovation is the driver
 - Japan: More weights on reliability
 - Business knowledge for the long run
 - Capture
 - Reuse
 - Automate
 - Explore
 - Optimize
 - Validate

Review questions

- What is PLM?
- Why is PLM critical to the success of business?

Reference

- Grieves, M. (2005). *Product Lifecycle Management: Driving the Next Generation of Lean Thinking*. McGraw-Hill. Chapters 1-2.
- Ikujiro, N. & Takeuchi, H. (1995). *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. Oxford University Press.
- Stark, J. (2004). *Product Lifecycle Management: 21st century Paradigm for Product Realisation*. Springer. Chapters 1, 2, & 6.

Additional Reading

- [Business maps by SAP](#)
- [Oracle's viewpoint](#)

Additional Reading

- [Computing Your Cost of Goods Sold](#)
- [Leveraging Managed Services to Advance Your Business](#)
- [Refining and Extending the Business Model With Information Technology: Dell Computer Corporation](#)
- [Four Models of Design Definition: Sequential, Design Centered, Concurrent and Dynamic](#)
- [IBM Full Economy Model for SAP: reducing total cost of ownership](#)
- [Internet-Driven Innovation and Economic performance in the American Automobile Industry](#)
- [IT Showcase News – Autumn 2005](#)
- [The Case for make-to-order](#)
- [Manufacturing: Make to Stock Merges with Make to Order](#)
- [Towards theory building in manufacturing flexibility](#)

- Forecast Accuracy Improvements Refinement of Forecast Process Implementation and Integration
- Profitable Innovation
- Reinforcing a Customer-Centered Strategic Focus by Cascading a Balanced Scorecard

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