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# Supplier involvement in new product development and innovation: Taking stock and looking to the future

Thomas E. Johnsen *

*Purchasing & Supply Management, Audencia Nantes School of Management, 8 route de la Joneliere, BP 31222—44312 Nantes Cedex 3, France*

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ABSTRACT

This paper provides a comprehensive and critical review and synthesis of the current state of empirical research into supplier involvement in new product development (NPD). The paper begins by defining supplier involvement in NPD and evaluating the rationale for supplier involvement in NPD. This suggests that early and extensive supplier involvement in NPD projects has the potential to improve NPD effectiveness and efficiency, however, existing research remains fragmented and empirical findings to date show conflicting results. The paper takes stock of the research on supplier involvement in NPD, tracing the origins of the literature to the late 1980s, and evaluating the development of the field up to the present day. From this broad base of empirical research the analysis identifies a set of factors affecting the success of supplier involvement projects. The paper concludes with a discussion of two emerging themes: (1) supplier relationship development and adaptation; (2) supply network involvement in product innovation.



## 1. Introduction

As more and more companies are outsourcing parts of their new product development (NPD) activities to suppliers, it is not surprising to find that research into how to manage supplier involvement in NPD and innovation has greatly expanded during the last 30 years. Several definitions of supplier involvement in NPD have been suggested; fundamentally it concerns the integration of the capabilities that suppliers can contribute to NPD projects (Dowlatshahi, 1998), the tasks they are able to carry out on behalf of the customer, and the responsibilities they assume for the development of a part, process or service (Van Echtelt et al., 2008, p. 182). Supplier involvement in NPD is important, therefore, because suppliers possess specialized product and process capabilities, which are critical as products are becoming increasingly complex. Indeed there is much evidence to suggest that involving suppliers extensively and early in NPD can improve NPD performance in terms of reduced costs and time to market and improved quality (e.g. Ragatz et al., 2002), and it has been used as a key factor in explaining the 'Japanese advantage' (e.g. Clark, 1989).

However, despite the apparent benefits of supplier involvement in NPD, research remains fragmented. Although there is a substantial body of research emerging in this field using a range of different research methodologies, empirical findings regarding performance benefits differ quite significantly. There are also uncertainties as to the situations in which supplier involvement will reap the expected benefits. For example, supplier involvement in products of high technological uncertainty, i.e. radical innovation has been investigated by several authors, but the results are contradictory. Furthermore, although research has increasingly investigated the conditions for successful supplier involvement, there is still a lack of consensus as to what makes for successful long-term supplier involvement efforts. This paper seeks to provide a rigorous and critical analysis of the state-of-the-art empirical research on supplier involvement in NPD. To ensure that only the highest quality research is considered, the analysis focuses specifically on articles published in major English-language North American and European journals. This means that the analysis considers mainly journal articles that are included as 'four stars' on the latest Association of Business Schools (ABS) ranking (Harvey et al., 2008) plus a few seminal journal articles and contributions that are widely accepted as having provided major contributions to the field. The ABS ranking draws from several other highly regarded journal quality rankings; journal articles ranked as four stars represent the highest tier of business and management journals and include top journals such as Journal of Operations Management, Journal of Product Innovation Management, Academy of Management Review, and Strategic Management Journal. These journals tend to have a high citation impact factor (measured by the Institute for Scientific Information—ISI) of at least 2.0. Although any journal ranking is inevitably controversial, the ABS ranking is widely viewed as providing a reliable measure of research rigour and quality.

* Tel.: +33 0 2 40 37 46 53.
*E-mail address:* tjohnsen@audencia.com

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The implications of focusing on these particular journals are discussed at the end of the paper.

## 2. Empirical research into supplier involvement in NPD

This section of the paper provides a chronological review of the literature on supplier involvement in NPD. The first empirical research to focus on the role of suppliers in NPD can be traced to a few internationally influential studies in the 1980s. As this section will show, the field has developed significantly since then, having become much more sophisticated in terms of research methods as well as industrial and regional context. The analysis of the literature in this section is therefore designed around a set of tables, which helps to structure the analysis, divided into the 1980s, the early 1990s, the late 1990s, early 2000, and the latest research since 2005. As the tables show, a large set of high-quality contributions to the field have been analyzed, drawing out the methods employed, the context in terms of industry and region, the focus and objectives of the studies, the underpinning theory, any performance measures applied (if at all), the key results and contributions of the studies, and finally the nature of the publication including the journal acronym.

