

**Dissertation title:**

**Closed Loop Business Models - Ein Geschäftsmodellkonzept für die ressourceneffiziente Produktherstellung**

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This thesis contributes a business and managerial perspective to the field of industrial ecology, a field which subsumes concepts of re-integrating industrial production processes into material flows of the ecosphere. In practice, implementation of re-integration requires the re-use and recycling of products, components and materials at companies' level, including a more resource-efficient manufacturing of products and savings in scarce natural raw materials. It is an approach that transforms the structure of value creation, while it also implies that companies need to cope with more complexity in their business models. The new contribution of the thesis is especially to develop a novel management tool that supports implementation of closed-loop business models and in doing so, enables competitive advantages, anticipating turbulent markets and effectively re-configuring the given business models of a firm.

Conceptually, the thesis develops an understanding of 'sustainability' rooted in industrial ecology and develops an indicator for ecologically beneficial and economically viable processes. Two strategies of choice for achieving resource efficient production process were identified, a choice which depends on product characteristics: First, recycling and second, re-use strategies. Recycling strategies are those where a product is manufactured from materials that have at least already once been introduced to the production process. Re-use strategies are those that pursue restoring product functionality and that repurpose used or end-of-life products and components for another use phase.

Drivers of complexity which these strategies face are located across business functions, may it be product development, production, procurement or marketing. This thesis demonstrates how the complexity can only effectively assessed by an integrated perspective. A business models concept is developed as opposed to just a business model blueprint. The novel closed-loop business models concept shall be illustrated by two qualitative case studies; theory development thereby is linked to corporate practice and, generic configurations of such concept are analysed.

Finally, the thesis facilitates transfer of the findings into corporate practice by introducing a business consultancy methodology for the design of new closed-loop business models that is conceptually grounded upon the techniques which the thesis generated.