

Integrating Cost-Benefit Assessment and Contract Design to Support Industrial Symbiosis Deployment

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Abstract : Industrial symbiosis (I.S) is the realization of Industrial Ecology (I.E) principles in production systems in function. I.S consists in the use of waste materials, fatal energy, recirculated utilities and infrastructure/service sharing as resources for production. Environmental benefits can be achieved from resource conservation but economic profitability is required by the participating actors. I.S indeed involves several actors with their own objectives and resources so that each one must be satisfied by ex-ante arrangements to commit toward I.S execution (investments and transactions). Following the Resource-Based View of transactions we build a modular framework to assess global I.S profitability and to specify each actor's contributions to costs and benefits in line with their resource endowments and performance requirements formulations. I.S projects specificities implied by the need for customization (asset specificity, non-homogeneity) induce the use of long-term contracts for transactions following Transaction costs economics arguments. Thus we propose first a taxonomy of costs and value drivers for I.S and an assignment to each actor of I.S specific risks that we identified as load profiles mismatch, quality problems and value fluctuations. Then appropriate contractual guidelines (pricing, cost sharing and warranties) that support mutual profitability are derived from the detailed identification of contributions by the cost-benefits model. This analytical framework helps identifying what points to focus on when bargaining over contracting for transactions and investments. Our methodology is applied to I.S archetypes raised from a literature survey on eco-industrial parks initiatives and practitioners interviews.

Keywords : contracts, cost-benefit analysis, industrial symbiosis, risks

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