



**BUYER-SUPPLIER RELATIONSHIPS
BETWEEN ESTABLISHED FIRMS AND
STARTUPS FROM A PROCUREMENT
PERSPECTIVE**

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TABLE OF CONTENT

LIST OF FIGURES	VII
LIST OF TABLES	VIII
LIST OF ABBREVIATIONS	IX
CHAPTER 1 INTRODUCTION AND RESEARCH QUESTIONS	1
1.1 Motivation	1
1.2 Research Questions	2
1.2.1. Research Question 1: Aims and Challenges in the Relation between Corporates and Startups.....	4
1.2.2. Research Question 2: The Selection of Startups as New Suppliers	4
1.2.3. Research Question 3: The Development of Startups as New Suppliers.....	5
CHAPTER 2 STARTUP MEETS CORPORATE: THE AIMS AND CHALLENGES OF THE MULTIFACETED RELATIONSHIP ...	7
2.1 Introduction	8
2.2 Conceptual Background	10
2.2.1 Software vs. Hardware Innovations.....	10
2.2.2 The Resource Based View and Relational View.....	11
2.2.3 The Corporate-Startup Relationship.....	13
2.3 Method.....	15
2.3.1 Study Design	15
2.3.2 Data Sample.....	16
2.3.3 Data Analysis.....	18
2.4 Analysis and Results.....	18
2.4.1 Aims of Startups and Corporates in a Relationship.....	18
2.4.2 Challenges of Startups and Corporates in a Relationship	20
2.4.3 Model: Steering Mechanisms of the Dyad	23
2.5 Discussion and Implications	24
2.5.1 Scholarly Implications.....	24
2.5.2 Managerial Implications	26
2.6 Limitations and Future Research Opportunities	27

CHAPTER 3	SEARCHING FOR SIGNALS: NOVEL WAYS OF SELECTING STARTUPS AS FUTURE SUPPLIERS	28
3.1	Introduction	29
3.2	Conceptual Background	30
3.2.1	The Selection of New Ventures from Two Perspectives.....	30
3.2.2	Perspective 1: Traditional Purchasing Selection	31
3.2.3	Perspective 2: Modern Investor Selection.....	33
3.3	Method	37
3.3.1	Investigation 1: Regression Analysis - Traditional Purchasing Selection.	37
3.3.2	Investigation 2: Discrete Choice Experiment - Modern Investor Selection	38
3.3.3	Sample	41
3.4	Analysis and Results	42
3.4.1	Investigation 1: Regression Analysis - Traditional Purchasing Selection.	42
3.4.2	Investigation 2: Discrete Choice Experiment - Modern Investor Selection	44
3.4.3	Summary of the Results of Investigation 1 and Investigation 2.....	47
3.5	Discussion and Implications	48
3.5.1	Theoretical Implications	48
3.5.2	Managerial Implications	50
3.5.3	Limitations and Future Research Opportunities	52
CHAPTER 4	UTILIZING STARTUP ENGAGEMENT MODELS AS SUPPLIER DEVELOPMENT TOOLS FOR NEW VENTURES.	53
4.1	Introduction	54
4.2	Conceptual Background	56
4.2.1	Resource Dependence Theory	56
4.2.2	Direct and Indirect Supplier Development.....	56
4.2.3	The Tradeoffs in Working with Startups	57
4.2.4	The Engagement Models with Startups.....	59
4.3	Method	61
4.3.1	Study Design	61
4.3.2	Data Sample.....	62
4.3.3	Data Analysis.....	64
4.4	Analysis and Results	65
4.4.1	Tradeoffs of the Startup Engagement Models.....	65

4.4.2	Framework: The Engagement Models of Startups as Direct and Indirect Supplier Development Tools for New Ventures	70
4.5	Discussion, Implications and Outlook	75
4.5.1	Theoretical Contributions	75
4.5.2	Managerial Implications	76
4.5.3	Limitations and Outlook.....	77
CHAPTER 5	SUMMARY, CONTRIBUTIONS, AND OUTLOOK.....	79
5.1	Summary of the Research Questions.....	79
5.1.1	Research Question 1: Aims and Challenges in the Relation between Corporates and Startups.....	79
5.1.2	Research Question 2: The Selection of Startups as New Suppliers	80
5.1.3	Research Question 3: The Development of Startups as New Suppliers....	81
5.2	Major Academic and Practical Contributions.....	82
5.2.1	Major Academic Contributions	82
5.2.2	Major Practical Contributions	83
5.3	Limitations and Future Research	85
REFERENCES.....		87
APPENDIX		100
CURRICULUM VITAE.....		104

LIST OF FIGURES

Figure 1: Overview of the Research	3
Figure 2: Steering Mechanisms of a Corporate - Startup Relationship	24
Figure 3: Summary of the Results of Investigation 1 and Investigation 2.....	48
Figure 4: Framework - Sequential Supplier Development with New Ventures.....	71

LIST OF TABLES

Table 1: Sample Composition of Study 1.....	17
Table 2: Discrete Choice Experiment - Reference Setting.....	41
Table 3: Pearson Correlations of the OLS Regression.....	42
Table 4: Regression Results of Analysis 1	44
Table 5: Discrete Choice Experiment - MNL Estimation and Results.....	46
Table 6: Quality Signals 7-Point Likert Scale Results	47
Table 7: Definitions of the Corporate-Startup Engagement Models.....	59
Table 8: Sample Composition of Study 3.....	63
Table 9: Tradeoffs of the Engagement Forms with New Ventures.....	70
Table 10: Summary of Propositions of Study 3	74

LIST OF ABBREVIATIONS

CVC	Corporate venture capital
DCE	Discrete choice experiment
FOUNDEXP	Founding experience
INDEXP	Industry experience
M	Mean
MNL	Multinomial logit model
OEM	Original equipment manufacturer
RDT	Resource dependence theory
RV	Relational view
RBV	Resource based view
SD	Standard deviation
STRATALL	Strategic alliances
OLS	Ordinary least squares
VC	Venture capitalist
VCBACK	Venture capital backing
VIF	Variance inflation factors

CHAPTER 1 INTRODUCTION AND RESEARCH QUESTIONS

1.1 Motivation

Digitalization and its inherent changes affect the business models of established firms and incumbents are forced to review their traditional practices on an ongoing basis (Hackober, Bock, & Malki, 2019). The automotive industry serves as an example for this development, as researchers predict a shift of the original equipment manufacturers (OEM) revenue stream towards a 30% share stemming from new revenue pools such as services or shared mobility in the year 2030 (Mohr, Kaas, Gao, Wee, & Möller, 2016). Consequently, established firms are forced to collaborate with new partners in order to gain complementary resources and know-how that lies beyond their core competencies and firm boundaries (Dyer & Singh, 1998). As a result, the supply chain gets increased attention as a critical element for the overall success of the enterprise and the ability to stay competitive in the long-run (Kannan, 2018). Hence, the selection and further development of appropriate suppliers constitutes a critical task for the purchasing function (Govindan, Khodaverdi, & Jafarian, 2013; Krause, Handfield, & Tyler, 2007). Therefore, the technological changes challenge the historically evolved industry boundaries, and collaborations of different sized companies are increasing (Bernhard, Gackstatter, Böger, & Lemaire, 2019).

As one reaction to the development, established firms are reaching out to the startup ecosystem in order to tap into novel innovations and to manage the competitive environment (Weiblen & Chesbrough, 2015). Therefore, partnerships with startups are getting more attention, and the DAX30 companies in Germany have been accelerating their activities in working with new ventures since 2012 (Hackober et al., 2019). Nevertheless, more than 50% of innovation projects between established firms and startups are subject to fail (Bernhard et al., 2019). As a result, established firms are required to develop new venture partnering capabilities, as the traditional processes are hardly applicable in the relationship with new ventures (Zaremba, Bode, & Wagner, 2017). Especially, managing the relationship (Hogenhuis, van den Hende, E. A., & Hultink, 2017; Minshall, Mortara, Valli, & Probert, 2010), selecting the right startup (Dushnitsky & Lenox, 2006; Zaremba, Bode, & Wagner, 2016), and further developing the new ventures (Brigl, Hong, Roos, Schmiegl, & Wu, 2016; La Rocca, Perna, Snehota, & Cia-

buschi, 2017) arise as three extremely demanding endeavors. Nevertheless, the inherent differences of both partners affect the entire relationship between established firms and new ventures and results in a variety of challenges (Minshall et al., 2010).

Startups, or *new ventures*, are characterized by agility, specialized know-how, and a high level of innovation (Hogenhuis et al., 2017). However, startups are commonly faced with overcoming their resource constraints, and they require access to critical partners and complementary assets (Pahnke, Katila, & Eisenhardt, 2015). In contrast, *established firms* hold a favorable resource position, an advanced business model, and organizational processes and routines (Weiblen & Chesbrough, 2015). Nevertheless, these characteristics are often detrimental to the entrepreneurial activities of large organizations and can potentially result in moments of inertia (Fang, Yuli, & Hongzhi, 2008). So, the complementarity of the firms is highly attractive from both perspectives because one partner possesses what the other one needs, but the buyer-supplier relationship with young ventures is recognized as highly precarious (Weiblen & Chesbrough, 2015; Zaremba et al., 2016).

Previous research about the relationship between established firms and startups has outlined multiple obstacles for both partners and the necessity of established firms to further develop their capabilities in working with young ventures. (Hogenhuis et al., 2017; La Rocca et al., 2017; Minshall et al., 2010; Zaremba et al., 2017). The overall understanding of the partner's aims and challenges (1), the selection of appropriate startups (2), and the further development of new ventures (3) are significant responsibilities of established firms to leverage the entire potential of startups and to prevent a high failure rate. Despite the growing interest of large organizations to tap into innovative young enterprises, the research stream is still in its infancy. This dissertation aims to increase the theoretical and practical understanding of the relationship between established firms and startups from different perspectives in order to exploit the inherent potential. Three specific research questions in three distinct studies set the boundaries of the underlying work and provide insight into the multifaceted partnership both in general and from the procurement lens.

