Collaboration Platform and Product Life Cycle Management

Prepared by: Dr. Ram Kumar Kesharwani

Contents

What is Collaboration Platform?

- Category of business software which combines organizational networking capacities to operations.
- It includes knowledge management into business operation to encourage renovation.
- Collaboration platform helps employees to share information and solve business problems.

[Source: Techtarget.com: Collaboration-platform]

What is Collaboration Platform? (Contd.)

- There are some perspectives to build collaboration platforms.
  - A social layer is combined with provision of business utilizations.
  - New products are implemented with collaboration tools.
- There are some common attributes in business collaboration platforms.
  - Easily accessible and easy to use.
  - They require some familiar functions which help them collaboration.
- Example: **ProWork Flow**
  - Web-based project management designed for managers
  - Collaborate to improve project delivery

[Source: Techtarget.com: Collaboration-platform]

Collaboration Productivity in Industry 4.0

- Collaboration Productivity
  - There are four key parts, which enable collaboration productivity:
    - IT Proliferation
    - Single Source of Truth
    - Industrialization
    - Coordination

[Source: Collaboration Mechanisms to Increase Productivity in the Contexts of Industries 4.0]

Collaboration Productivity in Industry 4.0 (Contd.)

- IT Proliferation.
  - It shows the huge impact of computers on economic growth and their impact on increased capital stock's shares.
  - Industries are required to consider and promote global information technology and computing power.
  - Storage capacity and high speed computing are increasing day by day.

[Source: Collaboration Mechanisms to Increase Productivity in the Contexts of Industries 4.0]

Collaboration Productivity in Industry 4.0 (Contd.)

- Single Source of Truth (SSoT)
  - It is a kind of practices of formatting information models to store every data element exactly once.
  - SSoT must employ the right software for decision making.
  - SSoT is needed to be realized across the whole product lifecycle, so that even a single change in product associated information is visible.

[Source: Collaboration Mechanisms to Increase Productivity in the Contexts of Industries 4.0]

Collaboration Productivity in Industry 4.0 (Contd.)

- Industrialization
  - It is the bridge between the virtual world and the physical environment.
  - Physical environment is linked with the virtual world using CPS, which fix computers and sensors into an application platform.
  - It requires intuitive and self-effective elements.
  - For dynamic objectives in technology and industrial area, it adapts the system behavior like smart factories.

[Source: Collaboration Mechanisms to Increase Productivity in the Contexts of Industries 4.0]

Collaboration Productivity in Industry 4.0 (Contd.)

- Coordination
- Stronger coordination among multiple industry agents is required in Industry 4.0 for enabling collaboration productivity.
- It can be initiated in two steps:
  - First, establish a network which communicates with overall target.
  - Second, provide authority to decision-makers in decentralized system.
- This network is maintained by encouraging the exchange of the employees or by using smart devices.

[Source: Collaboration Mechanisms to Increase Productivity in the Contexts of Industries 4.0]

Product Lifecycle Management (PLM)

- It is a type of business activity to manage the lifecycle of a product.
- PLM works as a management system for a company's products.
- PLM handles a prodct completely, from single part of the product to entire portfolio of that product.
- **Example**: Computational Intelligence System (CIS)

[Source: Techtarget.com: Collaboration-platform]

Product Lifecycle Management (PLM) (Contd.)

- The main goal of PLM is:
  - To maximize product revenues.
  - To decrease product-associated costs.
  - To increase product's value.

[Source: Product Lifecycle Management: Stark J]

P, L, and M in PLM

- The P of PLM
  - P means product in PLM.
  - The product has an essential role in Industry.
  - The product is origin of company earnings.
  - There are no services without product.
  - An industry leads in industry sector because of its products.
  - Product has different types of shapes and sizes.

[Source: Product Lifecycle Management: Stark J]

P, L, and M in PLM (Contd.)

- The L of PLM
  - L stands for lifecycle.
  - Product lifecycle has five phases, namely, Visualize, Explain, Perceive, Use/Support, and Dispose/Retire.

[Source: Product Lifecycle Management: Stark J]

P, L, and M in PLM (Contd.)

- **Visualization:** People have an idea regarding the product.
- **Explanation:** This idea is transformed into a representation.
- **Perceiveness:** By the end of the phase, the product is in its final form.
- **Use/Support:** The customer starts to use the product in use/support phase.
- **Retire:** Company retires a product when it is not useful.

[Source: Product Lifecycle Management: Stark J]

P, L, and M in PLM (Contd.)

- The M in PLM
  - M means management in PLM.
  - Product management has:
    - Coordination and institution of product-related devices.
    - Fix objectives, capability of decision taking and result control.
  - To ensure that a product works well, it is managed across its lifecycle and management guarantees that the product will earn the profit for the company.

