



Does being R&D intensive still discourage outsourcing? Evidence from Dutch manufacturing

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Abstract

Being R&D intensive has traditionally been seen as an impediment to outsourcing. This study confirms that empirically this was the case for a set of manufacturing industries in The Netherlands in the early 1990s, but also shows that R&D intensity became a positive predictor for changes in outsourcing levels over the 1990s, suggesting firms in R&D intensive industries have increasingly started to rely on partnership relations with outside suppliers. This confirms the need to move the analysis from scale, opportunism and appropriation concerns to a relational perspective when studying outsourcing in R&D intensive industries.

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1. Introduction

Firms no longer are what they used to be, appears to have become the communis opinio among practitioners and academics alike when it comes to the newly emerging vertical structures of high-tech firms. More extensive outsourcing of activities, including activities in the manufacturing and product development realms, has led to more nimble and leaner firms, so the argument often starts (Domberger, 1998; Quinn, 2000). To compensate for the loss of internal technological capa-

bilities, however, firms increasingly rely on partnering relations with outside suppliers that can act as an effective substitute to the internal generation of knowledge and innovation (Dyer and Nobeoka, 2000; Dyer and Singh, 1998; Hagedoorn, 1993; Kinder, 2003; Nootboom, 1999; Quinn, 2000). Yet, through all the anecdotal evidence on leading manufacturing firms supporting these statements, it is unclear whether such changes in outsourcing policy have indeed taken on broader significance to the extent that R&D intensive industries have been engaged in large-scale outsourcing efforts.

It has long been argued that a high R&D intensity should lead to lower levels of outsourcing (Harrigan, 1985; Stigler, 1951; Williamson, 1985). In R&D inten-

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sive industries, scale advantages are usually sufficient to allow for more vertical integration (Harrigan, 1985; Stigler, 1951). Furthermore, innovative activities may be harder to appropriate if they are not performed inside the firm (Teece, 1986; Pisano, 1990). And there can be an increased risk of opportunism under these conditions, especially where the R&D concerned is of a proprietary rather than a generic nature (Williamson, 1985). Yet an alternative, relational view has arisen, which predicts outsourcing levels should be on the rise in the context of R&D intensive firms, since there is increasing inter-sector technological specialization and buyer–supplier relations have become more effective vehicles for exchanging technological know-how (Dyer and Nobeoka, 2000; Dyer and Singh, 1998; Kinder, 2003; Quinn, 2000). It has been suggested that in the face of severe technological change (Afuah, 2001) or if heterogeneity among firms is a substantial driver of the competitive process (Barney, 1999), vertical integration can instill rigidity into technological trajectories. Furthermore, the widening range of technologies needed to produce products like aircraft engines forces firms to look to outside suppliers for an increasing part of their innovative needs (Brusoni et al., 2001). Thus, there is now no conceptual agreement on the relation between R&D intensity and outsourcing.

This article attempts to tackle this controversy in the outsourcing and technology literatures by empirically unraveling the relationship between R&D intensity and outsourcing. Its central contention is that R&D intensity is no longer a negative predictor of outsourcing because firms in high-tech industries increasingly use cooperative relations with outside suppliers to obtain technology in areas that they know of, but are not themselves specialized in. By investigating outsourcing both as a state variable, in terms of how much a firm relies on external suppliers for producing its goods, and as a flow variable, in terms of changes in that external reliance, static and dynamic effects are captured. The two rival theoretical explanations are contrasted. An empirical test of 52 manufacturing industries in The Netherlands provides support for the traditional argument initially, but also shows how the relational view (Dyer and Singh, 1998) has gained impetus over the 1990s and is now more valid, implying R&D intensive industries were originally more vertically integrated, but have outsourced a substantial amount of activities and are now less integrated than other industries. This

casts substantial doubt over the tenability of the conventional argument and suggests that the relational view is more appropriate.

The second section of the article discusses the current stock of knowledge on outsourcing in the management and applied economics literature, focusing in particular on how R&D is believed to influence make-or-buy decisions. It also puts forward two hypotheses. Section 3 discusses developments in outsourcing in The Netherlands over the 1990s and presents the empirical data underlying this study. In the fourth section, these data are used to test the hypotheses through regression models. The conclusions, in Section 5, center on the theoretical implications, in terms of our understanding of when (not) to outsource and on the policy implications, particularly how the changing nature and extent of outsourcing forces managers and policy makers to rethink existing practices.

2. Outsourcing and its predictors

The make-or-buy or outsourcing decision has been the subject of substantial analysis in economics and management. While this is neither the place nor is there enough space to fully review this area here, it is useful to recapture some of the main arguments and findings. In particular, various attempts have been made to construct contingency models that help explain under which conditions outsourcing is a beneficial solution. Transaction cost economics clearly is one such model that predicts (Williamson, 1981, 1985) outsourcing occurs under conditions of low asset specificity, low uncertainty and a low frequency of transactions. When transactions employ highly specific assets, markets fail due to pressures for opportunism, forcing firms to internalize transactions (Walker and Weber, 1984). Similarly, if a certain asset is required frequently, the transaction cost disadvantages of the market will increase and internalization occurs. Uncertainty, for instance, in the form of volume or profit margin fluctuations, will induce the same effect, since contracts with suppliers will be imperfect, making external contracting less attractive. This effect of uncertainty is strongest in the simultaneous presence of asset specificity (Williamson, 1985). Williamson (1981) originally also argued that technological uncertainty, like volume uncertainty, would lead to vertical integration.

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