

WHAT ARE RESEARCH JOINT VENTURES (RJVS)? ARE THEY GOOD FOR INNOVATION AND FOR ECONOMIC WELFARE?

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1 INTRODUCTION

This paper sets out to understand the growing interconnectedness of firms on matters of research & development; specifically focussing on Research Joint Ventures (RJVs). We will assess their use case and impact on consumer and societal welfare; in order to suggest whether Antitrust laws should lean against or facilitate firms pursuing RJVs and whether they are beneficial to society.

We find that RJVs are useful tools which in the optimal conditions, promote increased innovation and economic welfare; though there are many caveats whereby design, or through exploitation, RJVs can achieve the exact opposite.

This paper is structured into six sections. In section two, we will define and assess the background of Research Joint Venture, analysing the purpose of RJVs and their subsequent use case. In section three we will identify the motivation of a given firm to partake in an RJV. In section four, we proceed to assess the impact on innovation, followed by a discussion on the impact on welfare in the fifth section. Finally, we conclude based on the findings of the paper in section six.

2 BACKGROUND & DEFINITION

Coordinated R&D in the US and the EU became necessary to overcome the emerging threat of competition internationally in the high growth, mainly technologically focussed industries

(Röller, et al., 1997). It was observed that firms within developing countries had been employing joint venture strategies in the R&D space long before they were commonplace in the industrialised world- especially in Japan (Röller, et al., 1997). The ‘necessary’ designation we assign to the importance of coordinated R&D is best highlighted by Kamien *et al* (1992), who disregard previous commentators’ sentiment that development is immensely costly; such that only the largest firms have the resources to undertake it. They posit that even the largest firms do not now possess the capabilities to undertake “unilateral development of some new technologies” anymore. Therefore, to ensure future competitiveness of the industrialised countries; legislation was relaxed in the 1980s to encourage greater coordinated ventures, thus, Research Joint Ventures (RJVs) were formalised.

An RJV is defined as an organisation established by two or more participating agents who share joint control; with the aim to participate in collaborative research and development (R&D) (Grossman & Shapiro, 1986). It is important to add that though firms are the primary participants of RJVs; universities and government also engage in such projects (Caloghirou, et al., 2003). This specific form of R&D covenant is concerned with the “generation/adaption (but not simple exchange) of new technological advances” (Caloghirou, et al., 2003). RJVs are often described as operating in an “upstream market” (the market for research and information) which is the opposite of a “downstream market” (the market for goods and services – often used made using the technological developments founded by the RJVs) (Grossman & Shapiro, 1986).

The underlying intuition is that coordinated efforts between agents will achieve greater technological progression and economic welfare than pre-existing independent R&D structures would otherwise produce (Kamien, et al., 1992). The intuition is hopeful, though for competing firms to corroborate; each must realise significant upside/participation gains.

3 MOTIVATION

As aforementioned, determining the motives of agents engaging in RJVs, will support our eventual determination of whether they can be recognised as societally beneficial.

One of the principal reasons in favour of a firm entering an RJV is the elimination of the spillover externalities generated by independent R&D activities. One of the main spillovers considered by D'Aspremont & Jacquemin (1998) and Katz (1986) is the free-rider problem. Essentially, this implies there is a transfer flow of benefits from the firm/s undertaking R&D to other firms in the market – without fair licensing payment (D'Aspremont & Jacquemin, 1998). This disincentivises the costly R&D in groundbreaking technological advances as the ‘innovator’ concedes that the competition will gain from their investment. RJVs overcome this by cost-sharing, whereby the firms share the cost but benefit mutually from the research (Katz, 1986). The cost incurred by both firms works to incentivise maximum effort exerted by all contributing firms. Cost-sharing also mitigates the potential duplication of research, especially in a scenario whereby firms seek homogenous innovation (Röller, et al., 1997).

Caloghirou *et al* (2003) determine twelve factors in total which motivate firms to enter a RJV. These include research synergies; access to complementary resources; as well as market access and market power gains. They posit that earlier on; the more important gain from coordinated R&D and RJV activity was the possibility to “diversify horizontally and vertically” as well as enabling “virtual diversification into fluid technology fields”.

