

How to Coordinate Value Generation in Service Networks – A Mechanism Design Approach

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Abstract

The fundamental paradigm shift from traditional value chains to agile service value networks implies new economic and organizational challenges. As coordination mechanisms, auctions have proven to perform quite well in situations where intangible and heterogeneous goods are traded. Nevertheless, traditional approaches in the area of multidimensional combinatorial auctions are not quite suitable to enable the trade of composite services. A flawless service execution and therefore the requester's valuation highly depends on the accurate sequence of the functional parts of the composition, meaning that in contrary to service bundles, composite services only generate value through a valid order of their components. The authors present an abstract model as a formalization of service value networks. The model comprehends a graph-based mechanism implementation to allocate multidimensional service offers within the network, to impose penalties for non-performance and to determine prices for complex services. The mechanism and the bidding language support various types of QoS attributes and their (semantic) aggregation. It is analytically shown that this variant is incentive compatible with respect to all dimensions of the service offer (quality and price). Based on these results, the authors numerically analyze strategic behavior of participating service providers regarding possible collusion strategies.

Keywords

Mechanism design – Coordination – Service value network – Procurement auction – Semantics

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