

Unlocking Supplier Innovation: The Strategic Role of Purchasing in Incumbent Firms

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Preface

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Summary

Startup supplier innovation can become a major contribution factor for purchasing and supply management of established companies and its usage is still in an early stage. By tapping into the innovation performance of these small entrepreneurial firms, an incumbent can significantly speed up their product, service or even business model innovation. The successful integration of these supplier innovations into the daily operations and supply chain management will then become a competitive advantage. Both sides, despite the asymmetric nature of the relationship, can benefit significantly from their complementary assets. Using startups as suppliers, however, requires completely different supply chain management skills, processes and tools. Although interest in startups as suppliers has grown in recent years, research on this topic remains scarce. In particular, there is limited understanding of how firms structure their supplier management practices regarding the sourcing, integration, and governance of new venture suppliers. This provides a research opportunity on the startup-incumbent relationship with a focus on purchasing and the required future competencies from their professionals.

This dissertation provides a comprehensive overview of managing startup-corporate alliances within purchasing and supply management. It draws on three empirical studies: a long-term participant observation, interviews, and a survey. The findings offer insights into (1) the different pathways startups face when allying with incumbents, (2) the importance of aligning the organizational ambidexterity between R&D and purchasing, and (3) future opportunities to developing the purchasing function using the jobs-to-be-done theory. This research contributes to the literature on the dynamics of asymmetric R&D alliances between startups and incumbent organizations, on the impact of alignment of the organizational ambidexterity at the department level within an organization on the innovation performance, and on the integration and selection of capabilities for supplier innovation activities in the purchasing and supply function.

Dissertation Structure

My dissertation starts with the synopsis of my independent three papers. In this first part I describe the research setting and motivation, my findings, and the contribution of this dissertation. The main concepts and theories are introduced, and it connects the papers through the overarching findings and implications for research and practice. Then the three independent research papers follow. Each paper is structured by an introduction and conceptual background, followed by the applied methods and findings, and finished with a discussion and implications.

AI Acknowledgments

In the preparation of this dissertation, I utilized ChatGPT-4o as a tool to enhance language clarity and improve text structure. The Artificial Intelligence (AI) did not generate original ideas, arguments, or conclusions; rather, it assisted in refining the presentation of my work. Every AI-assisted modification was thoroughly reviewed and edited where necessary to ensure accuracy and alignment with my own academic standards.

I take full responsibility for the content, interpretations, and conclusions presented in this dissertation. All intellectual contributions, critical analyses, and findings are my own.

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List of Abbreviations

AI	Artificial Intelligence
ANOVA	analysis of variance
AUTOSAR	AUTomotive Open System ARchitecture
CVC	corporate venture capital
FtM	First-to-Market
ICE	Internal Combustion Engine
IoT	Internet of Things
IP	Intellectual Property
IT	Information Technology
JIT	Just-in-time
M&A	Mergers and Acquisitions
MVP	minimal viable product
NPD	New Product Development
ODI	Outcome-driven Innovation
OEM	Original Equipment Manufacturer
OS	outcome statement
POC	proof of concept
PSM	Purchasing and Supply Management
R&D	Research and Development
RFP	Request for Proposal
SCM	Supply Chain Management
SME	Small and Medium-sized Enterprise
SOP	Start of Production
TAR	Task, Authority, Responsibility
USP	Unique Selling Proposition
VDMA	Verband deutscher Maschinen- und Anlagenbauer

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Part 1

Synopsis

1.1 Introduction

In order to further their success, companies continuously work to gain a competitive advantage. Researchers have known for a long time, that one avenue of success is through good innovation management (Abernathy & Clark, 1985; Teece, 1986; Tushman & O'Reilly, 1996). Innovations take a variety of forms and may involve improvements in services, products, processes or even business models (Abernathy & Clark, 1985; Chesbrough, 2010). If the changes are small, and often cost and efficiency driven, they are called incremental innovations. Radical innovations can replace complete services and product categories (Tushman & O'Reilly, 1996). Although seen as a major driver for competitive advantage, innovation literature over the last few decades reports high innovation failure rates of 50% to 90% (Cooper, 2017; Griffin, 1997; Heidenreich & Spieth, 2013). This demonstrates, that despite the importance of innovation on the profitability and even survival of an organization, it also creates substantial risks and challenges to invest into innovation (Enkel et al., 2009). This pro-innovation bias refers to the assumption that innovations are inherently beneficial and should be adopted widely and rapidly, often without critical evaluation (Rogers, 2003). This bias can lead to the neglect of contextual factors, implementation challenges, and the nuanced balance between exploration and exploitation in organizational innovation processes (Talke & Heidenreich, 2014).

To mitigate some of the risks and expand their innovation portfolio, more and more companies are seeking partnerships for their innovation work — either through R&D alliance with similar companies, through suppliers or even through startups (Doz & Hamel, 1998; Jung, 2018; Rothaermel, 2001a; Schiele, 2010). Driven by ever shorter time to market and decreasing R&D budgets, incumbent organizations increasingly rely on supplier innovation for their New Product Development (NPD) (Azadegan, 2011; Johnsen, 2009; Wagner, 2012). The early integration of suppliers has a positive impact on the innovation project success at the buying company (Luzzini & Ronchi, 2011; Schiele, 2010). It can improve productivity and quality, reduce costs, and even reduce NPD lead time (Clark, 1989; Handfield et al., 1999; van Echtelt

et al., 2008). However, a reliance on supplier innovation can also pose significant risks for the purchasing company. In any partnership the risk of appropriability, i.e. theft of intellectual property, exists. The buying firm may also enter into an inefficient partnership, leading to a dependence on an unreliable supplier (Laursen & Salter, 2014; Partanen et al., 2019).

In recent years we have seen a rise in the number of startup firms that thrive in the environment of globalization and digitalization. If the success of these young firms is a consequence of or rather the catalyst for these developments would be an interesting avenue of research. Regardless, it is exactly this success which makes them interesting for established companies, who began experimenting with the integration of startups into their R&D pipelines through Mergers and Acquisitions (M&A) (Rothaermel, 2001b). More recently, established companies are also seeking to integrate startups in new modes of cooperation, incorporating their innovations through corporate accelerator programs or integrating them as suppliers in their supply base (Hallen et al., 2020; Jung, 2018). Additionally, these firms seek to integrate the startups' tools and know-how into their organizational designs. Startups, however, are fundamentally different organizations rather than just smaller versions of corporations or companies (Blank, 2013). This is one reason why established corporations, when looking for supplier innovation from startups, experience difficulties when using their standard procedures (Kurpjuweit & Wagner, 2020). The use of new ventures as suppliers creates benefits for the buying firm through the sourcing or co-development of products or services, however, it also creates new operational challenges for those buyers in their purchasing and supply chain management divisions.

The Purchasing and Supply Management (PSM) literature is focused mainly on the relationship between established firms. Only in recent years, has there been a shift in the focus to the relationship between startups and established organizations from a purchasing perspective (Knight et al., 2022). The differences in assets, such as resources, and capabilities between startup and an established supplier are substantial: established organizations usually prefer the proven manufacturing capabilities, product quality and reliability, and the financial resources an established supplier can bring to the table (Choi & Hartley, 1996). Objective selection

criteria are typically used to assess the supplier's capabilities and resources, making it often impossible for purchasing to nominate a new firm, such as a startup; new firms lack in the appropriate metrics, denying their selection according to the standard evaluation criteria. If the new firm is still desired, this leads to additional investment of resources, such as monetary funds or time, needed by the buying firm to establish a startup's suitability to become a new supplier. Given the added riskiness of a startup venture, in addition to the normal risk-level of innovation work, additional investments become unlikely. This will also apply to other standard practices of the buying firms, such as supplier development or supplier integration.

The importance of PSM departments to the outside-in innovation process through suppliers has been highlighted in the past (Johnsen, 2009; Wagner, 2012) and, in fact, has been recently the cause of a call for additional research (Knight et al., 2022). Within supplier innovation, startups can be considered a clearly defined group, which require the buying firm to adapt their established processes and tools to achieve successful partnerships (Zaremba et al., 2016). This means that the buying firms need to increase their resources in order to manage these partnerships on a more individualistic level, as well as relax some of their supplier selection criteria in order to not miss a collaboration opportunity upfront (Zaremba et al., 2017). Knowing that, however, at the present for many industries, it is common for more than half of the value creation to come from the supply base (Schuh et al., 2022), these criteria, processes, and supplier management practices are still valid. The balance between the traditional tasks of securing supply at the best cost and the new task of innovation integration provides new challenges.

PSM is still seen as the risk averse and cost focused side of an organization (Murfield et al., 2021). It is in alignment with this culture, that the typical purchasing professional is measured and hired. Giglio et al. (2025) have shown in their literature review a lack of research into the necessary individual antecedents for corporate-startup collaborations (Giglio et al., 2025). The needed skills or competencies for innovation purchasing by the purchasing and supply management professionals thus have been scantily researched. Some studies have looked into the general future requirements of purchasing employees (e.g. Bals et al., 2019; Beske-Janssen

et al., 2023), however, these used either qualitative methods or focused on other aspects of purchasing, such as sustainability and innovation.

This dissertation connects research on supplier-driven innovation with the literature on entrepreneurial ventures and purchasing, thereby deepening our understanding of the role new venture suppliers play within contemporary supply networks and on the purchasing departments. In doing so, it contributes to a more nuanced view of innovation processes in buyer-supplier relationships and offers insights into the impact of ambidexterity structures and buyer capabilities in innovation driven supply chains.

1.2 Conceptual Background

1.2.1 Corporate – Startup Alliances and Collaboration Modes

Firms have been collaborating through alliances, ecosystems or other partnerships for many years. The focus of such collaborations on the innovation performance of the partnership has also been studied since the late 90s (Doz & Hamel, 1998; Gulati, 1998). Despite the extensive research, many of these alliances still fail and the partners are often left feeling exploited (Alvarez & Barney, 2001; Greve et al., 2010). Some studies report failure rates of 90%, while others report a lower 50% (Cooper, 2017; Griffin, 1997; Heidenreich & Spieth, 2013). Despite these precarious statistics, startups and corporate firms are seen as natural alliance partners due to the need for the complementary assets each possess (Hess & Rothaermel, 2011; Rothaermel, 2001b). The know-how of a startup in new technology fields and the ability to successfully develop new products or services are highly sought after by incumbent firms. Startups are interested in the resources, legitimacy and investment potential an incumbent firm can provide. Many incumbent firms are therefore setting up corporate startup programs, which can be ranged along a governance spectrum. On one end are loosely integrated R&D alliances which serve as listening posts to understand trends and development, while on the other end, corporate venture capital (CVC) or corporate accelerator programs acquire equity stakes in startups, gaining formal say through board level seats or other legal means (Kanbach & Stubner, 2016). Similarly to the governance structure, the innovation intention of these alliances can be placed on a spectrum. On one end is represented by the complementary assets theory by Rothaermel (2001a). This theory focuses on the commercialization of the startup's technology by the incumbent to gain a competitive advantage. The other end is represented by the open innovation theory by Chesbrough (2003). His theory suggests that a much broader range of goals should be targeted in these incumbent – startup alliances. These goals range

from public relations and employer branding to gaining insights into new markets, business models, and technologies Richter et al. (2018). These two bookends can be directly linked to the exploration/exploitation theory by March (1991).

In all these theories the homogeneity of an organization is assumed (Balachandran & Eklund, 2023). Reality shows that partners, and therefore also new ventures, face not one but several organizational groupings when dealing with a large incumbent firm (Puranam et al., 2014). These smaller groupings within a large organization do differ in their roles and targets, such as technical knowledge acquisition or product commercialization (Balachandran, 2024). Over time, it becomes increasingly difficult for the partner to navigate these different clusters within an organization and their individual governance and innovation modes.

1.2.2 Organizational Ambidexterity

In order to solve this need of a startup for navigation within a large incumbent organization the concept of ambidexterity should be applied (Zahoor et al., 2024). Ambidexterity in the sense of innovation performance is achieved when an organization is effectively applying both exploration and exploitation measures (Birkinshaw & Gibson, 2004; Tushman & O'Reilly, 1996). O'Reilly and Tushman (2013) describe three organizational designs that aim to balance exploration and exploitation: temporal, structural, and contextual ambidexterity.

Temporal ambidexterity is also referred to as sequential ambidexterity, as it describes the shift between two punctual equilibrium points (Burgelman, 2002). Long periods of exploitation and short bursts of exploration alternate as companies try to adapt to technological change and innovation (Brown & Eisenhardt, 1997). A major difficulty in this organizational approach lies in the timing of the switch between them. Favored by smaller firms in stable environments, temporal ambidexterity saves resources (O'Reilly & Tushman, 2013), however, this is not the reality experienced by most firms at present. Fast and turbulent markets seem to have become the norm across all industries (Weiblen & Chesbrough, 2015). Additionally, to reconcile the tensions created within the organization, the change in innovation mode requires a strong top

management team (Raisch & Birkinshaw, 2008).

By setting up parallel, but structurally separate business entities within the organization, structural ambidexterity can be achieved (Duncan, 1976). The continuous effort of both exploration and exploitation avoids the crucial timing challenges of temporal ambidexterity. However, as each activity requires a specific set of capabilities and setup, it creates a paradoxical challenge for the organization (Jansen et al., 2009). Each business unit can thrive on its own within its system, as the culture and processes are ideal for their specific setting (Tushman & O'Reilly, 1996). The transfer of knowledge and the strategic alignment needs to be coordinated by top management (Kauppila, 2010). With an overarching set of values and goals, integration of a common strategic intent will present a challenge (O'Reilly & Tushman, 2004).

Contextual ambidexterity offers a novel approach to balancing exploration and exploitation by integrating both within the same organizational subsystem, rather than separating them spatially or temporally (Wang & Rafiq, 2014). This bottom-up approach empowers individual employees to engage in both tasks simultaneously, fostering creativity and discipline through an organizational culture built on diverse knowledge and perspectives (Ghoshal & Bartlett, 1994; Gibson & Birkinshaw, 2004; Simsek, 2009). Unlike structural or temporal ambidexterity, contextual ambidexterity leverages parallel structures, such as formal routines for efficiency and project teams for innovation, within a single business unit, providing flexibility and reducing management costs (Raisch & Birkinshaw, 2008). Particularly in dynamic markets, such as high-tech industries, contextual ambidexterity is essential for balancing short-term success with long-term sustainability (Wang & Rafiq, 2014). However, its implementation poses challenges. Fostering the necessary behaviors through social learning takes time, and the ability to drive radical innovation may still require senior managerial support (Gilbert, 2005).

Ambidexterity can also be achieved through the use of alliances between organizations (Zahoor et al., 2024). Only in recent years has the impact of individual departments on the success of strategic alliances been identified (Johnsen et al., 2022). With the focus shifting from organizational ambidexterity approach at the firm level to organizational ambidexterity approach at

the individual department level, the interactions between these departments become relevant (Picaud-Bello et al., 2019).

1.2.3 Future Role of Purchasing Departments

As competitive pressures increase, it is only natural to look outside an organizational boundary for competitive advantage (Brunswick & Chesbrough, 2018). This strategy and its complexities were described in the previous section. The open innovation approach not only requires change in the Research and Development (R&D) functions of an organization, but also from its complementary functions, one of them being the PSM function. The role of purchasing has constantly evolved, increasingly so during the last decades. The change from a traditionally cost focused function (Gualandris et al., 2018), to a much broader role in recent years, has resulted in several calls for papers to identify potential future roles and responsibilities, such as the participation in the strategic decision making of companies (e.g. Di Mauro et al., 2024; Knight et al., 2020, 2022).

Early involvement in the NPD process is one of the major trends in the new role of PSM. The integration of purchasing has a positive effect on supplier integration and innovation performance (Luzzini et al., 2015; Schiele, 2010). However, R&D departments are still reluctant to accept this increasing responsibility of PSM (Picaud-Bello et al., 2019). One of the reasons identified is the low internal status of purchasing and the lack of skills required for innovation processes (Patrucco et al., 2017; Tassabehji & Moorhouse, 2008).

1.3 Summary of Research Papers

During my extended time as a participant observer at an automotive manufacturer, I was able to identify challenges in the handling of outside-in innovation through the purchasing and supply management function. These limitations have been neglected in current research. Paper 1 aims to extend the theory on the change of the dyadic relationship between the startups and the incumbent organization over the period of a strategic alliance. In Paper 2, I broaden my investigation into a greater understanding of the individual setup of departments in the context of organizational ambidexterity and innovation performance. I also identify the potential conflicts that can occur, if the organizational ambidexterity setups between R&D and PSM departments are not aligned. In Paper 3, I use an exploratory method to identify the future needs of PSM departments in order to improve the outside-in innovation performance with a focus on suppliers. See Table 1.3.1 for an overview of the content of the three search papers.

Research Paper	1	2	3
Title	Managing R&D Alliances with Startups: The Dynamics of Governance and Innovation Modes	Ambidexterity at Crossroads: R&D and Purchasing in Managing Innovation Collaboration	Future-Proofing Innovation Procurement: What Purchasing Must Change to Support New Suppliers
Theme	Changes in the governance and innovation modes during the strategic alliance due to a heterogeneous organizational setup.	The role of organizational ambidexterity at the department level and the resulting interdependencies.	Future requirements regarding purchasing employees in the context of outside-in innovation.
Research Gap	Lack of understanding of the dynamic interplay of governance and innovation mode at asymmetric strategic alliances.	Lack of knowledge in the impact of organizational ambidexterity at departmental level in strategic alliances.	Lack of understanding of needs driven future requirements on purchasing experts in innovation management.
Research Question	What does a heterogeneous organization mean for alliance performance? How does a change in governance impact the alliance performance? How does a change in innovation mode impact the alliance performance?	How do the respective organizational ambidexterity design approaches at PSM and R&D departments affect the firm's innovative performance?	What are the future requirements regarding the PSM function to improve a firm's innovation performance?
Theory	Alliance governance, innovation management, new product development	Open innovation, organizational ambidexterity, purchasing and supply management	Jobs-to-be-Done theory, purchasing and supply management, skills
Design	Qualitative case study with 16 dyadic supplier-incumbent projects	Qualitative, single case study	Quantitative survey
Data	40 semi-structured interviews, participant observation, archival data	24 semi-structured interviews, participant observation, archival data	Survey data from 128 PSM experts working at a large automobile manufacturer

Table 1.3.1: Overview of the three research papers

1.3.1 Paper 1: Managing R&D Alliances with Startups: The Dynamics of Governance and Innovation Modes

Strategic alliances between new ventures, such as startups, and large established companies offer benefits for both parties, especially if the alliance goal is to improve innovation performance. Startups often lack the resources and legitimacy to access some markets. Incumbent firms can provide these assets and help with the commercialization process. As the incumbents are facing increasingly volatile markets, opening their commercialization assets up for the startup technologies, they can gain speed and know-how in new products and services often outside their primary domain. This logical partnership has led to an increase of corporate startup programs in recent years, ranging from hands-off listening posts to full-fledged corporate venture capital programs. Similarly to traditional strategic alliances, the success rates of these programs are not very high and often leave one partner disillusioned. Additionally, if the incumbent firm becomes known in the industry as an unreliable partner, it becomes almost impossible to regain trust for future partnerships.

During my time as a participant observer at a large European automobile manufacturer, I was able to follow 16 startup-incumbent partnerships from November 2017 till June 2018. These partnerships began with first contact, via a startup program for a common minimal viable product (MVP) project and had the target of industrialization of the startup's technology for the incumbent. Using semi-structured qualitative interviews with both sides of the partnership, I examined the pathways these startups had to use to navigate the incumbent during the MVP phase and later evaluation of the continued partnership.

By using the concepts of governance (formal and informal) and innovation mode (iterative and linear) I was able to identify that the startups were taking different paths through the incumbent organization. The startups often began in an informal and iterative innovation mode. Some startups experienced an increasing formalization towards the end of their MVP project.

Other startups experienced a continuation of the informal governance setup but were moving from the iterative innovation mode to the linear innovation mode. Due to the small sample size, these pathways are only anecdotal, however my findings indicate that a formalization of the governance within an iterative innovation mode leads to more successfully continued partnerships and these startups gained more follow-on contracts. Moving into the linear innovation mode, led in most cases to a project termination.

1.3.2 Paper 2: Ambidexterity at Crossroads: R&D and Purchasing in Managing Innovation Collaboration

Building on the analysis of innovation partnership at the dyadic level in Paper 1, I turned my attention towards the internal processes and setup of the organization within the incumbent automobile manufacturer. Building on the theory of organizational ambidexterity, I dug deeper into the phenomenon of the change in innovation mode during the partnerships with the startups. I was able to identify the iterative innovation mode as being used by internal departments working on innovation exploration, while departments working on innovation exploitation tended to work in a linear innovation mode. This separation of exploration and exploitation was deliberate and followed an organizational separation within the R&D department into pre-development units and serial development units. In the context of organizational ambidexterity, the R&D department is therefore following the structural ambidexterity approach. This is in contrast to the purchasing department at the automobile manufacturer. Like the R&D department, the purchasing department is separated into technology functions, such as autonomous driving or engine development. However, unlike the R&D department, purchasing does not have a dedicated unit for pre-development. This means that the same purchasing experts are responsible for pre-development and serial development projects. This simultaneous handling of exploration and exploitation links the purchasing department to the contextual ambidexterity approach.

This asynchronous setup of organizational ambidexterity at the departmental level led to many conflicts with the startups. Purchasing departments, which set up fully contextual ambidextrous structures, had the greatest difficulties in on-boarding new suppliers, effects such as crowding out resulted. The serial development issues were often prioritized, as these projects had more resources, were more business critical (at least in the short term) and were also more prestigious.

1.3.3 Paper 3: Future-Proofing Innovation Procurement: What Purchasing Must Change to Support New Suppliers

Given the increasing involvement of purchasing departments in NPD and the growing importance of outside suppliers to the innovation pipeline of incumbent firms, the skill set needed within the purchasing department will also experience growth and change. PSM is evolving from a purely operational function into a strategic function. In order to contribute successfully to the innovation process, PSM experts need to be equal partners in cross-functional teams during the early phase of supplier innovation. Unlike the R&D departments, purchasing needs to be mindful of the entire life cycle of an innovation, with special focus on the commercialization phase.

Using the Jobs-to-be-Done theory, I developed a survey based on the Outcome-driven Innovation (ODI) method. I adapted it to identify unmet potential for future development in the PSM domain. Usually used for market research, the ODI helps to uncover latent requirements from customers by ranking statements on a fulfillment and importance level. I adapted the survey to identify purchasing experts as the ‘customers’ and used statements focused on the innovation purchasing job.

With the data obtained from 128 PSM experts, I was able to determine that for specific groups of purchasers, different types of needs were of greater importance. The PSM employees

at the large automobile manufacturer valued the innovation collaboration but were dissatisfied with its current performance. For most, established tier-1 suppliers are still seen as the most important and satisfactory innovation source. The exception being for purchasers of radical innovations who favored outside-industry suppliers. A strong desire was expressed for earlier PSM involvement in the NPD process. This would require new capabilities such as big data and new business model understanding to further radical innovations. The PSM experts currently working in areas driven by incremental innovation are still focused on supplier scaling. Radical innovation purchasers favor contextual ambidexterity, aiming to balance traditional purchasing roles with expanded innovation responsibilities.

1.4 Discussion

1.4.1 Implications for Research

This dissertation focuses on new supplier innovation and the influence of the PSM function on the supplier driven innovation performance. As such, the dissertation is not based on one single unifying theory, but rather a combination of theories. Each of the three research papers examines a different aspect of the supplier-buyer relationship. The use of qualitative (interview based) and quantitative (survey-driven) analysis creates a holistic view on these aspects. I investigate the supplier-buyer relationship from the outside in, starting at the dyadic relationship between the new suppliers and the incumbent buying organization, then by analyzing the internal organizational setup of the R&D and PSM departments at the incumbent organization, and finally by using the PSM experts to evaluate future requirements in their field through a market-driven methodology. My dissertation provides new insights into the complexities of successful outside-in innovation for incumbent organizations. It defines a path for future developments, especially as applied to the PSM, an often neglected, but important contributing player in outside-in innovation.

The initial finding of my dissertation concerns the heterogeneity of the startup-incumbent partnership and its impact on the success rate. Despite an organized partnership program, I discovered that for the 16 cases I observed at the incumbent, six different paths based on the governance and innovation mode existed. The governance of alliances and partnerships, even asymmetric ones, has been widely discussed (see for example Alvarez & Barney, 2001; Hogenhuis et al., 2016; Hora et al., 2018; Weiblen & Chesbrough, 2015). By including the variable of time, I show that it is not necessary for the governance of partnerships to be fixed over the course of the relationship, as change does occur and can be positive. Driven by the need for quicker and more streamlined processes, the startup program uses much simpler, less formal, governance to initiate the collaboration. While startups initially benefit from an

informal governance, many transition to a more formal relationship with the incumbent over time. I find that this formalization alone does not hinder partnerships. The circumstances of the collaboration can have a significant impact on their success. This second variable of innovation mode is determined by the R&D processes practiced by the incumbent. These R&D processes can be separated into two distinct innovation modes: *linear* and *iterative*. While the iterative innovation mode aligns with agile or flexible processes often inherent in those found at startups or new ventures, the linear innovation mode is found in more traditional environments (Bianchi et al., 2018; Cooper et al., 2002; Mills et al., 2018). A mismatch in innovation modes, where the incumbent imposes their traditional, linear process on the more agile startups, led in this study to higher failure rates. This misalignment has a greater impact on partnership outcomes than governance changes. This underscores the importance of aligning innovation approaches during the early stages of the partnerships.

As a second finding, this dissertation provides a concept of organizational ambidexterity at the departmental level. While many researchers looked at the impact of organizational ambidexterity at the whole organization level, they did not identify the impacts of individual departments working in different approaches, independent of each other. However, when required to work together, such as the R&D and PSM departments need to do for innovation alliances, a mismatched organizational ambidexterity approach can lead to complications. Proponents of contextual ambidexterity have suggested that it is the more successful model as it leverages the expertise and knowledge of the entire workforce (Gibson & Birkinshaw, 2004; Os- senbrink et al., 2019). This is supported by anecdotal success stories such as Hewlett-Packard’s laser printing business or Google’s Gmail, both the product of contextual ambidextrous organizations. Proponents of structural ambidexterity argue that truly radical innovation can only be developed in separate entities (Kauppila, 2010) as well as the capability to absorb outside-in innovation (Hwang et al., 2023). I propose that the alignment of internal structure is more important than the selected organizational approach, as both have their merits.

With the third finding I support the call for papers from Knight et al. (2022) and Di Mauro

et al. (2024) by extending the research into new areas and examining the additional skills needed by purchasing experts. This dissertation highlights some key areas for future research in PSM. While the PSM employees value multiple sources of innovation, overall they still prefer traditional tier-1 suppliers. This suggests that there is a gap between the practice and experience of experts in the field and the academic findings, where the leveraging of external innovation sources, such as startups or non-traditional tier-1, is considered a broadly understood necessity. However, purchasers of radical innovations do place greater emphasis on suppliers from outside the industry, aligning with the open innovation theory (Chesbrough, 2006). Additionally, this dissertation reveals a range of competency priorities among PSM employees, with radical innovation purchasers emphasizing an expertise in big data, software, and new business models, while the incremental innovation purchasers prioritize supplier scaling capabilities. This finding also suggests that employees dealing with incremental innovations favor structural ambidexterity, which maintains clear separations between exploration and exploitation tasks. In contrast, those engaged in radical innovation prefer contextual ambidexterity, balancing both within their roles. This aligns with prior literature (Constant et al., 2020) suggesting that innovation-focused purchasers seek a more active role in NPD.

1.4.2 Implications for Practice

This dissertation provides some important implications for the practice of R&D alliance. When forming R&D alliances with startups, managers must carefully choose governance structures and consider the innovation modes of their partners. A mismatch between innovation processes can disrupt collaboration. Additionally, the maturity of both the startup's technology and the target project significantly impacts integration speed into corporate innovation processes. Without proper measures to transition pilot projects into serial development, tensions between those firms may arise later. In addition, corporate startup programs differ from traditional incubation models as they aim to transform startups into suppliers rather than integrate them into the company. Since internal demand is often limited to a single department,

every partnership opportunity must be maximized. Lowering entry barriers for startups has increased collaboration opportunities, but long-term success depends on ensuring innovation transfer beyond pilot projects. Startup managers must also seek internal “champions” within R&D and purchasing departments to navigate corporate processes effectively.

When it comes to aligning organizational ambidexterity in PSM to the overall innovation strategy of the organization, Paper 3 reveals a clear need for improvement. The role of the PSM department in innovation is evolving, requiring new competencies in digitalization, business models, and open innovation. The study highlights the tension between traditional purchasing roles and innovation-driven responsibilities. While contextual ambidexterity (balancing exploration and exploitation) is often more sustainable, structural ambidexterity (dedicated innovation units) may be necessary for managing radical innovations. A hybrid approach, with specialized purchasing units for highly innovative commodities and traditional purchasing functions for stable commodities, could optimize both innovation and cost efficiency.

1.4.3 Limitations and Future Research

While this dissertation provides a contribution to current research and understanding, it does come with limitations. These limitations, however, can provide useful paths for future research opportunities.

My focus on a single organization does limit the generalizability and external validity of my findings. Future studies could expand the survey ODI study to encompass other industries, in order to identify further areas of opportunity or strengthen research into the current open topics. Additionally, other startup-incumbent partnership programs could identify alternate paths across the governance and innovation modes to support startup navigation.

The use of the ODI method in Paper 3 provides valuable insights into areas of partnership optimization within the PSM departments. However, it also presents certain limitations. ODI relies on subjective measures, which may introduce bias in assessing organizational needs. Future research should incorporate objective data, such as the number of software-related projects

or supplier diversity metrics, to expand on the validity of my findings. Additionally, given the overall dissatisfaction expressed by PSM employees across various opportunity scores, the study could cross-reference those satisfaction ratings within the different departments, using broader organizational satisfaction surveys for more contextualization.

To determine concrete pathways for organizational change, additional research is required. The needs identified in this study should serve as a foundation for further exploration using methodologies such as design thinking or other creative problem-solving approaches (Cousins, 2018). These methods could refine the formulation of specific competencies and strategies necessary for PSM transformation. Moreover, longitudinal studies tracking the impact of implemented changes over time would provide deeper insights into the effectiveness of different optimization strategies.

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Part 2

Managing R&D Alliances with Startups: The Dynamics of Governance and Innovation Modes

Abstract

Incumbent firms enter R&D alliances to improve their innovative performance by joining with little known and, in many ways, dissimilar partners, such as new ventures. To improve their access to such firms, many incumbents have implemented startup programs. However, these programs do not create lasting relationships and few new ventures continue their partnership with the incumbents beyond the scope of these programs. Shifts in the governance and innovation modes during the program period were observed during a 16-month participant-observation study at a global automotive company. 40 semi-structured interviews were conducted with managers of the startups that took part in such a program, as well as their responsible project manager at the incumbent. The shifts experienced caused conflicts and harmed the relationship between the partners. To benefit from R&D alliances with new ventures, managers on both sides need to be aware of the dynamics of governance and innovation modes during and after such programs and contain the tensions likely to emerge in the process. I am extending the alliance management literature by proposing a dynamic perspective that links shifts in inter-firm governance and innovation modes to the formation and maintenance of long-term partnerships.

Keywords: R&D alliances, new ventures, startups, incumbents, inter-firm governance.

2.1 Introduction

In today's digital age more than ever before, incumbent firms are threatened by radical and at times disruptive innovation emerging from unexpected sources (Hopp et al., 2018). One way in which incumbent firms attempt to enhance their adaptive flexibility and innovative performance is by joining forces with new ventures. A prime example of such strategic alliances can be found in the biopharma industry during the emergence of biotechnology (Rothaermel, 2001a). Theory tells us that these new entrepreneurial ventures, also widely known as startups, and the incumbent firms ought to have much to benefit from joining forces, given their often complementary capabilities (Gans & Stern, 2003; Gassmann, Zeschky, et al., 2010; Kaulio et al., 2017; Rothaermel, 2001a, 2001b). While startups have to take risks and bring innovative ideas and organizational flexibility to the table, incumbent firms can offer financial resources, scaling capabilities and organizational efficiency (Weiblen & Chesbrough, 2015). Further benefits for both parties exist. Startups can create value in a short time period with help from the incumbent firm through mentoring and accessing knowledge, as well as financial resources and market access (Pauwels et al., 2016). The incumbent, in turn, is set to gain preferred access to the technology base of participating startups, at a time when the valuation of the startup is still relatively low (Kohler, 2016).

Despite the promise of incumbent-new venture alliances, the odds of success are known to decline with the growth of asymmetry within the partnership (Hogenhuis et al., 2016). Additionally, strong competition exists among incumbent firms to partner with the best startups, particularly as startups also have the alternative of partnering with other types of organizations, such as venture capital firms (Katila et al., 2008). To improve their position in this competition, incumbent firms are implementing programs, such as corporate accelerators, to attract startups at an early stage (Kohler, 2016). Such startup programs are part of outside-in innovation, as they improve the insourcing of external innovation, are increasingly popular with incumbent firms and have been put into place by many organizations in the last few

years (Weiblen & Chesbrough, 2015). Yet, the effectiveness of such startup programs is still under debate (Hallen et al., 2020). While startups were found to increase their valuation by participating in such programs, company-independent accelerator programs primarily serve as signaling mechanisms rather than as a firm value creator (Kim & Wagman, 2014). Even for corporate startup programs it is at this point difficult to establish a success rate, especially to measure the performance implications for the incumbent organization. Critics state that most corporate startup programs are only initiated due to the media hype around startups and so the conversion rate of startup innovation into working projects is low (Kanbach & Stubner, 2016). Unsurprisingly, the topic of incumbent-new venture cooperation has received growing research attention (Bartman, 2014; Hora et al., 2018; Knoblen & Bakker, 2019; Neyens et al., 2010; Weiblen & Chesbrough, 2015). However, there appears to be a striking discrepancy between the logical and theoretical fit of startups and incumbent firms as partners and what is seen in practice: the low conversion rate of these startup programs into long-term partnerships, for which neither academia nor practitioners offer a compelling explanation so far.

It is against this backdrop that I seek to identify some of the key factors promoting or inhibiting the conversion of start-up pilot projects into incumbent-new venture R&D alliances. The data from my in-depth field study at a global incumbent firm in the automotive industry suggests that the local managers are generally unhappy with the success of their startup program, mainly in terms of the low conversion rate of startup pilot projects into R&D alliances. These pilots are short-term projects, where the startups have the chance to validate their technology in collaboration with the incumbent and provide initial evidence for the validity of a possible R&D alliance. In this context, the incumbent acts as a value chain investor, designing its startup program with the objective *“to identify, develop and integrate new products and services into the parent company’s value chain”* (Kanbach & Stubner, 2016, p.1771). As part of a 16-month participant-observation study, I was able to conduct 40 semi-structured interviews with key people from the startups participating in the program and their responsible project managers at the incumbent and analyze their experiences during and after the

completion of the startup program. Additionally, I participated in meetings and discussions, learning about the potential conflicts such a cooperation must overcome before long-term R&D alliances can be forged. Based on the sample of 16 dyadic relationships between the incumbent and startups, I observed each startup experiencing a different path through the organization. Previous studies on partnerships have mostly ignored this aspect of different paths, assuming that the partner has homogeneous access to the different resources, such as knowledge, within the partner organization (Puranam, 2018). Rather than a single homogeneous path, I have identified multiple differing ones through the inter-firm governance and innovation modes in these 16 relationships. Between the startup program and the incumbent's day-to-day business lies a diverse organization and as such finding the right path is a critical factor impacting the conversion from startup program to R&D alliance.

Inter-firm collaboration in R&D can be governed by an informal mode, relying on trust and relational governance, and a formal mode, in which contracts and control are used. As part of being the first point of contact with the incumbent, the startup program governs their projects in a more informal mode. Towards the end of these projects, I often observed a shift towards a more formal governance mode, sometimes creating tension in the relationship. The paths of this shift to a more formal relationship between the startup and incumbent varied. A second factor in determining changes in the path was in the innovation mode in which the partnership rested. Traditionally, startups relied on an iterative innovation mode, using development methods stemming from Information Technology (IT) and programming (Kanbach & Stubner, 2016) such as agile or lean development (Ries, 2011), whereas traditional development methods, such as stage-gate or waterfall development, are still predominant in many industries and correspond to the more linear and controlled innovation mode prevalent with the incumbent (Bianchi et al., 2018). These two innovation modes have very different key characteristics and underlying assumptions and requirements, giving rise to possible tensions in a second key domain of R&D collaboration. Importantly, tensions arose less from differences between the startups and incumbent in governance and innovation modes at a single point in time, rather, from the changes

in governance and innovation modes over time. For the incumbent learning from these changes was made even more difficult, as not all projects experienced the same changes, as they followed different paths towards their goal of a formal R&D alliance. As such, my article contributes twofold. I present a more dynamic perspective on inter-firm governance with special reference to outside-in startup programs as a new form of corporate innovation. And I show that the prior view of a homogeneous incumbent organization has to be replaced by a more nuanced view of different partnership paths in R&D alliances within the same organization. Given the increasing speed of innovation due to digitalization, the advantages of such partnerships should not be neglected to avoid the managerial challenges associated with them. By describing the tensions that arise due to governance and innovation mode changes, their root causes and their impact on early-stage asymmetric R&D partnerships, this article contributes the literature on both inter-firm governance and collaborative innovation. Additionally, a stronger, more dynamic understanding of the tensions arising between the incumbents and startups over time and in different paths will help incumbent managers improve their startup programs with special emphasis on the interfaces to the incumbents' day-to-day operations. These awarenesses may help incumbents increase their conversion rate in order to turn such pilot projects into successful long-term R&D alliances; thereby, allowing the incumbent to fully leverage the innovation potential of startups. Startup managers, in turn, can benefit from my findings by developing a better understanding of the potential pitfalls associated with joining corporate startup programs and proactively manage the shifts of the governance and innovation modes over time. Below, I introduce the conceptual background of my study. I then describe the research setting and methods, before presenting and discussing my findings.