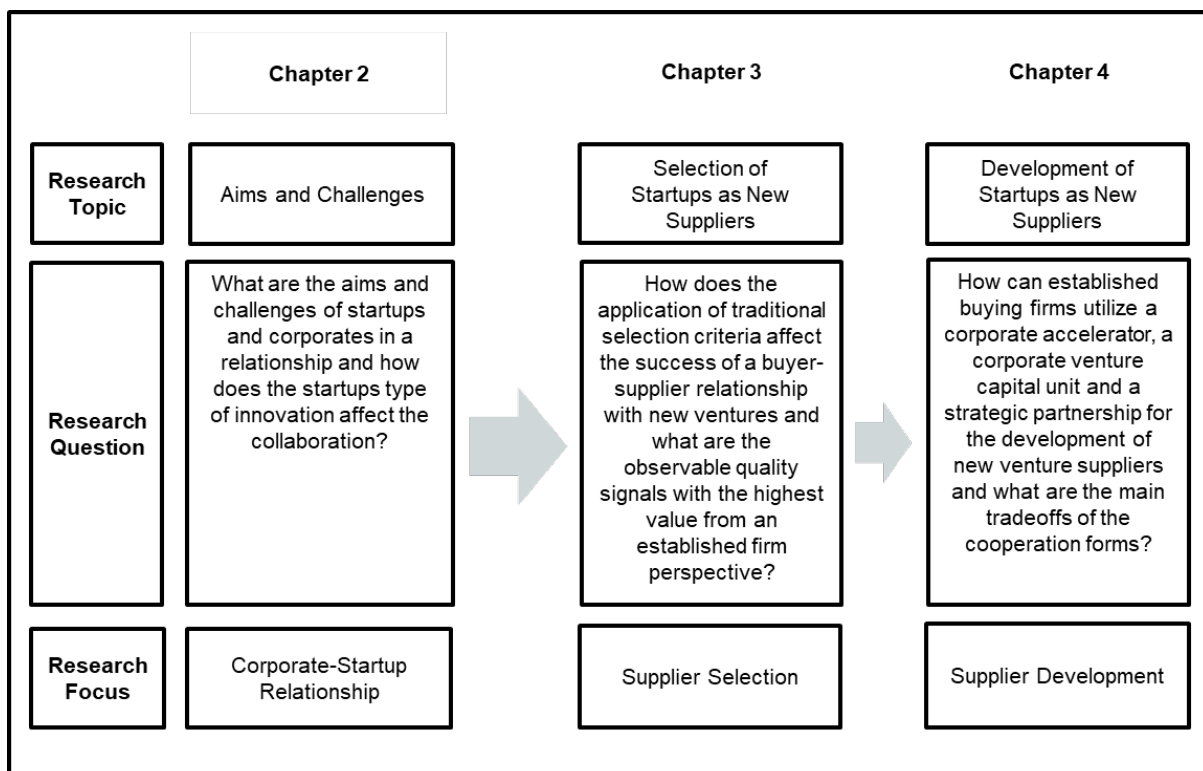
1.2 Research Questions

The dissertation focuses on the established firm perspective, and the subsequent three research questions intend to support large organizations in developing new venture partnering capabilities, as proposed by Zaremba et al. (2017). In the following research, a *startup* is defined as “a firm that is in its early stages of development and growth” (Klotz, Hmieleski, Bradley, & Busewitz, 2013, p.227). In line with previous work, the cut-off age for the newness of a startup is set

between six and eight years (Song, Podoyntsyna, van der Bij, & Halman, 2008). Furthermore, the terms *corporate* and *established firm* are utilized interchangeably in the course of this research to describe firms with a long tradition as well as a proven business model.

Figure 1 portrays an overview of the three connected studies and illustrates the context of the dissertation. The research starts with a comprehensive investigation of the relationship between established firms and startups and narrows the depth of focus in the subsequent studies by applying a procurement perspective. Chapter 2 explores the overall aims and challenges of the affiliation in order to shed light on the peculiarities of the relationship between startups and established firms. After the understanding of the relationship is developed, Chapter 3 and Chapter 4 focus on specific deviances of the purchasing function and startups as novel suppliers. Chapter 3 analyzes the supplier selection of the most appropriate startups, and Chapter 4 describes emerging instruments to increase the startups' capabilities in the context of supplier development. In general, the chapters cover the characteristics of the relationship (Chapter 2), the supplier selection (Chapter 3), and the supplier development (Chapter 4) as essential cornerstones of the procurement function. Prior to the detailed illustration in the subsequent chapters, the three research endeavors and research questions are briefly introduced and described.

Figure 1: Overview of the Research



1.2.1. Research Question 1: Aims and Challenges in the Relation between Corporates and Startups

Despite the high potential of the relationship between startups and established firms, there are multiple barriers and challenges for both sides of the partnership (Doz, 1988; Hogenhuis et al., 2017; La Rocca et al., 2017; Minshall et al., 2010; Minshall, Mortara, Elia, & Probert, 2008; Zaremba et al., 2017). In particular, the high complexity of large organizations (Pahnke et al., 2015) and the development of appropriate communication routines were found to affect both perspectives of the dyad (Gassmann, Zeschky, Wolff, & Stahl, 2010; Minshall et al., 2010). Likewise, startups are emerging in a variety of industries with entirely different innovation approaches (Brigl et al., 2016). However, little is known about the aims and challenges of the partners and the impact of the startup's heterogeneity on the overall relationship. Given these facts, it is essential to develop a comprehensive understanding of the partner's aims and challenges by including the startups type of innovation (*software* vs. *hardware*) to realize the entire potential of the dyad.

Although academia has outlined a few challenges and guidelines of the relationship between startups and established firms, the impact of the startup's type of innovation remains unclear from the literature. However, scholars have revealed differences in the attractiveness and characteristics of setting up a new venture based on the tangible or intangible nature of the startup's innovation (Criscuolo, Nicolaou, & Salter, 2012; DiResta, Forrest, & Vinyard, 2015). Therefore, a consideration of the startup's background is supposed to yield valuable insights for theory and practice. As a consequence, study 1 aims to investigate the impact of the startup's type of innovation (*software* vs. *hardware*) on the relationship between startups and established firms, and intends to provide valuable information that needs to be implemented in preparing and structuring the relationship with startups. Based on 20 semi-structured interviews with both the startup and established firm, the following research question is qualitatively examined:

Research Question 1: *What are the aims and challenges of startups and corporates in a relationship and how does the startups type of innovation affect the collaboration?*

1.2.2. Research Question 2: The Selection of Startups as New Suppliers

The selection of appropriate suppliers is essential for the firm as it affects the entire performance of the organization (Arabsheybani, Paydar, & Safaei, 2018). However, the situation gets uncertain and challenging in the context of startups as suppliers, as young ventures commonly

do not possess great experience or accumulated history (Sutton, 2000). As a result, the supplier selection is a multidimensional decision and a variety of attributes need to be considered at the same time (Awasthi, Govindan, & Gold, 2018).

Interestingly, the selection of traditional suppliers from an established firm perspective but also the selection of startups from an investor's point of view are well-developed research streams. On the one hand, the *cost*, *quality*, and *delivery* performance are mostly applied as criteria for the selection of traditional suppliers (Ho, Xiaowei, & Prasanta, 2010; Kannan, 2018; Krause, Pagell, & Curkovic, 2001). On the other hand, quality signals stemming from the *human capital*, *alliance capital*, *intellectual capital* as well as *third party endorsement* increasing the perception of the startups' quality as well as the likelihood of getting funded as a new venture (Baum & Silverman, 2004; Plummer, Allison, & Connelly, 2016).

Nevertheless, and despite the differences of established suppliers and startups as a supplier, little is known about the applicability of the traditional selection criteria in the startup context and the value of the quality signals for the purchasing function. Therefore, study 2 sets out to shed light on the selection of startups as new suppliers by creating a link between the traditional supplier selection literature as well as the emerging research stream about the startups' quality signals. As a result, study 2 follows the signaling theory and quantitatively investigates the subsequent research question by the utilization of a discrete choice experiment (DCE) as well as a regression analysis:

Research Question 2: *How does the application of traditional selection criteria affect the success of a buyer-supplier relationship with new ventures and what are the observable quality signals with the highest value from an established firm perspective?*

1.2.3. Research Question 3: The Development of Startups as New Suppliers

The development of a supplier is a key function of the purchasing department, and the commonly pursued activities were outlined to have a positive impact on supplier performance (Lawson, Krause, & Potter, 2015; Modi & Mabert, 2007; Wagner & Krause, 2009).

Hence, the development activities for suppliers were found to improve the supplier capabilities, the delivery performance, and the supplier's product itself (Wagner, 2010). Despite the outlined effects of supplier development towards working with established firms, startups as suppliers require more timely and tailored development initiatives, as they are still in their early stages (Zaremba et al., 2017). Though, little is known about appropriate development

activities with startups as new suppliers in order to unlock the inherent capabilities of young ventures.

The research about traditional supplier development is well advanced and established firms are already aware of, and apply a variety of direct and indirect methods (Krause & Ellram, 1997; Wagner, 2006, 2010; Zaremba et al., 2016). Likewise, the further development and acceleration of startups through equity-based or non-equity-based instruments have gotten increased attention in recent years (Bernhard et al., 2019; Cohen & Hochberg, 2014; Weiblen & Chesbrough, 2015). Nevertheless, literature neglects to bridge the supplier development research with the startup development literature, although it appears promising for the purchasing function.

