

Challenges and opportunities in developing circular economy in islands : case study of La Réunion. Sébastien BOURDIN¹, Philippe JEAN-PIERRE², Philippe HOLSTEIN³

The circular economy (CE) concept is increasingly recognized as a crucial framework for addressing environmental challenges and fostering sustainable development. It offers a systematic approach to reducing waste, conserving resources, and promoting economic resilience by transforming traditional production and consumption patterns. However, its implementation and significance within island economies have been largely overlooked in existing literature, despite these regions' unique vulnerabilities and ecological constraints (Andriamahefazafy & Failler, 2022). Islands face specific challenges, such as dependency on imports, geographic isolation, and limited natural resources (Ruiz-Pérez et al., 2024), making the traditional linear economy model — based on the “take, make, dispose” approach — unsustainable in the long run (Hall, 2015; Garau et al., 2020). Islands' geographic and economic isolation amplifies their susceptibility to global market fluctuations and ecological crises, underscoring the urgency of adopting more resilient and sustainable economic models (Fuldauer et al., 2019).

Recent studies indicate that the adoption of CE principles not only mitigates environmental impacts but also provides substantial opportunities for local economic development, particularly in terms of job creation, resource efficiency, and reducing dependence on external resources (Bourdin et al., 2022; Niang et al., 2023). Despite these potential benefits, the practical application of CE in island contexts remains under-researched. Until now, studies have primarily focused on waste management in islands (see, for example, Eckelman et al., 2014; Mohee et al., 2015; Elgie et al., 2021), while CE encompasses a broader range of aspects. This research gap is particularly pressing given that, due to the environmental, societal, economic, and logistical constraints of island territories (Ruiz-Pérez et al., 2024), the 10Rs of the circular economy — Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle, and Recover — are not merely ecological options but essential strategies for survival (Potting et al., 2017; Khajuria et al., 2022; Hartley et al., 2023a).

Furthermore, implementing CE in island economies requires careful consideration of local contexts, including cultural, social, and economic factors that can influence the success of CE initiatives (Tapai et al., 2021; Rajaonson & Chembessi, 2024). Moreover, the success of CE often depends on strong governance frameworks, active stakeholder participation, and effective public policies that support the transition to circular models (Veyssiere et al., 2022; Hartley et al., 2023b). From this point of view, the CE can enhance the sustainability and resilience of island economies. However, there is a lack of understanding regarding how these principles can be effectively applied in specific island contexts. Addressing this gap is crucial for global sustainable development, especially in vulnerable island regions facing disproportionate risks.

La Réunion, a French and European Outermost region, provides an ideal case-study to explore such dynamics. Since the 1960s, the island witnessed a thorough modernization policy, supported by national and European public transfers which reshaped production, distribution and consumption systems, turning a ruined plantation economy into a “thermo-industrial”, mass consumption society, supported by imported fossil fuels and materials (Holstein, 2014). A material flow accounting analysis conducted in 2015 revealed that domestic extraction represented only 6 of the 25 million tons of resources needed yearly to support the regional economy (Nexa, 2015) engendering strong dependencies and vulnerabilities. La Réunion must choose between maintaining its linear model or embracing a resilient circular model, making it a laboratory for ecological transition and an ideal subject for examining the implications of the circular economy.

Our study aims to address this literature gap by examining how a small island economy can progress towards a circular economy, given physical challenges (such as limited size, isolation, and resource

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scarcity) and socially-constructed obstacles (such as the path-dependency of regional economy systems, the challenges of multi-level governance, the allocation of structural funds and publics, and the influence of political cycles and strategies). We focus on the regional plans and strategies implemented in La Réunion, highlighting the opportunities and challenges faced in adopting circular economy practices. Additionally, we emphasize the importance of international cooperation, public awareness, and stakeholder training in this transition. The research seeks to answer how La Réunion, as an isolated and insular territory, can not only adapt to waste management challenges and the ecological crisis but also serve as an innovative model for other similarly isolated regions.

Theoretically, our research expands the existing literature by framing the circular economy within the unique context of island economies, characterized by geographical isolation, limited resources, and heightened environmental vulnerability. Applying the 10Rs framework, we contribute to the discourse on sustainable development in insular areas by highlighting the necessity of these principles as critical survival strategies in insular settings. This study empirically uses La Réunion as a case study to demonstrate the effective implementation of circular economy principles in a small island economy. We carefully analyze the island's infrastructure, economic conditions, and environmental constraints, showing how these factors impact the success of circular economy practices. This analysis addresses a crucial gap in the literature and provides a model that can be adapted by other island economies or remote areas facing similar challenges. We recommend the establishment of strong governance frameworks to support the integration of circular economy principles into local policies and economic strategies.

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