2.2 Conceptual Background

2.2.1 Corporate – Startup Alliances

In the past, the corporate innovation pipeline was often only fueled by internal R&D. Since the late 90s collaborative innovation in the form of alliances, networks, and ecosystems have been identified as additional and necessary sources of innovation and capability development (Doz & Hamel, 1998; Gulati, 1998; Khanna et al., 1998; Lavie, 2006). As such, these R&D alliances have become an essential part of the outside-in process of open innovation (Chesbrough, 2006; Enkel et al., 2009). But alliances are difficult to manage, with studies showing alliance fail rates between 30% and 70% (Day, 1995; Greve et al., 2010; Kale & Singh, 2009) and others showing that 80% of the alliance partners are left feeling exploited (Alvarez & Barney, 2001). As such, alliance failure can cause substantial economic and social damage, potentially leading to suspicion and distrust between the former partners (Faems et al., 2008) and to sanctioning and the lowering of confidence from potential new partners (Hallen et al., 2014). R&D alliances vary greatly and in the past, have been distinguished primarily by their governance structure, ranging from very formal equity investments (e.g., minority equity positions, joint ventures, or equity swaps) to less formal non-equity arrangements (e.g., contract research, long-term sourcing agreements, or less than arm’s length franchising and licensing) (Dacin et al., 2007; Gulati, 1995, 1998). Similarly, corporate startup programs can follow the same governance spectrum, from equity positions based on the resources provided by the incumbent, often through accelerator programs or venture capital, to very loosely integrated R&D alliances programs that can be categorized as listening posts, whose objective is to gain an understanding of trends and developments and to initiate relationships (Kanbach & Stubner, 2016). Joining an alliance also exposes a firm to hazards that can negatively affect its performance, such as opportunistic behavior by the partner (Kale & Singh, 2009). Effective governance is therefore important for alliance success and one of the four pillars for relational rents in the relational view of the firm

(Dyer & Singh, 1998). The governance of alliances falls under the responsibility of the PSM department and has become a key element of the competitive performance of firms (Hill & Rothaermel, 2003).

R&D alliances are not only categorized by their governance but also can be categorized along their innovation motivation. Similarly to a firm’s internal innovation effort, which might be directed into exploration or exploitation, their R&D alliances can also be focused on exploration or exploitation (March, 1991). An exploration alliance is entered into with the motivation to discover something new, while an exploitation alliance seeks to commercialize an innovation (Rothaermel & Deeds, 2004). The main attraction in a startup alliance for an incumbent firm, and for venture capital, is the know-how and the ability to successfully develop a new product or service; Startups mainly use alliances with incumbents to gain access to legitimacy, resources, and investments (Rothaermel, 2002). If these complementary assets of the two alliance partners are the primary reason for joining a partnership, it is a strong indicator of an exploitation alliance. Therefore, the innovation motivation is a major driver of alliance type and partner selection (Kale & Singh, 2009). Freeman and Engel (2007) describe these different innovation modes as the “*corporate model*” and the “*entrepreneurial model*” and see the partnership of the two as key to successful market introduction of an innovation (Freeman & Engel, 2007). In this paper I am delving deeper into the heterogeneity of the incumbent’s organization due to the different governance and innovation modes within the corporate model and the movement of the startup between these.

2.2.1.1 Heterogeneous Organization

Existing literature has focused on the governance and innovation modes at the organizational level with the assumption of a homogeneous organization on each side of the partnership (Balachandran & Eklund, 2023). In the view of organizational knowledge, an organization itself helps its members to solve specific solutions by generalizing the problem and then providing standardized answers (Tsoukas & Vladimirou, 2001). These standardized solutions, sometimes

also called practices or routines, are defined by Kostova and Roth (2002, p. 216) as: “*an organization’s routine use of knowledge for conducting a particular function that has evolved over time under the influence of the organization’s history, people, interests, and actions*”. The routines are therefore institutionalized and thus homogeneous across an organizational grouping (Lupton & Beamish, 2014). However, especially large incumbent firms show significant diversity between their organizational groupings (such as organizational subunits) due to their organizational structure and the problem-solving approach (Puranam et al., 2014). The four main problems any organization must solve are *task division*, *task allocation*, *reward distribution* and *information provision* (Galbraith, 1973; Porter et al., 1975; Puranam et al., 2014), and it is assumed that an organization has one approach inside its boundaries. However, the size of an organization is often not defined, as a whole corporation can be conceptualized as an organization, but the sub-units, such as departments, teams or other arrangements within the organization can also each be treated as their own organization (Puranam et al., 2014). It is only recent studies, such as Balachandran (2024), that have started to differentiate organizations from a corporate level into smaller clusters, such as technical knowledge departments (i.e. technological invention and refinement) and complementary asset departments (i.e. product development and commercialization) (Balachandran, 2024).

Research Question 1: *What does viewing the incumbent as a heterogeneous organization rather than a homogeneous one mean for the performance of the startup-incumbent partnership?*

2.2.1.2 Governance Modes

To reduce the exchange hazard of opportunism, ensure appropriability, and to promote the knowledge transfer between two partnering firms, formal contracts or legally binding agreements are frequently used in inter-firm partnerships (Williamson, 2008). As such, formal governance often involves complex contracts and legal remedies to solve conflicts and contain opportunism (Poppo & Zenger, 2002). It is through such formal terms that intended transactions between

partnering organizations become enforceable (Ring & Van de Ven, 1994). Classic contracts promise to reduce the risk of exchange hazards by specifying the legal and economic consequences arising from any violation of the contract terms (Lee & Cavusgil, 2006). If the relationship between two firms becomes too complex for classic contracts, if more control is necessary, or if the parties do not trust in the legal institutions, the alliance partners can agree on equity ownership of the alliance (De Man & Roijakkers, 2009). By holding a partner's equity stake or by holding joint control over alliance-specific assets, the alliance partners are deterred from opportunistic behavior, as those investments would be lost or decrease in value. De Man and Roijakkers (2009, p. 79) also call this a "*hostage situation*". While formal remedies such as contracts are usually enforced by a third party, these 'hostages' are self-enforcing (Dyer & Singh, 1998). In addition to the deterrence aspect, ex ante commitment by the alliance partners can improve the relationship between them, as it provides an opportunity to monitor the other side (Kale & Singh, 2009). Both equity ownership and contracts represent a formal obligation to the alliance partner and therefore provide some level of control over the alliance. Alliance control, in turn, makes alliance behavior more predictable and enhances partners' confidence in the alliance (Das & Teng, 1998). Formal inter-firm governance, however, has notable limitations. One is the above-mentioned complexity of contracts. A contract that tries to account for every eventuality would become immensely complex and, as it is practically impossible to anticipate every potential event, would nonetheless still be incomplete (Williamson, 2008, p. 46). Additionally, contracts require third-party enforcement, which can be time consuming and costly even in a stable and efficient legal system (Dyer & Singh, 1998). Firms should therefore additionally employ informal forms of governance. Dyer and Singh (1998) differentiate between formal, third-party enforced contracts and self-enforcing informal agreements, such as goodwill trust or reputation. Trust is defined as the confidence of one person that another person, when presented with a choice, has the ability and intention to choose the path that is beneficial for the former (Deutsch, 1960). Trustworthiness can help to lower negotiation costs, as contracts do not have to be as detailed, and can contain conflicts during the partnership for instance

pertaining to the distribution of relational rents (Zaheer et al., 1998). Next to reducing the risk of opportunistic behavior, trust in an alliance partner increases interactions with partners and fosters knowledge sharing as a vital precondition of collaborative innovation (Dyer & Singh, 1998). Sako developed a model of trust which defines it as dynamic and hierarchical, as each level of trust builds on the previous one and the last level can only be reached, when the first two have been established: Those levels are contractual trust, competence trust and goodwill trust (Sako, 1997). She defined contractual trust as the first level of trust in which one trusts that the business partner will uphold the agreed contracts. Competence trust is the second level, in which one has the trust that the business partner is able and willing to uphold the agreement. The third level is goodwill trust, defined as one's trust that the business partner made a long-term commitment to act for the benefit of both parties while refraining from opportunistic behavior. Lewicki and Bunker also show the development of trust over time, from the stage of calculus-based trust¹ via knowledge-based trust to identification-based trust (Lewicki & Bunker, 1996). This shows that trust as a form of informal governance becomes more efficient over time, but takes time and resources to be built (Das & Teng, 1998; Vangen & Huxham, 2003). On the other side, trust can be easily destroyed (Kramer, 1999; Slovic, 1993). Usually, one major mistake is enough to destroy the results of years of trust building. Rebuilding it will take a very long time if trust can be regained at all. Slovic (1993) theorized that trust destroying events have a stronger influence than trust building events. This asymmetry can be explained by two factors: first, positive events are not as visible as negative events, and second, a negative event of the same magnitude as a positive event carries a stronger weight (Slovic, 1993).

The interdependence between formal and informal governance modes has been widely discussed. Dyer and Singh (1998) argued that trust and reputation as informal, self-enforcing governance mechanisms not only supplement, but rather supplant contractual and formal safeguards in providing greater relational rents and better alliance performance. Trust and informal governance are therefore conceptualized as a substitute for formal governance, as it is the less

¹Sometimes also called deterrence-based trust

costly and more effective governance mode (Gulati, 1998; Uzzi, 1997). Especially in the setting of R&D alliances, informal governance surpasses formal governance, because innovation and learning between organizations are unlikely to flourish in absence of trust (Sako, 1997). Additionally, it has been argued that formal governance, which is too strong, reduces trust, as it is seen as undermining the basis for any goodwill trust (Das & Teng, 1998, 2001). Other scholars support the substitution view, showing that informal governance, i.e. trust, can substitute formal governance, and therefore reduce the need for complex contracts (Gulati, 1995; Lee & Cavusgil, 2006; D. Li et al., 2008; Zollo et al., 2002). However, high risk scenarios with costly and more severe opportunities for alliance defection need a strong formal basis to build trust (Reuer & Ariño, 2007). This supports the complementary relationship view between formal and informal governance modes introduced by Poppo and Zenger (2002). Their research showed that managers increased the complexity and individualization of contracts, as relationships with the partners grew, and that with growing contractual complexity those managers employed greater levels of informal relationships with their partners. This complementary view, where the increase of one mode of governance results in the increase of use or benefit of the other, is supported by other studies (Y. Li et al., 2010; Liu et al., 2009; Luo, 2002). Time as a factor in governance was also part of the research, especially with a focus on deadlines, time pressures, and issues such as late payments (Roehrich et al., 2020). However, the focus on governance dynamics in the scope of innovation collaborations and between asymmetric partnerships are scarce (Fang et al., 2024; Keller et al., 2021). Hence, the focus on the innovation partnership between the startups and the incumbent firm in this context, is highly suitable for my second research question:

Research Question 2: *What impact has the change in governance mode due to a shift from one part of the incumbent's organization to another had on the performance of the startup-incumbent project?*

2.2.1.3 Innovation Modes

The current popularity and success of new ventures is reflected not only in the emergence of countless supporting institutions including business angels, startup incubators, co-working spaces or government-funded support schemes, but also in the adoption of new innovation methodologies, such as the lean startup or agile development (Weiblen & Chesbrough, 2015). Traditionally, the R&D processes at incumbent firms follow a linear, plan driven innovation mode (Bianchi et al., 2018). A popular innovation process is the Stage-Gate model, which divides the development into successive stages. The development can only advance to the next stage when it has passed the review gate (Cooper et al., 2002). The primary goals of this plan driven development process are predictability, stability and high assurance (Boehm & Turner, 2003). Additionally, it is easier to manage large teams and complex projects with such an innovation mode (Zhang, 2013). However, linear innovation processes, such as Stage-Gate, are best used in a stable environment with a low change rate of specifications (Port & Bui, 2009).

In 2001, 17 software developers created the “*Manifesto for Agile Software Development*” (Beck et al., 2001), which served as guidelines and values for new software development. Agile development is based on an iterative and flexible development approach (Mills et al., 2018). This approach consists of a short, intensive creation surge leading to a working prototype, which is adapted according to customer feedback into another short, intensive surge, and so on (Mills et al., 2018). The results of this iterative, feedback driven, development approach are closer customer interaction and shorter implementation cycles (Beck et al., 2001). Customer focus and repeated creation and hypothesis testing cycles are the basis for the development of the final use case and business model for the startup (York & Danes, 2014). Derived from the “*customer development*” method by Blank (2006), startups working with this approach need to understand their customers and create a solution based on this user-centered approach by adapting the product or service to the needs of their customers (Müller & Thoring, 2012). The “*customer development*” process consists of a four-step model: customer discovery, customer validation, customer creation, and company building (Blank, 2006). The first step, customer

discovery, is based upon the finding of customers and relevant problems, however it is not a mere feature list, but a genuine idea from the entrepreneur to solve a real-world problem for real world people (Blank, 2006, p. 18). In the next step, customer validation, the entrepreneur must validate their assumption by getting a prototype on the market and selling it to customers (Blank, 2006, p. 18-19). If sales cannot be achieved, the entrepreneur must go back to the first step and find a new customer or a new business case. The “*lean startup*” calls this step the MVP, where the entrepreneur creates a minimal version of the product, so that it can be tested and customer feedback is acquired (Ries, 2011). The first two steps are the iterative part of the customer development method. In the third step, customer creation, the startup focuses on the buildup of a customer base to drive the end-user demand (Blank, 2006). Subsequently, the fourth step is company building, in which the startup transitions from a build designed for discovery and learning to one built for execution (Blank, 2006).

The two innovation modes, iterative and linear, have different objectives and thus require completely different organizational management styles. The complementarity of these two innovation modes is still debated (Dingsøyr et al., 2012). In Table 2.2.1 the key characteristics of each innovation mode are displayed. When the two approaches are employed within one company, tensions are likely to emerge across organizational levels, triggering possible increases in bureaucracy (Dikert et al., 2016). Another problem arising from running these two innovation modes in parallel is the mismatch between traditional reward systems, usually rating personal performance, and the team-based nature of the iterative development approach (Dikert et al., 2016). In an R&D alliance, especially between an incumbent firm and a new startup venture, the individual innovation modes employed are likely to differ fundamentally. Due to the two-step nature of R&D alliance formation, such as beginning in a startup program and then moving into serial development, the startup is likely to experience a major shift in innovation modes from highly iterative in the early-stage startup program to notably more linear at the point of transitioning from pilot project to longer-term R&D alliance. As seen above, the two innovation modes might not be compatible, with transitions from one mode to the other being costly and

likely to trigger notable tensions in the R&D alliance formation stage. As part of my third research question, I seek to unpack these dynamics and their consequences.

***Research Question 3:** What impact has the change in innovation mode due to shift from one part of the incumbent’s organization to another had on the performance of the startup–incumbent project?*

Characteristics	Linear Innovation Mode	Iterative Innovation Mode
Objective	Predictability Assurance Stability	Rapid value High dynamic
Size	Large teams and complex projects	Small teams and projects
Environment	Formalized Explicit documentation	Informal Tacit interpersonal knowledge
Customer	Stable & known customer preferences Late customer interaction	Changing / unknown customer preferences Early customer interaction
Organizational	Failure avoidance Top-down intervention Top-down supervision	Team leadership Team accountability

Table 2.2.1: Characteristics of linear and iterative innovation modes

2.2.1.4 Visualization of the Collaboration Modes

To enable a better visualization of the two modes and the shifts between these in each dyadic corporate–startup relationship, I have created a 2x2 matrix (see Figure 2.2.1). Each quadrant corresponds to one phase which describes the corporate–startup partnership. Quadrant **A** represents a partnership which is on a formal governance basis, but operates in an iterative innovation mode, while quadrant **D** represents a partnership operating on an informal governance basis with a linear innovation mode. Drawing from the theory in section 2.2.1.2 and 2.2.1.3 the quadrants **B** and **C** align almost naturally with their respective category counterpart. The focus on knowledge exchange and the higher dynamics of the iterative innovation mode aligns well to the more informal relationships at this stage of a collaboration (Balachandran, 2024; Perrone et al., 2003). At the later stage of a corporate–startup collaboration, where the startup

Governance	Formal Governance	A	B
	Informal Governance	C	D
		Iterative Innovation Mode	Linear Innovation Mode

Figure 2.2.1: 2x2 Matrix of the governance and innovation modes for the startup–incumbent partnerships

will need access to the complementary assets of the incumbent (Gans & Stern, 2003; Rothaermel, 2001a), a stronger reliance on formal governance is often necessary (Balachandran, 2024; Dessain & Fishman, 2017).

2.3 Settings and Methods

In this study, I draw on rich qualitative data, from 16 months of participant observation and 40 interviews, to examine the dyadic relationships between a large incumbent firm and 16 startups in the context of automotive R&D, with a particular focus on the critical transition from pilot project to longer-term R&D alliance. This dyadic research design benefits from examining both sides of the relationship, while a single-source study would assume that both sides of the dyad converge in their perception of shifts in governance and innovation modes over time (Flynn et al., 2018). By looking at 16 different new venture relationships with the large incumbent, I was able to adopt a multiple-case study design as a solid foundation for the holistic interpretation of contemporary practices (Yin, 2018) and theory development (Eisenhardt & Graebner, 2007).

2.3.1 Setting

The incumbent firm at the center of this research is a German automobile manufacturer, sometimes also called Original Equipment Manufacturer (OEM) in the automotive industry, and an established innovation leader. Managers in the automotive industry are facing an uncertain environment due to changing customer behavior, new technologies and increasing governmental regulation (Homfeldt et al., 2017). New research areas, such as connectivity or autonomous driving, require the building of new capabilities internally. Additionally, the OEM's traditional fields of expertise, such as combustion engines and transmission development, are being threatened by electrification, lowering the entrance barrier to new competitors. Parallel to the buildup of internal competencies, the focal incumbent sought to increase their innovative performance in these emerging technology fields by partnering with non-traditional suppliers, including startups. To enable the focal incumbent to partner with new ventures, a startup onboarding program was set up. This facilitated startups in a short-term pilot project, allowing the internal R&D departments to have the opportunity to evaluate the technology as well as

the business case. The startups benefit in this program from the automotive experience of the focal incumbent through mentoring and would receive remuneration for the pilot project. In the automotive industry, development cycles are bound to the life cycle of the produced vehicles. The average production life cycle is seven years, often with a small update in the middle of the cycle (Sørensen, 2006). Development of a new model starts up to five years before the Start of Production (SOP) in European and US firms, with the final three years reserved for the integration, adaptation and testing of all components (Sørensen, 2006, p. 70). This means that three years before the first new model is produced, many components are selected, and more are, although with some flexibility, already ordered. Any changes after this point are very costly or even impossible due to the above-mentioned integrated vehicle design. Serial development therefore has a low tolerance for delays or project failure (Gassmann, Enkel, & Chesbrough, 2010). The focal incumbent startup onboarding program was set up in such a way that startups could apply for a pilot project themselves. Additionally, the startup program managers also search and actively approach startups in the search areas of interest to the OEM. After the initial application, the startup and its technology are screened by the startup program managers, as it needs to fulfill specific formal requirements. If the startup passes these formal criteria, the corresponding development department at the OEM is brought into the project. Their experts are then able to conduct a first assessment of technology maturity and strategic fit to internal R&D priorities. After a successful piloting phase, the startups and their innovation are expected to be able to successfully compete with the traditional suppliers and have the chance to become an established partner of the OEM. Due to the fierce competition between venture capital firms and corporates to partner with the best startups (Katila et al., 2008), new ventures with a strong technological basis are therefore in a strong bargaining position. They can choose relatively freely between different automotive OEM, partner with a firm outside the established automotive ecosystem or accept traditional venture capital. The incumbents are therefore in the position in which they must offer the best package to become the preferred partner of the innovative startup firm and thereby gain access to the technology. The OEM

calculates the business case for new venture collaboration using two distinct approaches. The first is employed for innovations in the production environment and for standard configuration parts of the car. Here, the innovation must provide lower costs of production or lower cost per part at the same or better quality. The second approach is used for optional extras in the car or additional services. In this case, the price of the innovation is compared to the potential sales price, the forecast take-rate (percentage of customers ordering the optional extra features or service), and the additional investment to provide, for example empty installation space for hardware products or additional computing power for software products. As such resources are limited and valuable in the vehicle design, any additional feature must provide a solid business case.

2.3.2 Data Collection

In my in-depth qualitative study, I adopted a dyadic multiple case study design that combines longitudinal data from participant observation, semi-structured interviews, and archival data. Below, I describe each of these data collection approaches in turn.

2.3.2.1 Participant Observation

To obtain first-hand insights into the research context, I conducted participant observation within the focal incumbent every working day over a period of 16 months from August 2017 to December 2018. Participant-observation, first described as “*direct research*” by Mintzberg, 1979, pp. 558-589, relies on description and induction to identify a set of real organizational variables, supporting the systematic data collection with anecdotal data. As a participant observer, I was part of the innovation management department of the supply chain management and purchasing division. In this role, I participated in both internal and external meetings as a note taker and observer. During this time, I also engaged in numerous informal conversations. Due to my position, patterns emerging from my analyses could be periodically discussed with

the innovation management department. As the managers of this department also participated in most startup program projects, either monitoring or in a support function, I was able to use their feedback as part of member validation. Used systematically, member validation can improve the validity of case studies internally and externally (Bygstad & Munkvold, 2007). During the first three months, I followed the daily activities of the managers of the innovation management department. Afterwards, I conducted the first workshop with the innovation management department to discuss research strategy and accessibility of interview partners. I then began with the startup interviews, which were summarized and discussed with the innovation managers at regular intervals. Three months later, I held another workshop with the innovation management department, this time including the head of the department, to present and validate my initial results. At this point, I decided to begin the internal interviews, again discussing the findings at regular intervals with the innovation managers. Once I had conducted all the interviews, the results were presented to the key stakeholders in a workshop. Additionally, I was able to participate in startup workshops for the new batch of startups joining the startup program. This program had the purpose of advertising the startups to internal stakeholders and giving the startups a first glimpse about the standard procedures for suppliers at the OEM. All these workshops supported the purpose of discussing my interpretations and thus increasing the validity of my study (Gibbert et al., 2008; Yin, 2018). The timetable for this project can be found in Table 2.3.1. Due to my constant engagement with the department, I increased their trust in my ability to improve the organization and ensured that I had continued access to people and materials, while also allowing me to participate in the discussion of more confidential topics (Jay, 2013). Table 2.3.2 reflects the variety of meetings across all stages of the incumbent – startup interaction I was able to participate in. In the Appendix on page 94 Table 2.5.1 provides a detailed list of the participants per meeting.

Phase	Time	Activities	Documentation
1. Initial activities	August '17 - October '17	Daily participation of meetings and business days	Summary of notes
2. External data collection	November '17 - February '18	Workshop with Innovation Management department Startup-program workshop with startups External (startup) interviews	Interview summaries Workshop summaries
3. Internal and external data collection	March '18 - June '18	2 nd Workshop with Innovation Management department Startup program workshop with startups Internal (OEM) interviews External (startup) interviews	Interview summaries Workshop summaries
4. Documentation	July '18 - December '18	Internal (OEM) presentation of results	Final project report

Table 2.3.1: Data collection phases at incumbent firm

Meeting description	Interval	# of events
Innovation management group meeting	weekly	50
Innovation management department meeting	weekly	30
Startup group mentoring session	twice a year	1
Startup networking event	triannual	3
Startup kickoff sessions	irregular	3
Startup proof of concept (POC) demonstration day	irregular	2
Startup negotiation session	irregular	3

Table 2.3.2: List of attended meetings

2.3.2.2 Interviews

Interviews proved particularly valuable for understanding the perspectives of managers in both the startup and the incumbent (Boyce & Neale, 2006). The interviews were constructed as semi-structured interviews and interviewees were selected from the current and past participants of the pilot project. Due to the complex nature of the dyadic relationship, interviews can provide more granular information about the respondents' experience, thoughts, and behavior than a survey could. In addition, Eisenhardt and Graebner (2007) describe interviews as a highly efficient data gathering method, as they provide rich, empirical data. Also, interviews can capture data from infrequent and highly episodic events (Eisenhardt & Graebner, 2007). As part of semi-structured interviews, the interviewees were asked a number of open questions supported by theory driven questions and confrontational questions. The theory driven questions help to make the implicit knowledge of the interviewee explicit, while the confrontational questions are intended to expose the interviewee to alternative interpretations and help them

to critically question the established theory (Flick, 2018). The questions were ordered by topic and organized in the form of an interview guide. In total, interviews were conducted with 26 companies who had no prior relationship with the incumbent, containing 25 startups and one large established electronics company without automotive business in Europe. Concurrently, I conducted interviews with the employees of the incumbent firm involved in each project. The startup was always interviewed first, as they were considered as the more distant interview partner. After conducting a startup interview, I contacted members from the project team at the focal incumbent OEM and, if applicable, their responsible purchasing department. The availability of the purchasing department members depended on the stage of the technology after the program initiation. In 16 of the startup projects, the project leads were willing to participate. One of these involved interviewing two project leads, as the first project lead had to hand over responsibility during the project due to a lack of time due other responsibilities. For seven of the 16 projects, the responsible PSM department employee was also available for an interview. In total, 24 interviews were conducted from the view of the incumbent, seven of those in the purchasing department and 17 with key members of the internal project teams. To analyze the dyadic relationship in this article, I only considered the 16 startup interviews for which I had a corresponding interview with at least one responsible employee of the incumbent OEM. This reduced the number of cases to 16 and the total number of interviews used to 40. An overview of these interviews is found in Table 2.5.2 in the Appendix on page 95. The different cases are labeled Cases C01 to C16 and further categorized using *S* to indicate the startup interview partner, *PM* the internal product manager, and *SCM* the purchasing & supply chain manager. In the one Case (C11) where the product manager changed during the POC project, I differentiated between PM1 who started the POC and PM2 who finished it.

All the external partners were willing to have their interviews recorded and transcribed. Of the interview partners from the OEM seven agreed to have their interview recorded. The 17 other interviews were manually transcribed during the interview by note taking. Directly after the interviews, I transcribed the notes into a word document and added the impressions from

fresh memory. The internal participants were helpful and understanding during the interviews, waiting to finish their statements, so that I could take time to finish my notes. All were supportive of this study, giving me insights into their internal procedures and the politics around the projects, but felt uncomfortable having their statements recorded. Overall, the material from the 40 interviews amounted to 17 hours of voice recording and 297 pages of verbatim transcript.

2.3.2.3 Archival Data

Before each interview, extensive background research was conducted into each startup firm and their relationship to the incumbent firm. A source for this research was archival online data, such as the startup websites, blogs if available, newspaper articles, and online databases. Additionally, the startup program keeps data about each participant, to which I had access. This internal database also contained background information on the startups, their technology, and the project. The incumbent internal database also contains email traffic between the key stakeholders. However, these mostly concerned scheduling.

2.3.3 Data Analysis

To analyze the rich data collected, I used the qualitative content analysis method (Huberman & Miles, 1994). The explorative foundation of this study fits into inductive category definition, in which the categories are directly generalized during the analysis process without a direct relation to a previously formulated theory (Huberman & Miles, 1994). The basis for this generalization process is the condensation of the content into relevant phrases. After this process, also called paraphrasing, each passage is categorized (coded) into an existing or a new category. For the coding of all documents and interview transcripts I used the software MAXQDA 2022 (VERBI Software, 2021). I used MAXQDA to keep a visual overview of the gathered codes and the software allowed me to search and analyze codes across documents.

Due to concerns about confidentiality, the interview transcripts could not be checked by a second coder for intercoder reliability. Cho and Trent (2006) suggest member checking as a method of increasing credibility, which was done during the interviews. However, the narrative by the interviewees is still a reconstruction of the reality and therefore subject to their memory and interpretation of the events (Cho & Trent, 2006, p. 322f.). The interviews were first analyzed within each case and the incumbent opinion was compared to the startup opinion. This allowed me to position each case on the 2x2 matrix as a function of its governance and innovation mode at the beginning of the program and at the end of the four-month program. As this study does not use any quantitative measures, the position within each quadrant serves visualization purposes only. After analyzing each case individually, I was able to cluster the cases according to their shifts in the governance and innovation mode during participation in the startup program. I then analyzed the differences between the cases within each cluster and between the clusters, with a focus on the shifts between the governance and innovation modes over time and their associated conversion performance and underpinning root causes. Table 2.3.3 and 2.3.4 provide the overview of my final coding scheme and exemplary quotations.

Aggregate dimension	Second-order theme	First-order concept	Exemplary quotation
Innovation mode	Linear	Failure avoidance	“R&D team was skeptical, if automotive grade specifications could be reached” (C07-PM)
		Predictability	“Before a nomination, typically everything is technically validated” (C07-PM)
		Explicit documentation	“[Startups] make mistakes when filling out [specific purchasing template] and other documents” (C06-SCM)
		Stability	“i don’t think the urgency to move has yet reached all those involved. i don’t think the process has yet reached a high level” (C16-S)
Governance mode	Iterative	Complex Project	“We already develop the majority of the functions ourselves, but it’s spread across many control units [...] you’re responsible for only one control unit and everything on it. (C13-PM)
		High dynamics	“[OEM] appears to be more progressive, by far, than [...] they are the more progressive ones in the automotive sector.” (C05-S)
		Early Customer interaction	“The other reason I came and got a on a plane is, I know my technology when demonstrating in a car is kicks ass” (C01-S)
		Changing scope	“We started changing the design of our machines so that it would be special and meet all the requirements of [OEM]. And that is how [...] you know an example of how we [...] how we evolve.” (C04-S)
		Team accountability	“So they provide a lot of feedback, about the platform and they feel very open with us [...] And they are very responsive. If We have questions they answer very quickly.” (C03-S)
	Formal	Contractual paperwork	“As soon as it comes to money, there are contracts, and they are proper, real contracts that are also between larger, more established companies” (C14-S)
		Liability	“No import without CE seal [...] then the team leader bears personal responsibility for all damage” (C04-PM)
		Domineering	“So as a result they have all the power in the relationship. So often they’ll say this is our agreement except it or go away right.” (C05-S)
	Informal	Compliance	“(OEM legal lacks flexibility and [...] the belief that they don’t need to have the flexibility (C05-S)
		Open communication	“Actually I think it’s the opposite. [...] I think they inform you in front of the curtains.” (C01-S)
Governance mode	Informal	Stewart/Champion	“You know, people define metrics and they define success or failure of products. You know, we have our internal champion in your company” (C04-S)
		Relationship oriented	“Plant manager saw the project at a startup event and brought the idea [...] to OEM” (C02-PM)
		Informal channels	“The project was bypassed by the purchasing department [...] Project was taken over by the boss on his own responsibility” (C02-PM)

Table 2.3.3: Governance and innovation mode

Aggregate dimension	Second-order theme	First-order concept	Exemplary quotation
Alliance quality	Adverse effects	Arrogance	“OEM still has this wishful thinking. I heard from my former boss: ‘If [the supplier] doesn’t sign, he’ll be dropped [from the negotiations].’ OEM is sitting on too high a horse.” (C11-SCM)
		Communication	“if, of course, we had known that we are working with a customer and that project comes to nothing afterwards, then of course we don’t tie up our time.” (C06-S)
		Low priority	“There was the 3rd new purchaser during the 6 months and therefore no consistency at all. The purchasers always had to familiarize themselves anew.” (C08-PM)
	Supporting effects	Collaborative accountability Individual effort Commitment	“and how we now dare to jointly identify potential, for example, where we then had to jointly set premises.” (C13-PM) “Just did it - the boss already knew about it, but didn’t give me any real extra time. I was able to argue with the boss, but he had no idea what I was working on with them.” (C14-PM) “had the feeling that they were 100% interested in OEM and were fully behind the project.” (C11-PM)
Alliance evolution	Harmful influence	Overambitious	“Startup wanted to get straight into contract negotiations. Only addressed the money and did not discuss the technology at all.” (C13-SCM)
		Culture clash	“No experience in business etiquette, but understanding because they have to work on everything.” (C14-SCM)
		Overpromising	“Unfortunately, start-ups often say that they can do everything [...] often overestimate themselves. [We] must avoid hype” (C08-SCM)
	Promotive influence	Champions Workarounds	“So each startup needs a champion, but the champion needs to want it – it can’t be pushed on him or her – has to be with heart in it. (C08-S) “[OEM] has recognized the potential and we are using it, although not officially. And only via a backdoor solution with a service provider in between. (C01-PM) “Hard, clear feedback is also part of it. [...] This is essential for us because, as you know, startups are defined by the fact that they act quickly and also learn quickly, and also get to grips with these mistakes” (C10-S)

Table 2.3.4: Alliance quality and alliance evolution

2.4 Findings

I was able to follow 16 startups through their journey from first contact with the OEM, the following POC project and the final presentation of the results. After conclusion of a successful project, several outcomes were possible: transfer of the project into the serial development unit, a second POC phase with changed parameters within the predevelopment department, or a project stop. At the time of the interviews, the startups were on average 3 years old (min. 1 year and max. 5 years) and had an average of 24 employees (min. 4 and max. >100). The founder's ages averaged at 35 years old, with the youngest being 25 and the oldest 59. The average number of businesses founded by each founder is 1.95, however with an outlier of 10 businesses started by one of the interviewees. Most of the founders were actually first-time entrepreneurs, reflected by the median value of 1 startup per founder. As a German OEM, geography seems to be the strongest influencing factor in startup selection, as three quarters of those selected are from Europe and the Middle East, with 7 of them from the German speaking countries; Austria, Switzerland, and Germany, and an additional four startups coming from Israel. The OEM has a strong market presence in Israel and additionally runs a technology scouting unit in the country. Four of the startups originate in the US, where the OEM also runs a technology scouting office. The figure 2.4.1 shows the country distribution of the startups and a summary of the 16 cases are found in Table 2.4.1 and Table 2.4.2.