As a result, study 3 sets out to investigate the tradeoffs and the applicability of a *corporate accelerator*, a *strategic partnership*, and a *corporate venture capital* investment in the context of direct and indirect supplier development. Based on the resource dependence theory (RDT), 14 semi-structured interviews with experts from the automotive industry intends to shed light onto the following research question:

Research Question 3: *How can established buying firms utilize a corporate accelerator, a corporate venture capital unit and a strategic partnership for the development of new venture suppliers, and what are the main tradeoffs of the cooperation forms?*

CHAPTER 2 STARTUP MEETS CORPORATE: THE AIMS AND CHALLENGES OF THE MULTIFACETED RELATIONSHIP

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ABSTRACT

The relationship between established firms and new ventures offers great potential for both parties but it is also subject to a variety of obstacles. Therefore, understanding the partners' aims and challenges is a vital precondition to encounter the entire range of possibilities of the collaboration. However, startups are highly heterogeneous with products ranging from intangible software algorithms to tangible prototypes, meaning that there is no "cookie cutter" model for successful relationships between established firms and startups. This study adopts a qualitative research approach to investigate the aims and challenges of both partners as well as to examine the impact of the startups' type of innovation on the overall relationship. The findings suggest that it is critical for corporates to consider the startups' type of innovation and therefore distinguish between software and hardware startups because these two types of startups pursue different goals when collaborating with an established firm.

2.1 Introduction

The increasing interplay of technologies makes it hard for firms to access the totality of necessary knowledge on their own (Pérez, Florin, & Whitelock, 2012). Therefore, to sustain their long-term innovativeness, firms are compelled to focus on external ideas and knowledge in addition to the further development of their internal capabilities and activities (Chesbrough, 2006). According to the relational view, this access to complementary resources is crucial for the overall success as it serves as a source for a competitive advantage and it allows for the combination of capabilities in a unique way (Dyer & Singh, 1998). Mainly the exchange between new ventures and established firms seems highly attractive because one partner can benefit from the other (Weiblen & Chesbrough, 2015). Nevertheless, startups are a heterogeneous phenomenon due to the fact that intangible software innovation possesses distinct properties such as a fast modification time in contrast to tangible hardware innovations (Criscuolo et al., 2012; Giardino, Bajwa, Wang, & Abrahamsson, 2015). As a result, the appealing complementarity between both parties also increases the complexity of the relationship and therefore makes the engagement highly challenging for both sides (Minshall et al., 2010; Prashantham & Yip, 2017). In this regard, startups generally face the risk of misappropriation by their larger partner who is commonly referred as “shark” in the literature (Diestre & Rajagopalan, 2012; Hallen, Katila, & Rosenberger, 2014; Katila, Rosenberger, & Eisenhardt, 2008) and corporates struggle to exploit the full capabilities of startups (Gassmann et al., 2010; Slowinski & Sagal, 2010; Zaremba et al., 2016). Hence, understanding the partners’ aims and challenges is vital for a prosperous relationship as well as supports to set up and structure the relationship well in advance (Hogenhuis et al., 2017; Minshall et al., 2008; Slowinski & Sagal, 2010). However, a one fits all approach does not exist for the collaboration between startups and corporates and firms are faced by a variety of strategic tradeoffs (Pisano & Verganti, 2009).

Prior research already started the investigation of the relationship from different perspectives and revealed first strategies for a valuable collaboration with startups (Minshall et al., 2008, 2008; Minshall et al., 2010; Oughton, Mortara, & Minshall, 2013; Pahnke et al., 2015; Slowinski & Sagal, 2010; Zaremba et al., 2017). Academia points attention to the phase before the partnership with startups occur as it allows for a smoother collaboration and preparation (Hogenhuis et al., 2017; Slowinski & Sagal, 2010). However, research about the aims and the challenges of the relationship is still underdeveloped despite the significance to thoroughly prepare a partnership with startups. Likewise, a research gap exists for considering the startups’ type of innovation (hardware vs. software) as an influencing factor of the aims and challenges

of the two partners. Using a qualitative research design involving ten corporate-startup partnerships, this study seeks to shed more light on this topic by providing the following contributions.

First, this research intends to enrich the discussion on how to manage the partnerships between corporates and startups (Hogehuis et al., 2017; Minshall et al., 2008; Minshall et al., 2010; Oughton et al., 2013; Slowinski & Sagal, 2010; Zaremba et al., 2017) by examining the aims and challenges of both partners independently. As a result, the study aims to contribute to the development of a clear and structured process for the engagement with startups as well as to provide crucial insights for the phase before an actual partnership occurs which was found as a critical aspect (Hogehuis et al., 2017; Slowinski & Sagal, 2010).

Moreover, this research seeks to investigate the impact of the startups' type of innovation (software vs. hardware) on the aims but also challenges that might stem from the different perspectives. Previous studies have already suggested that being a startup with an intangible innovation provides a more appealing surrounding for innovations due to the low upfront investments in contrast to startups with tangible innovations that face many financial and legal challenges en route to product commercialization (Criscuolo et al., 2012). So far, however, this important distinction has not been investigated in the context of corporate-startup partnerships though startups with a *software* background arguably have different aims within a partnership than startups with a *hardware* background. This results in distinct relational challenges for both parties. To shed light on this issue, we empirically study different dyads based on the startups' type of innovation (software or hardware) to identify differences in the startups' and corporates' aims and challenges.

Furthermore, the study follows the logic of the relational view and seeks to develop a model that illustrates the different influencing factors and controls for steering mechanisms in the partnership dyad. As a result, this research asks the following research questions: *What are the aims and challenges of startups and corporates in a relationship and how does the startups type of innovation affect the collaboration?*

The subsequent study is structured as follows: Firstly, the conceptual background provides a shared understanding of software and hardware innovations, the relational view as well as it reviews the literature about the aims and challenges of the relationship between corporates and startups. A detailed description of the applied methodology, the analysis of the 20 semi-structured interviews as well as the presentation of the results follows the theoretical foundation and precedes the practical and scholarly discussion and limitations.

Moreover, a variety of cooperation models between corporates and startups exist in the market to access the novel ecosystem (Weiblen & Chesbrough, 2015). Nevertheless, this study focusses on non-equity partnerships in which the two partners have the intention to voluntarily develop a solution that is beneficial for both perspectives (Mocker, Bielli, & Haley, 2015). Consequently, the collaboration of startups via a corporate accelerator, corporate incubator and corporate venture capital investments is no subject of this study. So, this work follows the definition of Ellram (1990) who defines a strategic partnership as “mutual ongoing relationship involving a commitment over an extended time period, and a sharing of information and the risks and rewards of the relationship”(p.8). Hence, the subsequent study utilizes the terms collaboration, relationship and partnership interchangeable and equity-based partnerships are not covered in this chapter.

2.2 Conceptual Background

2.2.1 Software vs. Hardware Innovations

The development and implementation of new hardware products significantly differ from the development of software solutions as the software life-cycle is comparably short (Mohr et al., 2016). As an example of intangible innovations, established firms and startups are developing services such as for maintenance, accounting, IT and software solutions (Den Hertog, 2000). According to Paternoster, Giardino, Unterkalmsteiner, Gorschek, & Abrahamsson, (2014), software startups such as Facebook, Spotify or LinkedIn are evolving “to create high-tech and innovative products, and grow by aggressively expanding their business in highly scalable markets” (p.1). Hence, software and service innovations possess unique properties; they are dependent on customer interaction and driven by a short time frame to enter the market (Berg, Birkeland, Nguyen-Duc, Pappas, & Jaccheri, 2018; Giardino et al., 2015). As a result, the identification of lead-users is of crucial importance for technology-based services (Matthing, Kristensson, Gustafsson, & Parasuraman, 2006). The intangible innovations are hard to control, not standardized and more easily developed by young firms due to the structural inertia of established firms (Criscuolo et al., 2012). However, these innovations are faced by a fast-changing and unpredictable environment, as the intangible innovations can be changed or modified quickly (Criscuolo et al., 2012; Giardino et al., 2015). Consequently, this work utilizes the term *software* startup in the following research to cover innovations stemming from services as well as software solutions.

In contrast, the development of a tangible manufactured good is seen as more capital-intensive and less dependent on the interaction with customers (Criscuolo et al., 2012). The modification of a physical innovation is more complex than that of an intangible one, as technical changes to tangible products cannot be made at short notice (Johnes & Storey, 1998). According to DiResta et al. (2015), these capital-intensive *hardware startups* face issues with prototyping, manufacturing and funding. As an example, the authors categorize hardware startups as wearables, connected devices, robotics, and designed products. Consequently, the development of physical products or manufacturing goods such as additive manufacturing technology or drones is termed *hardware startups* in this study and in the literature (DiResta et al., 2015; Tech). Therefore, the different properties of hardware and software startups are expected to affect the partnership between the new ventures and established firms in a variety of aspects.

2.2.2 The Resource Based View and Relational View

The resource based view (RBV) as the foundation of the relational view considers the firm as a bundle of resources and assumes that the distribution of these resources across firms is heterogeneous (Barney, 1991). Barney (1995) defines a firm's resources and capabilities as "all the financial, physical, human, and organizational assets used by a firm to develop, manufacture, and deliver products or services to its customers" (p. 50). The theory further assumes that the likelihood of obtaining a competitive advantage depends on the extent to which a firm's internal resources are valuable, rare, imitable and non-substitutable (Barney, 1991, 1995). Consequently, the aims and strategies that a firm implements to exploit opportunities, in comparison to those of its competitors, highly affect its achievement of a competitive advantage (Barney, 1991). As an extension of the RBV, the relational view (RV) focuses on the firm's relationships, networks, processes and routines (Dyer & Singh, 1998). The combination of resources is a mean for firms to generate relational value that is determined by partner-specific investments, effective governance, knowledge-sharing routines and through the combination of complementary resources (Dyer & Singh, 1998). In the following, the different dimensions of the RV are described in detail.

