

Brand-driven Transition to Bio-based Plastics Supply Chain

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Abstract

The world has been seeking operations and processes that were competent and efficient in terms of output and quality for several years. Today, solutions exist that are not only effective and efficient but also sustainable and positive for both the economy and society. However, introducing change and innovation into a stable and working social system has always been a risky endeavor; hence, companies and entrepreneurs should catalyze this transition with a comprehensive plan that considers the influencing factors.

Plastics encompass an essential part of many products that are used in humans' daily lives. As the plastic industry relies strongly on petroleum—a scarce resource—for raw materials, there is a potential threat regarding its availability and cost. Consequently, bio-based materials and specifically, bioplastics are now being widely used as these make plastic products more sustainable. In this context, through case studies, this article describes different approaches toward the transition to bioplastics in supply chains and compares traditional and bio-based plastics supply chains across a range of indicators.

The proliferation of products, processes, suppliers, and markets coincides with the rise in the *complexity of supply chains*. Moreover, *circularity* and *cost*—two basic pillars of circular economies—offer integration between sustainability and business development. Further, the *corporate image*, which is equally important, refers to the company's reputation—description of its perception, activities, and products/services by outsiders. Based on these significant indicators, in this article a novel framework, *4C*, has been introduced to examine the transition to the bio-based plastics supply chain. Additionally, the impact of this sustainable transition on circularity, cost, complexity, and corporate image for each presented case within the proposed framework is scrutinized. Based on the results, the concept of “brand-driven transition” is elucidated upon, and its benefits and barriers are highlighted and discussed. These results have the potential to help companies realize business logic in the light of the discussed opportunities and obstacles; thus, they could then opt for the right trajectory regarding transition to the bio-based plastics supply chain for their products. Notably, by utilizing the proposed framework, companies can assess whether they should move toward a bio-based plastics supply chain for their products.

Keywords: Sustainability, brand-driven, bio-based plastics, circularity, supply chain complexity, corporate image.