

# The implications of product modularisation on the development process, supplier integration and supply chain design in collaborative product development

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## ABSTRACT

Generating economies of scale is one of the most desirable goals when developing modular product systems. Since complex products are commonly developed in collaboration between an Original Equipment Manufacturer (OEM) and its suppliers, pursuing this goal inherently establishes interdependencies between the development process, supplier integration and supply chain design. To fully reap the benefits of modular product systems requires a comprehensive approach that encompasses these fields and addresses the interdependencies between them via a coherent collaboration between development and purchasing. This is the main focus of this work. In this paper, we first describe how the product development process has to be restructured for the concerted development of modules and overall products within the scope of a modular product system. Secondly, we propose a new collaboration model between the OEM and its suppliers, since OEMs need to collaborate directly with suppliers of lower levels of the value chain in order to facilitate the standardisation of components and modules across different products. Finally, we delineate an awarding process for both development services and production volumes for series supply that resolves the conflicting priorities of economies of scale and avoiding over-dependence on single suppliers. The process models described in this paper have been conceived based on systems engineering principles and have been successfully tested and further refined throughout several industrial projects carried out with two automotive manufacturers. The resulting approach will be demonstrated using a generic example taken from the automotive industry.

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