2.2.2.1 Relationship-specific investments: Relational Support

According to the relational view, a firm must bring something unique to the relationship for the achievement of a competitive advantage (Dyer & Singh, 1998). Hence, strategic assets of a firm are defined as "difficult to trade and imitate, scarce, appropriable and specialized resources and capabilities" (Amit & Schoemaker, 1993, p.36). Williamson (1985) outlined three

categories of asset specificity: the site specificity, the physical assets and the human assets. Consequently, the theory states that a high level of human asset specificity can generate new knowledge as long-lasting partnerships lead to the development capabilities in working together. Likewise, the co-location of the teams serves as an example for site specificity as it reduces the cost of coordinating activities, and facilitates knowledge flows and the creation of social ties (Dyer, 1996; Williamson, 1979). So, the critical resources reside outside the firm and stem from the dedication of the alliance partners' assets to the partnership (Lavie, 2006). Therefore, an alliance between established firms and new ventures potentially lays the foundation for relationship-specific investments and the support of the exchange partners.

2.2.2.2 Interfirm Knowledge-Sharing Routines: Communication

The relational view states that superior interfirm knowledge-sharing routines are a source of relational rents as partners are critical sources of new information and ideas (Dyer & Singh, 1998). In this regard, knowledge is one of the vital resources of a firm and strategic alliances set the ground for mutual knowledge-sharing mechanisms and trading of the strategic assets (Grant, 1996). As an important distinction, Kogut & Zander (1992) differentiate knowledge from information and know-how. Information consists of facts and symbols; know-how is complex, hard to codify and therefore more likely to result in a competitive advantage due to the difficulties of transferring and imitation (Dyer & Singh, 1998; Kogut & Zander, 1992).

For example, Dyer (1996) states that Toyota created a competitive advantage through open information sharing and the dedication of consultants to its suppliers for months at a time. Consequently, the communication of partners is crucial, especially for the creation of a climate for innovations (Enkel, Bell, & Hogenkamp, 2012). Lavie (2006) notes the benefits of unintended spillover effects and leakages of initially non-shared resources once a firm enters a relationship with a partner. Subsequently, the close interaction between established firms and startups potentially produces interfirm social networks that might increase the absorptive capacity of a firm (Cohen & Levinthal, 1990). Therefore, the way in which established firms and new ventures develop routines for communication determines the outcome of the overall partnership.

2.2.2.3 Effective Governances: Relational Governance

The relational view stresses governance as a key factor in the creation of relational rents. Governance determines the partner's willingness to engage in value-enhancing initiatives (Dyer & Singh, 1998). Therefore, appropriate governance arrangements can unlock a competitive ad-

vantage (Dyer, 1997; Lavie, 2006). Researchers have found that formal contracts are less important than trust and reciprocity to benefit from the relationship with new ventures (Dyer, 1997; Larson, 1992). Consequently, the creation of a trustful environment could increase the partners' knowledge-sharing routines, the amount of specific investments but it also lowers the transaction cost (Dyer, 1997). Still, governance mechanisms have the power to cut across the other sources of relational rents due to its great impact (Dyer & Singh, 1998). In contrast, formal contracts can serve as a safeguard mechanism to engage in a long-term partnership and also decreases the transaction cost (Williamson, 1985). Therefore, applying appropriate governance mechanisms in the engagement with new ventures is crucial for the well-being of the partnership (Zaremba et al., 2017).

2.2.2.4 Complementary Resources

The relational view describes that the complementarity of the partners' resources provides a source of relational rents. So, partners create synergies by combining their resources to rare, more difficult to imitate as well as more valuable resources that are not freely available on the market (Barney, 1991; Dyer & Singh, 1998). The complementarity of the partners' resources is therefore vital for the creation of relational rents, as the combination of resources exceeds the cost of exploiting the firm's resource (Amit & Schoemaker, 1993; Lavie, 2006). Nevertheless, the relational view emphasizes the sourcing of complementary partners and access to the necessary information at short notice as a main challenge in the creation of relational rents (Dyer & Singh, 1998). Moreover, the organizational complementarity of the partners is stated as an enabler of access to the strategic resources of the partner (Dyer & Singh, 1998). Consequently, the engagement between new ventures and established firms can be seen as a prime example of complementarity, as one partner lacks something that the other partner possesses (Weiblen & Chesbrough, 2015).

2.2.3 The Corporate-Startup Relationship

The relationship between corporates and startups gets increased respect in recent years due to the complementarity of both partners as well as the need of startups to overcome their "liabilities of newness" (Stinchcombe, 1990). Consequently, firms are increasingly implementing a mindset of sharing and open innovations because the traditional business models are changing (Chesbrough, 2011; Chesbrough & Appleyard, 2007). As a result, a variety of collaboration models are created to reach out to the startup environment as well as to turn the innovation into business (Pisano & Verganti, 2009; Weiblen & Chesbrough, 2015). Nevertheless, managing

and setting up the relationship is a complex task and requires a structured and well-defined process (Giannopoulou, Ystroem, & Ollilia, 2011; Slowinski & Sagal, 2010). In this vein, literature commonly distinguishes the stage before the actual partnership and the stage during the collaboration (Hogenhuis et al., 2017; Slowinski & Sagal, 2010). Especially the phase before the actual partnership occurs offers the potential to prepare and develop solutions to the challenges that might appear during the relation well in advance and therefore reduces the impact on the partnership (Hogenhuis et al., 2017).

So, knowing the wants and needs of the partner is essential for the entire relationship between established firms and new ventures (Slowinski & Sagal, 2010).

2.2.3.1 Aims of Corporates and Startups in the Relationship

Startups but also established firms enter the relationship with the different-sized partner for a variety of reasons.

A startup tends to enter a relationship with an established firm to benefit from that firm's richer resource position (Minshall et al., 2010; Park & Steensma, 2012). In particular, the literature points out that new ventures seek financial resources amongst others in the relationship with established firms (Alvarez & Barney, 2001; Hogenhuis et al., 2017; Rothaermel, 2002). So, being acquired by a large partner is also an incentive for the engagement with a large organization (Prashantham & Birkinshaw, 2008). Hence, startups hope to scale their business via the relationship by entering new markets and by leveraging the established firm's infrastructure (Doz, 1988; Larson, 1992). Consequently, startups are searching for stability and ensuring their future survival by engaging with established firms (Street & Cameron, 2007).

Established firms enter the relationship with startups both to gain access to the innovative capabilities of the startup's and to solicit the new venture's talent (Alvarez & Barney, 2001). In this sense, established firms try to learn about the startup's agility, to discover new technology fields and to enter new and local markets (Hogenhuis et al., 2017; Prashantham & Yip, 2017). Also, firms see startups as a source of complementary resources and use the partnership to improve their public reputation (Prashantham & Birkinshaw, 2008). Consequently, new ventures support corporates to challenge their own myopia and rigidity that were developed over the past decades (Doz, 1988).

2.2.3.2 Challenges in the Relationship between Corporates and Startups

The partnership between new ventures and established firms is subject to a diverse set of challenges.

From a startup's perspective, the corporate's complexity is a main challenge in the entire partnership (Pahnke et al., 2015). Hence, making the initial contact (Hogenhuis et al., 2017; Minshall et al., 2010; Oughton et al., 2013), overcoming the lack of access and attention (Prashantham & Birkinshaw, 2008) and transferring the responsibilities across departments are issues that startups have to face in the collaboration (Minshall et al., 2008). In addition, the corporate's organizational structure, slow decision making, and the social distance across management levels affect the startup's well-being in the relationship (Doz, 1988; Oughton et al., 2013). Likewise, the importance of the partnership differs amongst both sides. A firm's relation to one startup is less likely to affect that firm's operations but it might determine the success or failure of the new venture's (Doz, 1988). In terms of communication, startups often struggle to understand the needs of the established firm and to find a common way of working together (Gassmann et al., 2010; Hogenhuis et al., 2017; Oughton et al., 2013; Slowinski & Sagal, 2010; Zaremba et al., 2017). Moreover, managing the intellectual property rights during a partnership results in an additional challenge (Hogenhuis et al., 2017; Luoma, Paasi, & Valkokari, 2010). Subsequently, startups find themselves in an uncertain environment in which it is difficult to predict and react to the actions of a large partner (Doz, 1988).

From the established firm's point of view, it seems clear that the large partner is the dominant part in the relationship and that they do not put as much at risk as the smaller one (Blomqvist, Hurmelinna, & Seppänen, 2005; Gassmann et al., 2010). However, established firms also act in uncertainty as working with startups is highly speculative because they struggle to assess the true value of the startup due to the startup's missing proven track of records (Baum & Silverman, 2004). Therefore, corporates might dedicate time and effort to the partnership but the likelihood of short-term results is low and the overall outcome unsecured (Prashantham & Birkinshaw, 2008). Further obstacles for established firms are the lack of experience in working together with startups (Blomqvist et al., 2005) but also the chance that startups inappropriately use the corporate's brand for their own good (Minshall et al., 2010). Consequently, established firms are not as strong and prepared as they seem, because they put both their resources and image at stake by entering startup relationships (Hallen et al., 2014).

2.3 Method

2.3.1 Study Design

The study takes a qualitative research approach as it allows for exploring new research areas within a real-life context while combining theories with an emerging phenomenon (Barratt,

Choi, & Li, 2011; Yin, 2014). Likewise, the qualitative nature of interviews enables for the investigation of facts but also to experience the behavior of the respondents at first hand (Rowley, 2012). The academic research about the corporate–startup dyad is still in its beginnings and the application of case studies and interviews has already proven its value for the investigation of this asymmetric relationship (Gassmann et al., 2010; Hogenhuis et al., 2017; Zaremba et al., 2017). Consequently, this study, like previous research, adopts a multiple case study design and is based on interviews with key informants as proposed by Eisenhardt (1989). Despite the increasing tendency of automotive companies to reach out to the startup ecosystem, the majority of the OEM projects were based on equity involvement of the corporates and therefore were not appropriate for our examination. As a result, a qualitative approach is adopted as it allows us to discover many details and experiences even with a small sample size (Rowley, 2012). Furthermore, the questions of the interviews were steered to get a thorough understanding of the aims and challenges of the partnership.

