

Date: 2025-11-17

Dealing with sustainability aspects in product and production co-development: Current state and a conceptual requirements management framework

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Why It Matters

The need for sustainable products and production systems has renewed focus on development processes that consider **entire life cycles** and **circularity**. While support for product development exists, there is a **gap in co-developing products and production systems with sustainability in mind**.

Current State & Challenges

- Collaboration with **8 manufacturing companies** revealed challenges in managing sustainability aspects and requirements across product and production development.
- Key issues:
 - Lack of **systematic methods**
 - Difficulty tracking **changing regulations**
 - Non-compliant or legal **requirements missing**
 - Lack of **production involvement**
 - Limited **ownership and traceability**
 - Insufficient **data management**

Identified Need

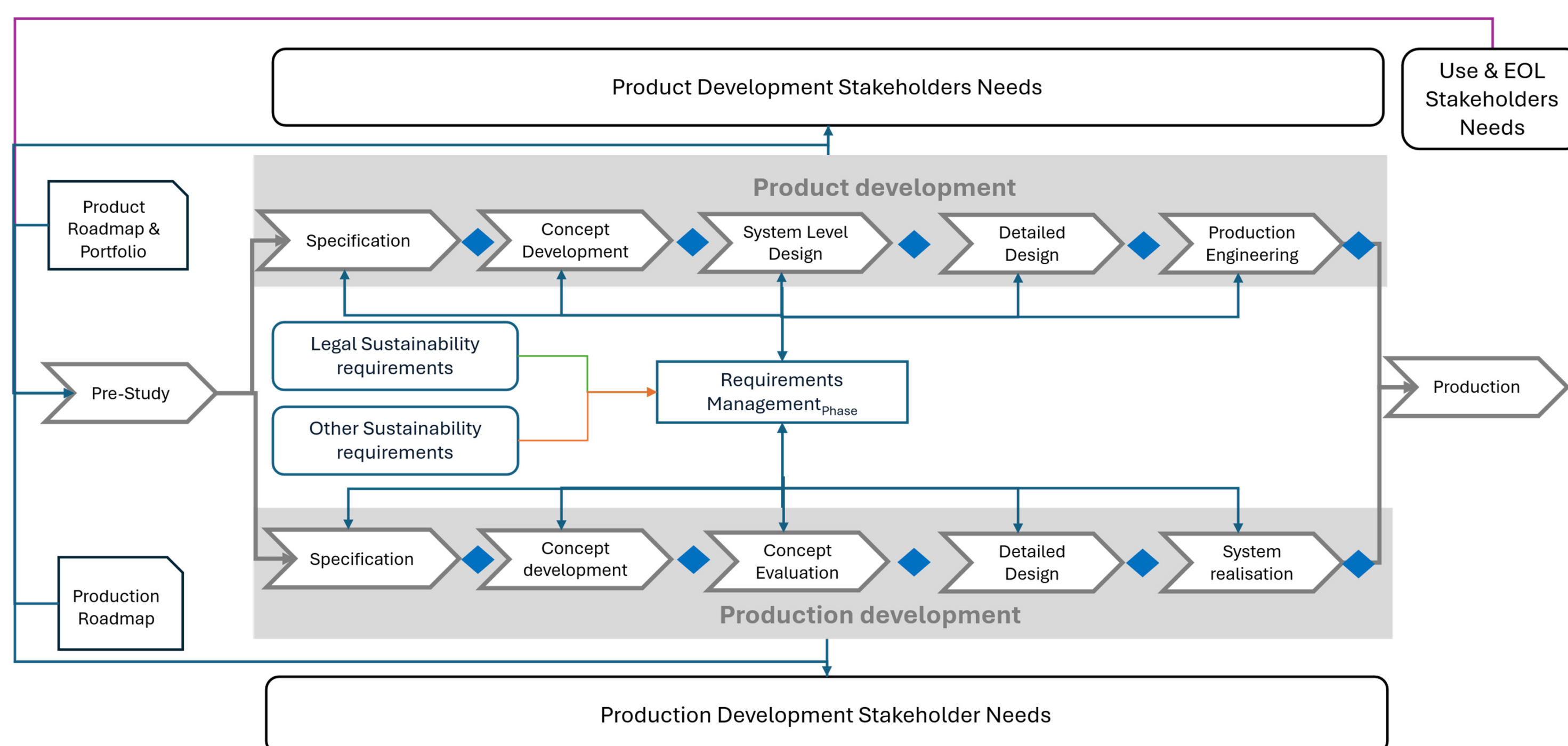
A **systematic method** that:

- ✓ Considers stakeholder needs across the lifecycle
- ✓ Creates ownership and traceability
- ✓ Tracks evolving regulations and system maturity
- ✓ Supports data and knowledge management

Our Contribution

A **conceptual framework** was developed to:

- Improve **knowledge management**
- Support **sustainable product lifecycle management**



Future Directions

- Develop methods for **sustainability requirements management** across the lifecycle
- Focus on aspects like **elicitation, analysis, validation, documentation, communication**
- Integrate sustainability requirements into **PLM and project management tools**

Goal: Enable systematic, traceable, and tool-supported sustainability requirements management for **co-development of products and production systems**.

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