2.4.1 Within-case Analysis

The Verband deutscher Maschinen- und Anlagenbauer (VDMA)¹ found, in a survey conducted with 110 German industrial companies already in collaboration with startups, that three out of five collaborations yield sustainable success (Dorfer et al., 2020). Of the 16 dyadic relationships in this case study only six (Cases 3, 4, 5, 8, 10, and 15) finished their projects with a satisfactory outcome for both partners; the OEM was particularly dissatisfied with this

¹Association of German Machine and Plant Manufacturers

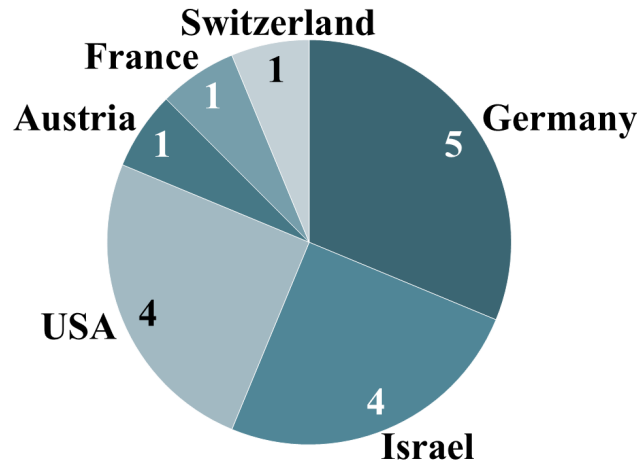


Figure 2.4.1: Country overview

Case	Case 01	Case 02	Case 03	Case 04	Case 05	Case 06	Case 07	Case 08
Technology field	Audio Software	IoT Hardware & Software	Big Data Software	3D Printing Hardware	3D Printing Hardware	Drivetrain Technology Hardware	VR & AR Hardware & Software	ADAS Hardware & Software
Starting Date	Sep 2017	Sep 2017	Nov 2017	Feb 2017	Jan 2018	Dec 2016	Sep 2017	Jan 2018
Innovation Type	Product	Process	Process	Process	Process	Product	Product	Product
Governance Mode at Start	Informal	Informal	Informal	Informal	Informal	Informal	Informal	Informal
Governance Mode at End	Informal	Formal	Informal	Formal	Formal	Formal	Formal	Formal
Innovation Mode at Start	Iterative	Iterative	Iterative	Iterative	Iterative	Linear	Linear	Iterative
Innovation Mode at End	Linear	Iterative	Iterative	Iterative	Iterative	Linear	Linear	Linear
Transition	Innovation Mode	Governance Mode	No Change	Governance Mode	Governance Mode	Governance Mode	Governance Mode	Both Modes
Project status	Stopped	Stopped	Continued	Continued	Continued	Stopped	Stopped	Continued

Table 2.4.1: Case Studies 01 – 08: Characteristics and Mode Dynamics

Case	Case 09	Case 10	Case 11	Case 12	Case 13	Case 14	Case 15	Case 16
Technology field	Camera Software	Connected Services	ADAS Software	Aftersales Services	IoT Software	ADAS Hardware	ADAS Hardware	Aftersales Platform
Starting Date	July 2017	Sep 2017	Jan 2018	Dec 2017	Aug 2016	Aug 2017	Feb 2018	Nov 2017
Innovation Type	Process	Product	Product	Process	Process	Product	Product	Process
Governance Mode at Start	Informal	Informal	Informal	Informal	Informal	Informal	Informal	Formal
Governance Mode at End	Formal	Formal	Informal	Formal	Formal	Informal	Formal	Formal
Innovation Mode at Start	Iterative	Iterative	Iterative	Iterative	Linear	Iterative	Iterative	Linear
Innovation Mode at End	Iterative	Iterative	Linear	Linear	Linear	Linear	Iterative	Linear
Transition	Governance Mode	Governance Mode	Innovation Mode	Both Modes	Governance Mode	Innovation Mode	Governance Mode	No Change
Project status	Stopped	Continued	Stopped	Stopped	Stopped	Continued	Continued	Stopped

Table 2.4.2: Case Studies 09 – 16: Characteristics and Mode Dynamics

rate of success. Of the 6 successful projects, only two startup pilot projects (3 and 4) received a follow-on project directly after the program, while the other four (5, 8, 10, and 15) had to wait for their follow-on project. Of the ten projects that were not continued, three (6, 9 and 13) were stopped because the technology did not meet the requirements or expectations of the OEM. Two other projects (7 and 11) were concluded too late for the tender process and, due to the development and life cycle of the automotive industry, needed to wait until the next car architecture cycle starts. The other five projects (1, 2, 12, 14, and 16) were officially stopped because one of the parties did not see a strategic need for a continuation at the end of the project. Of these five, four projects (1, 12, 14 and 16) were stopped by the OEM and in Case 2 both sides agreed that their strategic goals did not align. I clustered the 16 startups into six groups according to their innovation and governance mode changes. The clusters can be found in Figure 2.4.2. Two clusters (I – II) remained stationary in their governance and innovation mode, three clusters (III – V) experienced one shift in either the governance or innovation mode, and one cluster (VI) experienced a shift of both governance and innovation modes during the project. For each cluster I use a detailed description of one startup and add supporting information by the other startups in the cluster.

Cluster I – Stationary Informal/Iterative Only one case (Case 3) remained within informal governance and iterative innovation mode, from the beginning of their interaction with the OEM until the end of my observation. The startup of Case 3 is a big-data software company. The founder and CEO contacted the OEM project manager directly via *LinkedIn*, a professional networking platform, offering him a free test account, which was accepted and afterwards kept in regular contact to get feedback on the software. Both the startup CEO and the OEM project manager were open to explore new partnerships:

“We basically work with the data science team for a certain time and then they know the platform eventually.” (C03-S)

“And because the established companies are not really the most interesting part-

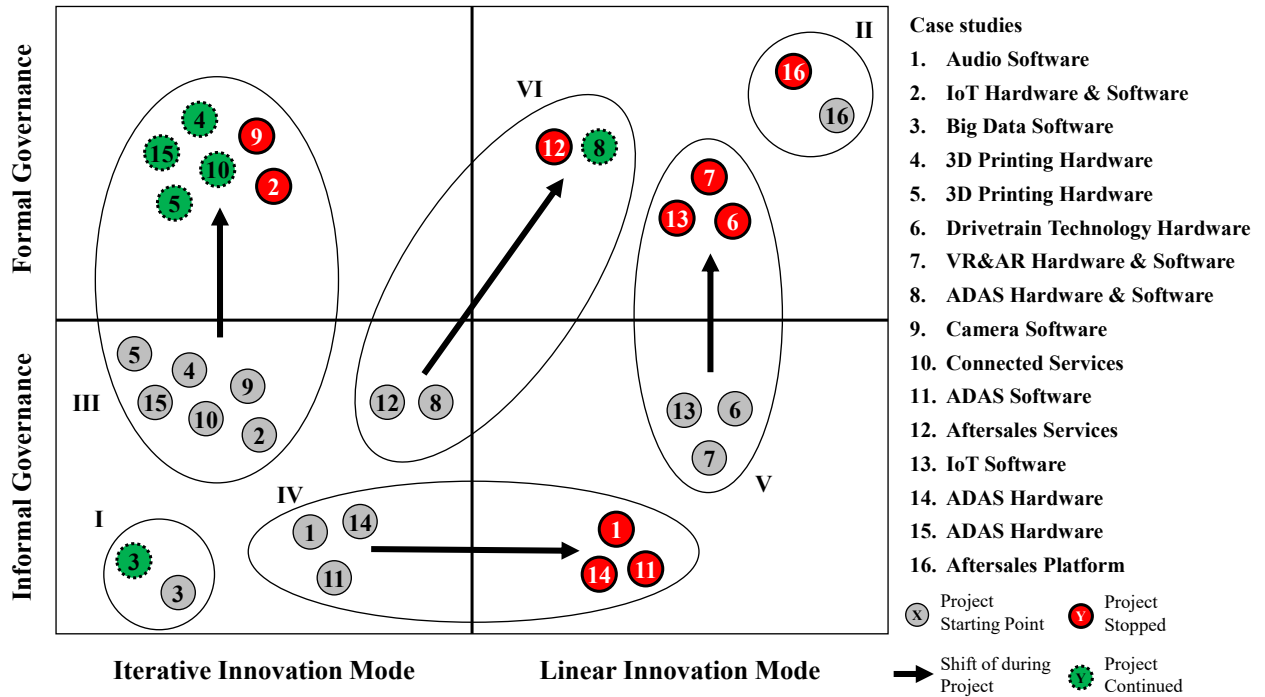


Figure 2.4.2: Changes in Governance and Innovation mode over project duration

ners, we always keep our eyes open. And there are a couple of markets, including geographical markets, that stand out a bit when it comes to topics.” (C03-PM)

After this successful initial phase was over, the project team wanted to continue working with the startup, and to avoid the formalities of the normal purchasing approach, they contracted a pilot project via the startup program: “In the end, it’s also more efficient for us if the bureaucratic conditions are brought closer to them via the Startup program” (C03-PM). In addition to the benefits of the low formal requirements, the constant feedback rounds were another asset of the program to the project team. The project manager (C03-PM) states:

“We are grateful for the startup program, as we could give constant feedback, and the product was then adjusted.”

After the program, the startup continued this feedback-driven iterative innovation mode, much to the delight of the project managers: “it was extremely cool experience to see how extremely agile they work” (C03-PM). Each special request, as long as it was of benefit to the software in

general, was adapted by the startup without any official configuration request, even after the startup program finished. As both sides profited from these ongoing interactions, the project manager believes that *“we are among the highest ranked [customers] if not the number 1”* (C03-PM). The iterative innovation mode of the project team complemented the innovation mode of the startup well and as their partnership was governed throughout by an informal mode, this partnership experienced no tensions and continues until the end of my observation.

Cluster II – Stationary Formal/Linear Similarly to cluster I, there was only one partnership, which stayed in the formal governance and linear innovation mode quadrant throughout the entire project phase. Case 16, an aftersales platform startup, began their relationship with very low trust. Both sides restricted the information revealed to the other side. The OEM considered the startup to be an opportunity to check if *“the customer is willing to pay a premium”* for this service and from the beginning looked for *“somebody to learn from, [and] not really a contractual partnership”* (C16-PM). The startup was equally unsure what *“will come afterwards”* and they *“did not expect that the project will be continued”* (C16-S):

“[...] but where the journey should go after that. So it’s not just about... for us and that’s why I had set it up the way I did, so that it made sense for us. The way it was originally laid out, [...] I had the assumption that it would be a one-off story.” (C16-S)

This weariness led to a relationship at arm’s length, with minimal information exchange and a strong separation of systems to ensure a low level of interdependence (compare Dyer & Singh, 1998, p. 661). The investment of the OEM’s venture capital arm into a competitor with a very similar business model increased the suspicion of the startup CEO, despite the venture capital arm being officially a distant and separate entity following its own investment guidelines and strategy.

“Yes, because we are of course very familiar with [the market] and such a [startup program] project is relatively inexpensive in order to get a precise insight. [...] Of

course, I don't share all the information if I know that [OEM] is involved with a competitor company. You have to be a bit careful.” (C16-S)

This fear of knowledge appropriation on the startup side was mirrored by a fear of revealing too much of their strategy on part of the OEM. This led to even sparser communication and a more distant relationship between the two. This formal governance was also mirrored by the linear innovation mode during the project. The formal internal processes and requirements at the OEM were hindering the project right from the beginning.

“The [startup program] helps, but still attempts to purchase an aftersales service through non-aftersales-specific processes – these processes have been, historically, designed for products and product innovations” (C16-PM)

“When I saw that day what requirements you have to fulfill as a supplier in order to be allowed to write an offer for the next [step], which also applies to software, that practically makes no sense at all.” (C16-S)

This meant that there was little exchange of feedback and the initial pilot project contract was adhered to according to their obligations, but nothing more. The two partners realized that they had no strategic alignment, but decided not to stop the project prematurely and continue with the arm's length relationship. This indicates that the relationship never left the formal and linear mode it began in.

Cluster III – Informal/Iterative to Formal/Iterative The third cluster I identified follows an intentional path through the organization. It begins at informal governance, with the relationship between the OEM and the startup becoming formalized during the startup's participation in the program. Case 10, a software startup for a connected service, spent over two years attempting to initiate a working relationship with the OEM, however they were unable to get past several introductory rounds. A positive meeting between the startups and OEM managers at a conference, lead to an accelerated process in which it only took two and a half

months to get to the project kickoff. The startup began the partnership with a lot of trust in the OEM due to it being the “*most progressive in the automotive sector in the realization of digital business models*” as well as the overall prestige of partnering with a “*premium brand*” (C10-S). This initial assumption by the startup manager was reinforced after initial meetings:

“What surprised me was that the program. The program was very sophisticated [...] the speed, which I have already mentioned, but also the flexibility that makes it possible to work together. [And the] framework conditions that then exist.” (C10-S)

The OEM project manager was also impressed by the startup stating that the POC was “*a lot of fun*” and that “*a big plus for the startup was their motivation*” (C10-PM). After the evaluation of the software during the POC phase, the OEM wanted to implement their service and have the startup participate in the official nomination process. The implementation of the service meant that many formal requirements had to be met. The iterative approach of the project was able to continue as the software implementation and evaluation continued. This helped especially when the project was on hold in the negotiation phase, as the partners remained in contact.

Case 2 is an Internet of Things (IoT) software and hardware startup. Fresh from university, the startup team got into contact with a top-level manager of the OEM during a startup conference. This manager then provided the team with access and funding for a technology validation project, avoiding standard procedures to “*save time*” (C02-PM). After the successful validation, a second project was started, this time within the scope of the startup program. During this second project, the OEM supported the startup in finding investors, further indicating a positive relational governance. The “*startup people were in and out of the building on a daily basis*” (C02-PM), and the project manager appreciated the quick and feedback driven project development. However, after the new investor joined and at the same time the initial sponsor at the OEM retired, a new relationship had to be built. The next planned project had a formalized governance, with a specific budget allocation and stronger reliance on contracts between the partners. The focus on risk avoidance and IP protection became more important

to the startup:

“So, when it came to the legal framework, it was particularly important for us that the issue of liability is clarified. We know all the examples, or the horror stories, that something goes wrong at large companies, or that the production line at [automotive brand] comes to a standstill because a supplier has not delivered and then millions are claimed.” (C02-S)

“[...] so the IP must be with us, it can’t be shared.” (C02-S)

Both the startup and OEM project managers attempted to continue the partnership, but had to suspend the collaboration and planned to continue at a later stage.

“After that, we wanted to go into subprojects 2 and 3, but the technology wasn’t ready” (C02-PM)

The startup, however, wanted to become a full and stable supplier, rather than living from project to project and so withdrew from the partnership to focus on new industries:

“Then I’ve lost time and perhaps I’ll be paid somehow. But I don’t survive on projects, I want to build a long-term business model. And then I tend to say no” (C02-S)

Cluster IV – Informal/Iterative to Informal/Linear Cluster IV is the only group which describes a purely lateral movement through the 2x2 matrix: While remaining in an informal governance, the startups in this cluster are moving from an iterative to a linear innovation mode. Case 1 is an audio technology software startup, which joined the startup program after having contact with an external R&D center of the OEM. The main reason the CEO, a serial entrepreneur, gave for joining the program was his trust in the employees at the program. He believed that the startup program still *“had to prove something”* and had a *“vested interest to see a company like me be successful within [OEM]”* (C01-S). The well defined process along with

high transparency, contributed to his trust that the startup program would help his company gain a foothold in the automotive industry. Therefore, he decided to “*spend more resources on [OEM] than the other innovation groups within automotives*” (C01-S). He especially liked the structured, iterative process of the startup program with a clearly outlined “*step system*” (C01-S). Even “*be they be baby steps*”, he felt he was “*still stepping [...] still moving forward*” (C01-S). His view was mirrored by the project manager at the pre-development, who appreciated the direct communication, which he described as “*very positive*” and the tackling of the steep learning curve by the startup (C01-PM). His impression was that the startup “*gave everything [...] as they wanted to continue*” (C01-PM). After successful completion of stages in the program, the software was then shared with the serial development department. This department normally finalizes the R&D projects with suppliers. These suppliers usually have “*long relationships*” (C01-PM) with the OEM, know the development processes and can align their development time-line. The serial development department did “*not have time*” for the startup and could not provide access to the audio-laboratory (“*too busy*”). Concurrently, the pre-development department did not have the funding to “*get the car themselves and do the rebuild*” (C01-PM). For a traditional supplier these constraints would not have been a problem, as for example “*(supplier name A) buys often test vehicles from us for a couple of thousand euros*”, and “*(supplier name B) just came by with 4 show cars and one demo van*” (C01-PM). Despite being still at an informal stage of the development phase, with good personal relations, no follow-up project could be transferred to the serial development department.

Cluster V – Informal/Linear to Formal/Linear The startups in cluster V experienced a shift in governance from informal to formal during and after the startup program. In this aspect the cluster V is very similar to cluster III. The main difference is that this cluster starts and remains in the linear innovation mode. Case 6 from cluster V is a drivetrain technology hardware startup. This startup was immediately involved in the serial development department, and thus their linear innovation mode. The governance of this project started with an informal relationship, reflected by the personal involvement of the innovation manager (“*internally driven*

by Mr. [name of innovation manager]", C06-SCM) and the startup program employees. The innovation manager helped the startup to present themselves at the internal supplier fair in the R&D department and generally the startup "*felt to be in good hands*" (C06-S). The concept of the startup program was also lauded as "*very positive and unbureaucratic*", leading to rapid results from the POC project ("*in this short time getting the test samples to run [...] was very impressive*") (C06-PM). The introduction of the purchasing department into the process led to a formalization of the governance. The purchasing specialist was "*surprised by the intimate relationship between the startup program and the startup*" (C06-SCM). Overall, the purchasing specialist did not like the immediate informal attitude of the startup ("*normally more distanced relationship to a supplier*" and "*don't want to be buddies*") and stated it was "*cultural shock compared to established suppliers*" (C06-SCM). In the end the project was stopped, officially because the technology could not reach the expectations, however the startup's opinion was that "*with one or two more iterations, we could have immensely improved the product*" (C06-S). Internally, additional roadblocks were identified. Neither the product manager nor the purchasing specialist believed that the startup could build the parts at the required quality levels. At this point, the innovation manager tried to develop a "*concept [...] to create a contract [between startup and OEM] and then approach a 3rd party supplier [for the production]*" (C06-S). This workaround however would create "*complex awarding [supplier nomination and contract process] with many partners*" and "*technical benefit did not compensate for this additional effort*" (C06-SCM). Additionally, the series development project manager could not invest more time and budget into the project ("*engine dynamometer tests are very costly, and the capacities are pretty much exhausted*", C06-PM). This combination of increasing formalism and the linear innovation process meant that the startup was not able to overcome set boundaries to become regular supplier or even continue the innovation collaboration with the OEM.

Cluster VI – Informal/Iterative to Formal/Linear Cluster VI describes the most complex path taken by the startups through the OEM's startup program. The startups both started at the informal and iterative modes and moved over time to a formal and linear mode. Case 12

is an aftersales services startup. The startup had applied through the startup programs website and received a call back very quickly. The startup program managers found an internal sponsor for a collaboration and the startup was invited to a kickoff as well as the startup group mentoring session. Their communication was regular, as *“the team [of the startup program] is very involved”* and *“the relationship was really well”* (C12-S). While *“there were phases where it was clear that there was internal momentum”*, the startup experienced phases of reduced momentum (C12-S). However, the startup program *“was very open about the whole process”* and in their communication about the reasons for delays or speedups in the project (*“if we have to go faster or slower”*, C12-S). This became especially relevant when the startup ran into a legal problem to receive government approval for a portion of their service. The startup had done their *“homework”* (C12-S) by running their business model through a German legal firm, but the OEM required additional documentation from the Ministry of Transportation. This need to involve a ministry *“surprised”* the startup, as the legislation and the legal study were very clear (*“very frustrating point for us, because the regulation and the law is very specific”*, C12-S). Together with the startup program a solution was found by switching the scope to the startup’s country homebase, where the OEM has a sales department and the POC could continue. After some time, the startup suddenly reduced its communications with the OEM and gave no explanation for it. This soured the relationship with the OEM, as they *“just could not reach anybody”* (C12-PM), which in return also increased the formality of the relationship. A few months later, the startup admitted to financial problems due to a failed investment round and thereby needed to deprioritize the startup program project. Due to the worsening relationship, the internal project team shifted to a more linear mode in the project, reduced the communication cycles and were eager to finish the project.

2.4.2 Cross-case Analysis

Each case represents a unique path the startup took through the different departments of the OEM. In the previous section I have clustered and described the different paths. Six of

the 16 cases achieved an ongoing relationship between the startup and the OEM, with two receiving immediate follow-up projects, while four had to wait a longer time period for their follow-up project. Ten cases received no follow-up after the startup program project finished.

Comparing the clusters and cases which experience a shift in the governance mode, we can see that there is no instance of a shift from formal to informal governance. The increase in formal requirements by the OEM stems from a need for compliance and a rigidity in the contractual design. The internal purchasing specialists acknowledge that these requirements are extremely complex and overwhelm a new partner:

“The actual application is very complicated. What should you ask of a new partner or startup? A startup can’t work through 800 pages of terms and conditions [...] and a good one won’t anyway.” (C13-SCM)

“This makes for a very complex Request for Proposal (RFP). There is probably no startup that can do this alone. Difficult, because the request is bigger than the Unique Selling Proposition (USP) of the startup.” (C10-SCM)

However, in some cases the startup manages a positive navigation of this formalization. Cluster III indicates that for a successful continuation, the iterative innovation mode might be connected to the innovation mode of the partnership. Comparing cluster III, V, and VI, three different paths towards a more formalized relationships between the startups and the incumbent can be described. In cluster III, the partnerships continue in the iterative innovation mode, where early interaction with the “customer”, the OEM continued throughout the project phases and the interaction continued to be dynamic. The project managers at the OEM allowed flexibility in the project scope and saw themselves more as part of the startup team, rather than the OEM.

“And that led to the fact that we were able to generate a lot of results and positive outcomes in a very short space of time, from my point of view. Which would never have happened if everything had just followed a defined process to the letter.” (C10-S)

“OEM is very accommodating; we always give them more time and have also offered smaller areas so that we can simply test it. OEM is also prepared to consider alternative options, for example, that we have it simulated on our computer. This option was suggested by the startup, but then not explored further [...] on the part of the startup.” (C09-PM)

The stopping of the partnerships in Case 2 and 9 was mainly attributed to the associated technology being insufficiently developed and not to the standards of the engineers at the OEM. Both project managers, however, affirmed that they would like to continue the project as soon as the startups make a breakthrough with their technology (*“If they [the Startup] come back in 1-2 years, I would approach them.”*, C09-PM).

Cluster V describes an almost parallel path the startups can take. Rather than working in an iterative innovation mode, these projects were kicked off in a linear innovation mode. The typical characteristics of this innovation mode are visible across all three cases in this cluster (see Table 2.2.1). Failure avoidance was a main driver for the slowdown and very cautious approach on both sides:

“R&D team has shown concerns whether automotive grade requirements can be achieved” (C07-PM)

“When you hear that there is this zero-tolerance rule. And that, of course, assumes that if someone doesn’t manage their workload, then of course they resign. You can see that it’s a tough business.” (C06-S)

This failure avoidance behavior was driven by the serial development. The OEM demands that if a technology works, it is rolled out to all vehicles or all plants as quickly as possible. This means that including an immature technology in the product development cycle of a vehicle too early could have wide reaching, devastating financial and reputational consequences. In addition, the complexity of vehicle development means that the technology from start-ups

often must be integrated into the technology of other tier 1 suppliers. This can lead to complex project constellations, where the startup would not be the direct supplier of the OEM.

Interestingly, the third path, cluster VI, shows the most complex transition, as the two startups, 8 and 12, changed both innovation and governance mode. The startups experienced the same attitude of failure avoidance towards the end:

“Our quality management often has concerns. Unfortunately, quality management is often very apprehensive when it comes to suppliers without references. Startups also often lack creditworthiness data” (C08-SCM)

However, due to the iterative innovation mode at the beginning, the project lead was able to navigate the startup through this, by beginning at smaller steps and slowly increasing the formality:

“[the startup program] is good because it makes it easier to set up a startup as a company [in the systems] so that you can start talking about it in the first place. However, the conditions of a fully-fledged partner still must then be met. [...] Getting them ready for industrialization.” (C08-PM)

In Case 12, the startup experienced an additional complication in that a third party, in this case the municipality of the location where the OEM wanted to run the trials, required additional certification to allow the operation. Despite the startup owning an operation license and several safety certificates in France, the legal obstacles were too costly in terms of time and resources. The OEM helped by providing a smaller trial run at its French subsidiary, however, as the municipal authorization dragged on the startup withdrew from the project.

“Up until that point, the relationship was really great. The team is very involved. they go deep on their analysis, on what they act for us, so on that side it went really good.” (C12-S)

For these reasons, discontinuation of the partnership could not be attributed to internal pro-

cesses, but rather an external factor. The external stress was reinforced by the startup's financial problems, which became apparent only after the partnership had already been concluded.

The transition from iterative to linear innovation mode can also be described as an additional path. In the three cases of cluster IV the partnerships between the startup and the OEM were stopped, despite remaining in an informal mode. For example, throughout the project, Case 1 continued to have a good informal relationship between the project manager and the startup CEO, due to their transparent and frequent information exchanges.

“And where were we found with the [startup program] that they were very transparent. Look here’s what’s going to happen: if we accept you need to sell this and if you fill up that then we may go for this RFP and then you need to submit the RFP and if you’re accepted this is what’s going to happen.” (C01-S)

“In general, the discussions were very fruitful and very proactive on the part of the startup. I didn’t notice much of a Silicon Valley mentality. Personally, it was a good fit, even if he was sometimes very pushy, but that’s normal. The culture and everything else fit.” (C01-PM)

The other two cases had similarly positive experiences with the informal governance during the project phase:

“OEM [...] culture is fantastic. [...] that’s sort of my biggest lesson learned. [...] the culture is set in such a way that everyone understands what they’re doing, everyone knows to ask someone, if it is their responsibility to do the task, [...] And whenever there’s an issue it’s easy to raise issues for people inside, for people outside, with the right people and get them resolved quickly.” (C11-S)

“Startup happy about input, don’t know exactly where they want to go themselves. Have not yet found themselves, they need to consolidate and sharpen more [...] Know themselves what and how and at what price. [...] [Startup] keeps [OEM] up to date and is very open, the collaboration fits.” (C14-SCM)

All three cases subsequently experienced a transfer into the serial development departments of the OEM and thus experienced a shift into the linear innovation mode that is predominant in these departments. The strong focus on predictability and failure avoidance, together with the complex interaction within the car development, caused problems and finally the termination of all three projects.

“But there are also other examples, [Supplier] came with four cars and a demo van. That was much more professional. If [startup] had been at that level, they might have had a chance.” (C01-PM)

“some of whom are also fresh out of university, who simply don’t have any serial development experience yet, who simply ... hmm... yes, some of them simply lack this experience where things can go wrong.” (C11-PM)

Unlike the startups from Cluster III, which remained longer in the iterative innovation mode, before experiencing a formalization of their relationships, Cluster IV maintained a level of informality with lower formal requirements. This is evidenced by the OEM’s ongoing willingness to create flexible contracts and the purchasing specialists’ understanding of the unique needs of startups compared to traditional suppliers. Despite this informality, Cluster IV experienced a shift toward linear innovation.

I additionally analyzed the technological background of the innovation and their purpose for the incumbent. The innovations were divided into software, hardware or hybrid innovation. Software innovation is exemplified by intangible solutions such as machine learning algorithms or digital services. Hardware, by tangible products such as the drivetrain component, and the hybrids of hardware and software innovations, such as a new combination of the camera and image identification algorithm in an integrated product. Another categorization of the cases was dependent on the target of the innovation. At the OEM, innovations can either improve the product, i.e., the vehicle, or improve the vehicle production process and supporting function. A matrix with the cases categorized along the two variables, hardware vs software and product vs

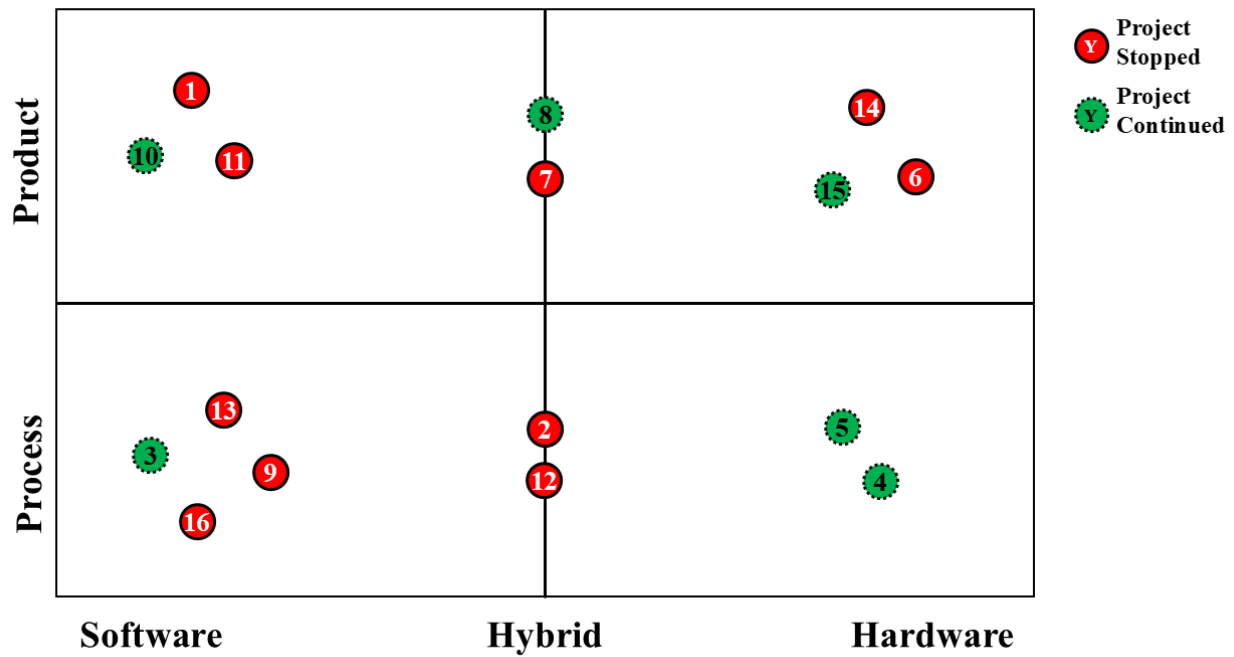


Figure 2.4.3: Startup technology and OEM area of application

process innovation, can be found in Figure 2.4.3. The follow-up projects are broadly distributed across processes and even spread between software and hardware. Therefore, these factors do not appear to have an impact on the project continuation.

2.5 Discussion

The goal of this multiple case study research was to explore the different paths startups take through the organization of a large corporation during a partnership and how these induced shifts in governance and innovation modes affected their collaboration. I have identified six clusters of shifts that occurred, showing that there is no single path a startup will take through the organization and thus the heterogeneity of an organization plays a significant role in the success of the partnership.

2.5.1 Implications for Research

Despite the effort extended by incumbent firms into gaining access to startup innovation, the anticipated benefits often remain elusive. I therefore began this paper with the question of the impact of a heterogeneous organizational view on the performance of startup–incumbent partnerships. The initial finding of this study shows that despite a single described partnership process within the OEM, participating startups experienced very different paths through this process (Balachandran & Eklund, 2023). The assumption that an organization is a homogeneous entity cannot be supported. A large organization such as the OEM needs to be broken down into individual subunits, in which each unit has its own institutionalized routines and is homogeneous in itself (Lupton & Beamish, 2014). Only by analyzing and comparing a larger number of partnerships of the focal firm, was I able to identify the multitude of development possibilities for partnerships across the various departments and technologies. The six described clusters each represent a potential path that a new firm could potentially face, when they partner with the OEM via the startup program. Each path has its own characteristics and challenges. This study proposes that a deeper understanding of the heterogeneity of an organization is necessary, as our case studies show that a *one size fits all* solution is not represented by reality. These paths were not planned or prescribed by the startup program or the incumbent but rather seem to be dependent on a variety of arbitrary factors. These

factors involve the target department, the individuals involved both on the technology side (project managers) and the purchasing side (purchasing specialists) as well as the maturity of the technology and that of the target project within the OEM. The target department might have experience in dealing with startups and is thus more inclined to continue in an informal and iterative mode. If the department has a history with startups, the likelihood of the employees involved having experience in startup partnerships is higher, especially for the purchasing specialist. The maturity of the technology plays another role in the path. A startup with very mature technology might move directly to the serial development, where it will experience a more linear innovation mode. A high degree of maturity of the target project also increases the likelihood of the partnership being located in the serial development unit (and as such, with a higher likelihood within a department with linear innovation mode). Case 8 is one such example, the maturity of the startup product and of the target project were both very high, but it was the individual commitment of both the project manager and the purchasing specialists which ensured the smooth transition from the startup program into the serial development and finally successfully into the target project.

Based on the finding that there are diverse partnership paths, I now want to address the second research question: How does the change in governance mode affect the partnership? The OEM's organization of the startup program offers a less formalized starting point, with a higher level of iterative innovation and as such, is set up to ensure a coequal partnership, rather than that of the traditional supplier relationships of the OEM. Fewer formal requirements are an advantage of such programs, by lowering the entry barrier for and making the initiation of the partnership much easier (Bauer et al., 2016; Kohler, 2016). In this study, 15 startups had begun in the informal governance mode, 11 of those moved into a more formal relationship with the OEM towards the end of the program. Of this group, five startups continued to receive follow-up projects. The formalization of the partnership in itself does not seem to be the problem, similarly to the results shown by Fang et al. (2024) and Roehrich (2009). Of greater importance than the formalization of the relationship is the circumstances of the partnership. Depending

on these circumstances, formal governance can complement the earlier informal governance and help the partnership evolve to the next level.

This leads us to the exegesis of the third research question. Observing changes in the innovation mode from a macroscopic view, nine of the 16 startups conclude in the linear innovation mode, but only one of these achieves a continuation of their project. In contrast seven startups finish the startup program in the iterative innovation mode, and five of those achieve a continuation. The startups-incumbent partnership in this instance demonstrates to have a much higher failure rate in the linear innovation mode. The traditional waterfall and stage-gate innovation development processes, which are prevalent in the serial development departments of the OEM, are much better suited for their *“seemingly predictable contexts in which customer and task requirements are well understood”* (Paluch et al., 2019, p. 3). Startups by necessity, often work in a more agile environment, with *“dynamic contexts with unique and yet to be discovered task requirements”* (Paluch et al., 2019, p. 3). This study shows that when the more powerful partner, in this case the incumbent firm, enforces a new innovation mode onto the other partner, the partnership suffers considerably. This misalignment of innovation modes played a much stronger role than the dynamics in governance in the cases of this study.

This study adds to the theory of dynamic innovation alliances, in terms of their changing governance and the influence of the changing innovation mode. The different innovation modes set the background for the collaboration and determine the impact of the changing governance (Keller et al., 2021). The study highlights the effects of imposing traditional, linear innovation modes on young startups in this collaboration setting.

2.5.2 Implications for Practice

The results and their success rate, observed after shifts in the governance and innovation mode provide useful data. Managers can apply the knowledge that when starting an R&D alliance with new partners, they should not only select the right governance for the R&D alliance, but also take into account the innovation mode the new partner currently employs. Despite the

startup program having very clearly defined processes, the participating startup's experiences differed greatly from one another. The startup program should include and address an awareness of the fact that maturity, both of the startup technology as well as the target project, will lead to a faster integration into the traditional innovation processes. Both situations could lead to shifts in the innovation mode to more traditional or necessitate beginning the program in this mode. This, as shown by most cases in this study, leads to a disruption in the collaboration.

The corporate startup program is in a unique situation, as its purpose is not to integrate the startup into its own organization, but rather to facilitate the startups into becoming a supplier of the OEM. One difficulty is that the number of potential clients within the organization is much smaller (sometimes there is only one department as the potential client) than exists outside the organization. Therefore, the startup program managers must make every single lead count, unlike an independent startup program that can offer the startup's solution to numerous customers in an open market. The pertinent question is, by which methods can managers at an incumbent improve collaboration, so that an increased number of startup projects will experience a successful integration into the supplier pool of the OEM. By lowering the entrance barrier into a R&D alliance with an incumbent, the OEM already has taken the first steps towards improving their collaboration opportunities. The increase in startup projects since the implementation of the program are proof of this. However, simply implementing such a program without the appropriate measures in place for the transfer of the innovation post pilot project into the serial development, increases the likelihood of heightened tensions between the firms at a later stage.

Startup managers also need to be aware of the timelines and processes of their incumbent, especially when it comes to the serial development (Balachandran, 2024). If startups do not have these competencies in-house, they need to find employees at the incumbent firm, who act as champions or promoters and can provide them with additional support or competencies (Gemünden et al., 2007; Howell et al., 2005). Especially, Case 8 showed the effectiveness of individual behavior. The search for such individuals, in both the R&D and PSM departments,

must become a top priority for both the startup and the startup program.

2.5.3 Limitations and Future Research

The limitations of this study serve as a meaningful starting point for further research. First is that while collecting rich qualitative data from a single incumbent allowed for deeper analyses and greater internal validity, it also necessarily limits the external validity of the study. My empirical findings therefore hold first and foremost for the automotive incumbent studied or companies with a very similar setup (Graebner et al., 2018). Extending the scope to other industries and more firms would provide important insights regarding the generalizability of this study. At a granular level, the modes of governance and innovation can differ between industries, resulting in different levels of conflict potential and the need for alternate solutions. Insights from a broader study could advance the understanding of temporal changes in governance and innovation modes and their impact on alliance success.

Second, the dyadic research design might be subject to response and non-response biases (Graebner et al., 2018). Interviewees from the startups and the incumbent might have assumed that information could be used against them, therefore withholding critical pieces of information. I myself, as a neutral external researcher (Babchuk, 1962) was not able to mitigate all fear from the operational employees, as evidenced by the refusal of some interviewees to allow voice recording. By taking detailed notes during the interview, however, I was able to capture the core arguments, even in these cases. As the case selection was mainly driven by the partners' willingness to participate, non-response bias could have also affected the results. It is plausible that startup CEOs who were particularly unsatisfied might not have been willing to have any further contact with the incumbent. Similarly, incumbent employees might have also had similarly negative experiences and might therefore now try to avoid further contact with the startup program. I attempted to appeal to these persons, by presenting myself as a neutral observer and stressing that feedback was an important method in providing the incumbent with insights leading to improvement and change. It is important to note that in my interviews, in

only seven out of the 16 cases did both a corresponding purchasing and R&D employee participate. For the remaining nine interviews, only one employee from either the R&D or innovation management side was willing to participate. This may have biased the cases towards the view of the R&D and production departments.

Third, with respect to the coding of the interviews, intercoder reliability could not be accounted for, as the interviews were not coded by a second, independent coder for reasons of confidentiality. However, Mayring (2015, p. 124) states that a second coder might only check for the objectivity of the original coder and not for reliability. This underscores the need for further research, building hypotheses from my research questions, using other firms and industries to test these hypotheses, and thereby increasing the reliability and generalizability of this study. Building up a panel dataset including data on governance and innovation modes in the dyadic relationships would then be the basis for additional insights on the nature, origin, and consequences of temporal changes in governance and innovation modes. These insights will advance the understanding of alliance governance and help practitioners in their efforts to enhance the success probability of early-stage R&D alliances.

