

Due to the increasing global population and high natural resource consumption, the current generation is facing inevitable crises such as resource shortages, increasing waste, and environmental concerns. As such, the linear model with a 'take-make-dispose' approach is no longer suitable. The evolving concept of circular economy (CE) is frequently proposed as a strategy to address limitations of the linear model. Thus, it is vital that products are designed based on the CE concept. However, the description and attributes of the CE remain ambiguous. There are also no clear explanations of what makes a product circular and how to measure its circularity. Therefore, a clear understanding of the CE and core constituent attributes of a circular product is imperative to evaluate its performance. This presentation demonstrates preliminary work to address the above gap with the goal of developing a comprehensive methodology for product circularity assessment. This effort begins by carefully analyzing the definitions and key features of the CE through an extensive literature review. The results are synthesized to attain the description and attributes of a circular product which will become the fundamental inputs to develop the methodology. Based on this outcome, preliminary observations about the existing product circularity assessment tools are conducted. The findings indicate the CE must consider both the technical and biological elements while accomplishing the closed-loop material flow. In addition, the CE descriptions show a lack of emphasis on stakeholders as enablers. The attributes of a circular product derived from the CE domain analysis are presented. Shortcomings of existing evaluation tools are also identified and shown as important factors to consider in the methodology. The outcomes of this project will inform the development of a comprehensive methodology for product circularity assessment and contribute to improving the circular product design process, thus leading to a more sustainable world.

Shaping the Relationship between Digital Technologies and Circular Economy through Dynamic Capabilities

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Abstract

The implementation of the circular economy paradigm and the adoption of digital technologies within industrial firms are hot topics in current academic, political, and managerial debates. Although being separated topics, digital technologies are largely recognized to potentially support the industrial circular transition, fostering the implementation of related practices. The relationship is currently mainly studied in terms of the direct support that digital technologies offer to the implementation of circular economy practices, with overall contrasting results, limited empirical evidence and unclear indications for practitioners. Latest developments suggest the non-linearity of the relationship, meaning the support offered by digital technologies might be actualized by the generation of dynamic capabilities. To shed light on the issue, we conducted explorative multiple case studies. Based on inductive logic, we investigated 11 Northern-Italy industrial firms,