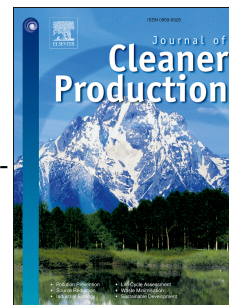


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Complexity as a means of resilience in metropolitan port areas: Application to the Aix-Marseille case study in France

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Complexity as a means of resilience in metropolitan port areas: application to the Aix-Marseille case study in France

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Abstract:

Conscious of their high energy consumption and dissipation, metropolitan port areas lead transition and adaption policies to achieve and contribute to a global shift toward a low-carbon future. However, we may ask if the adaptation strategies and processes contribute to the greater resilience of port cities. Defining port cities as a system, this article examines this issue through the dynamic point of view of functional complexity, by analyzing the evolution, in time, of diversity (i.e. diversification of primary energy sources) and connectivity (i.e. development of intra- and inter-connectivity among industrial, agricultural and urban subsystems). Our research is embedded in and illustrated by the case study of Aix-Marseille-Provence metropolitan port area (France).

We show that the complexification processes of Marseille metropolitan port area are not linear and straightforward: they entail different phases characterized by different levels of diversity and connectivity. We identify co-evolving factors such as the development of new energy technological pathways, the emergence of a metropolitan dynamic or the change of business culture toward better cooperation, to explain these complexification dynamics. We discuss these results in regard to other metropolitan port contexts, especially in Asia, in order to assess to what extent the complexification processes of Marseille can enhance the understanding of global changes in industrial societies. We finally question the ability of these complexification strategies, implemented through industrial ecology approaches that do not deeply challenge the use of fossil energy, to respond to sustainability and resilience issues.

Key-words: industrial ecology, port areas, complexity, resilience

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