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## A Survey of Danish Manufacturers

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# The impact of product and service modularity on business performance – A survey of Danish manufacturers

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## Summary Abstract

Modularity has been proposed as a powerful way of managing complexity. The emerging literature points to the importance of modularity of service architecture, with case based studies in logistics and healthcare. Little is known about the relationship between product and service modularity and their effects on business performance, both empirically and theoretically. This paper explores the relationship between product and service modularity and their effects on business performance based on a survey of Danish manufacturers. We provide empirical and theoretical insights into the emerging fields of service modularity and industrial services.

**Keywords:** Modularity, Servitization, Service Architecture

## Purpose

Manufacturers are increasingly turning towards services (Wilkinson et al., 2009) and integrated solutions (Davies et al., 2007) as a way of strengthening their competitiveness, a transition receiving growing attention in the literature (Gebauer et al., 2010; Kowalkowski et al., 2015). However, the relation between product and service architecture, its impact on service strategy and the performance of manufacturers is not well understood.

Recently Kowalkowski et al. (2015) challenged the assumption that the product-service transition occurs in a linear fashion from basic to advanced services. Rather, they suggest that in practice firms find themselves in different provider roles simultaneously, with a need to balance business expansion and standardization. Consequently they propose the need to industrialize services that we argue necessitates modularization competencies. This resonates with the proposition of Davies et al. (2007) that developing modular components is an important aspect in balancing the need for customization and standardization in tailoring integrated solutions to customer needs.

Modularity has been proposed to be a powerful way of managing complexity (Baldwin and Clark, 2000). However it is only relatively recently that the relationship between product modularity and performance has been surveyed empirically. In a study of mass customization, Duray et al. (2000) developed and validated a number of constructs including two of which capture the types of product

modularity. Similarly, Worren et al. (2002) developed and validated constructs for measuring modular architecture, including modular structure, products and processes. Along similar lines, Tu et al. (2004) developed scale items to capture modularity based manufacturing practices, and conducted a pilot study and validated their instrument before conducting large scale sample. Recent studies have adapted earlier scales to explore the relationship between product modularity and different aspects of performance, such as supply chain integration (Lau, Yam and Tang, 2010) and new product development (Lau, Yam and Tang, 2011; Danese and Filippini, 2010). Although an emerging literature has pointed to the importance of modularity of service architecture (Voss and Hsuan, 2009), with case based empirical reference in industries such as logistics (Bask et al., 2010) and healthcare (de Blok et al. 2010), little is known about the relationship between product and service modularity and their effects on business performance in the context of service strategies deployed by industrial firms. This paper then explores the relationship between product and service modularity and their effects on business performance based on a survey of Danish manufacturers.

### **Design/methodology/approach**

The paper is based on a survey among Danish industrial firms offering services. Through the Orbis business database 715 Danish industrial firms were identified and their web pages screened to identify descriptions of service offerings. Of these firms 268 described one or more services on a predefined list of 58 specific services discussed in the literature. Firms with services were contacted by telephone and 152 electronic surveys were distributed to which 107 firms responded (70.4%).

### **Findings**

Data analysis is currently being undertaken to explore the relationship between product and service modularity based on the service strategies being deployed. Importantly, we aim to test the relationship to provide an indication as to whether, or the extent to which, service strategies impacts business performance. We also explore whether customization through product and service modularity inhibits or enhances business performance. The detailed results will be presented in the full paper.

### **Relevance**

Our study will provide empirical and theoretical insights into the emerging fields of service modularity and industrial services. Managerial implications in respect of how service strategies and modularization may need to be congruent will be presented.

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