With regard to the aims, the respondents were asked about the intentions of entering the relationship as well as their overall objectives of reaching out to the different sized partner.

In contrast, the questions regarding the challenges followed the logic of the relational view as the theory describes vital dimensions for beneficial relationships. As a result, the interview questions were grouped according to the categories of the applied relational governance (1), the knowledge-sharing routines (2), and the partnership-specific investments (3). Consequently, these categories were directed to provide valuable insights about the challenges of the partnership. A detailed overview of the interview questions can be found in Appendix 1.

2.3.2 Data Sample

The matched-pair dyadic data collection focused on existing partnerships between corporates and startups in the automotive industry. For two reasons, we used a purposeful sampling approach in the European automotive context. First, the automotive industry is undergoing a massive technological transformation – both hardware-wise (e.g., electronic powertrain) and software-wise (e.g., autonomous driving) – to which a relatively large population of startups contributes with innovative ideas. Second, this industry sector is characterized by focal buyer-supplier relationships where the power-dependence differential is clearly in favor of the automotive OEM (corporate). Accordingly, we searched for automotive OEM–startup partnerships involving various hardware/software technologies and then contacted the individual firms. We were interested in non-equity partnerships to ensure independent legal entities. In total, this process yielded ten corporate-startup dyads that we could identify as polar cases within the

OEM's under investigation. As proposed by Eisenhardt (1989), no cases were added after theoretical saturation was reached. In this regard, the authors had access to the experts of six OEM's that are engaging with startups. In total, our data consists of interviews with ten knowledgeable corporate employees from six European automotive manufacturers and with ten counterparts on the startup-side of the relationship. The duration of the interviews ranged from 40 to 60 minutes. Each of the 20 respondents was interviewed separately to arrive a thorough understanding of the dyad. All interviewees were requested to focus on the specific corporate-startup relationship and were asked questions about specific aims and challenges. The dyads were based on the startup's type of innovation. Five dyads focused on software innovations (intangible in nature and with the primary goal to develop a software or algorithm with the corporate) and five dyads focused on hardware innovations (tangible product innovations). In line with the startup's stated cut-off age (Song et al., 2008; Song, Song, & Di Benedetto, 2011) as well as previous research (Zaremba et al., 2017), startups older than six years, were excluded in our sample. As proposed by Eisenhardt (1989), website information and available publications were used for triangulation purposes in order to access background information about the startups. All details of the established firms and startups can be found in Table 1.

Table 1: Sample Composition of Study 1

Number of Participant	Dyad	Industry	Type of Startup Innovation	Location	Interview Partner
Startup 1 Corporate 1	1	Blockchain Automotive	Software (Vehicle Access)	Germany Germany	CEO Product Manager
Startup 2 Corporate 2	2	Logistics Automotive	Software (Tracking goods)	Germany Germany	CEO Startup Scout
Startup 3 Corporate 3	3	Artificial Intelligence Automotive	Software (Proof-reading)	Canada Germany	Sales Manager Product Manager
Startup 4 Corporate 4	4	Production Logistics/Automotive	Hardware (Physical device)	Germany Germany	CEO Managing Director
Startup 5 Corporate 5	5	Production Logistics/Automotive	Hardware (Physical sensor)	Germany Cz. Rep.	CEO Managing Director
Startup 6 Corporate 6	6	Production Logistics/Automotive	Software (Maintenance)	Germany Germany	CEO Managing Director
Startup 7 Corporate 7	7	Urban Mobility Automotive	Hardware (Physical vehicle)	Germany Germany	CEO Managing Director
Startup 8 Corporate 8	8	Traffic Planning Automotive	Hardware (Physical sensor)	Germany Germany	CEO Innovation Manager
Startup 9 Corporate 9	9	Mobility Services Automotive	Software (Urban Mobility)	Germany Germany	CEO Managing Director
Startup 10 Corporate 10	10	Big Data Automotive	Software (Big Data Analytics)	Germany Germany	CEO Product Manager

2.3.3 Data Analysis

As stated by Miles & Huberman (1984), the analysis of the data was an ongoing iterative process. Data reduction techniques were used to make sense of the initial interviews that had been recorded and transcribed. The analysis started with a thorough within-case examination followed by the search for patterns across cases, as proposed by Eisenhardt (1989). The analysis was conducted in four steps. First, the interviews of each corporate and each startup were analyzed separately to identify the aims and challenges of the individual firms. As a second step of the analysis, the interviews of a corporate and a startup were paired according to their actual partnerships (Miles & Huberman, 1984). So, each dyad, but also each individual firm were the subject of examination. As a next step, the data were analyzed across cases and the dimensions and categories of each dyad supported the identification of differences and patterns across the sample (Eisenhardt, 1989). Finally, the dyads were distinguished based on the startup's type of innovation. Consequently, five software corporate-startup dyads and five hardware corporate-startup dyads were analyzed and compared. The validity of the research was increased by consulting additional researchers to verify the codes and classifications and to ask for further consultation (Rowley, 2012). The findings of the interviews were sorted into the two categories of the aims and challenges of the partnership. So, the underlying analysis is structured as follows: as a first step, the aims of software and hardware startups but also from a corporate perspective are described in detail as they affect the entire partnership. As a second step, the challenges based on the dimensions of the relational view are illustrated. Subsequently, the analysis of the challenges distinguishes between relationship-specific investments (in the following analysis: relational support), knowledge-sharing routines (in the following analysis: communication) and governance mechanisms (in the following analysis: relational governance). As the last step, the findings are summarized in a model.

2.4 Analysis and Results

2.4.1 Aims of Startups and Corporates in a Relationship

The relational view emphasizes the existence and combination of the partners' complementary resources as vital for the generation of relational rents (Dyer & Singh, 1998). Hence, the interviews showed that software startups, like startups generally, wished to access a variety of complementary resources that they do not have. However, as the majority in our sample confirmed, they wanted to access the corporate's ecosystem and exchange with software experts but they were not searching for financial support, minor investments, or a loss of exclusivity. Startup

(3) pointed out, *“Our product already works in a variety of application fields and our innovation fits almost all industries... an exclusive partnership would, therefore, take away 90% of our market.”* The data also indicated that software startups sought a platform solution and more than one big partner as they wanted to improve their own market position and to onboard further corporates. Startup (1) claimed, *“We want to develop a solution that is applicable across all vehicles around the world and we also want to implement further OEM’s of our platform.”* Therefore, identifying new use cases and testing the scalability of their innovation were two aims of software startups in their engagement with corporates. Startup (6) stressed one unique feature of software startups, which also affected their aims: *“Scaling our product after the pilot would be simple and cheap as we do not require high investments.”* Hence, the software startups in our sample wanted to keep its independence, apply their solution to further industries and increase their market visibility with different partnerships. In contrast, corporates in our sample were working with software startups in order to keep up speed as well as to benefit from the flexibility as Corporate (3) explained, *“Our projects with established external partners commonly have a long lead-time and by engaging with startups, the project starts right away and generates speed for us.”*

Hardware startups also wanted to access complementary resources but the interviews showed that the needs are considerably different from those of software startups. Startup (4) explained, *“Leaving our test kitchen and testing our product under real conditions is a big step in our development.”* Hence, hardware startups wanted a physical test space, exchange with experienced engineers and to learn more about safety requirements in production facilities. Startup (7) explained, *“We are aiming to start the series-production of our innovation and therefore we need to know how all the surrounding facts as well as how the transition from prototype to series-production works.”* Furthermore, the hardware startups in the sample were highly attracted by financial support. As Startup (4) explained, *“Money was definitely a trigger for us.”* The data indicated that the hardware startups were willing to enter, and to search for exclusive partnerships because they needed large investments to scale their business. Consequently, the findings showed that hardware startups are rather aiming for strategic long-term and money intensive partnerships. From a corporate perspective, the engagement with hardware startups potentially allowed to increase their efficiency as the innovations might reduce the cost in the future, according to Corporate (5), who stated that *“the idea is highly attractive to us and if we are able to implement it in series-production, we are able to save a lot of money and minimize redundant working processes.”* Consequently, software and hardware startups have specific needs and distinct aims in their engagement with corporates. In other words, both

startups and corporates strive to benefit from their partner's complementary resources (Dyer & Singh, 1998).

2.4.2 Challenges of Startups and Corporates in a Relationship

In accordance with the relational view, the analysis of the challenges draws attention to the relational aspects of the partnership in terms of relational support, communication and relational governances.

2.4.2.1 Relational Support

Most of the startups in the sample experienced problems because of a lack of relational support. Startup (3) mentioned that the identification of the right contact person with sufficient decision-making authority was as a main obstacle: "*The higher the level of the contact person, the more chances the project has to survive as it increases the visibility and decreases the time to get things approved.*" Consequently, each firm had a different organizational structure despite the importance of gaining access to the strategic resources of the partner in order to strengthen its competitive position (Amit & Schoemaker, 1993; Dyer & Singh, 1998).

The software startups in our sample struggled with access to software interfaces and experts from the IT department. According to Startup (8), "*The integration would have taken two hours maximum but we had difficulties to reach out to the software experts in time or to get the details to do it on our own.*" Consequently, the difficulties in providing support slowed the speed of the dyad, which is especially harmful to agile software startups and precludes quick wins as a corporate. From a corporate perspective, the interviews showed that the complexity and novelty of software innovations led to problems in identifying use cases and pilot projects within the corporate departments or brands as outlined by Corporate (1): "*We had to devote a lot of effort and time to build trust and to convince one department that the innovation might be beneficial for them in the future.*" Thus, providing and receiving appropriate support is highly demanding for corporates and startups and affects the entire partnership.

