

Proposition sujet de mémoire **2014 - 2015**

MASTER Recherche 2^{ème} année

Management, Innovation, Technologie

spécialité « **Génie industriel** »

Specification of an innovative requirement model
in a customer-suppliers product development process?

Technology and international competition are forcing many manufacturers to reduce product costs and continuously develop innovative products. Across all worldwide manufacturers, purchased materials account for over 50 percent of the cost of goods sold (Handfield et al., 1999). In addition, one manufacturer cannot possess the entire technological expertise required to develop a complex innovative product (Mc Ivor, 2006). In this respect, the integration of suppliers in the new product development (NPD) projects is a key factor of competitiveness (Bidault et al., 1998; Handfield et al., 1999; Rauniar et al., 2008). Thus customer firms seek to better use the supplier's technological competence at the early stage of NPD. This should have two major consequences for customer firms; first increasing the productivity of their own R&D activities and second extending the spectrum of technologies that can be included in the future final products (Brem & Tidd, 2012). This analysis is resulting in a global trend with a twice faster growth of outsourced R&D compared to in-house development in several industrial sectors (Howells, 2008). The study of Robertz (2001) involving the largest R&D investors worldwide demonstrated that the percentage of firms relying on external support for innovation increased from 20% 10 years ago to 85% nowadays.

Early Supplier Involvement (ESI) is generally defined as a form of vertical cooperation in which manufacturers involve suppliers at an early stage in the NPD process (Bidault et al., 1998). Supplier involvement in NPD can take the form of a variety of configurations: the simple consultation of suppliers about customer design ideas (white box), the joint development of an outsourced product (grey box), or delegation to the supplier of full design responsibility for an outsourced product (black box) (Handfield et al., 1999; Monczka et al., 2000; Petersen et al., 2005). These two last configurations refer to the notion of *collaborative design with suppliers* adopted in this research and introduced by (le Dain et al., 2011). In this approach, the supplier has a real responsibility on the design activity and its management, but also on the results from this activity. For black and grey box engineering, the customer provides a first list of functional and non-functional requirements concerning the product to be developed to the supplier. The supplier is more or less (from grey to black box) in charge of the design process starting by clarification of the design problem, including concept generation and ending with the manufacturing ramp-up.

In the master thesis, we will focus on the creation process of the requirement model in black box or grey box engineering configurations, leading by the customer and suppliers involved in NPD projects. The central research question to be tackled is how to specify a requirement model, in a customer-suppliers product development relationship, supporting product or service innovation? This process should consider the dynamic aspects of the exchange in the context of co-generation involving the customer and suppliers, but also the unavoidable co-evolution of the requirements considering the potential solutions which emerge during the design project.

The objectives of this research project are the following:

- Proposing a typology of pitfalls related to the requirement model process between customer and supplier.
- Formalizing requirements generation guidelines to reap suppliers' expertise and innovation benefits in the requirement model process.
- Leading an evaluation of such guidelines by companies involved in collaborative design with suppliers (black or grey configurations).

- This work will be part of a larger project which objective is to propose a requirement generation framework adapted to the customer-supplier relationship in a co-creation context. It will be appreciated if this master thesis work ends with some relevant ideas about this more generic framework.

The methodology selected in this research will combine insights from literature but also evidences from some case studies (Schneider Electric, Somfy,...)

This project will be carried out in collaboration with the Aalto University (Finland)

Our final objective is to publish the results of this Master thesis in a scientific international journal.

- Quel parcours conseillez-vous : Product Development ?
- Quel cours suivre : Knowledge Integration and Collaboration in Design

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Entreprise (éventuellement) Schneider Electric, ...