The characteristics of firms incentivised to form a RJV is considered by Röller *et al* (1997), who firstly hypothesise and later empirically determine that larger firms have a greater propensity to form a RJV with similarly large firms, and that participation with smaller firms

would be undesirable. Secondly, Röller *et al* (1997) determine that firms manufacturing complementary goods have greater propensity to form RJVs, than firms across differing industries with heterogenous products.

4 INNOVATION IMPLICATIONS

Now that we understand the motivation influencing firms to engage in RJVs, we can use this as a basis to assess the impact on innovation.

In a non-cooperative R&D framework, one of the biggest limitations faced by innovation-seeking firms is the uncertainty factor. That may alter a firm's propensity to invest and therefore an RJV becomes an attractive proposition in overcoming this by distributing the uncertainty risk among all participants (Poyago-Theotoky, 1997). Therefore, we can imply that the cost-sharing function of RJVs is beneficial in driving increased innovation.

From a similar angle, the spillover effect, and namely the free-rider problem, are mitigated by the usage of SJVs, as competing firms who stood to gain (without fair payment), from the R&D undertaken by their counterpart, now share the burden of the cost of said R&D. Thus, we can imply that SJVs increase the innovation rate in industries where spillover effects are prominent. De Bondt & Wu (1994) derive the relationship that the larger are the spillovers in an industry, larger are the innovation gains experienced via the usage of SJVs.

Not only are the size of spillover effects a factor, but also the size of the firm can impact innovation under an RJV agreement. We consider the analysis of Vonortas (1997), who finds that smaller firms are more risk-loving and therefore choose to invest in several RJVs in a bid to achieve success in any one area. This is in contrast to larger firms who concentrate efforts into one particular area/venture. The conclusion drawn in the paper is that smaller firms do

not contribute to large-scale effective innovation in nearly the same capacity as larger firms...i.e. the larger the size of the firms forming RJVs, the larger is the innovation payoff.

De Bondt & Wu (1994) pose that the problem of “cartel like production” as a threat to innovation. What they imply by this is that RJVs are an agreement to increase R&D levels, though they could very well be used for the exact opposite. They state that in an RJV where there is large membership, limited spillover effects and moderate information exchange flows – there is the possibility of an agreement to reduce R&D, which would harm both innovation and cause great dynamic inefficiency. Grossman & Shapiro (1986) evidence the case of “United States v. Automotive Manufacturers Association” in which the parents of the SJV used it to restrict and slow “the development of pollution control technology”. Although, in his paper Link (1996) determines that 59% of RJVs incorporated are concerned with process innovation over product improvement – suggesting that there is legitimate intention for the establishment of most RJVs to innovate upstream.

5 WELFARE IMPLICATIONS

The discussion of innovation leads naturally to the discussion on general economic welfare, since any hindrance to innovative progression is itself to the detriment of welfare. In this section we shall discuss this and the other major proponents necessary to assess implications on welfare.

A key consideration to analyse is whether SJVs increase consumer surplus and whether they are efficient from a static welfare perspective (consumer surplus plus producer surplus). It turns out that the extent to which consumer surplus is maximised is dependent upon the extent to which information sharing is proliferated within the SJV. De Bondt & Wu (1994)

state that the greater the information sharing in an RJV cartel, the greater the consumer surplus and static welfare. They posit that this result is intuitive, and add that welfare increases with the size of the RJV cartel if spillovers are large (and vice versa if spillovers are small).

Despite this, we must also analyse from an antitrust perspective. We consider the impact of a few firms controlling the patents on technological innovation. These RJV cartel members have a disincentive to license this technology to those firms not in the RJV 'club'. The concern arises that this leads to reduced competition in the upstream market, which in line with economic intuition, will nearly certainly lead to higher prices which will increase production costs in the downstream market (Grossman & Shapiro, 1986). Reduced competition as well as increased production costs which could be transferred to the consumer; are both clear negative welfare implications of WJVs.

Though we acknowledge the problem of internal bias within the RJVs, their existence in the first place is somewhat of a win for social welfare. The perspective employed here is that, as opposed to individual R&D investments, RJVs "guarantee diffusion" of information that may otherwise be held by one sole firm (Grossman & Shapiro, 1986). Many of the firms partaking in joint ventures would not otherwise have conducted the R&D themselves not sought a licensing contract from the R&D initiating firm. This greater information spread boosts competition, may proliferate to in the downstream markets and eventually translate to benefit consumers (Grossman & Shapiro, 1986).