Finally, future research might benefit from increasing the scope from startup-incumbent cooperation towards incumbent-new entrants' cooperation, where the new entrants are established firms from other industries. These types of cooperation become increasingly important in the automotive industry, where digitalization and e-mobility demand capabilities from established firms working in completely different industries. Insights from this interplay will help to explore organizational governance and cooperation mechanisms across industries and benefit both managerial practice and management research alike.

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Appendix

Meeting description	Interval	Participants	Length h:mm
Innovation management group meeting	weekly	Innovation manager	0:45
Innovation management department meeting	weekly	Innovation manager Innovation management department head Innovation manager Innovation manager Strategic alliances manager Strategic alliances specialist Strategic alliances specialist	0:45
Startup group mentoring session	twice a year	Head of startup program 3x Startup program manager Internal mentor R&D Internal mentor PSM Internal mentor IT Internal mentor production systems CEO Startup 1	2 days
Startup negotiation session	irregular	Purchasing Specialist 03 CEO Startup 08 R&D specialist 08 Innovation manager	1:30
Startup kickoff sessions	irregular	Internal mentor R&D CEO Startup Engineer Startup Startup program manager R&D specialist	1:30
Startup POC demonstration day	irregular	Head of startup program Startup program manager Internal mentor R&D Internal mentor PSM CEO Startup 1 Engineer Startup	4:00
Startup networking event	triannual	Head of startup program 3x Startup program manager Internal mentor R&D Internal mentor PSM Internal mentor IT Internal mentor production systems CEO Startup 1	full day

Table 2.5.1: Detailed list of meetings

Case	Startup interviews	Length	Project management interviews	Length	Purchasing interviews	Length
Case 01	CEO	0:45	R&D specialist	0:30	not applicable	
Case 02	COO	0:30	Innovation Management Production site	0:45	not applicable	
Case 03	CEO	0:45	Innovation Management IT	0:45	not applicable	
Case 04	CEO	0:45	Team Leader 3D Production	0:30	not applicable	
Case 05	VP Strategic Partners	1:00	Team Leader 3D Production	0:30	not applicable	
Case 06	CTO	0:45	R&D team leader	0:45	Purchasing specialist	0:30
Case 07	CTO	0:45	R&D specialist	0:45	Purchasing specialist	0:30
Case 08	MD Sales, Finance & HR	0:45	R&D specialist	0:30	Purchasing specialist	0:30
Case 09	CEO	0:45	R&D specialist	0:30	not applicable	
Case 10	CEO	1:00	R&D specialist	0:30	Purchasing specialist	0:30
Case 11	CEO	0:45	R&D project leader R&D specialist	0:45 0:30	Purchasing specialist	0:45
Case 12	CEO	0:30	Innovation Management Aftersales	0:30	not applicable	
Case 13	CEO	1:00	R&D specialist	0:45	Purchasing department manager	0:45
Case 14	VP Business	0:45	R&D specialist	0:30	Purchasing specialist	0:30
Case 15	Director Business Development	1:00	Innovation Management Logistics	0:36	not applicable	
Case 16	CEO	0:45	Innovation Management Aftersales	0:45	not applicable	

Table 2.5.2: Interview List

Part 3

Ambidexterity at Crossroads: R&D and Purchasing in Managing Innovation Collaboration

Abstract

Driven by the need to cope with rising economic uncertainty and complexity, many industries initiated collaborations, sharing assets and innovation. Such collaborations allow them to explore novel opportunities, while continuing to exploit existing ones. The automotive industry is already well known for its use of suppliers as a source of innovation. In addition to maintaining their traditional partnerships with tier-1 suppliers, many automotive firms have implemented startup programs to gain access to and collaborate with small and innovative firms. As part of a 30-month participant-observation study in an incumbent automotive company I conducted a multiple case study research into five startup cooperations with the incumbent. In this study, I observed the incumbent's application of different forms of ambidexterity across its divisions in an attempt to balance their exploration and exploitation activities. The organizational structure of different departments suggests that the R&D division uses structural ambidexterity to leverage the innovations coming from their startup collaborations. The PSM division on the other hand, as an important facilitator for all R&D cooperations, is characterized by contextual ambidexterity. My case studies, however, show that each startup project is characterized by a different combination of ambidexterity approaches with the respective R&D and PSM divisions. I extend the ambidexterity literature by demonstrating the different effects and challenges that combining structural and contextual ambidexterity have on startup driven innovation collaborations.

Keywords: contextual ambidexterity, incumbent, startup, structural ambidexterity.

3.1 Introduction

The automotive industry is known for using their traditional supplier base as a source of innovation (Schiele, 2010). In today's digital age however, radical and at times disruptive innovations are emerging from unexpected sources (Hopp et al., 2018). To enhance their adaptive flexibility and innovative performance, incumbents are trying to win new ventures, also called startups, as new sources of innovation (Kohler, 2016). The focal incumbent firm made the decision to increase its innovation pipeline through startup collaborations. In overseeing these startup collaborations, two main divisions bear the responsibility: the Research and Development (R&D) division oversees the technological evaluation of the startup while the Purchasing and Supply Management (PSM) division, from here on referred to as Purchasing, is responsible for the evaluation of the business case and the startup's industrialization capabilities. Each division must handle these new forms of explorative collaboration with startups, while continuing their traditional, mostly exploitative, collaborations. Balancing these explorative collaborations with the existing, exploitative partnerships requires different modes of learning within the organization (March, 1991). A growing body of literature describes three organizational approaches through which to obtain ambidexterity: temporal, structural or contextual (Gibson & Birkinshaw, 2004; Raisch & Birkinshaw, 2008; Tushman & O'Reilly, 1996). In this paper I focus on the two ideal approaches as identified by Raisch and Birkinshaw (2008) and which I also observed at the focal firms: structural and contextual ambidexterity. With structural ambidexterity, exploration and exploitation activities are separated into different business units and top management has to balance and manage the strategic alignment between the two (Kauppila, 2010; O'Reilly & Tushman, 2004). Alternately, contextual ambidexterity allows employees to freely allocate their resources between the two, rather than separating the exploration and exploitation activities at an organizational level (Kauppila & Tempelaar, 2016). This requires an organizational environment that allows for discipline and stretch on the one side, while support and trust is necessary on the other (Gibson & Birkinshaw, 2004). Below,

I introduce the conceptual background of my study. I then describe the research setting and methods, before presenting and discussing the findings.

3.2 Conceptual Background

3.2.1 Startup Programs as Sources of Outside-in Innovation

There is strong evidence that incumbent firms and entrepreneurial ventures, often referred to as startups, ought to have much to gain from joining forces given their complementary capabilities (Gans & Stern, 2003; Gassmann et al., 2010; Kaulio et al., 2017; Rothaermel, 2001a, 2001b). A prime example of such strategic alliances can be found in the biopharma industry during the emergence of biotechnology, a disruptive time for the incumbent pharmaceutical companies (Rothaermel, 2001a). While startups need to take risks and bring innovative ideas and organizational flexibility to the table, incumbent firms can offer financial resources, scaling capabilities and organizational efficiency (Weiblen & Chesbrough, 2015). Additional benefits exist for both parties. Startups can create value in a relatively short time with support from the incumbent firm, through mentoring and accessing knowledge, as well as the accompanying financial resources and market access (Pauwels et al., 2016). The incumbent, in turn, is set to gain preferred access to the technology base of participating startups, at a time when the valuation of the startup is still relatively low (Kohler, 2016). Despite the promise of incumbent-new venture alliances, the odds of success are known to decline with the growth of asymmetry within the partnership (Hogenhuis et al., 2016). To improve their success rate, incumbent firms are implementing startup programs, such as corporate accelerators, to attract startups at an early stage (Kohler, 2016). Corporate accelerators are a variation of the fairly recent form of organizational sponsor for entrepreneurial ventures, the startup accelerator. The first startup accelerator, Y Combinator, was founded in 2005 by Paul Graham and Jessica Livingston (Y Combinator, 2014). Their program was from the beginning very successful and replicated quickly, as it is estimated that globally over 2000 startup accelerator programs now exist (Cohen et al., 2019). This success and popularity attracted the attention of incumbent firms and led to

the implementation of corporate accelerators, as a tool to improve their insourcing of external innovation (Weiblen & Chesbrough, 2015).

The effectiveness of such startup programs, however, is still under scrutiny (Hallen et al., 2020). Hallen et al. (2020) show that an accelerator program's use of learning oriented practices, such as mentorship, workshops or interactions with other ventures, are the main argument given by many programs, for their success. Other factors could be significant in explaining the positive relationship between the accelerator programs and the ventures. These are selection, sorting, and signaling. Signals are pieces of visible information that relate to underlying qualities which are difficult to observe directly. This is often because higher-quality actors can obtain or display these signals more easily than others (Hallen et al., 2020). While signaling can be used by the participants to determine which programs to choose, it will be hard for new accelerators to replicate these effects. Sorting and selection are mutual and often iterative processes through which partnerships form, depending on the agreement of both parties and the broader competition for partners. When actors face constraints in forming multiple relationships, and selection is primarily based on perceived quality, sorting tends to produce a pattern where high-quality partners match with each other, while those seen as less desirable form partnerships with similarly positioned actors (Mindruta et al., 2016). This dynamic has been documented in the venture capital context, where entrepreneurial ventures are more likely to receive funding from venture capital firms that mirror their own perceived quality and status (Hallen et al., 2020). Selection and sorting, therefore, are less attractive effects for new ventures, policy makers and new startup programs, as they are not predictable and thus do not aid the new ventures. Additionally, while the accelerators themselves state that the learning experience is the most important part of their programs, critics state that most corporate startup programs are only initiated due to the media hype around startups and so the conversion rate of startup innovation into working projects is low (Kanbach & Stubner, 2016). Unsurprisingly, the topic of incumbent-new venture cooperation has received growing research attention (Bartman, 2014; Hora et al., 2018; Knoben & Bakker, 2019; Neyens et al.,

2010; Weiblen & Chesbrough, 2015).

3.2.2 Role of Purchasing in Facilitating Outside-in Innovation

The historical functions of the Purchasing and Supply Management (PSM) function, sometimes also called procurement, involved price negotiations, leveraging supply categories, managing supplier relationships and supplying the markets to achieve the best cost position (Gualandris et al., 2018). To differentiate from the concept of Supply Chain Management (SCM), this article uses the definition of Monczka et al. (2009) who define PSM as the “*strategic approach to planning for and acquiring the organizations current and future needs through effectively managing the supply base*”. Wynstra (2016) also uses this definition, focusing on the supply side and excluding the planning, production, distribution and logistics function included in the concept of SCM (see also Larson & Halldorsson, 2002). In recent decades, the focus of purchasing has shifted from an operative to a more strategic function, as a firm’s supply base is viewed increasingly as a source for innovations (Chen et al., 2004; Handfield et al., 2015). So, instead of simply purchasing products and services, the purchasing department is expected to manage the involvement of suppliers in the NPD activities (Johnsen, 2009), as companies realize “*that innovation cannot be totally achieved utilizing internal resources alone but must also tap supplier expertise in developing innovations*” (Monczka et al., 2009, p. 745). In times of technological uncertainty, the need for sourcing new technologies will increase as stable long-term supplier partnerships become obsolete and new partnerships with different capabilities are required (Phillips et al., 2006). To achieve this higher level of supplier collaboration, firms need to place a stronger emphasis on innovation strategies with their suppliers (Luzzini et al., 2015). This emphasis on innovation also increases the necessity for firms to employ competent buyers, as purchasing knowledge is an “*important catalyst of supplier-buyer collaborative innovation*” (Luzzini et al., 2015, p. 116). However, Monczka et al. (2009) state that purchasing depart-

ments need to continue to fulfill their original objectives, such as the continuous improvement of unit cost, quality and delivery performance and the reduction of product and process development time. The competences of most purchasing departments are still focused on these traditional responsibilities and a new dual role of purchasing will be required, if purchasing is able to play a meaningful role in sourcing new technologies (Schiele, 2010). Johnsen (2009) showed in his literature review that most papers suggest an improvement in NPD project performance facilitated by the early and close involvement of suppliers, marked by the reduction in development and product cost, a shorter time to market and a higher product quality. It was argued that purchasing should focus on transactional governance, including tasks such as non-disclosure agreements or exclusivity agreements negotiation, while the R&D departments should bear responsibility for the relational governance of the partnership, including trust building and goal alignment (Melander & Lakemond, 2015). This would lead to an organizational separation of the supplier governance, with the purchasing department and the R&D department acting as “*good cop – bad cop*” (Brattström & Richtnér, 2014). However, this approach could create conflicts as the supplier could receive mixed signals and experience inconsistency (Mikkelsen & Johnsen, 2019). Another possibility for the separation of these tasks takes place at a point in the life cycle of the partnership and product: an early stage sourcing could take the lead during the NPD projects and after entering production, a life-cycle sourcing assumes responsibility (Schiele, 2010). In this configuration, the advanced team would consist of engineering focused purchasers, while the life-cycle purchasers would have a stronger commercial background.

3.2.3 Balancing Outside-in Innovations through Ambidexterity

In many industries, organizations face increasing uncertainty and fast paced change. To thrive in such an environment, an organization needs to sustain its current markets but also

adapt to and engage in new markets. This *ambidexterity* can be achieved through strategic alliances (Zahoor et al., 2024). Most research focuses on the concept of innovation ambidexterity when researching strategic alliances, following the ideas of exploitation and exploration, described by March (1991) in his landmark research paper. While exploitation makes use of existing capabilities and assets to increase efficiency, reduce uncertainty and create stability, exploration is associated with the search for new markets and technologies to ensure longevity in times of uncertainty (March, 1991). March also described the complexity of balancing these two paths, principally due to a bias towards exploitation, with its increased certainty of success in the short term (O'Reilly & Tushman, 2013). This focus on exploitation, however, may lead to decreasing returns in the long term, or even failure, if the organization fails to adapt to the changing market requirements (Levinthal & March, 1993). A focus on pure exploration does not provide a sustainable business model either. Such an organization will not turn new ideas into markets, but constantly seek new opportunities (Levinthal & March, 1993). Thus, the argument is put forward that to balance these two approaches in an ambidextrous organization supports the idea that *“the ability to simultaneously pursue both incremental and discontinuous innovation and change results from hosting multiple contradictory structures, processes, and cultures within the same firm”* (Tushman & O'Reilly, 1996, p. 24). O'Reilly and Tushman (2013) highlight the concept that organizational ambidexterity should be analyzed as a dynamic capability, in that it describes *“the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments”* (Teece et al., 1997, p. 516).

Along with the innovation ambidexterity, Zahoor et al. (2024) have identified four additional types of ambidexterity in strategic alliances: supply chain ambidexterity, alliance ambidexterity, knowledge ambidexterity, and governance ambidexterity. Supply chain ambidexterity balances the need for supply efficiency with the ability to adapt to market changes (Gualandris et al., 2018). Alliance ambidexterity is described as the balance between different domains of alliances, such as exploration and exploitation alliances (He & Wong, 2004; Partanen et al., 2019; Wassmer et al., 2017) or between old and new alliances partners (Payán-Sánchez et al., 2022).

Knowledge ambidexterity is defined as “*the concurrent knowledge exploration and knowledge exploitation within alliances*” (Zahoor et al., 2024, p. 94). It enables the alliance partners to understand the knowledge gap between each other and improve the coordination of their interdependent tasks (Im et al., 2019). Governance ambidexterity focuses on the use of formal and informal governance to improve the knowledge flow between alliance partners while mitigating the risk of opportunism (Blome et al., 2013; De Man & Roijakkers, 2009). As such, whether it is possible for formal (contracts) and informal (trust and relational norms) governance mechanisms to have a substitution, or a complementary effect is still under discussion (Um & Oh, 2020). An integrated view of these different types of ambidexterity is still missing in current research. The interaction between any of these types of ambidexterity or the too narrow focus on only one type could lead to an improvement or equally adverse effect on the other types.

The positive impacts of ambidexterity on an organization have not been empirically conclusive. Most studies find a positive relationship between ambidexterity and firm performance, for example in terms of sales growth (He & Wong, 2004; Lin et al., 2007) or subjective performance measures (Lubatkin et al., 2006; Úbeda-García et al., 2019). However, there are also studies, which suggest that the relationship is not significant (Vrontis et al., 2017) or even that ambidexterity is harmful to firm performance, due to inefficiencies and duplicative work (Ebben & Johnson, 2005). This discrepancy has also been pointed out by O’Reilly and Tushman (2013) and Turner et al. (2013), suggesting that an increase in performance through ambidexterity is not a foregone conclusion. However, it is generally agreed that ambidexterity is especially beneficial in an uncertain and highly competitive environment and when the firm is larger (O’Reilly & Tushman, 2013). The debate regarding the effects of ambidexterity may, of course, stem from the fact that differences between the various types have not yet been researched.

To achieve ambidexterity, an organization can pursue various organizational design approaches. In this article I follow the differentiation of these approaches by O’Reilly and Tushman (2013) into three organizational designs (see also Lavie & Rosenkopf, 2006): temporal, structural, and contextual ambidexterity. While I observed mainly structural and contextual

ambidexterity at the focal firm, for completeness all three organizational forms will be introduced.

Temporal or Sequential Ambidexterity Sequential ambidexterity represents one of the earliest conceptualizations of how firms can navigate the tension between exploration and exploitation. Duncan (1976) proposed that organizations alternate between these two modes over time, shifting their focus depending on contextual needs. This temporal switching has been observed in empirical studies, such as Burgelman (2002) analysis of Intel, where long periods of exploitation are interspersed with shorter phases of exploration — a pattern viewed by many as both intuitive and operationally feasible (Gupta et al., 2006). Similarly, Brown and Eisenhardt (1997) describe how smaller electronics firms adopt a rhythmic oscillation between innovation and refinement to remain competitive amid technological shifts. Temporal ambidexterity relies heavily on leadership, as it is the responsibility of top management to manage these transitions and mediate the underlying tensions (Raisch & Birkinshaw, 2008). From this leadership-based perspective, ambidexterity aligns closely with the dynamic capabilities framework: senior executives must not only articulate a compelling strategic direction that legitimizes both exploration and exploitation, but also allocate and reallocate resources and competencies across units accordingly (Raisch & Birkinshaw, 2008). In this regard, balancing short- and long-term priorities becomes an exercise in organizational agility and cognitive flexibility:

It appears that ambidexterity as a dynamic capability rests on the ability of leaders not only to articulate a strategic intent and vision that justifies exploration and exploitation, but, more importantly, to manage the inherent tensions associated with incompatible organizational architectures. (O'Reilly & Tushman, 2011, p. 18)

Floyd and Lane (2000) offer a more granular view by emphasizing how exploration often originates at lower organizational levels, where middle managers test novel approaches, while exploitation tends to be driven by top-level decision-makers who institutionalize and scale the most viable solutions. However, one of the central drawbacks of the sequential approach lies

in the complexity of coordinating shifts between the two modes. Effective conflict resolution, trust-based relationships, and mechanisms that enable smooth transitions are essential to avoid organizational inertia or misalignment (Duncan, 1976; Floyd & Lane, 2000). Notably, O'Reilly and Tushman (2013) observe that sequential ambidexterity tends to be more common among smaller firms and in relatively stable industries, where the pace of change allows for phased transitions. In contrast, the volatile and fast-moving environments typical of large enterprises may demand more integrated or parallel approaches, such as structural or contextual ambidexterity (Weiblen & Chesbrough, 2015). Furthermore, despite increasing attention to the concept, there remains a lack of detailed understanding about how organizations practically manage the transitions between exploration and exploitation, suggesting the need for more fine-grained research on the underlying processes (O'Reilly & Tushman, 2013).

Structural Ambidexterity Contrary to the temporal separation of exploration and exploitation, Tushman and O'Reilly (1996) advocate for their simultaneous execution through structural separation. This approach acknowledges the inherent contradiction between the two activities, which require fundamentally different organizational designs, mindsets, and capabilities, a challenge often described as paradoxical (Jansen et al., 2009). Typically, exploratory units are characterized by smaller size, decentralized authority, and agile processes, whereas exploitative units tend to be larger, more hierarchical, and focused on standardization and efficiency (Benner & Tushman, 2003; Tushman & O'Reilly, 1996). The skill sets required for each also diverge significantly: exploration demands creativity, experimentation, and the questioning of existing assumptions, while exploitation relies on refinement, implementation, and disciplined execution (Auh & Menguc, 2005; March, 1991). By structurally decoupling these activities into distinct organizational subunits, firms can protect the exploratory culture from being overshadowed by the dominant logic of exploitation (Tushman & O'Reilly, 1996). This division allows employees to align their behaviors with the specific demands of their respective units, fostering internal coherence at the micro level. However, the challenge of alignment then shifts upward: integration across these differentiated structures must be managed by the

senior leadership team (Kauppila, 2010). According to Raisch et al. (2009) this top-down coordination constitutes the integrative mechanism that complements structural differentiation, enabling knowledge transfer and strategic coherence. For structural ambidexterity to succeed, leaders must not only manage the tensions between conflicting goals and cultures but also articulate a unifying strategic vision that legitimizes the coexistence of both exploration and exploitation (O'Reilly & Tushman, 2013). This requires the implementation of linking mechanisms and the cultivation of shared values and goals that bind otherwise independent units into a cohesive, ambidextrous system (O'Reilly & Tushman, 2004).

Contextual Ambidexterity Both structural and temporal ambidexterity represent established approaches to organizing the competing demands of exploration and exploitation. These approaches typically rely on either spatial separation, assigning distinct units to each mode, or temporal sequencing, alternating between exploration and exploitation over time. In contrast, contextual ambidexterity is a more recent conceptual development that aims to reconcile these dual activities within the same organizational subsystem (Kauppila & Tempelaar, 2016). Rather than dividing tasks across structures or timeframes, contextual ambidexterity emphasizes their simultaneous and complementary execution within a shared context (Wang & Rafiq, 2014). This approach is rooted in the idea of enabling individuals across the organization to engage in both exploratory and exploitative tasks, thereby fostering bottom-up ambidextrous behavior through employee involvement and discretion (Simsek, 2009). It combines the seemingly opposing demands of creativity and discipline by embedding ambidextrous capacities into the organizational culture, particularly where diverse knowledge bases and multiple perspectives converge to support a unified strategic orientation (Ghoshal & Bartlett, 1994; Gibson & Birkinshaw, 2004; Simsek, 2009). The core premise is that a conducive organizational context, rather than structural separation, forms the foundation for individuals to pursue exploration and exploitation concurrently (Gibson & Birkinshaw, 2004; Tempelaar & Rosenkranz, 2019). Gibson and Birkinshaw (2004) define this organizational context through two key dimensions: performance management and social context. Performance management refers to the systems

that promote high achievement through goal setting, accountability, and feedback mechanisms, echoing Ghoshal and Bartlett (1994) concepts of discipline and stretch. Key elements include encouraging ambitious goals, holding employees accountable for results, and using performance feedback for improvement (Gibson & Birkinshaw, 2004). In parallel, the social context emphasizes trust, support, autonomy, and information sharing, encouraging employees to learn from failure, make informed decisions, and develop capabilities continuously. While these two dimensions can at times create internal tension, particularly if not properly aligned, their successful integration enables the simultaneous pursuit of alignment and adaptability, a central aim of contextual ambidexterity (Gibson & Birkinshaw, 2004). To operationalize this form of ambidexterity, organizations may adopt parallel structures that allow employees to switch flexibly between exploitative and explorative tasks depending on situational demands. While the primary formal structure may focus on efficiency and stability through routine operations, secondary structures such as cross-functional teams or informal networks can support innovation and non-routine work. Unlike the spatial separation of structural ambidexterity, these parallel arrangements accommodate competing demands within the same unit, offering a balance between organizational efficiency and adaptive flexibility (Raisch & Birkinshaw, 2008).

In dynamic and fast-paced market environments, high-tech firms often face the dual challenge of maintaining their established operations while simultaneously pursuing novel opportunities. This tension creates a compelling need for contextual ambidexterity, which enables organizations to balance short-term performance with long-term adaptability (Wang & Rafiq, 2014). By embedding both exploratory and exploitative activities within the same organizational context, facilitated through processes of organizational learning, firms can avoid the considerable coordination and governance costs typically associated with structural or temporal approaches to ambidexterity (Simsek, 2009). Gibson and Birkinshaw (2004, p. 211) suggest that contextual ambidexterity offers a more viable and enduring model than structural separation, as it allows for the adaptation of entire business units rather than isolated substructures, thereby reducing the need for intensive monitoring and control:

This [contextual ambidexterity] is potentially a more sustainable model than structural separation because it facilitates the adaptation of an entire business unit, not just the separate units or functions.

Particularly in the early, uncertain stages of innovation, often referred to as the fuzzy front end, the boundaries between exploration and exploitation are blurred, making strict separation difficult to implement (Rosing et al., 2011). Moreover, as Good and Michel (2013) emphasize, employees across all functions increasingly operate in volatile contexts that cannot be effectively managed by formal structures alone but instead demand ambidextrous behavior at the individual level. In such unpredictable environments, contextual ambidexterity may not only be beneficial but essential for enabling flexible, situation-specific shifts between exploration and exploitation (Davis et al., 2009). Creating an organizational context that enables employees to independently navigate the tension between exploration and exploitation is a complex endeavor. Drawing on social learning theory, Hogan and Coote (2014) argue that the underlying values, behaviors, and competencies necessary for such ambidextrous action are developed through the observation of peers within a shared environment. As a result, the formation of a truly ambidextrous culture is a gradual and long-term process, often requiring years to solidify (Gibson & Birkinshaw, 2004). Even in mature organizational contexts, however, it remains uncertain whether individuals can be expected to initiate radical innovation, given the structural changes and significant resource shifts such innovation typically demands (Gilbert, 2005). This raises important questions about the extent to which top management must actively legitimize and support such transformations: a role that may conflict with stability and potentially disrupt ongoing technological development or market positioning (O'Reilly & Tushman, 2013).

3.2.4 Organizational Design Approaches to Ambidexterity at the Department Level and its Influence on Strategic Alliances

The bulk of research in ambidexterity focuses on the firm-level (organizational characteristics and structures), the alliance-level (alliance management capabilities) or the environmental-level (market development, institutional environment and international market openness) (Birkinshaw & Gupta, 2013; Zahoor et al., 2024). It also addresses the other extreme and focuses on individual ambidexterity (Gibson & Birkinshaw, 2004; Raisch et al., 2009; Tempelaar & Rosenkranz, 2019). Junni et al. (2013) imitated a call for further research at the lower organizational levels as an avenue of advancing understanding, which was most recently reiterated by Zahoor et al. (2024). As such, the focus of studies thus far has not included the organizational department level. This omission is especially relevant for research into ambidexterity in strategic alliances. Within the focus on the most common example of alliance ambidexterity, the innovation ambidexterity, we have seen the increasing influence by the purchasing department on innovation performance, along with that traditionally held by the R&D department (Andersen et al., 2021; Johnsen et al., 2022). In this type of ambidexterity, the function of the PSM must be balanced between the traditional function of cost performance and the more recent function of innovation performance (Blome et al., 2013; Úbeda-García et al., 2019). As described in section 3.2.1, the supply base, especially when consisting of young entrepreneurial firms, provides many novel innovations, requiring the PSM functions to take on a greater responsibility in managing these suppliers and at an earlier stage in the process than previously (see section 3.2.2).

With the recent growth in articles on the topic of ambidexterity in purchasing and strategic alliances (see Johnsen et al., 2022; Zahoor et al., 2024), the focus has been on the organizational ambidexterity at the firm level (Melander & Tell, 2019; Picaud-Bello et al., 2019), the governance between alliance partners (Blome et al., 2013; Lee & Cavusgil, 2006) or the general

influence of purchasing on the innovation performance (Constant et al., 2020; Mikkelsen & Johnsen, 2019). The specific role of purchasing at a department level is less often discussed. In principle, the PSM department can follow the same organizational design approaches as the R&D department or the entire firm. Schiele (2010, p. 149) recommends setting up a structural ambidextrous design with an *“advanced sourcing team [interfacing] with R&D, while the life-cycle sourcing team ensures compliance to the commodity sourcing strategies and company-wide pooling considerations”*. Gualandris et al. (2018, p. 669) argue that purchasing should follow the design of contextual ambidexterity, as *“for higher levels of ambidexterity, purchasing personnel will be allowed to make their own (contextual) judgments on how to best advance and balance efficiency-oriented and innovation-oriented activities”*. A purchasing department driven by sequential ambidexterity was identified by Mikkelsen and Johnsen, in which the purchasing department remained in an exploitation focus during times of stability and only during periods of change did it alternate to support exploration activities (Mikkelsen & Johnsen, 2019). As this practice appeared to be more of an ad hoc solution, driven by an external trigger, they recommended a more structured approach such as the early stage sourcing function described by Schiele (2010). However, as there is no consensus on the optimal organizational design approach for innovation performance, I aim to address this question within this study:

Research Question 1: *How does organizational ambidexterity design approach of the PSM department affect the firm’s innovation performance?*

All studies investigating the antecedents, forms, or outcomes of organizational ambidexterity have solely focused on either the R&D department (e.g. Kauppila, 2010; Ossenbrink et al., 2019; Zimmermann et al., 2015) or the PSM department (e.g. Gualandris et al., 2018; Johnsen et al., 2022; Mikkelsen & Johnsen, 2019) independently. However, the interaction between the R&D and PSM employees is escalating commensurate to the increase of exploration activities within the PSM department (Picaud-Bello et al., 2019). The argument can be made, that in the future the PSM department will be the one to orchestrate supplier innovations rather than R&D (Schmelzle & Tate, 2022). As most organizations have individual departments allocated

to the PSM and the R&D functions, those departments organizational ambidexterity design approaches so far, are examined independently of each other, by research and management. Additionally, R&D department opinion does not always consider the PSM departments relevant as a contributor in the technology selection process (Melander & Lakemond, 2014). To improve the inclusion of PSM in the NPD process, Melander and Lakemond (2014) also argue that the purchasing organization needs to be adapted to work with R&D and their strategy aligned with the overall R&D and firm strategy. As such, the alignment of approaches may have a positive impact on innovation performance. This leads to the second research question:

Research Question 2: *How does the respective organizational ambidexterity design approach in the PSM and the R&D departments affect the firm's innovation performance?*

3.3 Settings and Methods

This study is set in the automotive incumbent’s startup program and drawn from data gleaned from the incumbent’s partnership with five startups through its startup program. Data gathering was carried out over the course of a 30-month time span and included participant observation, a longitudinal survey given to startup employees of the five startups during their time in the startup program as well as seven follow-up interviews. In addition to these seven interviews, interviews gathered at an earlier stage of the research were analyzed again in order to enrich the topics raised by the survey. By following the startups throughout their time in the startup program, I observed changes in their perception of the incumbent and identified critical incidents (Pettigrew, 1990). In order to get a temporal proximate measurement of the changes in participant perceptions of the startup program and the focal incumbent firm I shared survey with those startup participants during different stages of the program (Podsakoff et al., 2003). By looking at five different collaborations with the same incumbent, I adopt a multiple-case study design. This approach allows for the holistic interpretation of contemporary practices (Yin, 2018) and theory development (Eisenhardt, 1989).

3.3.1 Setting

The focus of my research is the startup program of a large European automotive OEM. This program provides a platform for startups to develop a POC together with the research and development department of the OEM. During a four-month project, the engineers and software developers of the startup and of the OEM work together in close collaboration. While the startups do not work on the premises of the OEM, regular calls and meetings are set up, in addition to a physical meeting for the kickoff and final demonstration. Each project is supported by a member of the startup program, who helps with administrative tasks, such as scheduling or note taking. Additionally, the startup program organizes the scouting, benchmarking, as well as the purchasing and contracting processes. Towards the end of the POC project, the

managers of the startup program help the startups to define a follow-up project with the original R&D unit or find a new project with a different unit. The startup program is not set up like a traditional accelerator program. It does not provide working space, does not require any equity, and does not start the program in cohorts, but rather is based on the individual preferences of the startup and internal team. However, it does provide mentoring, by OEM employees and program alumni, with specific learnings about the OEM and the automotive industry.

3.3.2 Data Collection

In this in-depth qualitative study, I adopted a multiple case study design that combines longitudinal data from participant observation, a longitudinal survey, matched semi-structured interviews and archival data. Below, I describe each of these data collection approaches in turn.

3.3.2.1 Participant Observation

To obtain first-hand insights into the research context, I conducted a longitudinal participant observation study within the focal incumbent for every working day over a period of two and a half years from August 2017 to January 2020. Through my participant observation, also described as “*direct research*” by Mintzberg (1979, p. 589), I collected systematic data, by identifying a set of real organizational variables and complement this with anecdotal data. The definition of participant observation is broad and ranges from complete observer via observer as participant and participant as observer, to complete participant (Atkinson & Hammersley, 1998; Gold, 1958). In my position as participant observer, I was employed in the supply chain management and purchasing division of the OEM, as part of the innovation management team. In this role, I participated in internal meetings across the divisions, acting both as note taker and observer. Those meetings included the research and development division and the production divisions, and crossed hierarchies, from operational employees to top management and executives. In this capacity, I also participated in external meetings with the startups and

consulting firms. However, my position as a researcher was always overt, as I was introduced as such. During my time at the OEM, I also engaged in numerous informal conversations and meetings. As part of the innovation management department team, patterns emerging from my analyses were discussed with them periodically. As the managers of this department also were involved in most startup program projects, often in a support function, I was able to use their feedback to improve the internal and external validity of case studies (Bygstad & Munkvold, 2007). My research engagement at the OEM can be broadly categorized into two distinct project phases. The first phase centered on the analysis of the startup program, with a particular focus on dyadic interviews conducted with startup participants after their completion of the program. In parallel, I aimed to capture insights into the internal operations and perceptions of the innovation management department. To this end, I spent the initial three months closely observing the department's daily activities and shadowing key personnel involved in managing the program. Toward the end of this period, I organized an initial workshop with the innovation management team to present my research agenda and discuss access to potential interview partners. Following this, I commenced interviews with startup representatives, which were periodically synthesized and reflected upon in collaborative sessions with innovation managers. After another three-month interval, a second workshop was held to share preliminary findings, this time with the inclusion of the department head, allowing for broader validation and discussion. Subsequently, I initiated a series of internal interviews within the OEM, again maintaining a feedback loop with the innovation team through regular updates and discussions. Upon completion of the interview phase, I presented the consolidated results in a workshop attended by key stakeholders. Additionally, I was able to participate in internal startup workshops for a new cohort of startups. These workshops aimed to introduce the startups to relevant internal stakeholders and familiarize them with the organizational procedures and expectations related to supplier engagement at the OEM.

The second phase of the project involved the design and implementation of a longitudinal study. During the first six months of this phase, I developed the survey for the longitudinal

study in collaboration with internal stakeholders through departmental workshops and further startup interviews. Data collection was conducted over the subsequent five months, including follow-up interviews focused on critical incidents encountered during the participation in the startup program. In parallel with data collection, I continuously shared interim findings with relevant stakeholders and prepared a final report summarizing the main insights and implications derived from the study. All these workshops served the purpose of checking my interpretations and thus increasing the validity of my study (Gibbert et al., 2008; Yin, 2018). The timetable of this project is found in Table 3.3.1 and a summary of all events that I took part in is found in Table 3.3.2. In addition to the meetings and the interviews, I had access to the general databases of the OEM, where I could find the organizational chart as well as the Task, Authority, Responsibility (TAR)¹ matrix for each organizational unit. Additionally, I was provided with copies of department specific documents, such as sample contracts, templates and instruction material. Due to my consistent engagement with the department, I was able to increase their trust in my ability to improve the organization. This further ensured that I had continued access to people and materials, while also allowing me to participate in the discussion of more confidential topics (Jay, 2013).