The hardware startups stressed that they were constantly searching for funding because their long-term growth depends on their own liquidity. The tangibility of the product innovation called for support, as they needed timely financial backing as well as physical testing space. As explained by Startup (4), "*We already proved the value and robustness of our product and we could start scaling right away but we do need a high investment which is still waiting to be approved in a corporate board.*" Furthermore, the provision of testing space and the exchange with engineers took too long and resulted in high frustration, according to Startup (9): "*Testing*

our prototype was committed but the time until initiation took quite long and hindered us in our development.” However, the interviews indicated that corporates also face specific problems with supporting hardware startups. Corporate (7) noted how hard it was to provide the hardware startup with appropriate support because of internal problems and the lack of an investment vehicle: *“We identified the right startup and we are highly interested in making a minor investment but we are still working on a corporate venture capital vehicle that allows us to take it.”* Hence, the interviews determined the importance of relational support for both sides.

2.4.2.2 Communication

The relational view highlights that knowledge-sharing routines and ongoing interaction can unlock new ideas and information within a partnership (Dyer & Singh, 1998). However, interviewees from software and hardware startups alike noted that lack of communication created obstacles but with distinct expressions.

Software startups cited false expectations of their availability as a big problem and the lack of corporate’s understanding that startups have more than one big partner. As Startup (2) describes, *“The corporate wanted us to devote 100% of our time on their project as well as Skype calls on a daily basis but we are working with a lot of big players and we cannot spend more than one day per week on the project.”* From a corporate perspective, one interviewee struggled with the infrequency of physical meetings because the software startups preferred to save time and money by working remotely. Corporate (7) stated: *“We would like to have more face-to-face interaction with the startups but the geographic distance and the startup’s projects with other big partners does not allow for it.”* Moreover, as highlighted by Corporate (6), keeping up the speed for communicating with software startups was difficult to harmonize with the corporate’s decision-making processes: *“The startup can change its algorithms within minutes and that really challenges our corporate processes as the startups’ do need fast responses to deliver quick results.”*

Hardware startups had to explain and justify how to work as a startup with a tangible innovation. Product development is time-consuming, especially for a startup with a limited workforce and resources. As Startup (8) explained, *“The corporate has to learn that we are not able to deliver new insights every week with our innovation.”* One interviewee called attention to the post-pilot phase when they had trouble fulfilling the huge product demands of the corporate to enter series-production from scratch due to the lack of initial communication. Startup (4) explained, *“One week after we finished our pilot project, the corporate wanted to order 150*

units which were clearly not feasible for us but we did not talk about it at the beginning.” Therefore, the failure to communicate the expectations of the partnership undermined its success. From a corporate perspective, obstacles arose with hardware startups in the corporate ecosystem. Particularly a certain amount of reluctance of traditional employees towards startups was mentioned by Corporate (6): *“Our experienced employees know their technologies by heart and they are able to question the new innovations of startups from all angles.”* These reactions eroded the quality of communication between the corporate and the startup and generated frustration on both sides of the dyad. The data indicated the necessity of physical attendance of hardware startups because they had to test their tangible innovation under industry-specific conditions in contrast to software startups that were able to test their innovation with a cloud-based solution.

2.4.2.3 Relational Governance

According to the relational view, effective governance arrangements are an essential factor of the relationship, as it determines the partners’ willingness to share tacit know-how and to engage in relationship-specific investments (Dyer & Singh, 1998). In this vein, the interviews showed that both startups and corporates struggled with the relational governance arrangements pertaining to the traditionally cost-driven procurement process and the negotiation of the contract itself. As explained by Startup (3), *“The procurement process was often cost-driven, slow and independent on the price that we offered, they asked us for a discount.”*

Software startup (10) discussed the poor initial clarification of how to access the data and what kind of data they were allowed to use as highly detrimental to the success of the partnership: *“The access and combination of our algorithm with corporate data are essential for the success of the relationship.”* Especially software startups can make adjustments at short notice once they have access to data, which reinforces the need for fast responses. Furthermore, the software startups struggled with too many corporate-specific adaptations to their software innovation. For example, Startup (3) stressed that *“at a certain time you have to make clear that you cannot change your entire business model for one corporate but it might lead to disappointment on the corporate side.”* From a corporate perspective, problems that occur particularly with software startups originated from the corporate’s difficulties to evaluate the real value of the venture as the innovation is not tangible and often far beyond the corporate’s core competencies. As explained by Corporate (8), *“For us, it is really hard to identify the good startups, especially in Big Data or Artificial Intelligence areas as the solutions are hard to*

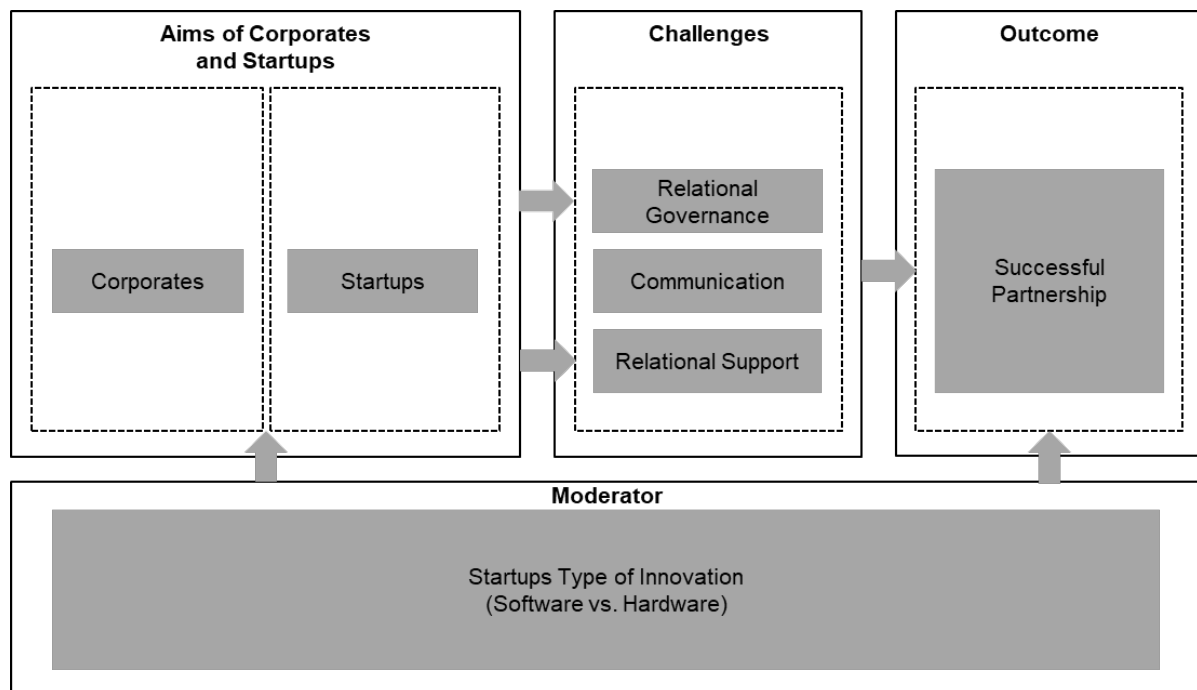
grasp for us and we are running the risk of being blinded by fancy presentations.” Consequently, corporates struggled with the unexpected power balance of the relationship and developing appropriate governance mechanisms was a huge challenge. As Corporate (3) explained, *“The startups know exactly what the strengths and the benefits of their business model are; this makes negotiations extremely demanding for us.”*

The hardware startups called attention to legal issues as the corporates traditionally expected them to assume full liability for production downtime cost that was caused by their product innovation. Startup (4) stated, *“Initially, the corporate asked us to sign the coverage of potential production downtimes caused by our innovation at the beginning of the negotiation.”* However, startups are not able to ensure 100% quality from the very beginning and signing the contract puts the life of the startup at risk. From a corporate perspective, one interviewee explained that problems with hardware startups arose in the transition from prototype to series-production. The hardware startups required long lead-time until the scale-up and often need additional support from more than one partner, which makes contracting a challenge. As Corporate (4) explained, *“The startup has a great product but they are far away from series-production readiness and they need to team up with an established supplier in order to make their product work.”*

2.4.3 Model: Steering Mechanisms of the Dyad

Based on the analysis of the corporate-startup dyad, this work synthesizes the findings in Figure 2 and points to the steering mechanisms of a successful relationship between those asymmetric partners. The sample outlined that the aims of the corporates and startups lay the foundation of the entire partnership and also affect the challenges that occur within the dyad. So, differences in the aims exist for corporates and startups which results in diverse challenges for the partners and therefore affects the outcome of the collaboration. Moreover, the interviews pointed to three particular sources of challenges in the relationship between startups and corporates. In line with the relational view, the applied relational governances, the communication and the relational support influence the outcome of the relationship. In addition, the study revealed that the startup’s type of innovation (software vs. hardware) does matter in the relationship with corporates. The startup’s background affected the aims of the partners, the challenges, and the outcome of the relationship. Consequently, corporates require a tailored relational approach to meet the different needs of the startups.

Figure 2: Steering Mechanisms of a Corporate - Startup Relationship



2.5 Discussion and Implications

The qualitative investigation of the aims and challenges of the engagement between corporates and startups has generated valuable insights for practitioners and academia alike. As a result, this research adds to the discussion on how to steer the relationship between corporates and startups as well as outlines the importance of the startups type of innovation as an influencing element of the relationship.