Following the discussion on benefits to the consumer, we next examine the factor of quality vs variety. As firms essentially 'collude', and RJVs innovate the 'superproduct', the quality offering increases but the variety that is achieved in non-coordinated markets declines. Poyago-Theotoky (1997) evaluate the impact of this in a simulation – determining that

consumers only consider the increase in quality a welfare gain over increased variety, if the size of the quality gain is significant enough. Thus, in the scenarios where SJVs develop small-to-medium quality improvements; consumers would rather the increased variety. In this case, the non-competitive equilibrium is the welfare-inefficient one.

6 CONCLUSION

In this paper, we set out to establish what is meant by a RJV and what the implications are on both innovation and economic welfare. We found that RJVs are effective solutions in overcoming spillover effects, especially the free-rider problem – by implementing a cost-sharing function. Using the existing literature framework as well as theoretical and empirical evidence, we observed that large firms were unlikely to enter an RJV with a small firm, preferring larger firm partnerships to exploit resources, skills and synergies.

We also observed that RJVs are generally positive drivers of innovation, as they overcome the fear of uncertainty by distributing risk, though we caveated this by specifying that the size of the firm undertaking the RJV impacts the size of innovative developments – such that smaller firms struggle to add significant innovative value due to their spread of investments across the risk landscape. We underpin the discussion on innovation by acknowledging the potential for output-limiting cartel-esque behaviour. In light of this risk, antitrust policies should carefully regulate and disincentivise innovation halting perverse incentives of the RJV cartels.

On the discussion of implications on welfare, we determine that the degree of information sharing dictates the welfare benefits in terms of consumer surplus and also static measures. The main impetus is the size of the spillover effect on the welfare benefits – if there are large spillover effects in a given industry, larger social welfare will derive as a result of RJVs. On the whole the welfare benefits far outstrip the counterfactual considerations. Research is

conducted in RJVs that would not have otherwise been undertaken, and that research is distributed to far more firms than in an independent research structure, benefitting society and ultimately consumers. In our view this outweighs the potential limitations on competition due to internal bias in the RJVs. Finally, we assess the consumers trade-off between quality and variety and conclude that where large technological innovations can be realised- consumers will sacrifice variety. Though for anything less than substantial innovation, many consumers would prefer variety – this presents the opportunity for competitive firms to fill the gaps and implicitly benefit from RJV coordination. Thus, it seems, that Research Joint Ventures are largely a positive development for the US and EU in maintaining a competitiveness in the globalised world.

7 REFERENCES

- Caloghirou, Y., Ioannides, S. & Vonortas, N. S., 2003. Research Joint Ventures. *Journal of Economic Surveys*, 17(4), pp. 541-570.
- D'Aspremont, C. & Jacquemin, A., 1998. Cooperative and Noncooperative R&D in Duopoly with Spillovers. *The American Economic Review*, 78(5), pp. 1133-1137.
- De Bondt, R. & Wu, C., 1994. Research Joint Venture Cartels and Welfare. *Onderzoeksrapport No 9403*, January.
- Grossman, G. M. & Shapiro, C., 1986. Research Joint Venture: An Antitrust Analysis. *Journal of Law, Economics & Organization*, 2(2), pp. 315-338.
- Kamien, M. I., Muller, E. & Zang, I., 1992. Research Joint Ventures and R&D Cartels. *American Economic Review*, 82(5), pp. 1293-1306.
- Katz, M. L., 1986. An Analysis of Cooperative Research and Development. *The RAND Journal of Economics*, 17(4), pp. 527-543.
- Link, A., 1996. Research Joint Ventures: Patterns from Federal Register Filings. *Review of Industrial Organization*, 38(1), pp. 138-198.
- Poyago-Theotoky, 1997. Research Joint Ventures and Product Innovation: Some Welfare Aspects. *Economics of Innovation and New Technology*, 5(1), pp. 51-73.
- Röller, L.-H., Tombak, M. M. & Siebert, R., 1997. *Why Firms Form Research Joint Ventures: Theory and Evidence*, Berlin: Wissenschaftszentrum Berlin für Sozialforschung.
- Vonortas, N. S., 1997. Research joint ventures in the US. *Research Policy*, 26(1), pp. 577-595.