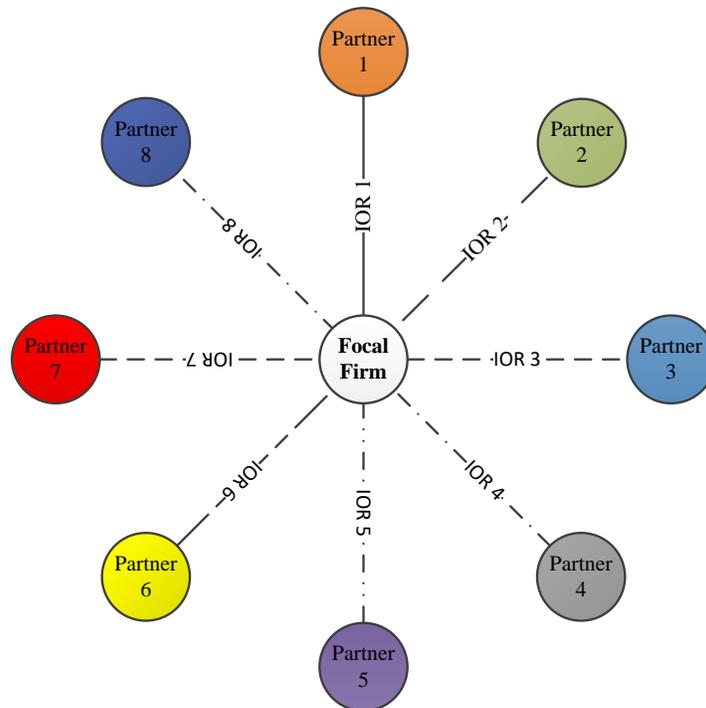


# Collaboration and You

**The Performance Implications and the Antecedents of Diversity in Inter-Organizational Relations Portfolios.**



**Dr.ing. Tim de Leeuw**

## Introduction

The central topic of this dissertation and the three underlying academic empirical studies is Interorganizational Relations (IOR). This dissertation analyzes the IOR at the portfolio level. The portfolio level (also called the egocentric level) incorporates all of the IORs a focal firm may have, such as all direct alliances, but also corporate venture investments, joint ventures, and mergers and acquisitions (M&As). Research on this relatively new level of analysis has started focusing on aspects such as the diversity of the IOR portfolio. With regard to IOR portfolio diversity, two aspects are studied in this dissertation:

1. Different partner types (i.e., alliance partner diversity, in Studies 1 and 2);
2. Different IOR modes (i.e., ties such as alliances, joint ventures, etc., in Study 3).

Overall, this dissertation aims to *investigate both the performance implications (studies 1 and 2) and the antecedents (study 3) of diversity in IOR portfolios.*

## Goals

The first two studies define IOR portfolio diversity as Alliance Partner Diversity (APD), which is the diversity of partner types in the direct alliances a focal organization engages in. With regard to the focus on the diversity aspects of the partners, the literature shows that similarities and differences among alliance partners (such as variance in the partners' resources, capabilities, competencies, and backgrounds) are important key network attributes that can have a significant impact on organizational performance. Furthermore, alliances are one of the IOR modes that are frequently used by firms and studied by scholars. The first study reports on the theorization and investigation of the relationships between portfolios with different types of alliance partners (e.g., buyers, suppliers, research institutes, etc.) and three firm performance measures: productivity and radical and incremental innovative performance.

The second study builds on and extends the first. Previous studies (including Study 1) showed that APD has an important impact on a firm's innovative performance, but the APD literature is inconclusive about this impact. Differences within the individual performance dimensions might be due to contingency effects that influence the relationship between APD and the performance dimensions. For this reason, coupled with a recognition that not all firms benefit equally from APD, this second study incorporates resource constraints as a contingency affecting the relationship between APD and innovative performance. The main reason for this focus on resource constraints has to do with how they are theoretically and empirically related to APD: firms can use their APD to (partly) overcome resource constraints. Therefore the effectiveness of APD on innovative performance might be influenced by resource constraints.

With regards to the third study, disruptive technological changes, such as the emergence of the smartphone which led to the demise of Nokia, illustrate the destructive impact technological developments and their corresponding uncertainty can have on firms. The third study therefore examines the diversity due to different modes of IORs firms use in their portfolio and assesses how they respond to two types of technological uncertainty (i.e., industry and firm-specific technological turbulence). It also investigates how firms change the diversity of their IOR portfolio by initiating different modes of IORs, such as alliances, joint ventures and M&As, in response to the two types of technological turbulence. In general, firms might decide between two opposing responses: increasing or decreasing the diversity of their IORs. These responses relate to a broader organizational debate about firms' responses to uncertainty: do they innovate or revert back to their core business?