2.5.1 Scholarly Implications

The qualitative study contributes to the discussion of managing the relationship between corporates and startups by examining the aims and challenges from both perspectives and it adds a crucial detail that affects the entire partnership with new ventures (Alvarez & Barney, 2001; Gassmann et al., 2010; Hogenhuis et al., 2017; Minshall et al., 2010; Prashantham & Birkinshaw, 2008; Slowinski & Sagal, 2010; Zaremba et al., 2017). As a result, our work has four major contributions:

Firstly, the findings add a valuable dimension to the relationship between corporates and startups (Alvarez & Barney, 2001; Gassmann et al., 2010; Hogenhuis et al., 2017; Minshall et al., 2010; Prashantham & Birkinshaw, 2008; Slowinski & Sagal, 2010; Zaremba et al., 2017). Consequently, our research points to the importance of distinguishing the partnerships between corporates and startups based on the startup's type of innovation (software vs. hardware). We

found differences in the partners' aims and challenges depended on the innovative background of the startup. So far, startups are considered as a single construct when it comes to the relational aspects (Minshall et al., 2010; Weiblen & Chesbrough, 2015; Zaremba et al., 2017). Therefore, our findings reveal the value of implementing the startups type of innovation and it allows to better set up and structure a potential relationship before they occur which was outlined as one of the most important aspects of working with startups (Hogenhuis et al., 2017; Slowinski & Sagal, 2010).

Secondly, this research enriches the literature about the aims of corporates and startups in a relationship by demonstrating a more nuanced perspective based on the startups' type of innovation. The study revealed the absence of the software startup's needs for financial support despite the general understanding that startups are in search of funding (Alvarez & Barney, 2001; Hogenhuis et al., 2017; Rothaermel, 2002). In contrast, software startups in our sample aimed to onboard corporates to their own platform, test the scalability of their business while maintaining their long-term independence. At the same time, hardware startups acted in line with the literature as they were willing to take minor corporate investments in return for company shares. Interestingly, we found that established firms do not distinguish their aims in a relationship with startups based on the innovative background so far. Subsequently, our research adds vital details that need to be implemented to develop a clear and structured process in the collaboration with startups (Oughton et al., 2013; Slowinski & Sagal, 2010).

Thirdly, the study adds to what is known about the challenges of the engagement between corporates and startups (Gassmann et al., 2010; Hogenhuis et al., 2017; Minshall et al., 2008; Minshall et al., 2010; Oughton et al., 2013; Zaremba et al., 2017). In line with the relational view, we portray the relational governances, the relational support and the communication as the primary sources of the partnership challenges that are also affected by the startup's type of innovation. From a corporate perspective, the study found that established firms have difficulties with assessing the true value of software startups due to the complexity and novelty of their solutions. In contrast to the common understanding of corporates as "sharks" and the risk of misappropriation by the large partner (Diestre & Rajagopalan, 2012; Hallen et al., 2014; Katila et al., 2008; Pahnke et al., 2015), we add an opposite effect to the literature for software startups. In this situation, software startups were found to have high negotiation power due to the necessity of corporates to access particular innovation as well as the problems to evaluate the product of the startup in detail. However, the findings show high negotiation power for corporates in the relation with hardware startups but difficulties in the transition from prototyping to series production. Likewise, the study supports the significance of communicational

factors to create a climate for innovation (Enkel et al., 2012). From a startup perspective, the findings reveal communicational issues of software startups and point to challenges regarding intellectual property rights from a hardware startup's point of view which is in line with previous findings (Giannopoulou et al., 2011; Hogenhuis et al., 2017; Luoma et al., 2010; Minshall et al., 2008; Minshall et al., 2010; Oughton et al., 2013).

Fourthly, the research developed a framework that synthesizes the findings and models the steering mechanisms of a partnership between startups and corporates. The framework illustrates the impact of the startups' type of innovation on the aims and the challenges and therefore on the overall well-being of the partnership.

In sum, our findings draw an even more multifaceted picture of the relationship between corporates and startups due to the variations of the aims and challenges that are stemming from the startup's type of innovation. Likewise, the findings challenge the predominant view of corporates as the strong partner in the relation with software startups due to the high negotiation power, the low financial needs as well as the applicability of a software solution across industries. Consequently, the underlying study answers the outlined research question and supports the call for new venture partnering capabilities (Zaremba et al., 2017). We further draw attention to the absence of a one-size-fits-all approach and the necessity of tailored collaboration.

2.5.2 Managerial Implications

This work also has managerial implications for startups and corporates.

First, startups should search for corporate partners whose core competencies are different from their innovation to reduce the risk of misappropriation and to maintain independence. Startups do have advantages over corporates in some facets as corporates are facing internal inertia and external pressure to be innovative. Hardware startups beneficially solve an existing problem of the corporate as this need makes it easier to convince the corporate employees as well as to get the necessary funding approved. In contrast, software startups might leverage the biggest potential with their innovation by searching for different use cases across industries as it enhances their market position as well as their negotiation power with their partners.

Likewise, the findings show that corporates still have a big impact on the relationship, as the internal procedures to the startup engagement are a source of many challenges. An appropriate amount of management attention, as well as the nomination of champions to take care of the startup's problems, might be ways for the corporate to minimize some of those challenges. Corporates need a tailored approach to startups as each has its own aims and challenges. The engagement with hardware startups require corporates to have an investment vehicle but

also a physical test space. In contrast, software startups require access to data, interfaces and an understanding of corporates that the good ones possess a strong market position and engage with competitors across industries.

2.6 Limitations and Future Research Opportunities

Despite its limitations, this study offers great possibilities for future research. As a first limitation, the aims and challenges of this study do not cover the entire range of possible expressions. Therefore, we cannot claim to report a complete set of problems that might occur in the partnership. So, additional aims and challenges might exist within the relationship and therefore, the generalizability of the study is reduced. Nevertheless, this limitation calls for a replication of the study with a broader set of new ventures as well as established firms to get more insights into the relationship. Besides, the established firms in the sample possess a hardware background that limits the transferability of the findings to firms within the software context. As a result, future research might also distinguish the established firms based on their software and hardware background to discover the specific challenges of the additional dimension.

As a further limitation of the study, this work merely focuses on strategic partnerships between established firms and startups but neglects additional engagement forms such as a corporate accelerator or corporate venture capital investments. Hence, the influence of the startup's type of innovation on the well-being of the variety of cooperation models like incubators, accelerators, or corporate venture capitalists, as outlined by Weiblen and Chesbrough (2015) might yield some interesting insights.

Lastly, this research only focuses on five software startups and five hardware startups. Consequently, the findings need to be interpreted with caution but it also offers a great possibility to replicate our study in a broader context beyond the automotive industry as well as with a huge sample size.

CHAPTER 3 SEARCHING FOR SIGNALS: NOVEL WAYS OF SELECTING STARTUPS AS FUTURE SUPPLIERS

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ABSTRACT

The selection of new ventures as suppliers is difficult for established firms because the true value of startups is hard to assess. The problems stem from the startups' high failure rate and the inability of established firms to utilize their traditional, and over a long time developed, supplier selection criteria. However, investors are experts in the evaluation of startups and they are utilizing observable quality signals as one tool for their startup assessment. Therefore, this research combines the two seemingly unrelated perspectives of purchasing employees and investors and evaluates the impact on a successful relationship between established firms and startups. The study quantitatively examines the applicability of traditional supplier selection criteria in a successful collaboration with new ventures and proposes the utilization of observable quality signals as a complementary information source for the purchasing function. The findings depict a negative association between the traditional supplier selection criteria of cost, focus on quality, and delivery performance in a partnership with new ventures. Furthermore, the study outlines the value of the startups' industry experience, founding experience, strategic alliances as well as venture capital backing as quality indicators that increase the startups' legitimacy and the overall success rate of the partnership.

3.1 Introduction

The selection of appropriate suppliers is a core task of a purchasing department and it serves as an instrument to strengthen firms' competitive position (Govindan et al., 2013). Traditionally, the purchasing function utilizes established selection criteria such as the cost, the quality of the products or the delivery performance to select capable suppliers (Krause et al., 2001). However, and despite the growing interest of established firms to work closely with startups, the selection of new ventures as suppliers is a highly complex task for large organizations (Zaremba et al., 2016, 2017). Consequently, one of the most critical factors in the performance of the purchasing department lies in the definition of suitable supplier selection criteria (Arabshaybani et al., 2018; Mak & Nebebe, 2016). Especially startups require special attention and established firms are forced to discover novel techniques to identify and select the right startups, because the failure rate of new ventures is considerably high (Song et al., 2008). Subsequently, a successful relationship between established firms and new ventures is hard to achieve for a purchasing function and one source for novel selection approaches potentially stems from the seemingly unrelated lens of startup investors.

In the startup context, investors are considered experts in evaluating new businesses and they commonly trust observable signals to assess the startups' capabilities (Ko & McKelvie, 2018; Moedl, 2018). These signals are associated with the future success of new ventures and they stem from the alliance capital, the human capital, and the third party endorsement of the new venture (Baum & Silverman, 2004; Plummer et al., 2016). However, the exploitation of observable quality signals of startups is not applied to the selection of new ventures as suppliers. Therefore, this study aims to combine the traditional supplier selection criteria perspective with the startup selection criteria perspective of investors in order to evaluate the effect on the success of working with startups.

The current research intends to add to the discussion regarding the buyer-supplier relationship between established firms and new ventures and enriches the literature on the intersection between entrepreneurship and operations management (Kickul, Griffiths, Jayaram, & Wagner, 2011; La Rocca et al., 2017; Zaremba et al., 2016, 2017). Thus, it is aimed at answering the following research question: *How does the application of traditional selection criteria affect the success of a buyer-supplier relationship with new ventures and what are the observable quality signals with the highest value from an established firm perspective?*

Our quantitative and experimental investigation of 117 participants from an established firm perspective aims for two contributions.

