

# A tale of two literatures: Transaction costs and property rights in innovation outsourcing

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## Abstract

This paper investigates the relative importance of property rights and transactions cost factors in driving the decision of firms to outsource innovation. Using data for over 8000 firms from the UK Community Innovation Survey, we find that property right factors dominate over transaction cost factors. Transaction cost variables are more important for process innovation, while property rights variables are more significant for firms involved in product innovation. In addition, we find that firms involved in process innovation have a higher probability of outsourcing innovation than firms involved in product innovation.  
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## 1. Introduction

Innovation and the outsourcing thereof is a double-edged sword. Using the ‘market’ for the generation of innovative inputs can confer a cost advantage on a firm. However, the downside is that, specifically in the context of innovation where knowledge can be exclusive to the originating firm, any transfer of knowledge to other firms runs the risk of opportunism by partner firms. Furthermore, reliance on third parties for the production of inputs in general incurs contracting costs, leading to production bottlenecks and quality issues.

This double-edged sword summarising the decision to use the market for the generation of innovation, sits

within the transaction cost (TC) and property rights (PR) literatures. However, there is a fuzzy divide between these two literatures defying efforts of ‘tidy’ economists to attribute predictions to their proper source. One major thrust of this paper is to attempt to do just that: to organise the predictions, even where these agree, for the decision to work together with a partner firm on developing innovative inputs.

The idea that the PR and TC literatures work in tandem in explaining information flows is made clear in a recent paper by Love and Roper (2005). A simple rule of thumb to differentiate between the TC and PR literatures is to locate the theoretical emphasis: does the theory emphasise scale economies as the main way to prevent appropriation of information by the partner firm? If the answer is yes and scale is important, then predictions from this literature should explain how a firm protects itself from opportunism by a partner, on the basis that it is not worth a partner firm’s time or effort misap-

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propriating knowledge flows due to the extent of scale economies. Here we think in terms of costly innovation such as redesigning a complete car assembly line, which requires such scale economies to produce cost effectively, and firms will gladly cooperate with each other without fearing opportunistic behaviour from the partner firm. On the other hand, the pure appropriation literature looks formally at appropriation via mechanisms such as patent and copyright (see Levin et al., 1987, for an example). More specifically, Audretsch et al. (1996) discuss this issue of appropriation and in the context of the type of information relayed to the partner. Uncertain, risky outcomes are difficult to appropriate (partners cannot exploit these) and may as well be outsourced to a specialist.

In summary, the TC literature represents an approach predicting cost reductions under certain conditions when the market is used. It has a wide set of applications. The PR literature is more concerned with revenue losses arising from misappropriation by the market. This literature is mostly valid for knowledge transfer and has a narrower set of applications than the TC literature.

Clearly these two literatures are not mutually exclusive but they emphasise different things: costs/benefits in the case of TC and formal protection/appropriation environment in the case of PR. One benefit of using the TC and PR dichotomy is that it may help shed light on how firms manage the procurement of different types of innovation: product and process innovation.<sup>1</sup> The TC literature predicts that large-scale process innovation should enjoy the protection of scale economies, while the PR literature suggests that products may be innovative enough to enjoy patent protection or their returns uncertain enough to make opportunism by partners not viable. It is important to distinguish between the two literatures because we conjecture that the generic TC literature is likely to explain a small part of outsourcing decisions (cost saving aspects), while the PR literature has more to do with revenue maximisation. A further reason to distinguish between the two approaches is that if TC variables dominate, then it follows that innovation outsourcing behaves very much like any other type of outsourcing such as raw materials or janitorial services. On the other hand, if the PR variables take precedence, we can highlight just how different innovation outsourcing is from outsourcing standard inputs where no knowledge transfer takes place.

<sup>1</sup> An example of a product innovation is where a partner firm helps design a new hybrid engine. Cutting costs by introducing an innovative inventories management system is an example of process innovation.

Accordingly, this paper investigates the relative importance of TC and PR factors in determining the innovation outsourcing decision of firms. Given that firms have three options to undertake their innovation activities (in-house, part-outsourcing and full-outsourcing), their decision is modelled using the multinomial logit (MNL) model. The UK Community Innovation Survey (CIS3) consisting of more than 8000 firms is used. Since not all of the firms are involved in innovation, analysing the innovation outsourcing behaviour of firms based on the sub-sample of innovative firms leads to sample selection bias. Furthermore, since the dependent variable is not continuous, a straight application of the inverse mills ratio (IMR) cannot be used to correct the bias, and instead we use the adjusted IMR proposed by van de Ven and van Praag (1981).

We also analyse whether the relative importance of TC and PR factors differs for firms involved in product and process innovation. The analysis is carried out separately for these two groupings involved in product and process innovation. The coefficients across the two equations are compared using the method proposed by Allison (1999).

We find that there are important differences but also similarities in firms' outsourcing behaviour of innovative products and processes. In general PR rather than TC factors appear to drive the decision to collaborate in innovation. TC factors tend to be more significant for firms involved in process innovation than in product innovation, while PR factors are more significant for firms involved in product innovation. Another important difference arising when firms outsource various types of innovative inputs is that, generally, there is a higher probability for process innovation to be outsourced than product innovation. The common denominator is that, regardless of the innovation type, firms favouring formal and informal ways of protecting their market share will shy away from outsourcing innovative inputs. This finding is in line with a similar result given by Veugelers and Cassiman (1999). What distinguishes our paper from that of Love and Roper (2005) is that where the latter use survey methods to highlight the relevance of strategic over TC factors in innovation outsourcing, we infer similar findings using econometric techniques on over 8000 UK firms.

The remainder of the paper is organised as follows. The next section reviews the literature on TC and PR in a broad as well as an innovation outsourcing context. In Section 3, the data, methodology and variables used in the empirical analysis are described, while the results and implications are explained in Section 4. Finally, the summary conclusions of the paper are set out in Section 5.

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