3.3.2.2 Longitudinal Survey

Towards the end of the first phase, in which I had concentrated on collecting data from the OEM and its startup program, I decided to shift focus to the startup experience during that partnership and try to identify critical incidents in the partnership, through a longitudinal survey (Pettigrew, 1990). During the final five months of the second project phase I followed five startups participating in the program and, to receive more immediate feedback, I sent surveys to them at regular intervals (Langley, 1999). As such, each startup received a survey at

¹Definition: Job design underlies the principle of congruence, stating that tasks, authority, and responsibility should align as closely as possible. Only individuals endowed with the requisite **authority** can be held **responsible** for the outcomes of their **tasks**. In this context, authority refers to job-related rights of action and responsibility entails the obligation to personally account for the proper execution of assigned tasks. (Keßler & Winkelhofer, 2004)

Part	Phase	Time	Activities	Documentation
1.	1. Initial activities	August '17 - October '17	Daily participation of meetings and business days	Summary of notes
	2. External data collection	November '17 - February '18	1 st Workshop with Innovation Management department Startup-program workshop with startups External (startup) interviews	Interview summaries Workshop summaries
	3. Internal and external data collection	March '18 - June '18	2 nd Workshop with Innovation Management department Startup program workshop with startups Internal (OEM) interviews External (startup) interviews	Interview summaries Workshop summaries
	4. Analysis	July '18 - December '18	Internal (OEM) presentation of results	Part 1 Project report
2.	1. Survey setup	January '19 - June '19	3 rd Workshop with Innovation Management department Startup program workshop with startups External (startup) interviews	Workshop summaries
	2. Data collection	July '19 - November '19	Survey distribution and collection Follow-up interviews about critical incidents	Survey reports Interview summaries
	3. Analysis and Documentation	August '19 - December '19	Internal presentation of results	Final project report

Table 3.3.1: Project phases and timeline at incumbent firm

Meeting description	Interval	# of events
Innovation management group meeting	weekly	90
Innovation management department meeting	weekly	45
Startup group mentoring session	twice a year	2
Startup negotiation session	irregular	3
Startup kickoff sessions	irregular	5
Startup POC demonstration day	irregular	5
Startup networking event	triannual	6

Table 3.3.2: List of attended meetings

the beginning of the program, starting at the kickoff event. After this initial survey, additional surveys followed at regular monthly intervals and ended with a concluding survey about a month after the final demonstration day. To minimize the possibility of survey fatigue on part of the key startup employees, I decreased the time needed to complete each survey. For this I divided the questions into two categories, a business and a development side. The set of business questions were answered by the project managers of the startup, often the CEO or a business development manager, and the questions regarding the development process were answered by the lead engineer or software developer. This division supported the validity of the data, as the engineers were not often involved in the negotiation phase, equally the business developers rarely participated in day-to-day engineering discussions.

3.3.2.3 Interviews

Interviews proved particularly valuable in understanding the perspectives of managers, in both the startup and the incumbent (Boyce & Neale, 2006). The interviews were constructed as semi-structured interviews and interviewees were selected from the current and past participants of the pilot project. Due to the complex nature of the dyadic relationship, interviews can provide more granular information about the respondents' experience, thoughts and behavior than can be acquired from a survey. In addition, Eisenhardt and Graebner (2007) describe the interview as a highly efficient data gathering method, as it provides rich, empirical data. Also, interviews are able to capture data from infrequent and highly episodic events (Eisenhardt & Graebner, 2007). As part of semi-structured interviews, the interviewees were asked several open questions supported by theory driven questions and confrontational questions. The theory driven questions help to make the implicit knowledge of the interviewee explicit, while the confrontational question's purpose is to expose the interviewee to alternative interpretations and help them to critically question an established theory (Flick, 2018). The questions were ordered by topic and organized in the form of an interview guide.

All five startups participated in the follow-up interviews at the end of their round of sur-

No.	Technology field	Startup Interview	Length
Case 01	Emotion AI	Business development manager	0:30
Case 02	Deep-web data mining	Business development manager	0:30
Case 03	ADAS AI	COO & founder	0:30
Case 04	ADAS Radar	CEO & founder	0:30
Case 05	ADAS Software	CEO & co-founder	0:45
		CTO & co-founder	0:45

Table 3.3.3: Follow-up interview list

veys. For each project, the responsible business manager or CEO participated. For one firm, the responsible technical manager was also available for an interview. The interviews were done mostly via the telephone, as all firms, with one exception, have their residency outside Germany. The list of all the follow-up interviews can be found in Table 3.3.3. After the interviews from the longitudinal study were concluded, the 24 transcripts conducted during phase 1 were screened again. The critical incidences portrayed by the five startups gave the initial round of interviews a new context. The internal interviews were conducted in both the purchasing and the R&D departments. Seven of those were conducted with employees from the purchasing department, 16 with key members of the internal project teams and one with a startup program manager. The list of all the internal interviews can be found in Table 3.3.4 and Table 3.3.5. Overall, the material used in this study amounted to 18 hours of voice recording from the 30 interviews.

No.	Position description	Technology field	Length
R&D01	Innovation Management	Aftersales Services	0:45
R&D02	Innovation Management	Aftersales Services	0:30
R&D03	Innovation Management	IT & Big Data	0:45
R&D04	Innovation Management	Logistics	0:35
R&D05	Innovation Management	Production Systems	0:45
R&D06	R&D Specialist	Sound Engineering	0:30
R&D07	R&D Specialist	Display	0:45
R&D08	R&D Specialist	Autonomous Driving	0:30
R&D09	R&D Specialist	Autonomous Driving	0:30
R&D10	R&D Specialist	Connectivity	0:30
R&D11	R&D Specialist	Autonomous Driving	0:30
R&D12	R&D Specialist	Connectivity	0:30
R&D13	R&D Specialist	Autonomous Driving	0:30
R&D14	R&D Project Manager	Autonomous Driving	0:45
R&D15	R&D Team Leader	Combustion Drivetrain	0:45
R&D16	Startup Program Manager		0:35
R&D17	Production Team Leader	3D Production	0:30

Table 3.3.4: Internal interview list – R&D Department

No.	Position description	Technology field	Length
PSM1	Purchasing Department Manager	Connectivity	0:45
PSM2	Purchasing Specialist	Combustion Drivetrain	0:30
PSM3	Purchasing Specialist	Display	0:30
PSM4	Purchasing Specialist	Autonomous Driving	0:30
PSM5	Purchasing Specialist	Connectivity	0:30
PSM6	Purchasing Specialist	Autonomous Driving	0:30
PSM7	Purchasing Specialist	Autonomous Driving	0:30

Table 3.3.5: Internal interview list – PSM Department

3.4 Findings

The OEM is divided into seven divisions, with each division headed by a member of the management board, divisions are: (1) chief executive functions, (2) sales, (3) research & development, (4) finance & IT, (5) purchasing & supply management, (6) human resources, and (7) production & logistics. This study focuses on the R&D department and the PSM department. Some innovations, especially process innovations, involve other departments, such as IT, however these innovations are out of scope at present. All strategic alliances with a focus on innovation begin in the pre-development subdivision of the R&D division. This subdivision is also the organizational home of the startup program. All startup collaborations of the OEM are initially supervised by the startup program, which facilitates the on-boarding, project management and transfer of the collaboration into the responsibility of the specialized project teams after a successful POC phase. To assess the technical viability of each startup, the startup program recruits technical experts from the pre-development units of the OEM for the duration of the POC project phase. To ensure the continued commitment of the responsible pre-development department, a collaboration project will only be kicked off, if the department commits resources including manpower, budget and the necessary hardware environment. The startup program has additional funding available to bridge financial gaps during the POC phase. The individual development and pre-development departments follow a functional organizational design approach. This means each department is charged with developing a specific function of the automobile. The responsibility for these functions is then broken down into smaller and smaller functions until the project team and individual levels. These development department functions begin at a higher level, such as the drive-train function or the autonomous driving function and then become more specialized. At the main department level, it is still normal to find high-level functions, such as Internal Combustion Engine (ICE) drive-train or electrical drive-train, but sometimes include specific functions such as autonomous driving level

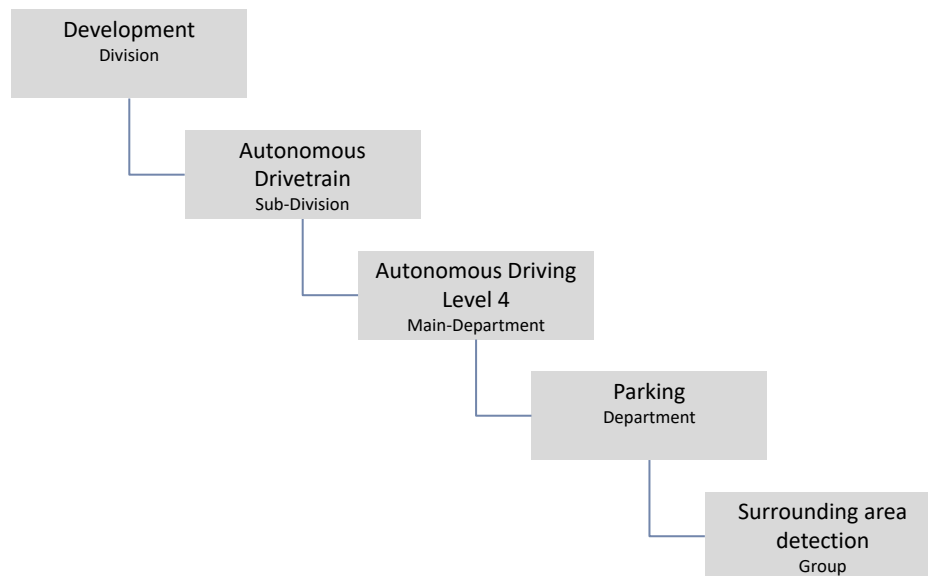


Figure 3.4.1: Example of organizational levels of the R&D division at the OEM

⁴¹. For a schematic overview of the organizational levels see Figure 3.4.1.

Figure 3.4.2 shows the parallel organization of pre-development and serial development within the R&D division of the OEM. The pre-development is set up independently from the serial development and reports directly to the R&D C-level executive. Its setup is divided into the different serial development units (such as pre-development drivetrains) following the functional design of the serial development units, but departments with designated tasks (such as the Startup Program or the remote Technology Offices in e.g. Silicon Valley) are also allocated to the pre-development sub-division. These departments have the responsibility to scout for new outside-in innovations and then to connect these innovations to the appropriate pre-development units.

The purchasing division is the main contact point for all suppliers. R&D employees are advised not to talk to potential suppliers without the involvement of the PSM department, as

¹Definition autonomous driving level 4: High automation - the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task, even if a human driver does not respond appropriately to a request to intervene. Autonomous driving levels as defined by the SAE International Standard J3016 (SAE International, 2014)

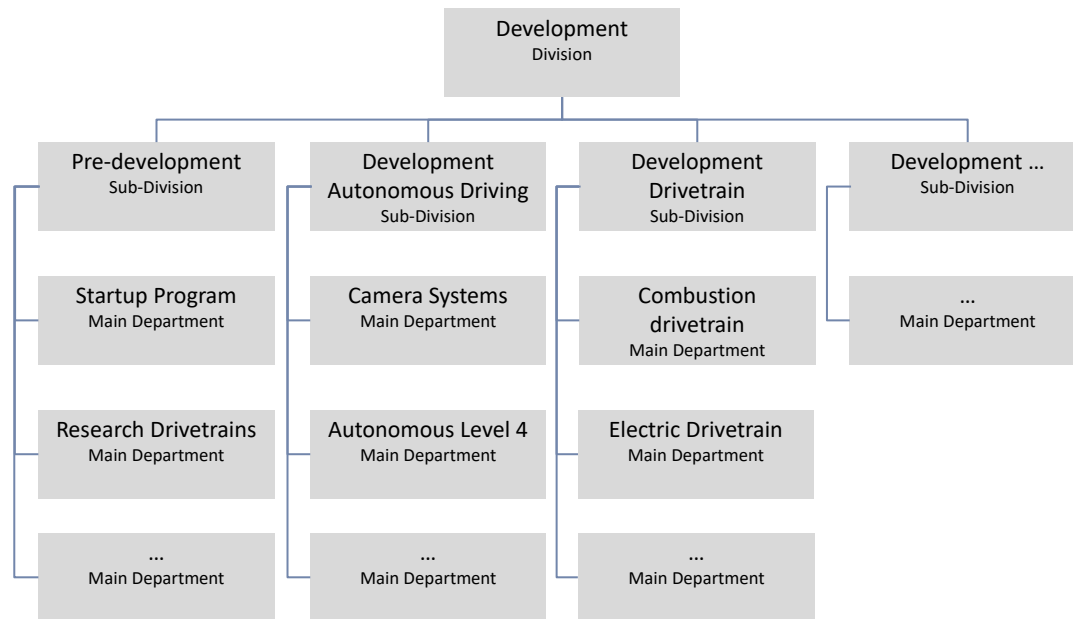


Figure 3.4.2: Schematic organization chart of the R&D division

it can create difficult Intellectual Property (IP) issues. The PSM employees negotiate the terms and conditions to which a supplier delivers his products or services, manage the flow of goods and handle any supply shortages or quality issues with the suppliers. Unlike the development division, the purchasing division is set up in a commodity structure. As such, each department is responsible for the complete supply chain of its commodities. One example being the electronics and sensors purchasing department of the digital sub-division bearing responsibility for all sensors in and around the automobile, while the software purchasing department of the same sub-division is responsible for all software products and services in the automobile. The sub-division drivetrain is similarly organized, with departments allocated to them holding the responsibility for battery systems, as they are related to the drivetrain function, but which require a completely different supplier set. For a schematic overview of the purchasing division see Figure 3.4.3.

This setup leads to a matrix structure between the development and the purchasing division. While the development department for autonomous driving uses all types of range and

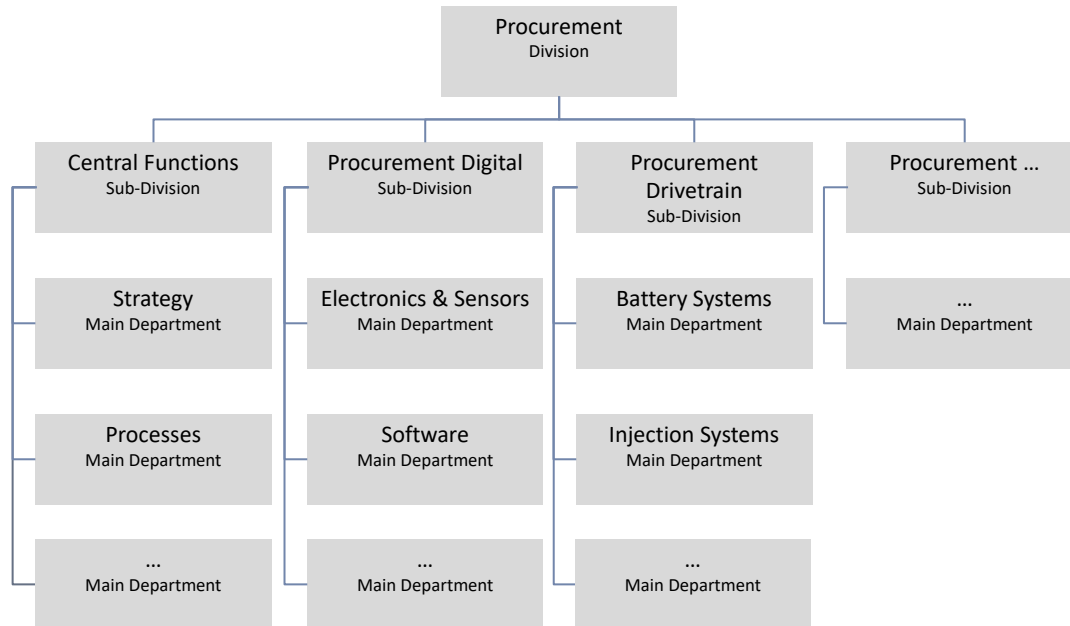


Figure 3.4.3: Schematic organization chart of the purchasing division

detect technologies, such as radar², lidar³ or camera-based systems, each system belongs to a different commodity and therefore is the responsibility of a different purchasing department. Similarly, the purchasing department responsible for camera-based systems, not only handles requests from the autonomous driving development departments for level three and level four individually, as each have different specifications for their systems, but it also must handle requests from the production division, whose engineers might require a camera-based system for an autonomous shop-floor logistics management system. For this reason developers normally have one buyer responsible for each technology or commodity within their function. Each of those buyers in turn handles requests from more than one development department. This mode of operation is also evidenced through the organizational levels of the purchasing department, which does not have a fifth level (group) but ends with the department level.

The main reason for the different approaches across the two divisions, is that the development

²Definition: Radar is an acronym for **radio detection and ranging**, describing a device or system that uses radio waves for detecting and locating objects (Oxford University Press, 2023)

³Definition: Lidar is a compound word of light and radar, describing a device that is similar in operation to radar but emits laser light instead of radio waves (Oxford University Press, 2023)

department is supposed to be technology agnostic. In the autonomous driving example, the customer does not care about the technology used to bring them from point A to B. They are more concerned about the convenience and safety of the solution. The development department must find the best solution and to achieve that can shift between the technologies (radar, lidar or camera-based). For this same reason, the development division needs to be independent of any supplier and evaluate the technology on its own merit. The selection of the final technology to be implemented is done between pre-development and serial development. During the pre-development phase, suppliers can provide different concepts to the OEM and the responsible departments must evaluate the level maturity of each concept. When a certain level is reached, the serial development and the purchasing together will decide on the best combination of a concept and a supplier. After that, the responsible development department develops the technology together with the supplier towards the final product for a specific car or architecture. This organizational divide into that of pre-development and serial development is a strong indicator for structural ambidexterity.

The purchasing of a technology at a reasonable cost requires an extensive understanding of the market. In the camera example, the systems applicable for a shop floor logistics system and an autonomous driving car might be very similar. In the best case, several suppliers would be able to provide such camera-based systems, but at a variety of prices, quality levels and production sites (important in times of uncertain tariffs and trade barriers). To find the best business case for the OEM, it is important to know all suppliers and therefore experience is necessary. During the production phase of a car, the PSM departments are also responsible for the adherence of the suppliers to their contractual agreement in scope of price, volume, and quality. As these contracts are quite complex, the same departments who negotiated the contract will be in charge of this serial production supervision. The knowledge and experience of current projects and the supplier base are maintained by keeping this responsibility within the department's personnel, who will then negotiate the contracts for the next automobile generation. The involvement of the same departments and employees for all projects from

pre-development to serial production are a strong indicator for contextual ambidexterity.

3.4.1 Organizational Ambidexterity Design Approaches at the Departmental Level

Figure 3.4.2 shows the organizational separation of pre-development and serial development. In my interviews with the R&D and PSM employees, it became clear that this organizational separation was reinforced through the different innovation and alliance objectives of pre and serial development. In their research on exploration and exploitation alliances in the biopharma industry Rothaermel and Deeds (2004) use the differentiation between drug discovery (exploration) and commercialization (exploitation) for the segmentation of different alliances. In the automotive industry, the divide falls along very similar lines. The pre-development focuses on the finding of new markets or technologies with their partners, while the serial development has a focus on the industrialization of the innovation. Table 3.4.1 shows some exemplary quotations on the different objectives of pre- and serial development. During the interviews, an interviewee from the pre-development units indicated that they had a great deal of freedom in the choice of their research agenda and could act on a much shorter notice to explore new technologies:

The startup program approached [name of pre-development department]. [It was an] interesting technology to look at in a POC. (R&D08)

Plant manager saw the project at a startup event and brought the idea to [OEM name] via cost center and small money. (R&D05)

Alliance objective	Exemplary quotations
Exploration alliance	“You invest some money. And then you learn how the market works [...] if it is actually interesting for OEM.” (R&D16) “The pre-development use case blurs after time, as no deadline or products depended on it” (R&D09) “[Currently] there is no use case that is of any use to me [at serial development] and therefore I pushed it towards [colleague from pre-development]” (R&D12) “In the current role, [name] can only make the technical assessment and say whether it works or not [...] but the technology offered much more in terms of functions and the discussion only started now [...] there was no strategic decision for a long time” (R&D11)
Exploitation alliance	“What about the industrialization? [The Serial development] wants a mature concept, and at best from a tier-1 [supplier].” (R&D13) “The work in the [pre-development] department had gone well, there were technically promising results. [...] the follow-on project [with serial development] was mainly about concept approval and industrialization possibilities. Above all, a validation on the technical side.” (R&D08) “However, the integration of established companies is easier, they have experienced specialists - especially with SAP integration - experience helps a lot and makes it easier” (R&D05) “Actually, always use the setup to industrialize via T-1, because [of the] very complex components and even then there are only a few T-1s that dare to do so. [Interviewee indicating the numbers with their fingers] AUTOSAR*, weight, noise, temperature etc.” (R&D07)

*AUTomotive Open System ARchitecture (AUTOSAR) is a global partnership of leading companies in the automotive and software industry to develop and establish the standardized software framework and open E/E system architecture for intelligent mobility. (AUTOSAR GbR, 2003)

Table 3.4.1: Overview of the exploration versus exploitation alliance objectives by the different R&D units

Their counterparts at serial development were significantly more restricted in their freedom to try out new innovations. Once an innovation was decided on, industrialization was the highest priority. Failure to industrialize was not acceptable, even software features, resulting in the serial development only accepting innovations after they have reached a certain level of maturity.

We could simply switch something off if it doesn't work. But we don't want to do that because of the reputational damage. (R&D10)

The [serial development] wants tested and adjusted systems. [...] They really didn't want [the innovation] before [...] the topic was still so immature. At the first presentation there was complete incomprehension [by the serial development team for the low level of maturity of the prototype]. (R&D13)

The typical difficulties of structural ambidextrous organizational design are also present at the OEM. The transfer of knowledge between exploration units to the exploitation is one major challenge in this design (Raisch & Birkinshaw, 2008), another is the correct balancing of resources between the units (Auh & Menguc, 2005).

However, the [serial development units] are very preoccupied with themselves and sometimes don't even know what their own requirements are [...] How to proceed now. If there is a follow-up project, the startup should not be left standing in the dark for half a year. (R&D11)

[We] started with a small project. But the audio [of the serial development] lab wasn't made available to me on the grounds that they were already very busy. I would have had to build one myself in [pre-development hub]. I wasn't provided with a test vehicle either, I would have had to get one myself and convert it. (R&D06)

The perceived crowding out of resources, money and people, by the serial development was a major pain-point for the pre-development employees in many of the innovation projects. The challenge of balancing resources between exploration and exploitation units, particularly given

the tendency for exploitation units to attract greater funding due to their closer proximity to measurable success, is a common issue in structurally ambidextrous organizations. Together with the other indicators, the OEM seems to follow an organizational design of structural ambidexterity for the R&D division with the associated benefits and challenges.

The purchasing division does not employ the same organizational design approach. The PSM employees involved in the startup program projects were also handling the serial development projects and even providing series production support. These three tasks have very different objectives. A complication arose when buyers engaged primarily with serial development projects, resulting in increased familiarity with established Tier 1 suppliers and a bias toward mature, low-risk innovations. These experiences did cause some PSM employees to develop a more rigid mindset. One purchasing specialist told me that he did not like startups projects, as “*(the startups) had no experience in business etiquette*” (PSM7), while another “*was surprised that they were directly on first name basis. Normally (purchasing) has a rather distant relationship with a supplier*” (PSM2). Another advantage of the traditional suppliers, I was told, is their knowledge about the processes and requirements of the OEM due to their long-established relationship:

Startups have [inexperienced] sales personal ... they make mistakes completing [OEM specific document] and other forms. This creates additional work for the purchaser. (PSM2)

[Startups] don't know how the [OEM] organization is structured. At [large T-1] and [large T-1] there is simply a sales contact, a development contact, everyone knows exactly who they must and are allowed to talk to. (PSM6)

Startups have to be guided through everything, need intensive support. (PSM7)

However, as the purchasing employees are involved in both pre-development and serial development projects, they do see the advantages of new ideas. In general, OEM personnel are not averse to outside-in innovation as it helps to improve the product and also increases competition.

[We have] only established suppliers that all use the same technology. With

[startup name], first tier [suppliers] should get an additional technology to build up competition [...] a commercial alternative. (PSM3)

[I] think it's good that [OEM] is doing something with start-ups, because they bring fresh ideas. (PSM6)

[Startups] must be extremely convincing that the extra effort is justified. But can also be good for the competition. [R&D division] unfortunately does not have such goals. (PSM7)

The simultaneous management of purchasing responsibilities of pre- and serial development places the challenges of ambidexterity onto the individual. Unlike in a structural design approach, contextual ambidexterity needs the individual to be able to restructure and reallocate resources. This requires management support, including a long-term approach, especially needed in the case of pre-development projects which would take years to bear fruit. Purchasers want to be included in the early stages of the new product development but find it sometimes difficult to prioritize this exploration effort due to their additional focus on series development. One R&D specialist complained that during an important negotiation round with a startup their “*the [purchasing] project manager disappeared after 30 minutes for a more important appointment and there were only people there who could not make any commitments or statements about OEM*” (R&D08), while another found it difficult to get support from their purchaser to setup the supplier as an official supplier at a number of projects:

It's possible that they can't be bothered to assign a supplier number for smaller transactions. (R&D17)

The purchasers themselves admitted that the additional amount of care needed for new supplier might lead to a lack of support:

But if the minimum number of suppliers has already been reached and the targets can probably be achieved, there are certainly purchasers who will not make the extra effort. (PSM4)

In meetings with the purchasing innovation management department, I have often heard it said that the purchasers and their departments are not given the time and resources to adequately address the pre-development department's issues. A crowding out of the exploration business by exploitation occurs, as *"in the face of short-term performance pressures, demands of existing customers, and ease of measurement, exploitation overwhelms exploration"* (Benner & Tushman, 2003, p. 245). This problem has also been identified at the OEM, as a purchasing manager attending the meetings told me: *"it is always the same, the urgent supersedes the important"*. Taking all these points together, the results show a strong indication that the PSM division is set up with a contextual ambidexterity approach.

3.4.2 Impact of Nonaligned Organizational Ambidexterity Design Approaches on Innovation Performance

After establishing that the organizational design approach to ambidexterity within the OEM varies by department, I will now examine the impact of such different organizational approaches on the innovation performance. Structural ambidexterity in R&D is normally characterized by a clear division between exploration and exploitation activities, enabling the pre-development department to concentrate on breakthrough innovations, while the serial development departments optimize current operations simultaneously focusing on getting their innovations out into the market. In contrast, contextual ambidexterity in the PSM division involves balancing these activities within the same unit, allowing for flexibility and responsiveness to the immediate needs of either exploration or exploitation. Alongside the specific challenges facing ambidextrous organizations, this dichotomy leads to conflicting interests and objectives within and between purchasing and R&D. I have identified three major conflicts that arise from this organizational design. The first, is the conflict between pre-development and serial development for resources within the R&D domain, which is well researched and documented (e.g. Junni et al.,

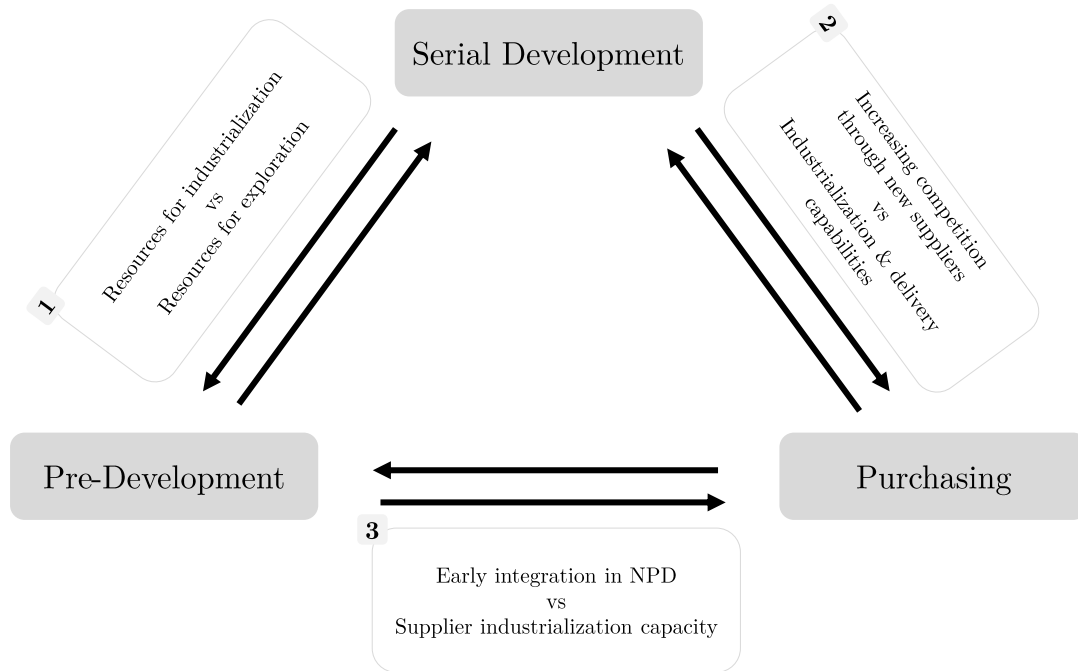


Figure 3.4.4: Conflict of targets to balance between R&D and PSM departments

2013; Lavie et al., 2010; Wilden et al., 2018). The introduction of the purchasing department as an additional actor adds a new layer of complexity by introducing purchasing resources as a further constraint. Within this expanded structure, the purchasing department encounters two additional conflicts. The second conflict exists within the scope of the serial development. It is a trade-off between fostering new suppliers to enhance competition, and thus not becoming dependent on a single supplier, and the focus on maintaining industrial excellence and delivery reliability from existing partners, thereby increasing the entry barriers for new suppliers and limiting competition. The third conflict stems from the tension between an early involvement in NPD projects and the department's operational capacity to industrialize these new suppliers. For a schematic overview see Figure 3.4.4.

The **first conflict**, the competition for resources in ambidexterity within the R&D organization, is well documented in literature. The OEM allocates its resources between the serial and pre-development, however, these resources are skewed towards the series development. The organizational setup alone shows that the pre-development is one organizational level below the

series development (refer to Figure 3.4.2 on page 124). Due to the different level of resources, funding as well as capacity, the new suppliers often seek to bypass pre-development and enter directly to series development. This was confirmed by the R&D specialist from autonomous driving:

The founders or colleagues from [startup name] frequently approached me and wanted to talk. Perhaps because they realized that we were closer to series [development] and therefore closer to real money, than if they were to speak with [name] from the pre-development department. (R&D13)

However, responsibilities are clearly delineated, and new projects are typically required to begin in the pre-development phase. Series development may only take over if a corresponding series project has allocated the necessary function. This has led to recurring frictions during the handover from pre-development to series development. A frequent point of contention was the question of when series development, with its significantly larger capacities, should or could take over. This raised issues around the transition from a push to a pull principle, especially given that the series department is not only responsible for further development but also for validation and homologation:

There is genuine interest from the specialist [series development] department, but uncertainty remains as to whether the technology will ultimately deliver on its promise. The [startup program] could no longer contribute. Their involvement ended after fifteen thousand euros, and from their perspective, the project was considered a success once [series] departmental interest had been sparked and a follow-up initiative was being pursued. (R&D08)

The cases illustrate that the well-documented challenges of structural ambidexterity continue to manifest in the OEM's context. Despite formal separation between exploratory pre-development units and exploitative series development functions, tensions arise particularly at the interface between the two domains. A central issue concerns the handover of projects: when

and how exploratory initiatives should transition into series development remains ambiguous, often resulting in inefficiencies, duplication, or delays. Moreover, there is a persistent risk that series development, due to its larger capacities, budget authority, and operational urgency, gradually absorbs a disproportionate share of organizational attention and resources.

With the increasing responsibilities of the PSM departments in managing supplier innovations, an additional resource has to be shared by the R&D department: the PSM department. As an effective gatekeeper to the resource of funds in the form of development contracts, and as the responsible department for supplier compliance to purchasing processes and regulations, the purchasing employees are important stakeholder in any supplier innovation project. The focus of the serial development is on the development of product features, while simultaneously ensuring conformity to standards and regulations. Established supplier relations are making this job easier for the R&D employees. The purchasers, however, try to minimize costs through competition and avoid dependency on a single supplier.

Tier-1s are often settled and therefore offer no room for maneuver (PSM1)

Yes, I can't jump any further than planned and that's always the next PoC, and once that has been successfully completed, you can move on to series production and then comes the purchasing department with its single sourcing and so on. (R&D03)

This reveals the **second type of conflict** within the ambidexterity design approach. The focus of the R&D engineers is to find the best workable solution. The costs or potential supply dependencies are not their first concern. For the PSM departments, however, the complications of becoming dependent on a single source supplier are the worst scenario. One of their ongoing tasks is the development of a commodity strategy, in which they evaluate the dependency of the OEM on a single supplier for each technology. If the supplier pool becomes too small, the purchasing department's personnel are urged to develop new suppliers in order to increase competition. In established technologies, the subsequently identified new suppliers are often unproven. This leads to tough discussions between purchasing and the R&D specialists, who generally prefer to remain with established suppliers. Innovative new suppliers with a high

degree of technological uncertainty, as well as the potential to be locked into a single source due to technological IP, will have to convince both departments of their viability. In such situations, the OEM attempts to combine both the advantages of these new innovative suppliers and the incumbent suppliers due to their complementary assets (Hess & Rothaermel, 2011). Complex contractual agreements between the OEM, the established tier-1, and the new suppliers will be set up to ensure compliance from all partners. This option helps allay R&D department concerns regarding timely industrialization and technological maturity. Meanwhile the PSM department is tasked with finding a complementary partner for the innovative firm that improves their competitive environment:

With [startup name], first tier [suppliers] should get an additional technology to build up competition [...] a commercial alternative. (PSM3)

The disadvantages of such a construct lies in the risk that the OEM does not have sole rights to the innovation. This risk has to be carefully assessed, but in general the OEM is not opposed to sharing the innovation:

However, OEM does not want exclusivity for a non-differentiating technology, preferring to share costs with others. (PSM1)

While this conflict has many possible solutions, the complexity of these constructs, as well as the willingness of either the innovative firm or a tier-1 to join such a partnership, makes this option one unlikely to succeed. At the OEM most of the purchasing NPD projects are serial developments with established suppliers. It is of note, that when the traditional power balance between an automotive OEM and its tier-1 suppliers was heavily tilted towards the OEM (Hebisch et al., 2022), a certain standard and behavior came to be expected from the supplier by the PSM employees:

You get information much later [by the startups], with [Tier-1 names] sometimes too, but always perfectly prepared. (PSM2)

I heard from my old boss: if he [the supplier] doesn't sign, he'll be dropped. (PSM6)

This points to the **third conflict** emerging from the ambidexterity design approach. The PSM employees are not accustomed to needing to provide support in early-stage innovation projects and complained in the interviews about the inexperience of new suppliers and the associated additional workload (see quotes page 130). Interestingly, the roles of the R&D and the PSM are reversed in regards to new pre-development. There is a slow process of mindset change, as some employees are beginning to realize that their procedures and standards might be too exacting and challenging to accommodate new suppliers.

I would like more projects [with the startup program] and believe that this would help to start rethinking [our] internal processes. (PSM6)

[Internal industrialization check list] is a madness. What we are putting the startups through. (PSM5)

While this change in thinking is evidenced in comments from the purchasers in my interviews, it is likely that purchasers with no contact and experience with pre-development units may still prefer the traditional supplier-OEM relationship. The setup of the purchasing department in the commodity structure will inevitably lead to projects facilitated by purchasers inexperienced in the needs of startups and new suppliers. As this third conflict is played out in pre-development projects, purchasers need to balance the advantages of an early involvement with the additional responsibilities this involvement entails. The purchasing employees overall prefer an early integration in the supplier selection and NPD process. This early integration has the benefit of helping the OEM avoid either, becoming too dependent on a single supplier, relying too heavily on the associated technology, or by addressing the issues of cost effective industrialization and quality too late in the process (see Schiele, 2010). This conflict between the early integration into the NPD process, especially with new suppliers, and the associated additional workload, seems to be a difficult one to solve for the purchasers in their daily operations. A further complication is that it is not the responsibility of the purchaser to develop the startup into an eligible supplier. In their TAR documentation, the purchasing departments are clearly tasked with traditional goals of the purchasing department (such as ensuring the supply capability

or commercial risk management). They have the authority to check the plausibility of offers, evaluate suppliers and negotiate offers, including ensuring the necessary documentation and contracts (e.g. cost detailing). There is no explicit documentation or instruction indicating that their role should support the supplier in achieving all evaluation criteria. Traditional tier-1 suppliers carry industrialization from idea to the ready for award status in-house. The responsibility to bridge this gap for the new suppliers (like startups), however, is also not officially taken up by the pre-development units:

And what is OEM's role? Industrialization is not our job — but then what is the benefit for the startup [working with pre-development] (R&D13)

We have to motivate the supplier to finance [the industrialization] in order to do business in the long term (R&D06)

In the interviews, the purchasers confided that their support beyond the evaluation of industrialization capabilities was purely done an act of goodwill, but that there also have been instances where they did not provide support for the project:

We also invested time, as we looked at the startup and tried to take it on board despite the awarding [process] having been completed. (PSM3)

However, it was also difficult to take care of [startup] alone. The award process had 8 suppliers in the one project. You can only take care of one of them to a limited extent. (PSM5)

Already, the purchasing department's other responsibilities leave little room for pre-development projects. By not having a designated responsibility for supplier industrialization and relying on the goodwill of individual purchasing employees, this often proves to be fatal combination, leading to new suppliers being excluded from the nomination process based on industrialization or maturity criteria. These typical challenges of a contextual ambidextrous organizational design can be counted with individuals that can handle these tensions and are supported by strong leadership.

We have seen that the use of two different organizational ambidexterity design approaches at the OEM led to three conflicts: One, the struggle for resources within the R&D division, two, the balance between introducing new suppliers while also maintaining delivery capabilities, and three, the balance between early NPD integration and industrialization capacity. As the two latter conflicts take place within the PSM departments, the purchasers are facing the struggle of ambidexterity from two sides. During the pre-development, they need to fulfill the role of gatekeeper and reduce the risks of a single source to the OEM, due to a lock-in into a technology at an early stage. During the serial development they need to increase potential suppliers and are even open to matching startups with tier-1, in spite of the risk of sharing the innovation with other automotive companies.