### 2.1. Early beginnings: 1980s

The first research that focused specifically on supplier involvement in NPD was the study by Imai et al. (1985) and Takeuchi and Nonaka (1986). As shown in Table 1 these two early contributions to the field were based on the same set of seven in-depth case studies within five major Japanese companies. Describing the commitment of dedicated supplier networks to so-called 'lead manufacturers', the authors explained the superior performance of the Japanese companies by their extensive supplier involvement in NPD projects. The later 'Harvard automotive study' by Clark (1989) and Clark and Fujimoto (1991) further explored the role of supplier involvement in explaining major performance gaps between Japanese and Western auto companies, in terms of reduced time to market, improved quality and productivity. Their research provided an extensive account of the use of black-box and detail-controlled (white box) parts, coupled with cross-functional teams, overlapping development stages and other internal development factors. Womack et al. (1990) capitalized on and consolidated the work by Clark (1989) and Clark and Fujimoto (1991) in the International Motor Vehicle Programme (IMVP). They labeled the Japanese (especially Toyota's) system as 'lean' and reached a much wider non-academic audience with their book 'The Machine that Changed the World'. Overall, these empirical studies demonstrated in a convincing manner a significant performance gap between Japanese and Western manufacturers in terms of new product quality, cost and time to market; supplier involvement in NPD was highlighted as a key explanatory factor.

It should be noted that the early studies were generally driven by empirical data from the automotive industry. The studies provided extensive benchmarks that have since been used not only across the global automotive industry, but also filtering into a range of other sectors. Inevitably these early studies have to be understood in their specific industrial, cultural and temporal context; the studies have provided much inspiration for improvement outside this original context, but much of the research that followed nevertheless continued to focus heavily on the automotive industry.

### 2.2. Expanding the field: the early 1990s

A series of publications in the early 1990s elaborated on the findings from the automotive industry (Cusomano and Takeishi, 1991; Lamming, 1993; Nishiguchi, 1994; Kamath and Liker, 1994), further analyzing the performance gap between Japanese and Western manufacturers; in these landmark studies supplier involvement was seen as a key explanatory factor in superior Japanese NPD performance. As Table 2 indicates the research was still at that point heavily focused on comparative studies of the

**Table 1**
Early supplier involvement research: 1980s automotive studies.

| Study | Method | Context | Focus | Theory | Performance measure | Key results and contributions | Journal/ discipline |
|---|---|---|---|---|---|---|---|
| Imai et al. (1985), Takeuchi and Nonaka (1986) | Case studies of 7 NPD projects | 5 Japanese companies, cross-industry | Explores entire supplier networks committed to a lead manufacturers | Limited: very empirically grounded | Speed; flexibility and high rate of innovation | Supplier involvement partly explains superior performance of Japanese companies. Importance of resident design engineers | Book, HBR |
| Harvard Auto Study: Clark and Fujimoto (1991), Clark (1989) | Comparative case studies of 29 NPD projects within 20 auto companies | 20 firms in auto industry: US, Japan and Europe | Typology of supplier involvement: supplier proprietary parts, black box and detail-controlled parts. Cross-functional teams, overlapping stages and other internal factors | Limited: very empirically grounded | Speed; quality; productivity | Performance gap between Japanese and US manufacturers. Higher Japanese reliance on suppliers for NPD and higher proportion of black-box parts. Supplier involvement accounts for 1/3 of significant Japanese advantage, i.e. reduced time to market, improved quality and productivity. | Book: Operations Management & Management Science |
| IMVP study Womack et al. (1990) | Harvard study and consolidated data: US, Japanese and European auto comparisons | Same as Harvard study | Coordination and delegation of design and development of modules to 1st tier suppliers, in turn cascading throughout supplier network | Limited: very empirically grounded | Mainly speed, quality, productivity | Success factors: contract/ ground rules to ensure commitment; price, quality, and delivery conditions, proprietary rights; mutual relationships; risk and reward sharing arrangements | Book-Operations Management |