A Decision Support System Framework for Purchasing Management in Supply Chains

NICOLA COSTANTINO¹, MARIAGRAZIA DOTOLI²,
MARCO FALAGARIO³, MARIA PIA FANTI², GIORGIO IACOBELLIS²

¹ Politecnico di Bari, Dipartimento di Ingegneria Meccanica e Gestionale, Via Japigia 182, 70126 Bari, Italy, e-mail: costantino@poliba.it

² Politecnico di Bari, Dipartimento di Elettrotecnica ed Elettronica, Via Re David 200, 70125 Bari, Italy, e-mail: {dotoli, fanti, iacobellis}@deemail.poliba.it

³ Politecnico di Bari, Dipartimento di Ingegneria Meccanica e Gestionale, Via Japigia 182, 70126 Bari, Italy, e-mail: m.falagario@poliba.it (corresponding author), phone +39 080 5962754, fax +39 080 5963411

Abstract

Purpose. This paper proposes the framework of a Decision Support System (DSS) to select the optimal number of suppliers that are candidate to join a supply chain network. The DSS bases the decision on the cost evaluation of the transaction among the buyer and the potentially available suppliers by way of a Monte Carlo approach.

Methodology. In particular, the presented DSS includes a statistical module and the DSS core. The former module estimates (in a probabilistic way) the exchange performance indices, i.e. total cost of the transaction, purchasing price and additional costs of purchasing, while the latter module implements the transaction evolution making use of a simulation model.

Findings. The DSS is tested by way of a case study, namely the supply of a customized product by a general contractor in the construction industry. The obtained DSS results are validated with the actual data of the purchasing, confirming the underlying model suitability and the DSS effectiveness for purchasing management in supply chains.

Research limitations/implications. Indeed, the DSS is able to evaluate the total cost of purchasing and the optimal number of suppliers to contact before the transaction takes place and may be employed by the buyer to forecast the cost of the purchase and take decisions to minimize such a performance index.
of the exchange. Perspectives on future research include further validations of the DSS, also considering other factors than price in the transaction evaluation.

*Originality/value of the paper.* The DSS can be successfully employed to identify managerial guidelines that can be followed by practitioners, particularly when the first supply of a product has to be carried out.

**Keywords:** Decision Support Systems, Supply Chains, Purchasing Management, Transaction Cost Analysis, Commodity/Asset Specific Product, Monte Carlo Approach.