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Contrasting Infrastructure Sharing and Resource Substitution Synergies Business Models

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Abstract : Industrial symbiosis (I.S) rely on two modes of cooperation that are infrastructure sharing and resource substitution to obtain economic and environmental benefits. The former consists in the intensification of use of an asset while the latter is based on the use of waste, fatal energy (and utilities) as alternatives to standard inputs. Both modes, in fact, rely on the shift from a business-as-usual functioning towards an alternative production system structure so that in a business point of view the distinction is not clear. In order to investigate the way those cooperation modes can be distinguished, we consider the stakeholders' interplay in the business model structure regarding their resources and requirements. For infrastructure sharing (following economic engineering literature) the cost function of capacity induces economies of scale so that demand pooling reduces global expanses. Grassroot investment sizing decision and the ex-post pricing strongly depends on the design optimization phase for capacity sizing whereas ex-post operational cost sharing minimizing budgets are less dependent upon production rates. Value is then mainly design driven. For resource substitution, synergies value stems from availability and is at risk regarding both supplier and user load profiles and market prices of the standard input. Baseline input purchasing cost reduction is thus more driven by the operational phase of the symbiosis and must be analyzed within the whole sourcing policy (including diversification strategies and expensive back-up replacement). Moreover, while resource substitution involves a chain of intermediate processors to match quality requirements, the infrastructure model relies on a single operator whose competencies allow to produce non-rival goods. Transaction costs appear higher in resource substitution synergies due to the high level of customization which induces asset specificity, and non-homogeneity following transaction costs economics arguments.

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