Case Study

PRODUCT LIFECYCLE MANAGEMENT SYSTEMS IN INDUSTRY 4.0 – A CASE OF DENMARK

Keywords: *Product Lifecycle Management, Production, Industry 4.0, Software, Sewage and sanitation equipment, vehicle production.*

Background to Case Study

In the last 30 years, Product Life-cycle Management (PLM) has been significantly transformed from a simple drawing management system into a cornerstone of enterprise IT. Before the rise of Industry 4.0., product management was a paper-based process. However, the huge amount of data produced with the rise of IT technologies and the emergence of CAD created the need of a new management system. Product Data Management, which is considered the ancestor of PLM was introduced in the 1980s. Although PDM was revolutionary for its time, it remained insufficient as it created an information silo, unavailable to be shared. These issues changed with the rapid development of Industry 4.0.

As the manufacturing process became much more complex, with the rise of Internet connected devices, leading companies started to adopt PLM methods and systems in order to ensure increased product lifecycle coverage and stronger integration of processes across the entire value-added chain. Nowadays, PLM is more efficient than ever, providing a centralized cloud-based system. (Spiegel, 2017)

Introduction to the Case Study and it's growth within Industry 4.0

Product lifecycle management is the process of monitoring and managing the entire life cycle of a product from its conception to service and disposal. All products and services have certain life cycles. In industry, product lifecycle management (PLM) includes people, data, processes, and business systems and provides a product information backbone for companies and their extended enterprise.

The life cycle of the product refers to the period from the beginning of life to the end of life and its split up into nine major steps (see graph below). Each of the steps is of crucial importance for the design and development of a product.

It should also be stated that the lifecycle of a product changes continuously. These changes require continuous adjustments in the new data.

In today's challenging global market, people are looking for a way to use computer technology in order to solve complex problems in industry. PLM seeks to address these issues by minimizing the waste of information, resources, and materials. The PLM system supports the product development process by integrating people, processes, data, tools, and business systems and providing information about companies and their expanding businesses. (NTT Data, 2015)

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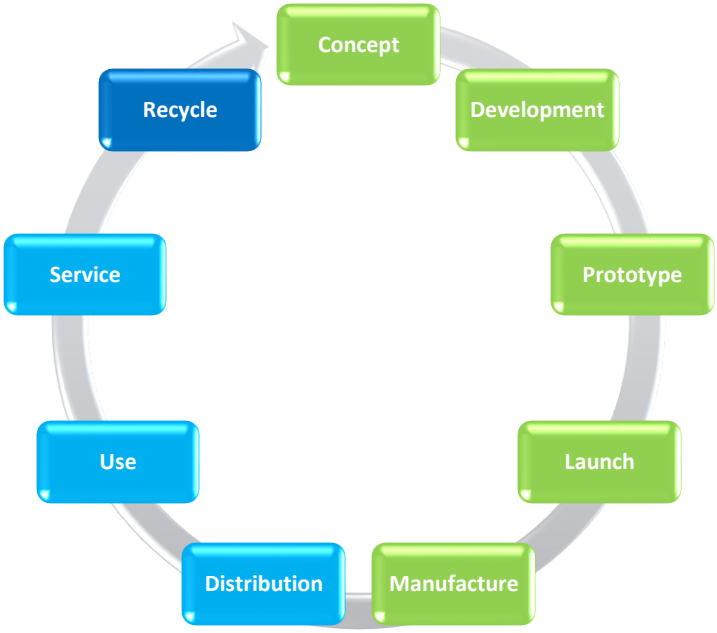
The Case Study and Industry 4.0 Elements: A Pictorial Overview

The following graph shows the Product Lifecycle Management process. PLM has three overarching stages: The Beginning of life which includes the initial conceptualization and development, the Middle of Life, which is the post-manufacturing phase, when your product is distributed, used, and serviced and the End of Life which starts when users no longer have a need for the product.



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The Element Explored within Industry 4.0 Application	*Hvidtved Larsen is an industrial company based in Silkeborg, Denmark and belongs to Bucher Municipal, a Swiss company. It operates as a vehicle and equipment manufacturer in the field of sewage cleaning and sanitation. The company has recently managed a shift from a traditional craftmanship one to a global-scale one, aiming to become an innovation leader in its sector. Through the years, the company faced several issues regarding time consumption and waste, risks of errors during the transfer of data between IT systems that could lead to production errors.* *Therefore, in accordance with the company's vision that required technology and IT systems integration into its production processes, Hvidtved Larsen proceeds with the acquisition and implementation of Bluestar PLM. This functions as a link, a common platform that provides a single point of connection for the company's IT systems for CRM, ERP, PLM, and CAD, so it is guaranteed that the company's technical departments can freely share drawings, data, and designs to facilitate the company's plans implementation.* *With the use of Bluestar PLM, Hvidtved Larsen is ready to deal with every possible change on design or any kind of adjustment, according to its customers' preferences from the order to the end of the production process. Moreover, the company can collect data along the way.* *As Jørgen Schioenning Larsen, the CEO of PDM technology states, "Hvidtved Larsen's migration to Industry 4.0 started with implementation of Bluestar PLM, which connects the sales system, engineers and production with one another in one single solution – an essential part of Industry 4.0. It is likely that their next step will be to get sensors in the vehicles, so Hvidtved Larsen can monitor them and, from there, make effective plans for vehicle maintenance and repairs. It's all about giving Hvidtved Larsen competitive power" (Hvidtved Larsen Ready for Industry 4.0, 2018).*
Application Target Audience	*The results of the case-study are intended for use by SMEs, Enterprises and Entrepreneurs.*

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Resources Used:	*- "A Brief History of PLM", by R. Spiegel. (2017). Available here.* *-"PLM as Enabler for Industry 4.0", by NTT Data. (2015) Available here.* *- "Ultimate Product Life Cycle Management Guide", by Smartsheet. (2020). Available here* *- "Hvidtved Larsen Ready for Industry 4.0", by Bluestar PLM. (2018). Available here.*
Further Reading:	*- "Product Life Cycle Management in Industry 4.0", by S. Salimbeni. (2020). Available here.*

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