Assessing the degree of "Isolation" of the Regenerative Economy

Topic: Input-Output economics and industrial ecology - LCA analysis 1
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This paper provides an IO methodology to assess the degree of "strong-recycling" as a mean to "isolate" a substance and applies it to the case of copper flows within the Brazilian economy. The Regenerative Economy is based on two principles: "Isolation" and "Integration". They enable a specific arrangement of the material flows of an economy which mitigates systematically resource depletion and pollutant emissions. The "Isolation" principle is achieved by "strong-recycling", i.e. recycling substances such as metals and minerals so that they regain their original properties.

First, this paper builds on the Waste Input-Output Analysis framework (Nakamura and Kondo 2009) which traces in detail the reallocation of by-products and wastes within the economy. It extends the WIOA framework by endogenising the household sector for both economic and material flows. Therefore, this framework provides a comprehensive picture of the material flows going through the economy. Then, the material flows that need to be modified to isolate the substance can be identified. In other words, this framework reveals which technologies and sectors need to be further developed in order to achieve the full strong-recycling of the substance.

Secondly, the paper applies this framework to the case of copper in Brazil. It first translates the copper Substance Flow Analysis in two sets of Physical Supply and Use Tables: one for products and another for wastes and by-products. Also, it disaggregates the Brazilian MIOT correspondingly to combine it with the PSUTs and perform the analysis described above. The results show the current degree of isolation of copper in Brazil and which flow paths need to be modified in order to increase it. The technologies and sectors that need to be developed will be discussed.

Nakamura, S. and Y. Kondo, 2009. Waste Input-Output Analysis. Springer.