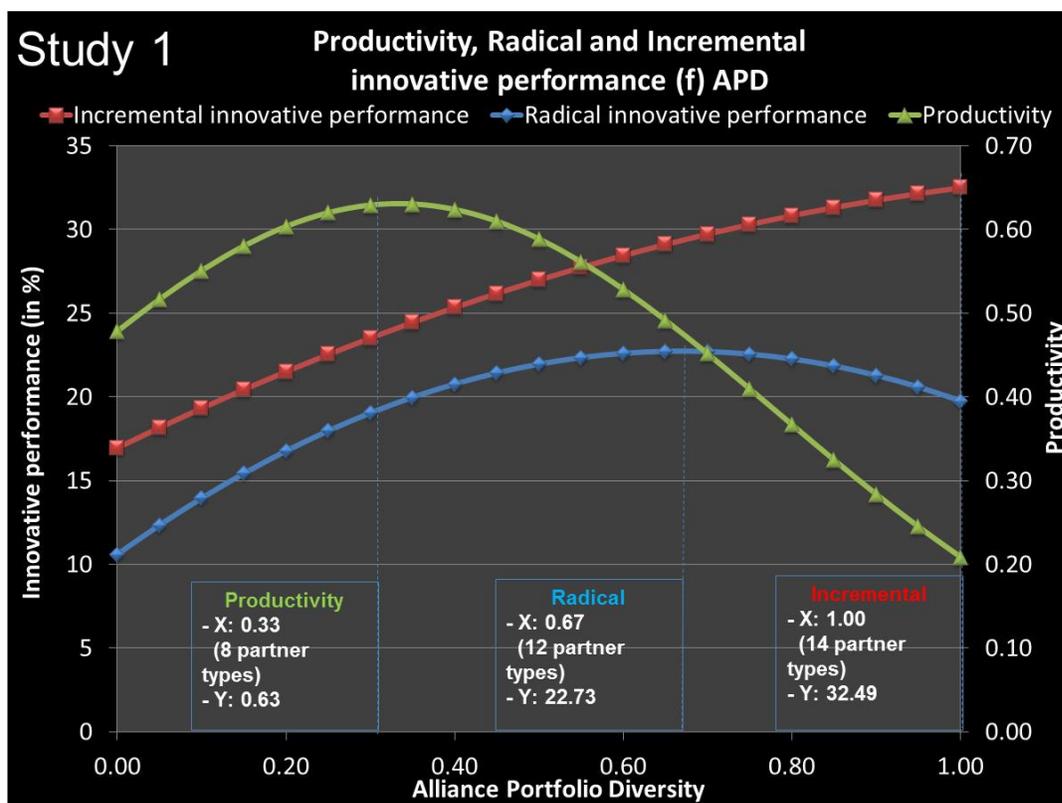
## Approach

All three studies are quantitative in nature and use secondary data to develop large panel datasets. This first two studies use +/- 10,000 Community Innovation Surveys (administered by the CBS) from more than 7,000 firms, from 26 sectors in The Netherlands over a period from 1996-2006. Tobit random effects panel data estimations are used to assess the relationships between APD and both dimensions of innovative performance (radical and incremental), while GLS was used to assess the relationship between APD and productivity.

For the third study multiple data sources were combined. Random effect and negative binomial panel data estimations were performed on a developed panel dataset of the 282 largest US pharmaceutical biotechnology firms during the period 1990-2007. These firms have over more than 8,000 IORs and more than 57,000 patents which are used to measure technological turbulence.

## Outcomes

This results of the first study shows that the partner diversity in a firm's alliance portfolio has an inverted U-shaped relationship to both productivity and radical innovative performance. A positive relationship is found between diversity in the alliance portfolio and incremental innovative performance. Moreover, the theorizing and findings suggest that a lower level of diversity is needed to achieve an optimum level of productivity compared to radical innovative performance, but for incremental innovative performance, a higher level of portfolio diversity appears to give the best performance. See the figure below.



The results and theorization of the second study show that resource constraints have a partial positive moderating effect on the relationship between APD and innovative performance. Contributing to the notion that APD and resource constraints can have different effects on different dimensions of performance (as shown, for instance, in Study 1), this study shows that the positive moderating effect differs for the relationships between APD and two dimensions of innovative performance: incremental and radical. No significant effect of resource constraints on the relationship between APD and radical innovative performance was found. But resource constraints were found to significantly positively influence the relationship between APD and incremental innovative performance, turning the original inverted U-shaped relationship into a positive relationship. This shows that some resource constraints might help firms to improve their efficiency and derive more benefits from their APD.

The theorization and results of the third study show that the two distinct types of technological turbulence trigger two opposing responses in firms and, additionally, that real options theory appears more valid with regard to industry technological turbulence, while threat-rigidity theory appears to be more valid for firm-specific technological turbulence. This study shows that firms that experience industry technological turbulence increase their IOR portfolio diversity with a preference for modes that have relatively lower levels of interdependence (i.e., licensing agreements, non-equity alliances, and CVC investments). In contrast firms that experience firm-specific technological turbulence decrease the diversity of their IORs, with a decrease in modes with both high and relatively lower levels of interdependence

### **Key takeaways**

This dissertation enriches our understanding of both the performance implications and antecedents of diversity in firms' IOR portfolios. Combined, the three studies show that:

- Diversity in a firm's IOR portfolio has a different impact on different dimensions of firm performance;
- This impact is influenced by contingency effects such as resource constraints;
- Different levels of portfolio diversity is beneficial for different performance dimensions (i.e., more diversity is not always better);
- The success of a new IOR might depend on the previous level of IOR portfolio diversity;
- Firms could thus benefit from assessing the fit of a new IOR not only with the company itself, but also within the IOR portfolio;
- Firms might use their IOR portfolio to deal with technological turbulence and resource constraints;
- Some resource constraints might be beneficial for improving incremental innovative performance by the use of APD;
- Different types of technological turbulence (industry and firm-specific) have competing effects on the diversity of IOR modes used in the IOR portfolio (and also on the preference for the individual IOR modes).