3.5 Discussion

In summary, the organizational structure and procurement strategies adopted by the OEM reflect a strategic orientation towards ambidexterity, balancing exploration and exploitation in the pursuit of innovation and operational efficiency. The organizational structure adopted by the OEM's R&D department reflects a strategic orientation towards ambidexterity, balancing exploration and exploitation in the pursuit of innovation and operational efficiency. In the purchasing department, maintaining continuity within departments, from pre-development to serial production, facilitates knowledge retention and fosters contextual ambidexterity. The involvement of the same departments and employees across projects is supposed to enhance adaptive capabilities. However, the use of two different organizational approaches to ambidexterity within the same organization leads to conflicts.

3.5.1 Implications for Research

Following the calls of Andersen et al. (2021) and Zahoor et al. (2024) this research looked at the organizational design beyond the level of analysis of the organization, but a level lower at the individual departments. I identified that the incumbent uses two separate approaches of ambidexterity in the two divisions important to its outside-in innovation capabilities. Since Duncan (1976) the focus of organizational ambidexterity has been at most at the level of the R&D department. With the recent rise of literature on the involvement of purchasing in innovation performance and NPD (Johnsen et al., 2022; Mikkelsen & Johnsen, 2019; Schmelzle & Tate, 2022), I am integrating organizational ambidexterity with the increasing role of purchasing in innovation performance. Andersen et al. (2021) made a start by investigating different organizational ambidexterity design approaches in purchasing departments. I am adding to this literature a new level of analysis through the departmental view across the organization, as well as by analyzing the interdependence of the design approaches between the two departments traditionally involved in supplier innovation — the R&D and the purchasing departments. While

in my case study the development division is structurally divided into a pre-development and a serial development, the purchasing department employees the same departments and people for the management of suppliers in pre- and serial development projects, following a contextual ambidextrous approach to balance its exploration and exploitation activities. As it possible to set up also a structural ambidextrous design for purchasing — for example by creating a specialized project purchasing units (Andersen et al., 2021; Schiele, 2010) — this finding surprised me. Following the literature, the organizational ambidexterity so far was conceptualized as dichotomous categories, between an organization had to choose from. Ossenbrink et al. (2019) developed a hybrid ambidexterity model, where the two constructs are conceptualized as a continuum. Following their argument, the concept of organizational ambidexterity might not only be more fluid for an organization, but also within an organization.

3.5.2 Implications for Practice

The findings from this study suggest that management should carefully consider the choice of ambidexterity approaches within their organization, as each approach presents unique challenges. Specifically, when different divisions within the same organization adopt differing ambidexterity strategies – such as structural ambidexterity in the development division and contextual ambidexterity in the purchasing department – managers must be vigilant about the potential for conflicting objectives, communication challenges, and operational misalignments. To mitigate these issues, management should implement cross-functional coordination mechanisms and foster a culture of collaboration that bridges the gap between structurally and contextually ambidextrous units. This awareness and proactive management can enhance the organization’s ability to effectively integrate innovation with operational efficiency.

3.5.3 Limitations and Future Research

This study exhibits at least two limitations which can serve as a significant avenue for future research. Firstly, the concentration on a singular automotive incumbent restricts the external validity of the study. However, delving deeply into rich qualitative data from a single incumbent facilitated more profound analyses and enhanced internal validity (Graebner et al., 2018). Given the idiosyncratic nature of the automotive industry, characterized by highly regulated, international, and expensive consumer products, studying the specific automotive incumbent or companies with a similar setup renders the empirical findings most relevant (Graebner et al., 2018). Broadening the scope to encompass other industries and additional firms would yield crucial insights into the generalizability of this study.

Second, this study focused on a very specific type of partnership between the incumbent firm and startups. Future research might wish to increase the scope from startup-incumbent cooperation towards incumbent-new entrants' cooperation, where the new entrants are established firms from other industries. The increasing demand for capabilities for digitalization and e-mobility in established automotive firms will increase the importance of collaboration with firms working in completely different industries than traditional automotive suppliers. Insights from this interplay will help to explore the challenges to balance ambidexterity in the R&D and purchasing departments across industries and benefit both managerial practice and management research alike.

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Part 4

Future-Proofing Innovation

Procurement:

What Purchasing Must Change to Support New Suppliers

Abstract

This study aims to examine the future needs of purchasing experts in regards to their responsibility in innovation purchasing. By using the jobs-to-be-done theory, this study relies on a market research approach to determine these needs. Defining the purchasing experts as customers who have to *do a job*, a job map and 21 outcome statements were created. Using the survey data from 128 purchasers working at a large automobile manufacturer, these statements were ranked according to their satisfaction and importance level. Overall, this study finds that purchasing and supply management (PSM) employees at the automobile manufacturer recognize the importance of innovation collaboration, but are by and large, dissatisfied with its implementations and outcomes, particularly with non-traditional suppliers. If responses are partitioned into different clusters, the results change. While purchasers of incremental innovations favor established tier-1 suppliers and emphasize supplier scaling capabilities, those dealing with radical innovations prioritize external sources, greater end-customer understanding, and an expanded participation in innovation projects. The study also reveals differences in ambidexterity preferences, with incremental innovation purchasers favoring structural approaches and radical innovation purchasers preferring contextual ambidexterity, highlighting the evolving role of PSM in balancing traditional procurement with innovation-driven responsibilities. This study aligns with key academic discussions in PSM literature, highlighting the need for enhanced competencies in digitalization, new business models, and big data, as well as stronger integration of purchasing into the NPD process. The results of this study suggest implementing structural ambidexterity for stable commodities and contextual ambidexterity for highly innovative ones to balance short-term efficiency with long-term innovation success.

Keywords: jobs-to-be-done theory, new product development (NPD), outcome-driven innovation (ODI), purchasing and supply management (PSM), skills and competencies.

4.1 Introduction

It has been a long held understanding that the only necessity for the purchasing and supply management (PSM) function to play a pivotal role in an organization, was for it to generate cost savings and increase efficiency for that organization. In some industries, up to 80 percent of the total costs are paid to suppliers (Monczka et al., 2009) and the operational management of these supplier costs was the focus of the PSM. With the growing trend for outsourcing and the efforts of organizations to try and capture more long term value from their suppliers (van Weele & van Raaij, 2014), the PSM's role became more strategic (Ellram & Carr, 1994). One strategic function is the development of a stable supply base and working relationships with those suppliers (Chen et al., 2004). An additional strategic objection has evolved into a primary PSM function, that of securing access to innovation (Blome et al., 2013; Carey et al., 2011). These new roles, the contribution to the innovation effort of an organization, as well as overseeing the supply base and supplier development, have been well researched in recent decades (Luzzini et al., 2015; Schiele, 2010; Wynstra et al., 2003). The early integration of suppliers into the new product development is also very well established (Johnsen, 2009). As companies are increasing the involvement of the PSM functions in development at ever earlier stages, new responsibilities and competencies are required of the purchasing employees (Luzzini et al., 2015). This leads to an increase in the range of competencies required from PSM professionals (Bals et al., 2019; Stek & Schiele, 2021). Previous studies have focused on procurement competencies for the 21st century (Tassabehji & Moorhouse, 2008) and included a focus on the current competencies of PSM professionals. Other studies concentrated on the development of future competencies with a focus on certain aspects of the added value of PSM, such as innovation (Stek & Schiele, 2021), sustainability (Schulze et al., 2019), or a combination of the two (Beske-Janssen et al., 2023).

This research extends the current literature by exploring the future competencies needed, by applying the outcome-driven innovation (ODI) method. This mixed-method approach is based

on the jobs-to-be-done theory (Ulwick, 2005). In the first stage, the ODI creates statements through the qualitative analysis of semi-structured interviews with the users or customers. In the second stage, these statements are analyzed quantitatively. The identification of user and consumer dissatisfaction with existing solutions is often the potential basis for innovation. The practice-oriented ODI approach was created for the development of new products and services for consumers, this study applies the approach for the development of competencies in the PSM function. The direct focus of the jobs-to-be-done theory can improve the understanding of the needs of PSM managers and employees when confronted with highly innovative solutions provided by their supply base. With the ODI approach, I provide a new methodological lens to uncover needs and contribute to a better understanding of the challenges for purchasers in general and in innovative field specifically.

This article is laid out as follows. First, in Chapter 4.2 I describe the theoretical background of the evolving role of purchasing and the associated new competencies required from PSM experts. I also introduce the concept of the ODI methodology and the use of this method to conduct employee-centric research. Then, in Chapter 4.3 I outline the two-step approach of the ODI method within this case setting, followed by the outline of my findings in Chapter 4.4. Chapter 4.5 concludes the paper with a discussion of the implications for current research and practice and an overview of future research opportunities.

4.2 Conceptual Background

A major driver of the evolution of the PSM function is the integration of suppliers into the NPD process (Johnsen et al., 2022). This integration has been an accepted method of increasing cost and lead-time advantages, following the study of Clark (1989). Clark, in his study of Japanese automotive OEM, highlighted the benefits to innovation performance, derived from the integration of suppliers into the early stages of the NPD process. In the ensuing years, numerous firms adapted the role of their suppliers to become a source of innovation and integrated them into their NPD process (Johnsen, 2009). However, the literature does not reflect this early integration of suppliers as being solely beneficial. One difficulty authors have identified is the supplier selection process (Hoegl & Wagner, 2005; Petersen et al., 2005). Other authors even demonstrated a diametrical effect of early supplier integration on innovation performance. Eisenhardt and Tabrizi (1995) described a lock-in effect if suppliers were involved too early in the process and thus reduced innovation performance, a finding later supported by Handfield et al. (1999). Additional concerns include; a loss of the core competencies of the buying firm (Wagner & Hoegl, 2006), supplier opportunism (Helm et al., 2020), and even a negative impact on cost, time to develop and efficiency (Littler et al., 1998). In more recent studies, the key role purchasing plays has been further recognized (Johnsen et al., 2022). A major factor contributing to the successful integration of suppliers into the NPD process is the involvement of PSM professionals as part of cross-functional teams (Luzzini & Ronchi, 2011; Schiele, 2010; van Echtelt et al., 2008). The integration of purchasing knowledge seems to have a strong influence on the innovation performance of a firm, by increasing the chance of a successful supplier integration in the NPD process (Luzzini et al., 2015).

Despite the academic support for early involvement of purchasing in the NPD process, R&D departments still are reluctant to invite the PSM experts into their projects (Picaud-Bello et al., 2019). If the PSM team is only contacted at the end or even after the completion of the NPD project, the room for negotiation can be much more narrow, depending on the patent

situation and the technology lock-in. Patrucco et al. (2017) offer an explanation for this conduct: the internal status of the PSM department and its innovation objectives. A mature (high status) purchasing department will be involved in strategic processes, have top management support, and have a long-term focus on strategy and therefore also become involved in innovation processes (Patrucco et al., 2017). Without the appropriate skills, purchasers will not be able to effectively manage the suppliers and become a high status organization (Tassabehji & Moorhouse, 2008). To understand the changing role of PSM professionals and required competencies, I will first analyze the changing objectives and challenges of purchasing departments. Afterwards I will describe the theory of the ODI approach and lay out a road-map addressing the needs of purchasing employees in order to facilitate a successful PSM integration into the NPD process.

4.2.1 The Changing Role of Purchasing

In the past, the traditional purchasing responsibilities involved price negotiations, leveraging supply categories, managing supplier relationships and supplying the markets to achieve the best cost position (Gualandris et al., 2018). This meant that the objective of purchasing departments was to supply *“the company with the right goods, in the right quality, in the right quantity, at the right time, at the right place, and at the right cost”* (Kaufmann, 2002, p. 7). Until the late 1980s, for most purchasing departments the only real area of freedom was the price. Purchasers kept their supplier relationships at arm’s length and focused on sourcing through competitive bid pricing (Monczka et al., 2009). Increasing globalization pressured organizations to look outside their boundaries for a competitive advantage. This pressure also affected purchasing departments and led to a widening of their scope from operative procurement to encompassing strategic sourcing (see figure 4.2.1). In this situation, strategic sourcing includes activities such as supply planning and supplier selection. It can be grouped into two additional objectives for purchasing departments: strategic positioning and innovation (Schiele, 2019). Strategic positioning ensures that a company can retain its competitive advantage by

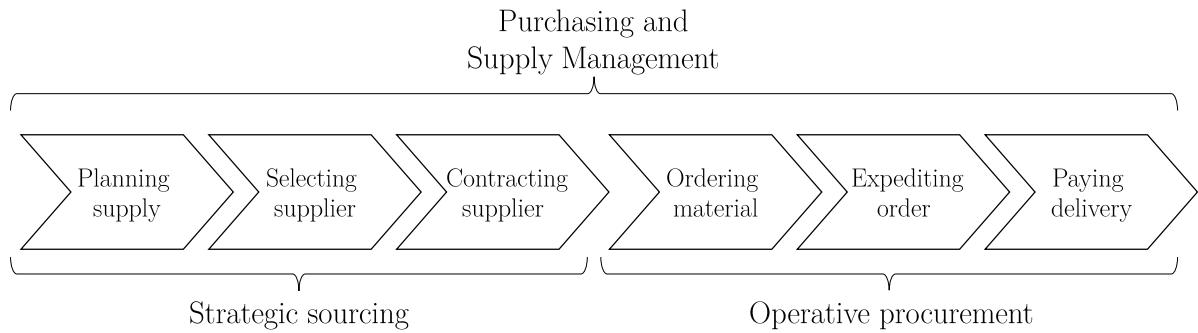


Figure 4.2.1: Split of purchasing in strategic and operative activities, based on Schiele (2019)

designing and maintaining its supply network (Ellram & Carr, 1994; Schiele, 2019). Together with new supply concepts, such as modular sourcing or Just-in-time (JIT) delivery, purchasing departments had to adopt a total systems perspective of supplier management in order to maintain peak performance (Kaufmann, 2002). The second new objective of innovation stems from the growing realization *“that innovation cannot be totally achieved utilizing internal resources alone, but [firms] must also tap supplier expertise”* (Monczka et al., 2009). Many firms have since begun to view their supply base as a source for innovation (Chen et al., 2004; Handfield et al., 2015). Traditionally, the R&D departments control the NPD development with the suppliers, however, the change from traditional, stable long-term supplier partnerships to new partnerships with different capabilities – accelerated in times of technological uncertainty – demand a greater involvement of the PSM department in the NPD process (Beckman et al., 2004; Phillips et al., 2006). Purchasing employees thus act as an *“important catalyst of supplier-buyer collaborative innovation”* (Luzzini et al., 2015). This role does not *“naturally fall within the usual sphere of responsibility and competence of purchasing departments”* and as such new capabilities are required (Mikkelsen & Johnsen, 2019). As purchasing departments need to continue to fulfill their original objects, such as the continuous improvement of unit cost, quality and delivery performance and the reduction of product and process development time (Monczka et al., 2009), a new dual role of purchasing will be required (Schiele, 2010). Otherwise, purchasing will never be able to go beyond a cost-focused identity (Murfield et al., 2021).

Johnsen (2009) has shown, in his literature review, that there has been extensive research on the benefits and improvements of NPD project performance through early and close involvement of suppliers, such as the reduction in development and product cost, a shorter time to market and a higher product quality. It can be argued that purchasing should concentrate on the transactional governance of suppliers, with a focus on the legal side such as the negotiation of non-disclosure agreements or exclusivity agreements, while the R&D departments should continue to be in charge of the relational governance of the supplier, including trust building and goal alignment (Melander & Lakemond, 2015). This would lead to an organizational separation of the supplier governance, with the purchasing department and the R&D department often acting as “*good cop – bad cop*” (Brattström & Richtnér, 2014). However, this possible sending of mixed signals could lead to conflicts, as the supplier experiences inconsistencies (Mikkelsen & Johnsen, 2019). Another possible separation of these responsibilities is along the life cycle of the partnership and product: an advanced sourcing should take the lead during the NPD projects and after entering production a life-cycle sourcing takes over (Schiele, 2010). In this configuration, the advanced team would consist of engineering focused purchasers, while the life cycle purchasers would have a stronger commercial background. This separation would also help to alleviate the tension between departments at different stages of the partnership: R&D primarily being focused on the first stage of the product life cycle, while PSM has to keep the whole life cycle in mind (Doha et al., 2013). These multiple challenges demonstrate the purchasing literature’s lack of insight into solutions enabling PSM departments to focus their efforts, in supporting innovations that can thrive, while satisfying their original objectives of optimizing costs.

4.2.2 Identifying new Jobs-to-be-Done in the Purchasing and Supply Management Function

A common critique of studies on the future of the PSM is the focus on extensive literature review or expert interviews (Knight et al., 2020). Literature reviews, in particular, predict or extrapolate problematic results, as the trends identified are inherently past oriented due to the backwards looking method (Näslund, 2002). Similarly with expert interviews, the quality of forecasting and explaining the future can be seen as equally problematic (Tetlock, 2017). The changing role of the purchasing departments creates opportunities for an organization to improve its processes and organizational setup. The need to innovate the PSM function is indicated in the increasing output of consulting reports (Helbig et al., 2017; Karumsi & Prokopets, 2023; Knapp et al., 2018; Umbenhauer et al., 2019) and in the call for papers over the years (Di Mauro et al., 2024; Knight et al., 2022; Murfield et al., 2021). Researchers — like companies — are facing the dilemma that they can now collect more information than ever before. With the increasing speed, amount and variety of data and the increasing performance of analytic tools it becomes possible to gain a deeper and richer understanding of their research topic or, in the case of companies, their customer base. Identifying and addressing unmet needs are core objectives for an organization to create successful new products and services (Blank, 2006; Christensen et al., 2016b; Keiningham et al., 2020). This statement can be adopted for academia as well: identifying unmet needs are a core objective for researchers to create successful meaningful insights.

To better understand customer needs, a whole range of market research techniques have been developed in recent years (e.g. Bearden and Netemeyer (1999)). However, many of these techniques fall short in fully uncovering the latent needs of customers. Customers find it difficult to articulate their needs through research methods using contextual or ethnographic approaches, such as Lead User analysis or design thinking (Ulwick, 2002, 2010) or they fail to address them when presented with product or product features during research, due to functional fixedness

(Goffin et al., 2012). In order to build a superior product or service, organizations need to be able to identify both expressed and unexpressed needs of their customers (Slater & Narver, 1998). As such, structuring markets around those analyses and categorizing the customer base are fundamental paradigms of product development (Christensen et al., 2020). However, Peter Drucker previously identified that the customer does not always buy the product for the reason the company sells it: “[...] *the customer never buys what the supplier sells. What is value to the customer is always something quite different from what is value or quality to the supplier*” (Drucker, 2008, p. 76). Discovering the causal driver behind a purchase and understanding the underlying need, a manager can put the company’s innovation effort into developing a real value proposition for their customer (Christensen et al., 2016b). So the integration of customer goals and associated opportunities is an essential part of product or service development and increases the success rates of innovation initiatives (Abrell & Durstewitz, 2016). Plain data however can only show correlations, which is not sufficient to understand customer behavior (Christensen et al., 2016b, 2016a).

Thus, organizations constantly need to build a deeper understanding of their customer needs. Similarly, research can benefit from a deeper understanding of a customer driven needs approach and for PSM research, the customer of greatest importance is the PSM expert. Following the argument that “*a fundamental problem that a customer needs to resolve in a given situation*” can also be considered as a *job* (Christensen et al., 2020, p. 2), a customer does not want to buy a product but rather the outcome generated through this product — the customer wants to *get a job done* (Ulwick, 2005). This customer-centric view is the core of the jobs-to-be-done theory (Bettencourt & Ulwick, 2008). By defining the job as the unit of analysis, the elements linked to the job are becoming central to the evaluation and the subsequent metrics (Hankammer et al., 2019). To understand the job-to-be-done, it must be broken into discrete steps, with each step and the overall job evaluated based on customer-defined success metrics within a specific solution domain. These metrics represent customer needs and serve as the basis for value proposition design and business model innovation (Bettencourt & Ulwick, 2008). The

jobs-to-be-done theory offers a structured approach to researching improvements in PSM by focusing on the underlying goals PSM experts aim to achieve. By splitting the job into its core process steps — such as supplier search, supplier selection, and supplier nomination — researchers can identify the metrics the PSM expert uses to define success at each stage. These metrics, or desired outcomes, highlight their unmet needs, inefficiencies, and pain points within the process. For example, improving supplier alignment with organizational goals or reducing industrialization difficulties could emerge as key areas for innovation. The job-to-be-done there facilitates a solution-agnostic exploration of potential improvements (Ulwick, 2005), allowing researchers to assess current practices and develop novel strategies that align with the experts' priorities, ultimately driving more effective and efficient PSM. Additionally, the ODI method focuses on the operational side, which has been lacking in research: Giglio et al. (2025) have found that most research focuses on the attributes of the managers in the corporate or on the entrepreneurs in the startups, rather than the operational purchaser (Giglio et al., 2025).

Ulwick's ODI method is an effective approach for analyzing the needs of the PSM domain through the lens of the jobs-to-be-done theory (Ulwick, 2010). It uses a mixed method approach, starting with a qualitative phase of semi-structured interviews. The second phase is a quantitative survey, in which the expressed needs are ranked (Ulwick, 2005). ODI shifts the focus from solutions or tools to the specific outcomes that customers — here the PSM experts — aim to achieve, making it ideal for identifying and addressing opportunities in PSM processes. By systematically gathering and prioritizing desired outcomes based on their importance and the degree to which they are currently satisfied, ODI provides a clear, data-driven understanding of unmet needs within the PSM departments (Ulwick, 2020). This method also helps to uncover latent requirements that might not be explicitly expressed by the PSM experts but are critical for success (Wowak et al., 2016). Through its structured approach, I am able to identify the most pressing challenges, ensuring alignment with PSM experts' goals and fostering a more strategic and effective purchasing management practice.

4.3 Settings and methods

As described in the previous chapter, PSM departments face many different challenges from their changing role due to internal and external factors. One major concern is the missing focus of the PSM department in the new role within the innovation effort of an organization. Having too many different goals is a major failing in a transformation quest, so priorities have to be set (Anand & Barsoux, 2017). To achieve a better focus on the future competencies required from PSM experts, I have adopted the ODI approach to receive input from current purchasing experts. Its jobs-to-be-done perspective normally aids market researchers in their decision making and prioritization. This study uses the same approach to help PSM experts in prioritizing the challenges in the PSM domain. After outlining the research of this study, this chapter describes the qualitative and quantitative steps of the ODI approach.

4.3.1 Setting

For this study, I was able to conduct the interviews and the survey in the purchasing department of a large European automotive OEM as part of a 36-month research project. The automotive industry is undergoing a major transformation as it is facing changing customer behavior, the rise of new technologies, such as electric vehicles or autonomous driving, and increasing government regulation (Homfeldt et al., 2017; Wölfel, 2019). The OEM's PSM organization is set up along a commodity structure, with each commodity focusing on a specific technology and product category. This demands a range of skills required in the PSM employees within the organization. Some commodities, such as car seats or ICE parts, are facing consolidating markets, reduced budgets and only incremental innovations. Other commodities, such as autonomous driving sensors or electric drive-train components, are confronted with new suppliers — established companies new to the automotive industry and sometimes completely new companies, also called startups —, increasing investments budgets, and facing radical or even disruptive innovations (Helbig et al., 2017; Knappe, 2014). The PSM department is there-

fore facing the same challenges as the automotive industry as a whole. On the one hand, the existing technologies still require attention and refinement as they are profitable and thus can and need to be *exploited*. On the other hand, the organization needs to allocate resources to *explore* new technologies in order to stay competitive in the future.

4.3.2 Qualitative Analysis

Customer input is a crucial resource for the ODI approach to find innovation opportunities. Using customer experience — or in this case the experience of PSM experts — the ODI approach relies on qualitative methods to develop a comprehensive and precise understanding of the needs (Hankammer et al., 2019). In order to achieve a quick theoretical saturation for the qualitative analysis, I studied the interviews and notes from the initial phase of the research project at the OEM. I conducted these interviews originally to identify difficulties and solutions in the collaboration between the OEM and startups. During these interviews, I identified several needs the purchasing department employees had to satisfy, some of which were contradictory. These results helped me to develop and refine the job map by structuring the individual steps of the jobs-to-be-done (Ulwick, 2005). With the use of the job map, I derived a process of purchasing innovative solutions, either as a product or service. In combination with my experience at the OEM, notes from informal and official meetings, and the interviews, I derived 49 need statements within the different responsibilities of a purchaser. These needs focus on the different stages of the purchasing process: The early stage including scouting, a supplier evaluation stage, a negotiation stage, a tendering stage, and the support during serial production. I then conducted semi-structured interviews with purchasing employees and managers at the OEM to validate these statements. It also allowed me to gain a deeper understanding of the relevance of the developed need statements (Boyce & Neale, 2006). After five interviews, I reached a theoretical saturation, as no additional information was gathered (Denzin & Lincoln, 1994; Flick, 2018). This corresponds to findings by Guest et al., who discovered that saturation could be achieved with only a small number of interviews (Guest et al., 2006). Through this

second round of interviews I was able to aggregate and reduce the need statements down to 21 outcome statements (OS).

4.3.3 Quantitative Analysis

In the qualitative analysis, I measure the level of importance and satisfaction of each outcome statement to reveal innovation opportunities. The outcome statements developed during the initial, qualitative stage reflect the needs of a PSM employee along the different stages of their job. The survey participant has to evaluate these along the two criteria: satisfaction and importance. To adapt the ODI approach to this setting, I had the PSM employee rate their organization's ability to satisfy the need and the level of importance of this need in the organization. I used a 5-point Likert scale, where 1 means "strong disagreement to the statement" and 5 "strong agreement to the statement" (see Table 4.3.1). These statements allow for a quantitative evaluation of the level of service of each outcome statement. Following the logic of the ODI approach, outcomes ranking high in importance, but low in the satisfaction are underserved (Ulwick, 2010) and thus yield a high potential for innovation (Ulwick, 2002). Following the outcome statements, the respondents had to answer general questions about their current position and overall length of employment at the OEM. I deemed these questions important in order to segment the needs across hierarchical lines and across new and established employees. Additionally, I asked the respondents to rate the OEM's economic situation in regard to their competition (Wagner et al., 2010). Finally, the respondents had to evaluate the level of innovation in the products they buy (incremental vs. radical) and the maturity of their supplier base (established suppliers vs. new suppliers). All the additional questions are single item or on a 5-point Likert scale (see Table 4.4.2).

I start the data analysis with the overall sample and rank the individual statements by their opportunity score. In the second part, I split the sample into sub-samples according to the answers the respondents gave in their control variables. To identify difference between the sub-sample groups I used the one-way analysis of variance (ANOVA) test and a two-sided t-tests to

Please rate the following need statements according					
1. to your perception of their importance in an organization's innovation collaboration.					
2. to your satisfaction with your organization's fulfillment of these needs.					
Increase purchasers' capabilities (tools or knowledge) in evaluating data-driven business models to improve innovation collaboration					
	strongly disagree	disagree	neither	agree	strongly agree
I see this need being important for the purchasing professional.	☐	☐	☐	☐	☐
I am satisfied with my organization meeting this need.	☐	☐	☐	☐	☐

Table 4.3.1: Exemplary outcome statement of the questionnaire

compare the variance across the samples. Due to the small sample size of the individual groups and the exploratory nature of this study, I will report the exact p-values for each satisfaction and importance ranking. The traditionally accepted significance level of $p < 0.05$ will be relaxed, as I want to show the trend. This aligns with the statement from Amrhein et al. (2017), who argue that $p < 0.05$ is an arbitrary level and that it is more important to interpret the results (Amrhein et al., 2017). In exploratory studies, a higher significance level of $p < 0.10$ or even $p < 0.15$ can be accepted. For this reason, I marked the results with a p-value of < 0.05 as significant, < 0.10 as marginally significant and < 0.15 as trend-level. For the sub-samples the full list of p-values for the satisfaction and the importance level is found in the Appendix in Table 4.5.9 and 4.5.10.

For the data analysis I adopted a tool created by Russo which helps with the analysis and visualization of the survey results from an ODI study (Russo, 2018). The implementation of the tool required the use of R (R Core Team, 2025). For the creation of the plots I used the package ggplot2 (Wickham, 2016). Other packages used were: Formula (Zeileis & Croissant, 2010), Hmisc (Harrell Jr, 2025), janitor (Firke, 2024), lattice (Sarkar, 2008), png (Urbanek, 2022), readxl (Wickham & Bryan, 2019), survival (Therneau, 2024; Therneau & Grambsch, 2000), and tidyverse (Wickham et al., 2019).

4.4 Findings

4.4.1 The Procurement Job Map

The ODI method starts with the creation of a job map associated with the different stages of the job-to-be-done process a customer goes through (Ulwick, 2010). Through the job map, I am able to connect the different jobs and map the decision journey with a eight step approach: define the jobs requirements, locate the inputs, prepare the inputs and the environment, confirm everything is in place, execute the job, monitor the outcome, modify if necessary, and conclude the job (Bettencourt & Ulwick, 2008). These steps can be adapted to the job of a procurement employee, but this would result in many different job maps, as the responsibilities of procurement employees are steadily increasing (Bals et al., 2019). I focused on the relevant job map for this study: the job of procuring innovative solutions as a product or service (see Figure 4.4.1). This job is derived by the need to implement a new and innovative feature or service in the product, which in the setting of this study is the car. This need is often triggered by the internal development department, but can also be triggered through external influences, such as the competition or the supplier base itself.

4.4.2 Results of the Qualitative Analysis

The interviews provided me with first insights into the challenges of PSM employees and of how they overcome these in their job. In order to increase the validity and generalizability of these results, the ODI logic requires one to standardize and aggregate these needs into an outcome statement (OS) (Ulwick, 2005, 2020). The 21 OS reflect the most often cited and important needs from the qualitative study and are the basis of the subsequent quantitative study. To create a better overview, I split the OS into categories. These categories are set up along the areas of concern I came across during the research and combined it with the procurement job-map. The area Innovation source focuses on the different suppliers available

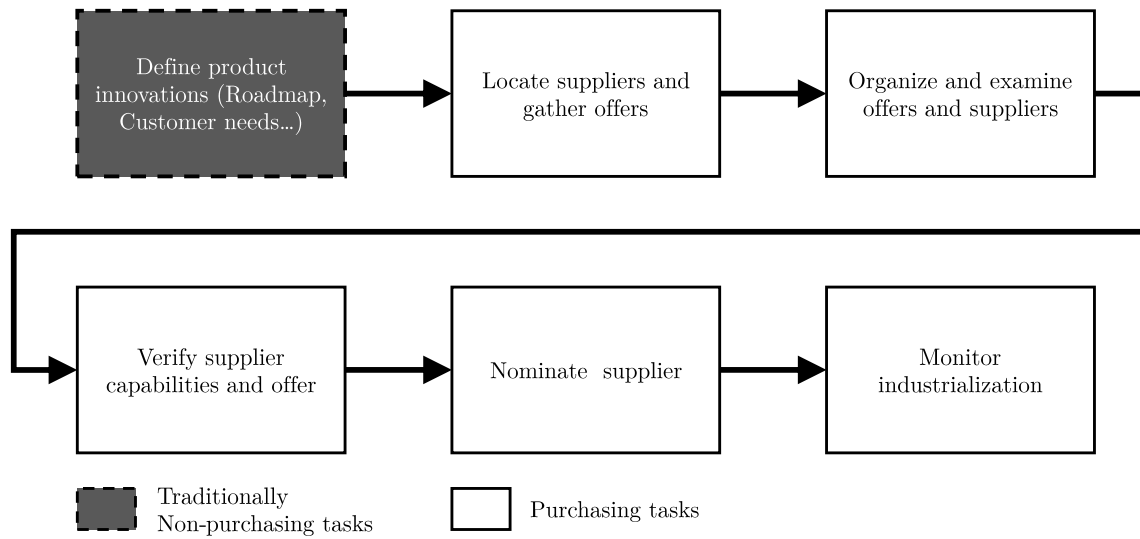


Figure 4.4.1: Job map of procuring innovative solutions as a product or service, based on Ulwick (2010)

to the OEM: traditional tier-1 (such as Bosch, Continental, Valeo, etc.), tier-1 suppliers outside the automotive industry (large established companies such as Amazon, Nvidia, etc.), lower tier suppliers (n-tier suppliers which used to supply the tier-1), and startups (such as MobileEye, a prominent example: established in 1999 and launched camera systems for GM, BMW and Volvo in 2007). During this step in the job-map, the PSM professional has received the specification for a certain product innovation from the R&D department and needs to locate suppliers for the innovation. After this step, the purchaser needs to examine the different offers of the suppliers. To be able to do this, in the past the purchaser relied heavily on the judgment of the R&D department. However, during the interviews, I saw the increasing demand to establish one's own capabilities and competencies in the PSM department — represented by OS 5 to OS 10. The area Supplier Capabilities represents the wishes of the PSM experts to influence the supplier processes, while the area Negotiation, Costs & Risks, the wishes to shape the contract between the OEM and the supplier. These OS are aligned with the later stages of the job-map, during the negotiation, nomination and industrialization phase. The area Collaboration between R&D and PSM and the area Ambidexterity are both not directly related to the job map, but as they are derived from the internal processes of the OEM. The R&D and the PSM

department work closely together to find the best solution for the OEM, but an even earlier and closer involvement of PSM employees was often mentioned during the interviews, derived from the wish to be involved at a stage with a broader scope and not to be placed facing already completed events. The optimal handling of innovation projects and the day-to-day business was perceived differently across the employees of the PSM department: while some preferred a strong centralized innovation purchasing unit, others wanted the innovations to be handled by the same employees. These two wishes resembled closely the two modes of ambidexterity an organization can adopt: structural and contextual ambidexterity. The OS 11 is an outlier, as it did not fit into any other area. It resembles the need mentioned by several PSM employees to be able to fast-track an innovation in order to be First-to-Market (FtM). During the interviews this need was confirmed and kept in the final OS list. For the full list of OS statements see Table 4.4.1. For a increased readability, I will refer to the outcome statements in an abbreviated form, focusing on the main statement. For the list of the abbreviated form see Table 4.5.1 in the Appendix on page 200.

4.4.3 Results of the Quantitative Analysis

The survey was sent to all purchasing departments across the OEM. A total of 580 purchasers were contacted via personalized e-mails. After three and six weeks, reminder emails were sent out to increase the response rate. In total, 244 purchasers participated in the survey. To process the data, I then removed surveys with missing values and too quick of an response time. I thus obtained 128 usable surveys for my analysis with a median time of 659.9 seconds (11 minutes) to complete. The response rate for the final sample is 22.1%.

I collected some descriptive statistics on the respondents (see Table 4.4.2): their job position, work experience, the innovativeness of the procured products and the maturity of their supply base. Just over half of the respondents (58.6%) do not have any management responsibility and 65% have under 10 years of work experience with the OEM. For the innovativeness of their procured products, the respondents can be separated into three groups: 23.4% are purchasing

Area	No.	Outcome Statement
Innovation Source	1	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from your industry.
	2	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from other industries.
	3	Increase the number of collaborative partnerships to gain access to better innovations with lower tier suppliers (tier-2/tier-3).
	4	Increase the number of collaborative partnerships to gain access to better innovations with startups or entrepreneurial firms.
PSM Capabilities	5	Increase purchasers' capabilities (tools or knowledge) in evaluating data-driven business models to improve innovation collaboration.
	6	Increase purchasers' capabilities (tools or knowledge) in evaluating software to improve innovation collaboration.
	7	Increase purchasers' capabilities (tools or knowledge) in evaluating platform-driven business models to improve innovation collaboration.
	8	Increase purchasers' capabilities (tools or knowledge) in evaluating the supplier's manufacturing capability to improve innovation collaboration.
PSM Competencies	9	Increase purchasers' level of understanding of the field of technology within the desired innovation collaboration to improve it.
	10	Increase purchasers' level of understanding of end-customers' needs, in order to improve evaluation of innovation collaboration.
Innovativeness/FtM	11	Increase purchasers' ability to establish the innovation through the innovation collaboration as first on the market.
Supplier Capabilities	12	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to scale the supplier's innovation to fit the needs of the purchasing organization.
	13	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to align with the standard purchasing processes and requirements within your organization.
Negotiation, Cost & Risk	14	Increase purchasers' freedom of negotiation during the contracting processes to improve innovation collaborations.
	15	Minimize the development, purchasing and investment costs accrued by your organization while maintaining effective innovation collaboration.
	16	Minimize the risks to product launch while maintaining effective innovation collaboration.
Collaboration between R&D and PSM	17	Minimize the financial risks while maintaining effective innovation collaboration.
	18	Increase coordination between the R&D and purchasing departments in your organization to improve the quality of innovation collaboration.
	19	Minimize time between initial supplier-development department contact and involvement of the purchasing department in innovation collaboration.
Ambidexterity	20	Increase the responsibility of dedicated innovation purchasing specialist, rather than e.g. operational purchasers, for innovation collaboration.
	21	Facilitate employee participation in innovation collaboration alongside their ongoing responsibilities.