[Source: Product Lifecycle Management: Stark J]

PLM for Industry 4.0

- The efficiency and effectiveness of PLM has an important role in today's enterprise operation systems.
- This efficiency and effectiveness of PLM improves market share and market size with increasing revenue.
- PLM system managers product's portfolio. It also manages the services from the initial concept to the final disposal.

[Source: Product Lifecycle Management: Stark J]

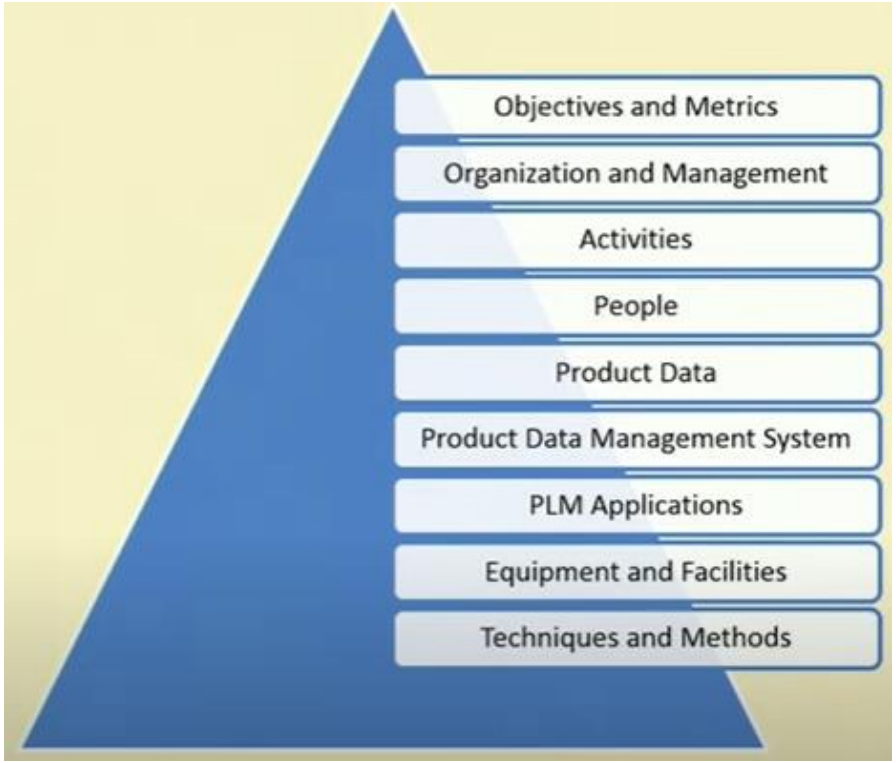
Business Objectives of PLM for Industry 4.0

- **Financial Performance**
  - Increase market revenue, reduce development cost, etc.
- **Time Reduction**
  - Reduce project time overrun, decrease profitable time (in less time more profit), etc.
- **Improve Quality**
  - Decrease defect rate in manufacturing, increase customer satisfaction rate, etc.
- **Business Improvement**
  - Decrease the delay time in new product release, ensure 100% configuration conformity, etc.

[Source: Product Lifecycle Management: Stark J]

Scope of PLM

- There are nine components in PLM to handle a product across its lifecycle; namely, Objectives and Metrices, Organizational and Management, Activities, people, product Data, Product Data Management System, PLM Applications, Equipment and Facilities, and Techniques and Methods.



[Source: Product Lifecycle Management: Stark J]

Scope of PLM (Contd.)

- Objectives and Metrices
  - The objective of the company for PLM is to improve quality and business, reduce the time, improve financial performance.
  - Key Performance Indicator (KPIs), which are known as metrics set targets for the company.
- Organization and Management
  - Resource management and company's effectiveness are crucial for PLM.
  - Plans must organize in such a way such that all resources are managed to fulfil the desired objectives.

[Source: Product Lifecycle Management: Stark J]

Scope of PLM (Contd.)

- **Activities**
  - There are many product associated activities such as idea management, program management, new product development.
- **People**
  - Many people are involved to progress and maintain a product, e.g., Business analyst, Cost accountant etc.
- **Product Data**
  - It is a major asset throughout the product lifecycle.
  - Product will face problem, if we provide false product data.

[Source: Product Lifecycle Management: Stark J]

Scope of PLM (Contd.)

- **Product Data Management System**
  - It manages all the generated products data and it is used for product lifecycle.
  - It provides correct information at the right time.
- **PLM Applications**
  - To get desired performance levels, these applications are responsible for enabling the people to take decisions.
  - These applications supports the people to build and maintain the products.

[Source: Product Lifecycle Management: Stark J]

Scope of PLM (Contd.)

