

Supply Chain Structural Complexity of a UK-Based Net Zero Industrial Cluster

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Abstract

A UK based collaborative partnership is aiming to create a large decarbonised industrial cluster. This will produce low carbon blue hydrogen for multiple industrial processes through the utilisation of Carbon capture and storage. One of the current challenges is to build a resilient supply chain for this cluster, that at the same time conveys high visibility and coordination. We understand a resilient supply chain to be one with low dependency on specific providers which, therefore, is less vulnerable to shocks in the supply of specific parts and components. We applied the Structural Complexity Theory to measure the resiliency of the potential UK-based net zero industrial cluster supplier network. Structural complexity is defined as the complexity that originates from the firm's business strategy. From an upstream view of the supply chain, it stems from strategic decisions about the bill of materials and its suppliers. When out of control, structural complexity erodes profits, introduces hidden costs, and hinders the agility of the supply chain. In a positive vein, it can be interpreted as a measure of the independence and resilience of the supply chain. Our resiliency investigation identified potential high-risk products which rely on specialist suppliers. Whilst a capacity analysis has isolated areas that do not currently have UK production volume to meet the projected demand. This has proved to be useful information in building a better supply network to achieve the net zero industrial cluster's vision.

Keywords: Structural Complexity; Supply Chain; Net-Zero; Resilience; Decarbonisation