Table 4.4.1: Outcome Statements

Control variables	Source
Economic situation How would you consider your firms competitive situation in comparison to your main competitor? (1 = much worse, 3 = equal, 5 = much better) – Product innovativeness – Market share – Sales growth – Profit margin General Questions about the respondent – Rank of the respondents current position (employee w/o management responsibilities, employee w/ management responsibilities, middle management, top management, executive partner) – Overall length of the respondent's employment at the firm (less than 2 years, 2-5 years, 6-10 years, 11-15 years, more than 15 years) Product innovation in commodity – How innovative are the products you are buying? (1 = mostly incremental, 3 = both, 5 = mostly radical) Established supply base – How established is your supplier base? (1 = very established supplier base, 3 = both established and new suppliers, 5 = mostly new suppliers)	Wagner et al. (2010)

Table 4.4.2: Control Variables

more incremental innovations, 45.3% both incremental and radical, and 31.3% more radical innovations in their purchasing category. The situation is similar in their supplier maturity: 36.7% record a more established supply base, 39.8% both established and new suppliers, and 23.4% more new suppliers. Additionally, the respondents have rated the OEM economic status compared to their main competitor along product innovativeness, market share, sales growth and profit margin (Wagner et al., 2010). 60.2% of the PSM employees rate the OEM as having a better or much better product innovativeness than the competition, while only 11.7% rate it worse (28.1% rate it equal). The market share and sales growth categories received a more centered rating (47.7% and 50.0% respectively), but overall, the OEM is still rated better or much better in these categories by a large proportion of the respondents (39.5% and 41.4%). In the profit margin category, the OEM is rated better or much better by almost half the respondents (48.4%) and equal by more than a third (39.1%). Table 4.4.3 summarizes the results of the descriptive analysis.

4.4.3.1 Full sample Analysis

The participants evaluated their satisfaction with their organization and the level of importance in the organization regarding the 21 OS. From these evaluations, a score for the

Respondent Job Position	N	%
Employee w/o mgmt. responsibility	75	58.6
Employee with mgmt. responsibility	36	28.1
Middle management	13	10.2
Top management	0	0.0
Executive Partner	0	0.0
n/a	4	3.1

Years of work experience	N	%
Less than 2 years	12	9.4
2-5 years	29	22.7
6-10 years	43	33.6
11- 15 years	21	16.4
More than 15 years	23	18.0

Product innovation in commodity	N	%
Mostly incremental	12	9.4
	18	14.1
Both	58	45.3
	31	24.2
Mostly radical	9	7.0

Supply base maturity	N	%
Very established supplier base	26	20.3
	21	16.4
Both establ. and new suppliers	51	39.8
	21	16.4
Mostly new suppliers	9	7.0

Product Innovativeness	N	%
Much worse than competition	1	0.8
	14	10.9
Equal	36	28.1
	61	47.7
Much better than competition	16	12.5

market share	N	%
Much worse than competition	0	0.0
	17	13.3
Equal	61	47.7
	42	32.8
Much better than competition	8	6.3

Sales growth	N	%
Much worse than competition	2	1.6
	9	7.0
Equal	64	50.0
	45	35.2
Much better than competition	8	6.3

Profit margin	N	%
Much worse than competition	2	1.6
	14	10.9
Equal	50	39.1
	53	41.4
Much better than competition	9	7.0

Table 4.4.3: Descriptive Statistics, in all categories $n = 128$

importance and satisfaction is derived for each OS. The score represents the relative share of the participants that rated an OS high in terms of importance and satisfaction (ranking ≥ 4). If the satisfaction score is lower than the importance score, (Ulwick, 2005) classifies the underlying need as underserved and thus an opportunity to innovate. For a better visualization, the OS are arranged on a two-dimensional coordinate system, where the x-axis describes the importance and the y-axis the satisfaction level, and both scales are normalized from 0 to 10, where 10 indicates 100% of the participants rated the satisfaction or importance ≥ 4 . Ulwick describes this as the opportunity space, which places the OS into three categories: overserved (everything above the orange line), appropriately served (between orange and green lines) and underserved (below the green line) (Ulwick, 2010). To analyze the underserved OS, an opportunity score

can be calculated:

$$\text{Opportunity score} = \frac{\text{importance} + \max(\text{importance} - \text{satisfaction}, 0)}{10} \quad (4.4.1)$$

for example the opportunity score for OS 9 is:

$$\text{Opportunity score} = \frac{94.53\% + \max(94.53\% - 44.53\%, 0)}{10} = 14.45 \quad (4.4.2)$$

The opportunity score thus can range from 0 to 20 with a higher score representing a high importance with a low satisfaction and thus a higher potential for innovation. Outcomes with a score higher than 15 (below dark green line) represent an excellent opportunity for innovation and should not be ignored. OS ranking between 15 and 12 (between dark and medium green) are defined by Ulwick (2005) as very good opportunities. He also refers to this section as “*low-hanging fruits*”, because they usually represent jobs which are poorly executed but already common. The outcomes ranking between 10 and 12 (between light and medium green) represent still good opportunities in many markets. The opportunity map for the full sample in Figure 4.4.2 reveals that only a few needs are met to the level of satisfaction of the PSM experts. Of the 21 OS, four have a satisfaction level of equal or greater than 50%. However, as all OS have a higher importance level than six, every single OS is considered a good opportunity according to the ranking developed by Ulwick. Ten OS have an opportunity score higher than 12 and are considered very good opportunities. The Table 4.4.4 shows these 10 OS and their respective opportunity scores (refer to Table 4.5.2 in the appendix for the full list of opportunity scores).

While the top 10 OS come from a wide range of areas of my survey, the 4 of the top 5 are concerned with the competencies and capabilities of the PSM employees themselves. This result indicates that the PSM employees want to move beyond the traditional scope of evaluating costs and to a more included role in the NPD process as indicated in the literature review. A deeper understanding of the technology and the end-customer needs will help to understand also the

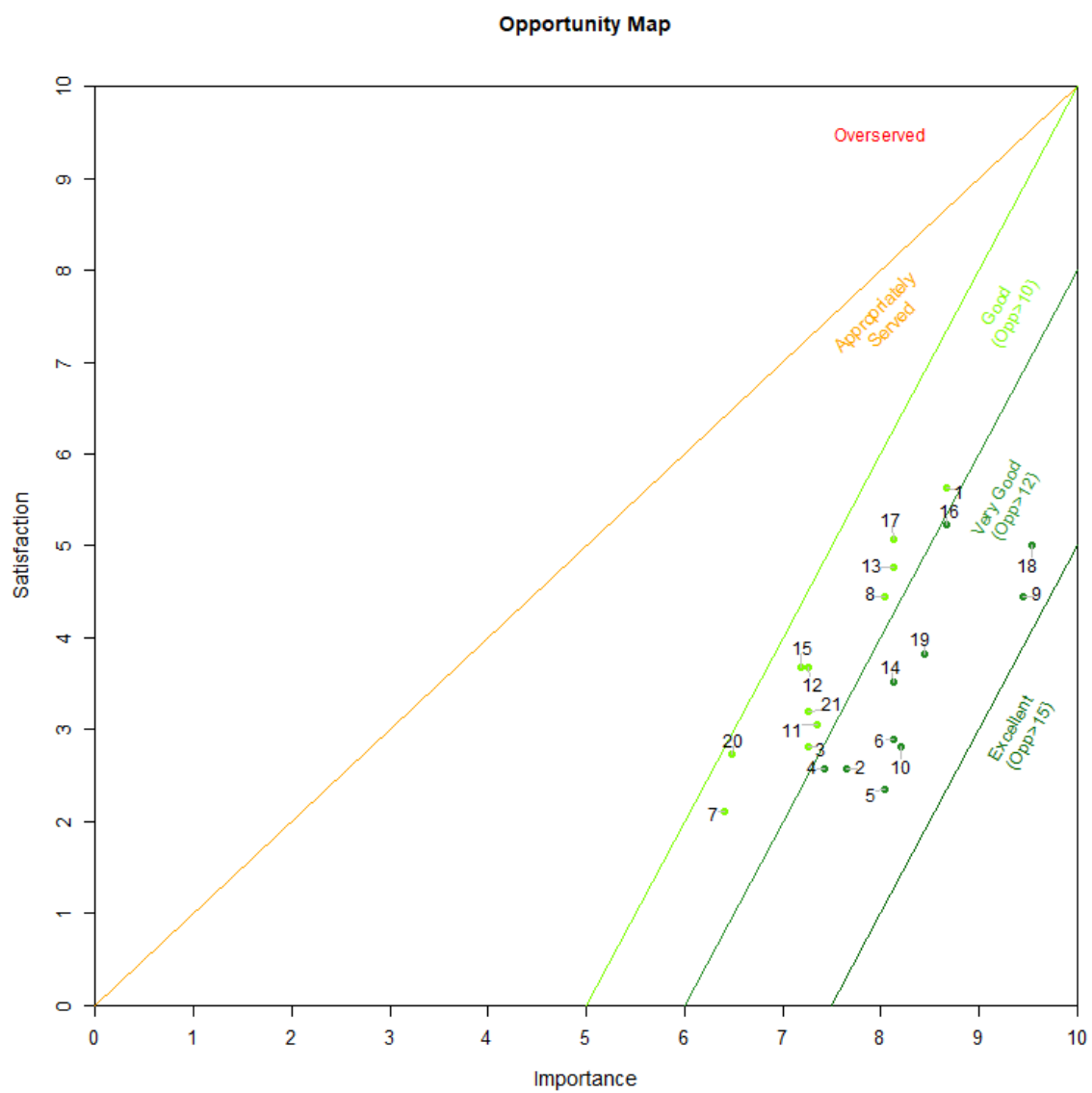


Figure 4.4.2: Full sample Opportunity Map

Area	No.	Outcome Statement	OPP Score	IMP Score (in %)	SAT Score (in %)
PSM Competencies	9	Understanding of technology field	14.45	94.53	44.53
PSM-R&D Collaboration	18	Increase Coordination	14.06	95.31	50.00
PSM Capabilities	5	Data-driven Business models	13.75	80.47	23.43
PSM Competencies	10	Understanding of end-customer needs	13.36	82.03	28.13
PSM Capabilities	6	Software evaluation	13.36	81.25	28.89
PSM-R&D Collaboration	19	Earlier involvement of PSM	13.05	84.38	38.28
Innovation Source	2	Tier-1 suppliers of outside industries	12.73	76.56	25.78
Negotiation, Cost and Risk	14	Freedom of negotiation	12.73	81.25	35.16
Innovation Source	4	Startups & entrepreneurial firms	12.27	74.22	25.78
Negotiation, Cost and Risk	16	Product launch risk	12.11	86.72	52.34

$n = 128$

Table 4.4.4: OS with highest opportunity scores for the full sample.

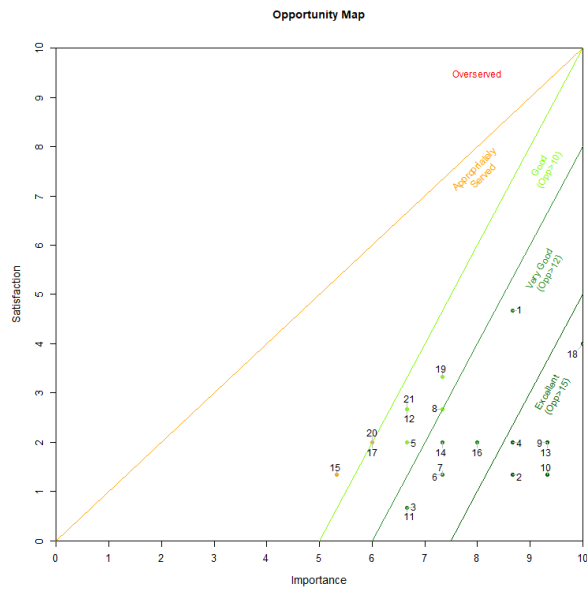
benefits of an innovation, while stronger understanding of new business models and of software evaluation will help to facilitate a wider range of supplier collaborations. These needs are reflected in OS 2 and OS 4, which also have high opportunity scores (> 12). The purchasers overall seem to see a stronger demand for collaborations outside the traditional sphere of the automotive OEM. This correlates with the concerns which were raised during the interviews I had previously conducted at the OEM. Several purchasers have stated that the traditional suppliers and even their sub-tier suppliers are either not able to provide solutions themselves, or have to find partners outside the industry and then just resell the product or service at a higher price to the OEM. This measure leads to a higher price at the OEM, however some purchasers also admitted that they prefer this solution as it mitigates the technology risk to the tier-1 supplier. This concern seems to be shared by other purchasers as OS 16 *product launch risk* shows. The OS *early integration of the PSM department* and OS *stronger integration into the NPD process* are also among the top priorities of the purchasers. This view is supported by a recent study of Schiele et al. (2020), who show that the integration of purchasing early in a NPD project can lead to a significant increase in innovative suppliers in the firm's portfolio.

The analysis so far is based on data from the full sample of participants, providing a good cross section of the PSM department. In the next step I analyze the answers of those participants who are either concerned about the innovation performance of the OEM or are in more contact with innovations at their day-to-day job. For this purpose I divided the participants into two sets of clusters. One set is built around the participants' view on the OEM's product

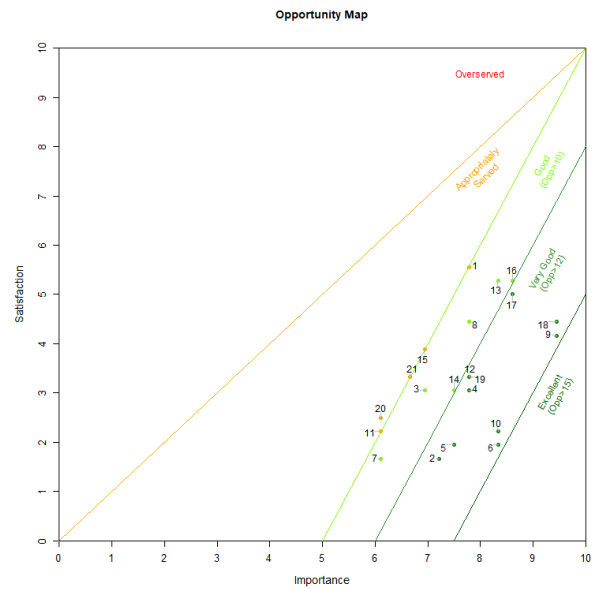
innovation performance in regard to the competition and then clustered into three subgroups: Worse, equal and better than the competition (compare Wagner et al., 2010). While the sample size of purchasers who see the OEM in a worse state than the competition is fairly low ($n = 15$) compared to equal [$n = 36$) and better ($n = 77$), I separated these into its own sample to include a more critical viewpoint. The second set of clusters is structured around the innovativeness of the product the purchaser is buying in his commodity: incremental innovations, radical innovations and both. In this cluster the subgroups are much closer in size (incremental innovations $n = 30$, radical innovations $n = 40$, both $n = 58$).

4.4.3.2 Sub-sample Analysis – Innovation Performance compared to Competition

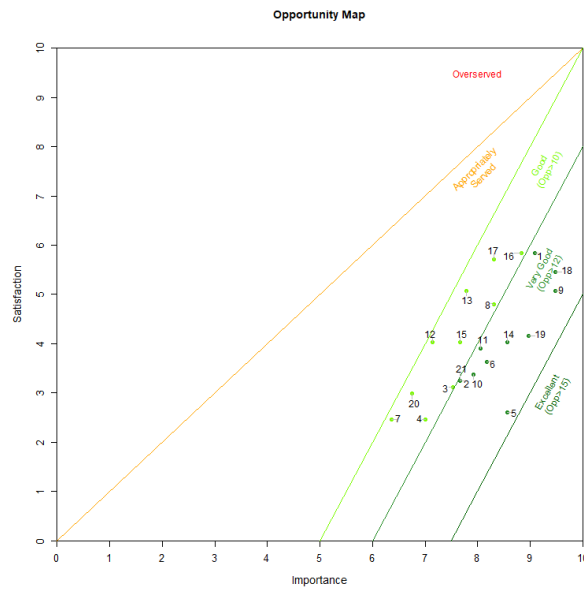
The opportunity maps of each cluster *innovation performance compared to competition* are displayed in figure 4.4.3. The comparison of the graphs shows that the level of satisfaction across all OS for the purchasing experts who judged the OEM's innovation performance worse is much lower than that in the other two groups. The PSM experts who judged the OEM' innovation performance better, scored across all OS a higher level of satisfaction. The lower level of satisfaction within the *worse* sample leads to 5 OS scoring an opportunity score above 15 and thus are considered excellent opportunities (Ulwick, 2010). The ranking of OS differs from the full sample and the other two sub-samples. While the OS *capabilities in software* is still among the top 10, it is now at the lower end. The OS *competencies in end-customer needs* and the OS *competencies in the technology field* are rated an excellent opportunity with the two highest scores. The ANOVA test shows that the satisfaction value for both OS are different between the three groups, however while OS 10 *end-customer needs* is statistically significant with $p = .03$, OS 9 *technology field* indicates a trend ($p = .11$) might exist. The post hoc analysis of OS 9 shows that between the groups *better* and *worse* the results are significantly different with a p-value of .03. OS 7 *Platform-driven business models* seems to have replaced OS *Data-driven business models*, but this OS is not significantly different between



(a) Worse than competition



(b) Equal to competition



(c) Better than competition

Figure 4.4.3: Opportunity map for clusters Innovation performance compared to competition

the three groups. Another new outcome statement in the top 10 is OS 13, aligning the supplier to the purchasing standard of the OEM ($p = .05$ for satisfaction and $p = .15$ for importance), while OS *freedom of negotiation* dropped from the top 10. This group, despite judging the OEM's innovation performance poorly, still sees the OEM's traditional first tier supplier as an important source for innovation. However this OS has the highest satisfaction level within this subset — The same status it has also within the full sample. The ANOVA also shows that the importance and satisfaction scores between the three groups are not significantly different and therefore it cannot be said that this group ranks the OS different than the other groups. Table 4.4.5a shows the overview of the top 10 OS for the sub-sample *innovation worse than competition*.

For the sub-sample *product innovation performance equal to the competition*, I found on average a higher satisfaction level than for the sub-sample *worse than competition*. This group of purchasers also rated the *PSM capabilities* (OS 6 and 5) and *competencies* (OS 9 and 10) with a very high opportunity score. OS *Startups* and OS *Suppliers outside the industry* are rated as underused innovation sources in this group and they also desire a stronger coordination between PSM and R&D and earlier purchasing integration. Two needs in the top 10 unique to this group, are OS 12 *supplier scaling capabilities* and OS 17 *financial risk*. While OS 12 is not statistically significant, OS 17 indicates a strong difference between the three groups with $p = .01$. The *financial risk* OS has a fairly high satisfaction score, its high importance within this group shows the more traditional role of purchasing represented here. Similarly, the need for *scaling the supplier innovation* falls in line with the traditional PSM role, where the industrialization of an innovation — meaning the latter stage of the product life cycle sometimes also called commercialization — falls into the responsibility of the PSM department (Constant et al., 2020). Table 4.4.5b shows the overview of the sub-sample *Innovation equal to competition*.

The largest sup-sample ($n = 77$) of this cluster had rated the innovation performance of the automotive OEM *better than their competition*. This overall higher satisfaction with the firm's

innovation performance is also reflected with an overall higher satisfaction score across all OS. However, like the other two sub-samples, this group of PSM experts also sees a great need for improvement in the *competencies* and *capabilities* within the purchasing department (OS 5, 6, 9, 10), as well as a need for *stronger coordination* and *earlier integration* in the NPD process (OS 18 and 19). For OS 18 and 19, the ANOVA test only shows a trend with p-values of $p = .15$ (OS 18, importance), $p = .13$ (OS 18, satisfaction), and $p = .13$ (OS 19, importance). But the post hoc analysis shows that especially between the *better* and *worse* sub-samples differences exist. As an innovation source, this group disagrees with the other two sub-samples and still sees an opportunity within their traditional suppliers, but with a current satisfaction of 58%. The t-test between the *better* and *worse* groups supports this view with p-value of .06. The tier-1 suppliers outside the industry have a similarly high opportunity score – at a much lower satisfaction level – while interestingly, startups are not rated at a very good opportunity within this group. This group has two OS in the top 10 that are not usual: OS 14 *freedom of negotiation* and OS 11 *first-to-market* are an outlier in the top 10 compared to the other sub-samples. OS 14 received a very high opportunity score but not significantly different from the other groups, with a score similar to the full sample ($p = .35$ for satisfaction and $p = .67$ for importance). OS 11, however, seems to score a much higher opportunity compared to the other two groups, driven by a significantly different satisfaction score ($p = .02$ for *better* vs *equal* and $p < .01$ for *better* vs *worse*) . The overview of the top 10 OS for the sub-sample *Innovation better than competition* is shown in table 4.4.5c.

4.4.3.3 Sub-sample Analysis – Innovativeness of Purchased Products

The opportunity maps of the three clusters for *product innovation in the purchased commodity* are displayed in Figure 4.4.4. While across these sub-samples the average satisfaction level is fairly even, the average level of importance across the OS shifts towards higher importance from *incremental innovations* purchased to *radical innovations*. For the PSM experts in the

Area	No.	Outcome Statement	OPP Score	IMP Score (in %)	SAT Score (in %)
PSM competencies	10	End-customer needs	17.33	93.33	13.33
PSM competencies	9	Technology Field	16.67	93.33	20.00
Supplier Capabilities	13	Align supplier to purchasing standards	16.67	93.33	20.00
Innovation Source	2	Tier-1 suppliers of outside industries	16.00	86.67	13.33
PSM-R&D Collaboration	18	Increased coordination	16.00	100.00	40.00
Innovation Source	4	Startups & entrepreneurial firms	15.33	86.67	20.00
Negotiation, Cost and Risk	16	Product launch risk	14.00	80.00	20.00
PSM capabilities	6	Software	13.33	73.33	13.33
PSM capabilities	7	Platform-driven business models	13.33	73.33	13.33
Innovation Source	1	Tier-1 suppliers of own industry	12.67	86.67	46.67

$n = 15$

(a) Sub-sample: Worse than competition.

Area	No.	Outcome Statement	OPP Score	IMP Score (in %)	SAT Score (in %)
PSM capabilities	6	Software	14.72	83.33	19.44
PSM competencies	9	Technology Field	14.72	94.44	41.67
PSM competencies	10	End-customer needs	14.44	83.33	22.22
PSM-R&D Collaboration	18	Increased coordination	14.44	94.44	44.44
PSM capabilities	5	Data-driven business models	13.06	75.00	19.44
Innovation Source	2	Tier-1 suppliers of outside industries	12.78	72.22	16.67
Innovation Source	4	Startups & entrepreneurial firms	12.50	77.78	30.56
Supplier Capabilities	12	Scale supplier innovation	12.22	77.78	33.33
Negotiation, Cost and Risk	17	Financial risk	12.22	86.11	50.00
PSM-R&D Collaboration	19	Earlier involvement of PSM	12.22	77.78	33.33

$n = 36$

(b) Sub-sample: Equal to competition.

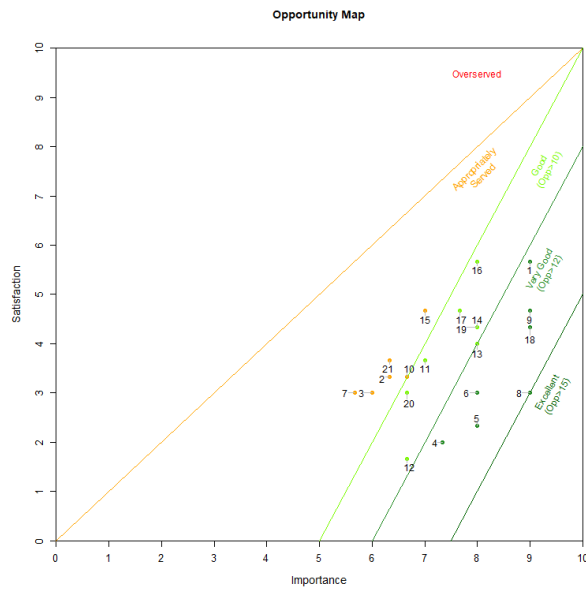
Area	No.	Outcome Statement	OPP Score	IMP Score (in %)	SAT Score (in %)
PSM capabilities	5	Data-driven business models	14.55	85.71	25.97
PSM competencies	9	Technology Field	13.90	94.81	50.65
PSM-R&D Collaboration	19	Earlier involvement of PSM	13.77	89.61	41.56
PSM-R&D Collaboration	18	Increased coordination	13.51	94.81	54.55
Negotiation, Cost and Risk	14	Freedom of negotiation	13.12	85.71	40.26
PSM capabilities	6	Software	12.73	81.82	36.36
PSM competencies	10	End-customer needs	12.47	79.22	33.77
Innovation Source	1	Tier-1 suppliers of own industry	12.34	90.91	58.44
First-to-market	11	Be First-to-market	12.21	80.52	38.96
Innovation Source	2	Tier-1 suppliers of outside industries	12.08	76.62	32.47

$n = 77$

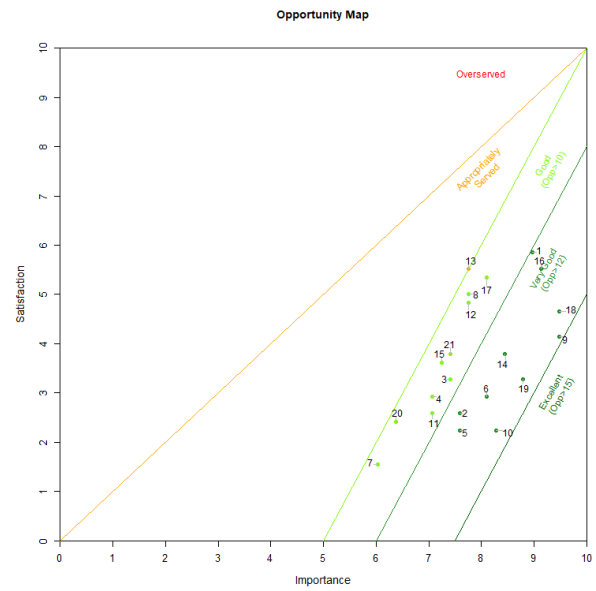
(c) Sub-sample: Better than competition.

Table 4.4.5: Highest opportunity scores for clusters Innovation performance compared to competition

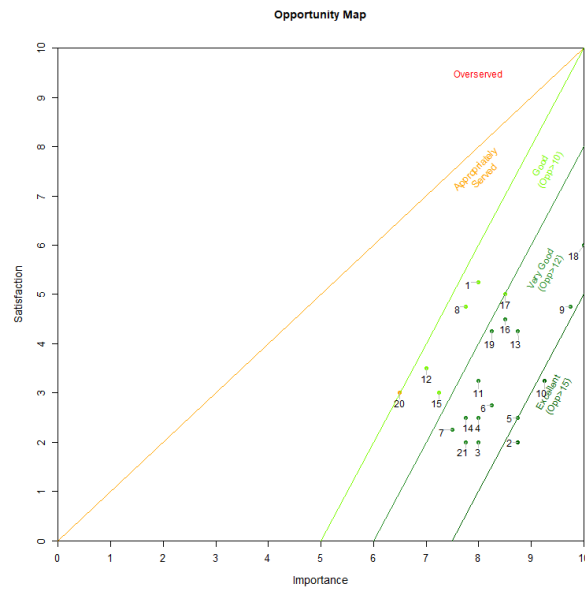
commodities with more incremental innovations, and thus a more stable technology path, I see a focus on the traditional pain-points of purchasing: OS *Supplier manufacturing capabilities evaluation* and OS *enabling scaling of product innovations* focus on the latter stages of the product life cycle (OS 8 and 12). Neither have significant ANOVA results, but the t-test results indicate a trend. For OS 8 the satisfaction score shows a slight significant difference towards the *radical* group ($p = .10$) and slightly less towards the group for *both* ($p = .13$). The p-values of the satisfaction for OS 12 are $p = .11$ for the comparison between *incremental* and *radical* and $p = .06$ for the comparison between *incremental* and *both*. Similarly, *sourcing from traditional tier-1 suppliers* and *aligning suppliers to standards* shows a reliance on established processes (OS 1 and 13), but both OS are not significantly different between the three groups. Improving the *competencies* and *capabilities* are seen as a path to improvement, similarly to the ratings across the other sub-samples (OS 5, 6, 9). However, OS 6 and 9 show a slight difference between the groups in their ANOVA test results. OS 6 has an importance p-value of .09 and OS 9 even an importance p-value of .04. The OS *increased coordination* between the PSM and R&D departments is in this sub-sample among the top 3 opportunities ($p = .11$, importance), while the OS *earlier involvement in NPD* only just makes the shared 10th place with an opportunity score of 11.67 ($p = .14$, importance) and as such is just below the cut-off value (> 12) for very good opportunities (Ulwick, 2010). One interesting observation is the high opportunity score for OS 4 *startups* ($p = .13$, importance) and 14 *freedom of negotiation* (p not significant). While not ranking as high as importance in OS *traditional tier-1 suppliers*, startups as a source of innovation seem to be on the mind of this group of purchasers. Additionally, while wanting their suppliers to align more to standards, it seems like these purchasers would like more *freedom in the negotiation process* for themselves. The ANOVA results for OS 14 are however not significant, therefore it cannot be said that this group ranks it higher than the other groups. Table 4.4.6a shows the overview of the sub-sample for incremental product innovation at commodity and contains eleven OS as the OS 12, 14 and 19 all have an opportunity score of 11.67.



(a) Incremental innovation



(b) Both incremental and radical



(c) Radical innovation

Figure 4.4.4: Opportunity map for clusters Innovation level of purchased commodity.

The sub-sample of purchasers who experience *both incremental and radical innovations* in the product category they are purchasing focus on the need to develop additional *competencies* and *capabilities* (OS 5, 6, 9, 10). From these four OS only *software* (OS 6, $p = .09$, importance) and *technology field* (OS 9, $p = .04$, importance) are significantly different based on the ANOVA test. Together with an *earlier involvement* ($p = .14$, importance) and *increased coordination* ($p = .14$, importance) in the NPD process (OS 18 and 19) this seems to reflect the wish of representing a more strategic function within the organization. The lower level of significance only indicates a trend, but is supported by the interviews before the survey. This is balanced by maintaining the traditional role of purchasing in the need to *reduce risks in product launch* (OS 16, not significant) and maintain established organizations as a innovation source (OS 1, not significant, and 2, $p = .02$). The post hoc analysis of OS 2 shows that this group and the *incremental* group do not show a significant difference in their importance ($p = .40$) and satisfaction ($p = .46$) ratings. But the group *radical* scored significantly higher at importance against the other two groups ($p = .03$, *radical* vs *both* and $p = .01$, *radical* vs *incremental*). Table 4.4.6b shows the overview of the sub-sample for *both incremental and radical product innovation* at the commodity level.

Purchasers in contact with *mostly radical innovations* in their product category make up the third sub-sample in this cluster. This is the first sub-sample where all outside innovation sources are rated with a high opportunity score: the *tier-1 suppliers from outside the automotive industry* ($p = .02$, importance), *lower tier suppliers* from the supply chain ($p = .03$, importance), and *startups* ($p = .13$, importance) are all important sources of innovation to this group of PSM experts and they are not satisfied with their usage (OS 2, 3, 4). The four competencies and capabilities OS *end-customer needs* ($p = .16$, importance), OS *technology field understanding* ($p = .04$, importance), OS *software evaluation* ($p = .09$, importance) and OS *data driven business model evaluation* ($p = .20$, importance) are ranked in this sub-sample as very good opportunities. An interesting result is the high opportunity score for the OS 21 *contextual ambidexterity* ($p = .19$, satisfaction): rather than building specialized innovation purchasing

departments, this group sees it more important to enable the purchasing employees to work in NPD projects whilst maintaining their current responsibilities. In the individual t-tests, the difference between the groups shows a slightly higher significance ($p = .11$, *radical* vs *both* and $p = .09$, *radical* vs *incremental*). This high opportunity score of OS 13 may support this view, as *purchasing standards* are more related to the traditional role of purchasing. However, this OS is not significantly different from the other in the ANOVA test ($p = .39$, importance), but a trend is shown in the post hoc analysis with a p-value of .13 (*radical* vs *both*). Table 4.4.6c shows the overview of the sub-sample for *radical product innovation* at commodity.

Area	No.	Outcome Statement	OPP Score	IMP Score (in %)	SAT Score (in %)
PSM capabilities	8	Supplier manufacturing capabilities	15.00	90.00	30.00
PSM capabilities	5	Data-driven business models	13.67	80.00	23.33
PSM-R&D Collaboration	18	Increased coordination	13.67	90.00	43.33
PSM competencies	9	Technology Field	13.33	90.00	46.67
PSM capabilities	6	Software	13.00	80.00	30.00
Innovation Source	4	Startups & entrepreneurial firms	12.67	73.33	20.00
Innovation Source	1	Tier-1 suppliers of own industry	12.33	90.00	56.67
Supplier Capabilities	13	Align supplier to purchasing standards	12.00	80.00	40.00
Supplier Capabilities	12	Scale supplier innovation	11.67	66.67	16.67
Negotiation, Cost and Risk	14	Freedom of negotiation	11.67	80.00	43.33
PSM-R&D Collaboration	19	Earlier involvement of PSM	11.67	80.00	43.33

$n = 30$

(a) Sub-sample: Incremental innovation

Area	No.	Outcome Statement	OPP Score	IMP Score (in %)	SAT Score (in %)
PSM competencies	9	Technology Field	14.83	94.83	41.38
PSM competencies	10	End-customer needs	14.31	82.76	22.41
PSM-R&D Collaboration	18	Increased coordination	14.31	94.83	46.55
PSM-R&D Collaboration	19	Earlier involvement of PSM	14.31	87.93	32.76
PSM capabilities	6	Software	13.28	81.03	29.31
Negotiation, Cost and Risk	14	Freedom of negotiation	13.10	84.48	37.93
PSM capabilities	5	Data-driven business models	12.93	75.86	22.41
Negotiation, Cost and Risk	16	Product launch risk	12.76	91.38	55.17
Innovation Source	2	Tier-1 suppliers of outside industries	12.59	75.86	25.86
Innovation Source	1	Tier-1 suppliers of own industry	12.07	89.66	58.62

$n = 58$

(b) Sub-sample: Both radical and incremental innovations

Area	No.	Outcome Statement	OPP Score	IMP Score (in %)	SAT Score (in %)
Innovation Source	2	Tier-1 suppliers of outside industries	15.50	87.50	20.00
PSM competencies	10	End-customer needs	15.25	92.50	32.50
PSM capabilities	5	Data-driven business models	15.00	87.50	25.00
PSM competencies	9	Technology Field	14.75	97.50	47.50
Innovation Source	3	Lower tier suppliers	14.00	80.00	20.00
PSM-R&D Collaboration	18	Increased coordination	14.00	100.00	60.00
PSM capabilities	6	Software	13.75	82.50	27.50
Innovation Source	4	Startups & entrepreneurial firms	13.50	80.00	25.00
Ambidexterity	21	Contextual ambidexterity	13.50	77.50	20.00
Supplier Capabilities	13	Align supplier to purchasing standards	13.25	87.50	42.50

$n = 40$

(c) Sub-sample: Radical innovation

Table 4.4.6: Highest opportunity scores for clusters Innovation level of purchased commodity

4.5 Discussion

4.5.1 Implications for Research

The analysis of the results shows that the PSM employees at the OEM consider the aspects of innovation collaboration important but are currently unsatisfied with the level of performance. Beginning at the start of the job-map of the purchasing employee, the innovation source in a NPD project, it can be seen that for the full sample all four sources are very important. The PSM employees are only satisfied (56.1% – highest satisfaction score in the full sample) with the traditional tier-1 suppliers, while the other three sources only score a satisfaction of 25.8% to 28.1%. Curiously, the established suppliers are still regarded as the most important source with an importance score of 86.7%, while the other three range from 72.7% to 76.6%. If I compare these figures across the different sub-samples, almost all sub-samples see the established tier-1 suppliers the most important source to increase, however they are also the most satisfied within this regard. The only exception is the sub-sample of the purchasers of *radical innovative products*: they regard established suppliers outside the industry as the most important source for innovation collaboration with 87.5% compared to 80% of the traditional established tier-1. Across the other samples I cannot determine a clear favorite to the PSM experts of the other three innovation sources (outside industry firms, lower n-tier suppliers or startups). The large difference between the radical innovation purchasers and the other samples, however, aligns with the theory of open innovation by Chesbrough (2003), where especially in dynamic markets outside sources of innovation provide a significant contribution.