- **Equipment and Facilities**
  - Product lifecycle use equipment and facilities in every phase.
  - They are required to produce, maintain and service the product.
  - Cost and quality of the product are affected by them.
- **Techniques and Methods**
  - To refine production across the lifecycle by means of product progress time, product cost etc. many methods and techniques are proposed:
    - ABC (Activity Based Costing)
    - Concurrent Engineering
    - DFS (Design for Sustainability)
    - LCA (Life Cycle Assessment)

[Source: Product Lifecycle Management: Stark J]

Challenges in PLM for Industry 4.0

- **Business Drivers**
  - There are new business challenges for PLM in Industry 4.0.
  - Challenges
    - Product lifecycle is short.
    - Outsourcing is increasing.
    - Products' structure is complex.
  - Increase in speed, increase in demand and quality of product are the other challenges to drive a business.

[Source: Product Lifecycle Management: Stark J]

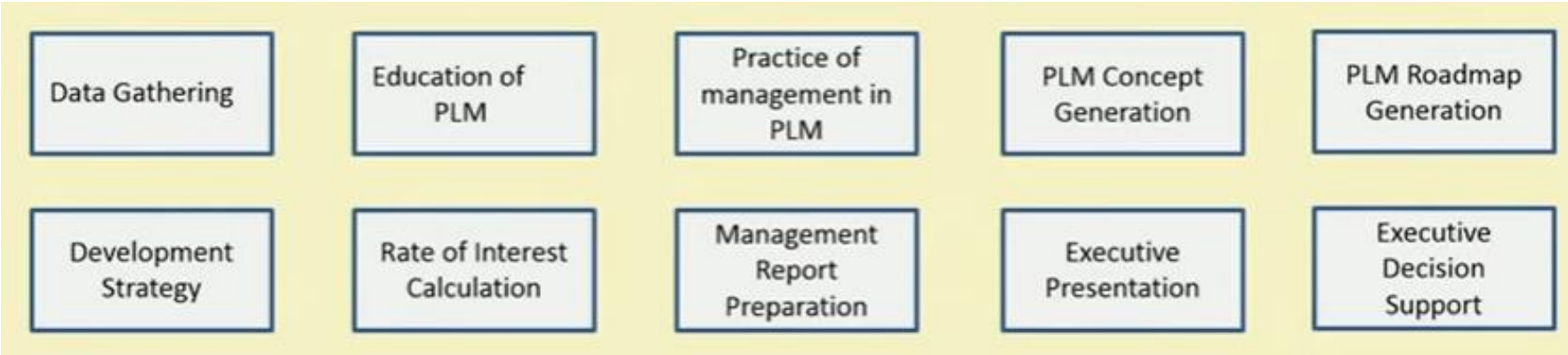
Challenges in PLM for Industry 4.0 (Contd.)

- **Industrial Requirements**
  - To design products virtually, geographically dispersed design teams and supply chain partners are required to collaborate.
  - A new perspective must be generated to hold net-centric technology. This perspective will be able to free the inherent value in today's enlarged business model.
  - Perform project management, exchange and maintain product information is a challenge in industry.

[Source: Product Lifecycle Management: Stark J]

The Ten Step Approach: PLM solution in Industry 4.0

- It is based on working experience of companies in industry sector.
- This approach has ten steps; namely, Data Gathering, Education of PLM, Practice of Management in PLM, PLM Concept Generation, PLM Roadmap Generation, Development Strategy, Rate of Interest Calculation, Management Report Preparation, Executive Presentation, and Executive Decision Support.



[Source: Product Lifecycle Management: Stark J]

Conclusion:

- Hence, collaboration platform, product lifecycle management, and their automation improvement in the context of IoT, IIoT, and Industry 4.0 are very important. These are often overlooked, but should not be from a single perspective, however from different perspectives.

Bibliography:

- Stark J. (2015), Product Lifecycle Management (Volume 1), Springer.
- Schuh G., Potente T., Wesch-Potente C., Weber A., & Prote J, "Collaboration Mechanisms to increase Productivity in the Context of Industries 4.0" Elsevier, Procedia CIRP 19, pp. 51-56, 2014.
- Kagermann H., Wahlster w., Helbig j., "Recommendations for implementing the strategic initiative Industries 4.0", Acatech, pp. 13-78, 2013.
- Menon K., Gupta P.J., & Karkkainen H., "Role of Industrial Internet Platform in the Management of Product Lifecycle Related Information and Knowledge", IFIP, pp. 549-558, 2016.
- Ming X., Yan J., Lu W & Ma D., "Technology Solutions for Collaborative Product Lifecycle Management - Status Review and Future Trend", Concurrent Engineering, vol. 13, no. 4, pp. 311-319, 2005.
- https://searchcontentmanagement.techtarget.com/definition/collaboration-platform.

Thank you