The need for new innovation sources to increase the innovation performance is just one side of the opportunities for the PSM practice (Knight et al., 2022). Traditionally, in the automotive industry customer requirements and the resulting innovation pipeline have been defined by the R&D departments. The problem of an early lock-in effect is highly present in the minds of the PSM employees – shown by the high opportunity scores of an *earlier integration* in the NPD

process and an *increased coordination* between the two departments. Increased coordination has the second highest opportunity score across the full sample, supporting the findings by Schiele et al. (2020, p. 28), who identified “*purchasing integration as a key enabling factor in the implementation of supplier involvement with a positive influence on the performance of buying firms.*” For the OS *early supplier integration*, while still rating highly, the different sub-samples show a more differentiated rating of the opportunity. The purchasers of incremental innovations see the lowest importance and highest satisfaction for this statement, compared to purchasers of radical innovations and purchasers of both types. This ranking falls in line with the statement of innovation source, where the purchasers of incremental innovations prefer traditional tier-1 suppliers. This traditional cost-oriented purchasing requires less involvement of the purchasing department (Akin Ateş et al., 2018), with the PSM employees often acting as the more distanced “*bad cop*” in the procurement process (Brattström & Richtnér, 2014). The purchaser of both and of mostly radical innovation, however, rank an earlier involvement much higher, a view supported by literature (Akin Ateş et al., 2018; Schiele et al., 2020). Regardless of the function or role the PSM experts will later perform, this study supports the view that PSM needs to adopt “*business-not-as-usual*” approaches (Knight et al., 2022) in order to “*earn a ‘seat at the table’ and contribute to strategic decision-making processes*” (Di Mauro et al., 2024, p.5).

The earlier and stronger coordinated involvement of the PSM employees leads to an increased need for new capabilities (Bals et al., 2019). This view is supported by this study, however, the priority ranking of specific competencies and capabilities differs between the sub-samples. The purchasers of radical technologies rank the capabilities referring to software, big-data and new business models the highest and the pure scaling capabilities of the supplier – while still highly important – as already more available at the organization and thus resulting in a lower opportunity score. The purchasers of incremental innovations flip the ranking completely. For them, the scaling capabilities of the suppliers is the OS with the highest opportunity score in their sub-sample. Business models – often related to disruptive innovation (Chesbrough, 2010)

– does not play a role in their purchasing world and as such does not need to be prioritized. From my interviews prior to the study, I learned that these groups often buy integrated systems from large tier-1 suppliers and as such, these systems involve more software and generate data. As such data and software products seem to become more solidly established, they are also becoming of greater relevance to these commodity groups. Many of which saw little or only incremental innovation in the past, explaining the higher priority for the OS 5 and 6 (Bals et al., 2019). In order to understand the underlying concepts and motivations, a PSM employee not only needs to understand the business model behind, for example big data, but also needs to understand more about the technology itself and the additional value to the end-customer. While in the past a purchaser was able to get by with pure financial knowledge, interdisciplinary cross-functional teams in a NPD project need more than just a basic understanding of the technology. The wish of increased involvement in these teams by the PSM employees seems to be correlated with an increased demand for a better understanding of at least the technology itself, as all three sub-samples (incremental, radical and both) rate it with a very good opportunity. The understanding of end-customer benefit however, seems to not resonate with the purchasers of incremental innovations, while the purchasers of radical innovations give it the second highest opportunity score in their sub-sample. Especially with radical innovations a good understanding of customer need is necessary in order to choose the correct solution (Hopp et al., 2018).

In explaining the two questions concerning ambidexterity, I see that across the full sample the two approaches – contextual and structural – receive a very close opportunity score of 11.33 for contextual ambidexterity and 10.2 for structural ambidexterity. However, if I compare the sub-samples of incremental and radical innovation purchasing, the study shows a difference in the preference of the PSM employees. The departments charged with buying those goods with a strong tendency for incremental innovation potential actually rate structural ambidexterity with a higher opportunity score (10.33) than contextual ambidexterity (9.0), while the departments buying radical innovations rate the contextual ambidexterity with a opportunity score of 13.5. If I compare the responses of the sub-samples to these two questions with their other responses,

a pattern emerges. The incremental sub-sample scored higher opportunity values in the areas of the traditional PSM job description: Supplier manufacturing capabilities, aligning suppliers to purchasing standards and helping them scale the innovation. This sub-sample also rated the established tier-1 suppliers from the automotive industry with a very high opportunity score, especially when compared to the other possible innovation sources. The purchasers who are more often in contact with radical innovations, however, rank completely different statements with a high opportunity score: A stronger focus on the other three sources of innovation (startups, lower tier suppliers and tier-1 from outside the automotive industry), a better understanding of end-customer needs and a stronger participation in innovation projects (within and outside their responsibilities). The other statements still reach a much higher score than with the incremental sub-sample (such as OS 13 and 16) showing, not a rejection of the traditional purchasing job, but rather the desire to expand their responsibility towards the traditional job of the R&D department. These findings are in line with Constant et al. (2020) that these purchasers prefer a stronger role of purchasing within the NPD process, whilst balancing their role in the traditional purchasing tasks, similar to the approach of contextual ambidexterity.

Knight et al. (2022) in their editorial, call for research into the future role of PSM. Because the ODI method was originally developed to identify customer needs and uncover unsatisfied market opportunities (Ulwick, 2005), this study successfully applied it to determine employee needs within the automotive OEM sector. By systematically capturing and prioritizing these needs, the research provides a structured understanding of the key challenges and tensions PSM employees face in their roles (Bals et al., 2019). These insights are particularly valuable for identifying the most critical opportunities to enhance innovation collaborations, ensuring that improvements align with the real demands of employees and the strategic objectives of the organization.

Moreover, the structured approach of ODI allowed for the classification of these needs into different levels of opportunity scores, offering a quantifiable basis for decision-making. This

enables managers to not only communicate their strategic priorities more effectively (Ulwick, 2005) but also to create tangible short-term wins that drive momentum for broader transformation efforts (Kotter, 2012). By applying ODI to the study of PSM's future role, this research highlights its value as a tool for systematically analyzing evolving job demands and shaping targeted, data-driven improvements. The findings suggest that ODI can serve as a foundation for further studies on the transformation of PSM, particularly in rapidly changing industries where aligning internal processes with innovation goals is crucial.

4.5.2 Implications for Practice

Many of the current academic questions in the PSM literature are reflected in this study. The employees identified the need for additional competencies and capabilities around digitalization, new business models, and big data reflected in a recent studies (Ancarani & Di Mauro, 2018; Bals et al., 2019), the need for open innovation by using additional sources for suppliers (Schupp et al., 2018; Servajean-Hilst & Calvi, 2018), and stronger involvement of purchasing in the NPD process (Picaud-Bello et al., 2019; Schiele et al., 2020). In addition to the identification of these needs, the survey also provides the management with a ranking. Overall an increase in competencies in the respective technology fields is encouraged as well as a better understanding of the end customer needs. Together with an increased coordination between the R&D and PSM departments through, for example, cross-functional teams PSM employees can be enabled to achieve a better understanding of both the technology and the underlying customer need. By opening up the sources for potential innovation, the PSM employees also increase their ability to find additional suppliers and create competition. Especially in commodities with a high degree of innovation additional suppliers can be difficult to establish, but lead to a significant cost benefit (Hebisch et al., 2022).

In the context of ambidexterity, its influence on the purchasing department has been overlooked. The involvement of the PSM department in the innovation work inevitably causes a struggle between the traditional role of purchasing and evolving responsibilities. An organiza-

tion has to align its processes to its culture and address the needs of its employees. My findings provide guidance for managers on how to prioritize the needs of the PSM department and thus facilitate a stronger contribution towards the NPD process and innovation. The PSM department should not be considered as a uniform body within the organization. I have shown that the level of innovation of the product bought by a purchasing employee results in a very different prioritization of needs. The more an employee is involved in radical innovation purchasing, the higher they rank the needs which are related to exploration work, while the employees purchasing mostly incremental innovations, focus rather on those reflecting the traditional role of purchasing. Setting up a contextual ambidextrous environment across the whole PSM department would result in serving the needs of the “radical” purchasers, while not addressing needs of the “incremental” purchasers and perhaps even over-serving them with tools they do not require. As some technologies are more stable than others, those purchasing units will likely have a low probability of a radical innovation showing up – short-term wins, however, are crucial to keep up the support for these new tools (Kotter, 2012). This creates the risk that if a radical innovation emerges, the “incremental” purchasers might possess the tools and abilities but do not know about or might even resist using them. For these commodity groups an advanced innovation purchasing might be more appropriate. Due to a larger number of commodities being supported, these purchasers will have a higher likelihood of experiencing radical innovation. This creates short-term wins, allowing the purchasers to focus on the traditional responsibilities in order to achieve the best cost position. Creating such an advanced purchasing unit for all commodities would result in the setup of a structural ambidexterity. Contextual ambidexterity, however, is considered to be more successful and more sustainable than structural ambidexterity (Gibson & Birkinshaw, 2004). In addition, the “radical” purchasers did indicate that they wanted to become more involved in the innovation and NPD process. The drawback of contextual ambidexterity – balancing exploration and exploitation within an individual’s context – might be less possible in this scenario. Literature shows that contextual ambidextrous models often fail. Over time, exploitation measures require more attention from management

and urgency and short-term gains often overshadow the importance of exploration. In a more dynamic setup, such as the radical innovative commodities, this negative outcome might be less likely to occur, especially as the employees in this survey indicated a strong preference for innovation work. I therefore encourage the establishment of specific units of advanced purchasing which cover those commodities with a lower likelihood of experiencing radical innovations, while the innovative commodities would be set up in contextual ambidexterity.

4.5.3 Conclusion, Limitations, and Future Research

In this paper I have proposed to use the jobs-to-be-done logic as a basis for measures to improve the innovation performance through the PSM department. In order to provide answers to this research objectives, I used the ODI approach in the context of an automotive OEM. The first objective was to outline the dual role of purchasing, the resulting tensions of cost and innovation work and propose solutions provided by the needs-based analysis. Second, I aimed to show the usefulness of the ODI approach through its jobs-to-be-done approach in the organizational setup. Using employees' needs in a manner similar to customers' needs enabled me to describe the different paths the organization should follow for the different types of purchasing units. Thirdly, this paper discussed the different optional pathways and the possible connections to organizational ambidexterity. As such, I showed that purchasing employees working in commodities with a higher degree of innovation tend to prefer a contextual ambidextrous environment, while the purchasers in commodities with a lower degree of innovation prefer the structural ambidexterity through an advanced purchasing unit.

ODI as a method for finding optimization paths in an organization has some limitations. While it is a solution-free first step, subsequent research is needed. The ODI relies on subjective measures and with the collection of more objective data (such as number of software-related projects or number and origin of suppliers per quota) and cross-referencing these, I may add validity to the findings. As could be seen, across all OS the purchasers were fairly unsatisfied and thus a cross-reference with overall satisfaction in the organization should be considered. To

determine exact paths for the organizational change, additional research using the findings as a source of information has to be conducted. The exact formulation of the needs derived from this study could be elaborated through design-thinking or other creative processes (Cousins, 2018).

This study has some limitations besides the ODI methodology, which can serve as a meaningful starting point for future research. By focusing on one automotive OEM's PSM department I limit the external validity of this study. However, the setting of the automotive industry is idiosyncratic, as it produces a highly regulated, very international and expensive consumer product. The automotive OEM studied or companies with a very similar setup are therefore the most applicable for the empirical findings (Graebner et al., 2018). Extending the scope to other industries and more firms would provide important insights regarding the generalizability of this study. Additionally, all respondents share the same cultural background, so cross-cultural differences could not be considered. However, as culturally influenced value systems are found to be a determinant of innovation challenges and inter-organizational cooperation issues (Hofstede, 1991), broadening the scope of future research beyond the OEM and incorporating an international perspective could yield valuable insights. Also, with the focus on an established and very large organization in a mature industry, a focus on Small and Medium-sized Enterprise (SME) may report different findings (Pressey et al., 2009).

I am aware that this study only provides a starting point and that a switch in organizational focus can bring many risks to well-established processes. Thus an overall shift of focus in PSM research from the project level to an organizational level will help with the understanding of the requirements in organizational level variables supporting the change. Effective innovation management and NPD may be made possible through the analysis of processes, the organizational structure and culture behind it, and the surrounding rules of engagement.

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Appendix

Innovation Source		Supplier capabilities	
1	Tier-1 suppliers of own industry	12	Scale supplier innovation
2	Tier-1 suppliers of outside industries	13	Align supplier to purchasing standards
3	Lower tier suppliers	Negotiation, Cost and Risk	
4	Startups & entrepreneurial firms	14	Freedom of negotiation
PSM capabilities		15	Cost > Innovation
5	Data-driven business models	16	Product launch risk
6	Software	17	Financial risk
7	Platform-driven business models	PSM–R&D Collaboration	
8	Supplier manufacturing capabilities	18	Increased coordination
PSM competencies		19	Earlier involvement of PSM
9	Technology field	Ambidexterity	
10	End-customer needs	20	Structural ambidexterity
First-to-Market		21	Contextual ambidexterity
11	Be First-to-Market		

Table 4.5.1: Outcome statements areas

No.	Outcome Statement	OPP Score	IMP Score (in %)	SAT Score (in %)
9	Increase purchasers' level of understanding of the field of technology within the desired innovation collaboration to improve it.	14.45	94.53	44.53
18	Increase coordination between the R&D and purchasing departments in your organization to improve the quality of innovation collaboration.	14.06	95.31	50.00
5	Increase purchasers' capabilities (tools or knowledge) in evaluating data-driven business models to improve innovation collaboration.	13.75	80.47	23.44
10	Increase purchasers' level of understanding of end-customers' needs, in order to improve evaluation of innovation collaboration.	13.59	82.03	28.13
6	Increase purchasers' capabilities (tools or knowledge) in evaluating software to improve innovation collaboration.	13.36	81.25	28.91
19	Minimize time between initial supplier-development department contact and involvement of the purchasing department in innovation collaboration.	13.05	84.38	38.28
14	Increase purchasers' freedom of negotiation during the contracting processes to improve innovation collaborations.	12.73	81.25	35.16
2	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from other industries.	12.73	76.56	25.78
4	Increase the number of collaborative partnerships to gain access to better innovations with startups or entrepreneurial firms.	12.27	74.22	25.78
16	Minimize the risks to product launch while maintaining effective innovation collaboration.	12.11	86.72	52.34
1	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from your industry.	11.72	86.72	56.25
3	Increase the number of collaborative partnerships to gain access to better innovations with lower tier suppliers (tier-2/tier-3).	11.72	72.66	28.13
8	Increase purchasers' capabilities (tools or knowledge) in evaluating the supplier's manufacturing capability to improve innovation collaboration.	11.64	80.47	44.53
11	Increase purchasers' ability to establish the innovation through the innovation collaboration as first on the market.	11.64	73.44	30.47
13	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to align with the standard purchasing processes and requirements within your organization.	11.48	81.25	47.66
21	Facilitate employee participation in innovation collaboration alongside their ongoing responsibilities.	11.33	72.66	32.03
17	Minimize the financial risks while maintaining effective innovation collaboration.	11.17	81.25	50.78
12	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to scale the supplier's innovation to fit the needs of the purchasing organization.	10.86	72.66	36.72
15	Minimize the development, purchasing and investment costs accrued by your organization while maintaining effective innovation collaboration.	10.70	71.88	36.72
7	Increase purchasers' capabilities (tools or knowledge) in evaluating platform-driven business models to improve innovation collaboration.	10.70	64.06	21.09
20	Increase the responsibility of dedicated innovation purchasing specialist, rather than e.g. operational purchasers, for innovation collaboration.	10.23	64.84	27.34

n = 128

Table 4.5.2: Full list of opportunity scores (for full sample)

No.	Outcome Statement	OPP Score	IMP Score (in %)	SAT Score (in %)
10	Increase purchasers' level of understanding of end-customers' needs, in order to improve evaluation of innovation collaboration.	17.33	93.33	13.33
9	Increase purchasers' level of understanding of the field of technology within the desired innovation collaboration to improve it.	16.67	93.33	20.00
13	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to align with the standard purchasing processes and requirements within your organization.	16.67	93.33	20.00
2	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from other industries.	16.00	86.67	13.33
18	Increase coordination between the R&D and purchasing departments in your organization to improve the quality of innovation collaboration.	16.00	100.00	40.00
4	Increase the number of collaborative partnerships to gain access to better innovations with startups or entrepreneurial firms.	15.33	86.67	20.00
16	Minimize the risks to product launch while maintaining effective innovation collaboration.	14.00	80.00	20.00
6	Increase purchasers' capabilities (tools or knowledge) in evaluating software to improve innovation collaboration.	13.33	73.33	13.33
7	Increase purchasers' capabilities (tools or knowledge) in evaluating platform-driven business models to improve innovation collaboration.	13.33	73.33	13.33
1	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from your industry.	12.67	86.67	46.67
3	Increase the number of collaborative partnerships to gain access to better innovations with lower tier suppliers (tier-2/tier-3).	12.67	66.67	6.67
11	Increase purchasers' ability to establish the innovation through the innovation collaboration as first on the market.	12.67	66.67	6.67
14	Increase purchasers' freedom of negotiation during the contracting processes to improve innovation collaborations.	12.67	73.33	20.00
8	Increase purchasers' capabilities (tools or knowledge) in evaluating the supplier's manufacturing capability to improve innovation collaboration.	12.00	73.33	26.67
5	Increase purchasers' capabilities (tools or knowledge) in evaluating data-driven business models to improve innovation collaboration.	11.33	66.67	20.00
19	Minimize time between initial supplier-development department contact and involvement of the purchasing department in innovation collaboration.	11.33	73.33	33.33
12	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to scale the supplier's innovation to fit the needs of the purchasing organization.	10.67	66.67	26.67
21	Facilitate employee participation in innovation collaboration alongside their ongoing responsibilities.	10.67	66.67	26.67
17	Minimize the financial risks while maintaining effective innovation collaboration.	10.00	60.00	20.00
20	Increase the responsibility of dedicated innovation purchasing specialist, rather than e.g. operational purchasers, for innovation collaboration.	10.00	60.00	20.00
15	Minimize the development, purchasing and investment costs accrued by your organization while maintaining effective innovation collaboration.	9.33	53.33	13.33

n = 15

Table 4.5.3: Full list of opportunity scores (for sub-sample innovation performance worse than competition)

No.	Outcome Statement	OPP Score	IMP Score (in %)	SAT Score (in %)
6	Increase purchasers' capabilities (tools or knowledge) in evaluating software to improve innovation collaboration.	14.72	83.33	19.44
9	Increase purchasers' level of understanding of the field of technology within the desired innovation collaboration to improve it.	14.72	94.44	41.67
10	Increase purchasers' level of understanding of end-customers' needs, in order to improve evaluation of innovation collaboration.	14.44	83.33	22.22
18	Increase coordination between the R&D and purchasing departments in your organization to improve the quality of innovation collaboration.	14.44	94.44	44.44
5	Increase purchasers' capabilities (tools or knowledge) in evaluating data-driven business models to improve innovation collaboration.	13.06	75.00	19.44
2	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from other industries.	12.78	72.22	16.67
4	Increase the number of collaborative partnerships to gain access to better innovations with startups or entrepreneurial firms.	12.50	77.78	30.56
12	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to scale the supplier's innovation to fit the needs of the purchasing organization.	12.22	77.78	33.33
17	Minimize the financial risks while maintaining effective innovation collaboration.	12.22	86.11	50.00
19	Minimize time between initial supplier-development department contact and involvement of the purchasing department in innovation collaboration.	12.22	77.78	33.33
14	Increase purchasers' freedom of negotiation during the contracting processes to improve innovation collaborations.	11.94	75.00	30.56
16	Minimize the risks to product launch while maintaining effective innovation collaboration.	11.94	86.11	52.78
13	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to align with the standard purchasing processes and requirements within your organization.	11.39	83.33	52.78
8	Increase purchasers' capabilities (tools or knowledge) in evaluating the supplier's manufacturing capability to improve innovation collaboration.	11.11	77.78	44.44
3	Increase the number of collaborative partnerships to gain access to better innovations with lower tier suppliers (tier-2/tier-3).	10.83	69.44	30.56
7	Increase purchasers' capabilities (tools or knowledge) in evaluating platform-driven business models to improve innovation collaboration.	10.56	61.11	16.67
1	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from your industry.	10.00	77.78	55.56
11	Increase purchasers' ability to establish the innovation through the innovation collaboration as first on the market.	10.00	61.11	22.22
15	Minimize the development, purchasing and investment costs accrued by your organization while maintaining effective innovation collaboration.	10.00	69.44	38.89
21	Facilitate employee participation in innovation collaboration alongside their ongoing responsibilities.	10.00	66.67	33.33
20	Increase the responsibility of dedicated innovation purchasing specialist, rather than e.g. operational purchasers, for innovation collaboration.	9.72	61.11	25.00

n = 36

Table 4.5.4: Full list of opportunity scores (for sub-sample innovation performance equal to competition)

No.	Outcome Statement	OPP Score	IMP Score (in %)	SAT Score (in %)
5	Increase purchasers' capabilities (tools or knowledge) in evaluating data-driven business models to improve innovation collaboration.	14.55	85.71	25.97
9	Increase purchasers' level of understanding of the field of technology within the desired innovation collaboration to improve it.	13.90	94.81	50.65
19	Minimize time between initial supplier-development department contact and involvement of the purchasing department in innovation collaboration.	13.77	89.61	41.56
18	Increase coordination between the R&D and purchasing departments in your organization to improve the quality of innovation collaboration.	13.51	94.81	54.55
14	Increase purchasers' freedom of negotiation during the contracting processes to improve innovation collaborations.	13.12	85.71	40.26
6	Increase purchasers' capabilities (tools or knowledge) in evaluating software to improve innovation collaboration.	12.73	81.82	36.36
10	Increase purchasers' level of understanding of end-customers' needs, in order to improve evaluation of innovation collaboration.	12.47	79.22	33.77
1	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from your industry.	12.34	90.91	58.44
11	Increase purchasers' ability to establish the innovation through the innovation collaboration as first on the market.	12.21	80.52	38.96
2	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from other industries.	12.08	76.62	32.47
21	Facilitate employee participation in innovation collaboration alongside their ongoing responsibilities.	12.08	76.62	32.47
3	Increase the number of collaborative partnerships to gain access to better innovations with lower tier suppliers (tier-2/tier-3).	11.95	75.32	31.17
8	Increase purchasers' capabilities (tools or knowledge) in evaluating the supplier's manufacturing capability to improve innovation collaboration.	11.82	83.12	48.05
16	Minimize the risks to product launch while maintaining effective innovation collaboration.	11.82	88.31	58.44
4	Increase the number of collaborative partnerships to gain access to better innovations with startups or entrepreneurial firms.	11.56	70.13	24.68
15	Minimize the development, purchasing and investment costs accrued by your organization while maintaining effective innovation collaboration.	11.30	76.62	40.26
17	Minimize the financial risks while maintaining effective innovation collaboration.	10.91	83.12	57.14
13	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to align with the standard purchasing processes and requirements within your organization.	10.52	77.92	50.65
20	Increase the responsibility of dedicated innovation purchasing specialist, rather than e.g. operational purchasers, for innovation collaboration.	10.52	67.53	29.87
7	Increase purchasers' capabilities (tools or knowledge) in evaluating platform-driven business models to improve innovation collaboration.	10.26	63.64	24.68
12	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to scale the supplier's innovation to fit the needs of the purchasing organization.	10.26	71.43	40.26

n = 77

Table 4.5.5: Full list of opportunity scores (for sub-sample innovation performance better than competition)

No.	Outcome Statement	OPP Score	IMP Score (in %)	SAT Score (in %)
8	Increase purchasers' capabilities (tools or knowledge) in evaluating the supplier's manufacturing capability to improve innovation collaboration.	15.00	90.00	30.00
5	Increase purchasers' capabilities (tools or knowledge) in evaluating data-driven business models to improve innovation collaboration.	13.67	80.00	23.33
18	Increase coordination between the R&D and purchasing departments in your organization to improve the quality of innovation collaboration.	13.67	90.00	43.33
9	Increase purchasers' level of understanding of the field of technology within the desired innovation collaboration to improve it.	13.33	90.00	46.67
6	Increase purchasers' capabilities (tools or knowledge) in evaluating software to improve innovation collaboration.	13.00	80.00	30.00
4	Increase the number of collaborative partnerships to gain access to better innovations with startups or entrepreneurial firms.	12.67	73.33	20.00
1	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from your industry.	12.33	90.00	56.67
13	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to align with the standard purchasing processes and requirements within your organization.	12.00	80.00	40.00
12	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to scale the supplier's innovation to fit the needs of the purchasing organization.	11.67	66.67	16.67
14	Increase purchasers' freedom of negotiation during the contracting processes to improve innovation collaborations.	11.67	80.00	43.33
19	Minimize time between initial supplier-development department contact and involvement of the purchasing department in innovation collaboration.	11.67	80.00	43.33
17	Minimize the financial risks while maintaining effective innovation collaboration.	10.67	76.67	46.67
11	Increase purchasers' ability to establish the innovation through the innovation collaboration as first on the market.	10.33	70.00	36.67
16	Minimize the risks to product launch while maintaining effective innovation collaboration.	10.33	80.00	56.67
20	Increase the responsibility of dedicated innovation purchasing specialist, rather than e.g. operational purchasers, for innovation collaboration.	10.33	66.67	30.00
10	Increase purchasers' level of understanding of end-customers' needs, in order to improve evaluation of innovation collaboration.	10.00	66.67	33.33
2	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from other industries.	9.33	63.33	33.33
15	Minimize the development, purchasing and investment costs accrued by your organization while maintaining effective innovation collaboration.	9.33	70.00	46.67
3	Increase the number of collaborative partnerships to gain access to better innovations with lower tier suppliers (tier-2/tier-3).	9.00	60.00	30.00
21	Facilitate employee participation in innovation collaboration alongside their ongoing responsibilities.	9.00	63.33	36.67
7	Increase purchasers' capabilities (tools or knowledge) in evaluating platform-driven business models to improve innovation collaboration.	8.33	56.67	30.00

n = 30

Table 4.5.6: Full list of opportunity scores (for sub-sample Incremental product innovation at commodity)

No.	Outcome Statement	OPP Score	IMP Score (in %)	SAT Score (in %)
9	Increase purchasers' level of understanding of the field of technology within the desired innovation collaboration to improve it.	14.83	94.83	41.38
10	Increase purchasers' level of understanding of end-customers' needs, in order to improve evaluation of innovation collaboration.	14.31	82.76	22.41
18	Increase coordination between the R&D and purchasing departments in your organization to improve the quality of innovation collaboration.	14.31	94.83	46.55
19	Minimize time between initial supplier-development department contact and involvement of the purchasing department in innovation collaboration.	14.31	87.93	32.76
6	Increase purchasers' capabilities (tools or knowledge) in evaluating software to improve innovation collaboration.	13.28	81.03	29.31
14	Increase purchasers' freedom of negotiation during the contracting processes to improve innovation collaborations.	13.10	84.48	37.93
5	Increase purchasers' capabilities (tools or knowledge) in evaluating data-driven business models to improve innovation collaboration.	12.93	75.86	22.41
16	Minimize the risks to product launch while maintaining effective innovation collaboration.	12.76	91.38	55.17
2	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from other industries.	12.59	75.86	25.86
1	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from your industry.	12.07	89.66	58.62
3	Increase the number of collaborative partnerships to gain access to better innovations with lower tier suppliers (tier-2/tier-3).	11.55	74.14	32.76
11	Increase purchasers' ability to establish the innovation through the innovation collaboration as first on the market.	11.55	70.69	25.86
4	Increase the number of collaborative partnerships to gain access to better innovations with startups or entrepreneurial firms.	11.21	70.69	29.31
21	Facilitate employee participation in innovation collaboration alongside their ongoing responsibilities.	11.03	74.14	37.93
15	Minimize the development, purchasing and investment costs accrued by your organization while maintaining effective innovation collaboration.	10.86	72.41	36.21
17	Minimize the financial risks while maintaining effective innovation collaboration.	10.86	81.03	53.45
12	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to scale the supplier's innovation to fit the needs of the purchasing organization.	10.69	77.59	48.28
7	Increase purchasers' capabilities (tools or knowledge) in evaluating platform-driven business models to improve innovation collaboration.	10.52	60.34	15.52
8	Increase purchasers' capabilities (tools or knowledge) in evaluating the supplier's manufacturing capability to improve innovation collaboration.	10.52	77.59	50.00
20	Increase the responsibility of dedicated innovation purchasing specialist, rather than e.g. operational purchasers, for innovation collaboration.	10.34	63.79	24.14
13	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to align with the standard purchasing processes and requirements within your organization.	10.00	77.59	55.17

n = 58

Table 4.5.7: Full list of opportunity scores (for sub-sample both product innovation at commodity)

No.	Outcome Statement	OPP Score	IMP Score (in %)	SAT Score (in %)
2	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from other industries.	15.50	87.50	20.00
10	Increase purchasers' level of understanding of end-customers' needs, in order to improve evaluation of innovation collaboration.	15.25	92.50	32.50
5	Increase purchasers' capabilities (tools or knowledge) in evaluating data-driven business models to improve innovation collaboration.	15.00	87.50	25.00
9	Increase purchasers' level of understanding of the field of technology within the desired innovation collaboration to improve it.	14.75	97.50	47.50
3	Increase the number of collaborative partnerships to gain access to better innovations with lower tier suppliers (tier-2/tier-3).	14.00	80.00	20.00
18	Increase coordination between the R&D and purchasing departments in your organization to improve the quality of innovation collaboration.	14.00	100.00	60.00
6	Increase purchasers' capabilities (tools or knowledge) in evaluating software to improve innovation collaboration.	13.75	82.50	27.50
4	Increase the number of collaborative partnerships to gain access to better innovations with startups or entrepreneurial firms.	13.50	80.00	25.00
21	Facilitate employee participation in innovation collaboration alongside their ongoing responsibilities.	13.50	77.50	20.00
13	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to align with the standard purchasing processes and requirements within your organization.	13.25	87.50	42.50
14	Increase purchasers' freedom of negotiation during the contracting processes to improve innovation collaborations.	13.00	77.50	25.00
7	Increase purchasers' capabilities (tools or knowledge) in evaluating platform-driven business models to improve innovation collaboration.	12.75	75.00	22.50
11	Increase purchasers' ability to establish the innovation through the innovation collaboration as first on the market.	12.75	80.00	32.50
16	Minimize the risks to product launch while maintaining effective innovation collaboration.	12.50	85.00	45.00
19	Minimize time between initial supplier-development department contact and involvement of the purchasing department in innovation collaboration.	12.25	82.50	42.50
17	Minimize the financial risks while maintaining effective innovation collaboration.	12.00	85.00	50.00
15	Minimize the development, purchasing and investment costs accrued by your organization while maintaining effective innovation collaboration.	11.50	72.50	30.00
1	Increase the number of collaborative partnerships to gain access to better innovations with established tier-1 suppliers from your industry.	10.75	80.00	52.50
8	Increase purchasers' capabilities (tools or knowledge) in evaluating the supplier's manufacturing capability to improve innovation collaboration.	10.75	77.50	47.50
12	Increase supplier's capabilities through implementation of tools or processes initiated by the purchasing organization to scale the supplier's innovation to fit the needs of the purchasing organization.	10.50	70.00	35.00
20	Increase the responsibility of dedicated innovation purchasing specialist, rather than e.g. operational purchasers, for innovation collaboration.	10.00	65.00	30.00

n = 40

Table 4.5.8: Full list of opportunity scores (for sub-sample radical product innovation at commodity)

No.	Outcome Statement	Variable	ANOVA	T-test		
				Better – Equal	Better – Worse	Equal – Worse
1	Tier-1 supplier of own industry	Importance	.22	.32	.06 [†]	.41
		Satisfaction	.34	.54	.24	.45
2	Tier-1 supplier of outside industries	Importance	.49	.80	.25	.22
		Satisfaction	.14 [‡]	.08 [†]	.27	.76
3	Lower tier suppliers	Importance	.64	.31	.87	.60
		Satisfaction	.48	.63	.21	.43
4	Startups & entrepreneurial firms	Importance	.09 [†]	.53	.03*	.08 [†]
		Satisfaction	.36	.76	.23	.35
5	Data-driven business models	Importance	.06 [†]	.23	.06 [†]	.27
		Satisfaction	.35	.17	.53	.72
6	Software	Importance	.45	.99	.26	.28
		Satisfaction	.10 [†]	.18	.05*	.33
7	Platform-driven business models	Importance	.95	.83	.70	.91
		Satisfaction	.57	.45	.36	.78
8	Supplier manufacturing capabilities	Importance	.45	.23	.65	.79
		Satisfaction	.09 [†]	.25	.04*	.28
9	Technology field	Importance	.91	.72	.90	.73
		Satisfaction	.11 [‡]	.26	.03*	.31
10	End-customer needs	Importance	.28	.39	.07 [†]	.30
		Satisfaction	.03*	.02*	.11	.49
11	Be First-to-Market	Importance	.38	.22	.93	.46
		Satisfaction	.00*	.02*	.00*	.35
12	Scale supplier innovation	Importance	.95	.81	.80	.91
		Satisfaction	.27	.18	.35	.79
13	Align supplier to purchasing standards	Importance	.15 [‡]	.62	.05*	.11 [‡]
		Satisfaction	.05*	.66	.01*	.04*
14	Freedom of negotiations	Importance	.67	.89	.45	.52
		Satisfaction	.35	.38	.18	.53
15	Cost >Innovation	Importance	.24	.96	.15 [‡]	.16
		Satisfaction	.56	.91	.16	.26
16	Product launch risk	Importance	.59	.94	.34	.39
		Satisfaction	.00*	.59	.01*	.03*
17	Financial risks	Importance	.38	.60	.38	.27
		Satisfaction	.01*	.16	.00*	.10 [†]
18	Increased Coordination	Importance	.15 [‡]	.72	.05*	.04*
		Satisfaction	.13 [‡]	.17	.09 [†]	.54
19	Earlier Involvement of PSM	Importance	.13 [‡]	.43	.11 [‡]	.27
		Satisfaction	.75	.46	.92	.61
20	Structural ambidexterity	Importance	.84	.98	.56	.57
		Satisfaction	.48	.30	.46	.95
21	Contextual Ambidexterity	Importance	.16	.29	.05*	.36
		Satisfaction	.66	.85	.39	.35

[‡] $p < .15$ (trend-level). [†] $p < .10$ (marginally significant). * $p < .05$ (significant)

Table 4.5.9: p-values for innovation performance compared to competition sub-sample

No.	Outcome Statement	Variable	ANOVA	T-test		
				Radical – Both	Radical – Incremental	Incremental – Both
1	Tier-1 supplier of own industry	Importance	.41	.22	.43	.74
		Satisfaction	.84	.60	.97	.64
2	Tier-1 supplier of outside industries	Importance	.02*	.03*	.01*	.40
		Satisfaction	.43	.47	.17	.46
3	Lower tier suppliers	Importance	.03*	.34	.01*	.07 [†]
		Satisfaction	.27	.12 [‡]	.68	.33
4	Startups & entrepreneurial firms	Importance	.13 [‡]	.23	.05*	.29
		Satisfaction	.88	.84	.78	.60
5	Data-driven business models	Importance	.20	.07 [†]	.39	.46
		Satisfaction	.97	.97	.84	.80
6	Software	Importance	.09 [†]	.05*	.07 [†]	.73
		Satisfaction	.99	.98	.92	.93
7	Platform-driven business models	Importance	.12 [‡]	.06 [†]	.08 [†]	.99
		Satisfaction	.66	.35	.73	.67
8	Supplier manufacturing capabilities	Importance	.44	.36	.78	.20
		Satisfaction	.20	.80	.10 [†]	.13 [‡]
9	Technology field	Importance	.04*	.17	.01*	.15 [‡]
		Satisfaction	.56	.54	.63	.29
10	End-customer needs	Importance	.16	.38	.08 [†]	.25
		Satisfaction	.18	.12 [‡]	.92	.14 [‡]
11	Be First-to-Market	Importance	.53	.46	.25	.60
		Satisfaction	.21	.28	.50	.09 [†]
12	Scale supplier innovation	Importance	.55	.70	.28	.42
		Satisfaction	.21	.73	.11 [‡]	.06 [†]
13	Align supplier to purchasing standards	Importance	.39	.13 [‡]	.55	.60
		Satisfaction	.82	.62	.92	.59
14	Freedom of negotiations	Importance	.36	.62	.38	.14 [‡]
		Satisfaction	.55	.86	.27	.32
15	Cost >Innovation	Importance	.88	.68	.65	.90
		Satisfaction	.57	.64	.30	.49
16	Product launch risk	Importance	.28	.70	.29	.11 [‡]
		Satisfaction	.75	.69	.69	.49
17	Financial risks	Importance	1.00	.99	.94	.93
		Satisfaction	.53	.95	.31	.34
18	Increased Coordination	Importance	.11 [‡]	.25	.05*	.25
		Satisfaction	.59	.30	.50	.87
19	Earlier Involvement of PSM	Importance	.14 [‡]	.42	.27	.05*
		Satisfaction	.80	.53	.62	.99
20	Structural ambidexterity	Importance	.65	.56	.36	.65
		Satisfaction	.99	.98	.92	.90
21	Contextual Ambidexterity	Importance	.82	.67	.53	.79
		Satisfaction	.19	.11 [‡]	.09	.76

[‡] $p < .15$ (trend-level). [†] $p < .10$ (marginally significant). * $p < .05$ (significant)

Table 4.5.10: p-values for innovation level of purchased commodity sub-samples