First, one of the purposes of this research is to quantify the applicability of the established supplier selection criteria of *cost*, *delivery*, *quality* as well as the emerging factors of *innovation* and *flexibility* in the partnership with startups as new suppliers. Therefore, a regression analysis will be conducted as a starting point to increase the understanding of the relevance of traditional and emerging supplier selection criteria (Boer, Labro, & Morlacchi, 2001; Ellram, 1990; Govindan et al., 2013; Kannan, 2018; Koufteros, Vickery, & Dröge, 2012; Krause et al., 2001, 2001; Wu & Barnes, 2011).

Second, a discrete choice experiment (DCE) will be utilized to assess the value of the startups' observable quality signals in the context of supplier selection. Hence, the study intends to contribute to the ongoing discussion of observable quality attributes of startups (Baum & Silverman, 2004; Courtney, Dutta, & Li, 2017; Hsu, 2007; Ozmel, Reuer, & Gulati, 2013; Plummer et al., 2016).

The subsequent study is structured as follows: the conceptual background sheds light on the two different perspectives of investors and established firms in the selection of new suppliers, which is followed by a detailed explanation of the regression analysis as well as the DCE. After the presentation of the results, the discussion and implications for theory and practice conclude the underlying chapter.

3.2 Conceptual Background

3.2.1 The Selection of New Ventures from Two Perspectives

Amongst others, the selection of new ventures can be viewed from *two perspectives*, the traditional purchasing perspective of established buying firms and the perspective of an external investor. Nonetheless, both standpoints follow distinct rationales and therefore apply different criteria.

First, traditional buying firms commonly focus on the overall transactional value and the reduction of the inherent risk in their supplier selection activities (Choy, Lee, Lau, & Choy, 2005). In this regard, the purchasing function refers to the total cost of ownership and implements a variety of quantifiable measures in their selection of capable suppliers (Boer et al., 2001). As a result, the traditional buying firm utilizes bidders lists, considers a large number of suppliers to achieve the best prices, and focuses on a short-term perspective with arm's-lengths relationships (Spekman, 1988). However, established buying firms were found to apply the same criteria for the selection of new ventures as for selecting established firms despite their diverse characteristics (Zaremba et al., 2017).

Second, investors are considered experts in the evaluation of startups because of their great experience in assessing new ventures and their advanced due-diligence checklists (Baum & Silverman, 2004). Investors commonly focus on the startups' prospects by systematically financing high-growth startups to accelerate their further development for economic returns in the long-run (Colombo & Grilli, 2010; Fisher, Kuratko, Bloodgood, & Hornsby, 2017). However, the investment is also uncertain and investors have to incorporate a broad range of information in their funding decisions to manage the inherent risk (Ko & McKelvie, 2018; Plummer et al., 2016). Nevertheless, startups do not possess a comprehensive track record and therefore investors rely on signals that arise from the startups' actions, their human capital or third party endorsements to reduce the inherent information asymmetry (Courtney et al., 2017; Ko & McKelvie, 2018).

In sum, established buying firms commonly focus on quantitative and transactional criteria in their selection process, in contrast to independent investors, who rely on the startups' quality signals as well as their future prospects.

3.2.2 Perspective 1: Traditional Purchasing Selection

The selection of appropriate suppliers serves as a powerful tool to increase the business performance of the firm (Kannan & Tan, 2002; Mak & Nebebe, 2016). Especially for large organizations, supplier selection is a complex task because many individuals with different backgrounds are involved in the decision (Krause, Luzzini, & Lawson, 2018). The complexity is even further increased in the selection of innovative components because the required products or services often do not exist as "*off the shelf*" solutions (Hoetker, 2005). Consequently, the buying firm is always faced with tradeoffs, as the suppliers differ in their technological capabilities and the decision is surrounded by uncertainty (Hoetker, 2005; Riedl, Kaufmann, Zimmermann, & Perols, 2013). The literature on supplier selection has a long history, and Dickson (1966) was the first to investigate the importance of 23 supplier selection criteria. More recently, researchers have pointed out that *cost*, *delivery*, and *quality* are the criteria most commonly used by firms in the selection process (Ho et al., 2010; Krause et al., 2001). First, the cost criterion refers to the attributes of the material's price as well as the production and shipment expenses of the supplier under investigation (Ho et al., 2010). Second, delivery performance involves the supplier's ability to distribute the products in time and to meet the pre-defined project deadlines (Govindan et al., 2013; Kannan & Tan, 2002). Third, the quality criterion relates to the reliability and durability of the supplier's product as well as the ability to meet the quality requirements of the customer (Krause et al., 2001; Vyas & Woodside, 1984).

Hence, these cost-driven criteria are a result of the buying firms' competitive pressure and the potential to generate savings through the purchasing function (Koufteros et al., 2012). So, economic factors are regularly seen as the core of selecting potential suppliers (Awasthi et al., 2018).

However, startups are constantly challenged to manage their resource constraints and to overcome their "*liabilities of newness*" (Stinchcombe, 2000). They are faced with enormous time pressure to enter the market and to further develop their initial products by integrating customer feedback (Giardino et al., 2015; Paternoster et al., 2014). Startups do not possess an established quality control process and they are challenged to achieve project deadlines for the delivery of project results (Hogenhuis et al., 2017).

As a result, the startup's innovations are subject to ongoing quality improvements and the standard evaluation criteria of established firms were found to be hardly applicable in the new venture context (Zaremba et al., 2017). Therefore, a strong focus on *cost*, *quality* and *delivery* affects the growth of young ventures and increases the risk of failure. The startups are dependent on their first customers and the experience from their partnerships but a strict cost focus hinders further development. Consequently, we proposed the following three hypotheses:

Hypothesis 1a: *The traditional supplier selection criterion of cost is negatively associated with a successful engagement between established firms and startups.*

Hypothesis 1b: *The traditional supplier selection criterion of quality is negatively associated with a successful engagement between established firms and startups.*

Hypothesis 1c: *The traditional supplier selection criterion of delivery is negatively associated with a successful engagement between established firms and startups.*

In addition to the cost, quality and delivery criteria, *innovation* capabilities, as well as the *flexibility* of the supplier, emerged as critical selection criteria in the past (Chan & Chan, 2004; Choy et al., 2005; Krause et al., 2001). In this regard, buying firms evaluate the innovativeness of a supplier through the underlying technological capabilities and the flexibility relates to the willingness of the supplier to adapt the product in accordance with the buying firm's needs (Chan & Chan, 2004). Hence, close interaction with their suppliers is essential for buying firms because it allows for increasing their performance in terms of innovation (Choy et al., 2005).

The innovation criterion corresponds with the core strengths of startups because young ventures possess high innovative power and they have the potential to unlock innovations

beyond traditional business boundaries (Bernhard et al., 2019). Another criterion that has received increasing attention in recent years is *flexibility* (Krause et al., 2001). Young ventures benefit from high flexibility and reactivity, as they can adapt their product according to changing environmental circumstances. (Paternoster et al., 2014). Therefore, being flexible is an essential attribute of new ventures (Sutton, 2000).

Consequently, the buyer-supplier relationship with new ventures profits from established firms that focus on the innovation potential and flexibility of startups, and thus the following two hypotheses were proposed:

Hypothesis 2a: *The traditional supplier selection criterion of innovation is positively associated with a successful engagement between established firms and startups.*

Hypothesis 2b: *The traditional supplier selection criterion of flexibility is positively associated with a successful engagement between established firms and startups.*

3.2.3 Perspective 2: Modern Investor Selection

The origins of *signaling theory* stem back to the work of Mike Spence in 1974. He examined how the information asymmetry in the hiring process between the job applicant and the potential employer might be reduced through the behavior of the applicant. In this case, the education of the applicant is likely to serve as a valuable signal for the former employer of the candidate's quality, in the absence of further information. According to his work, the signal increases the information provided to the former employer and indicates that the applicant possesses the minimum requirements for the listed job position (Connelly, Certo, Ireland, & Reutzel, 2010). According to the theory, the observability and credibility of the signals are essential preconditions to providing value to the partners (Spence, 1974). Credibility might be achieved through high imitation cost or through the signal originating with a third party (Courtney et al., 2017; Fischer & Reuber, 2007).

Researchers have applied signaling theory in a wide range of contexts, including the evaluation of startups' quality (Connelly et al., 2010). In that context, the startup takes the role of the applicant and the established firm that of the employer. Previous research showed that signals which indicate the startup's quality stem from *third party endorsement* (Courtney et al., 2017; Plummer et al., 2016), as well as the *alliance capital*, *human capital* and *intellectual capital* of the new ventures (Baum & Silverman, 2004). As a consequence, established firms

still face the risk of adverse selection, but new ventures can signal their quality by costly to imitate initiatives and therefore reduce information asymmetry (Ozmel et al., 2013). So, third party endorsements such as *venture capital backing*, alliance capital in the form of *strategic alliances*, and the human capital of the startup, which is expressed through *industry experience* and *founding experience*, act as valuable signals of the new venture's quality (Baum & Silverman, 2004; Franke, Gruber, Harhoff, & Henkel, 2008; Hoenig & Henkel, 2015; Ko & McKelvie, 2018; Ozmel et al., 2013; Plummer et al., 2016). In the following, the different categories of the startup's quality signals are described in detail.

3.2.3.1 *Human Capital – Industry and Founding Experience*

Human capital constitutes an essential attribute of startups, as it positively affects the willingness of investors to support new ventures (Baum, Calabrese, & Silverman, 2000). In this regard, human capital refers to the different characteristics of individuals, including prior experience and knowledge, level of aspiration, as well as personal traits (Gruber, 2009). This study focuses on previous *industry experience* and previous *founding experience* as a part of startups' human capital because it serves as a valuable quality signal regarding young firms (Cassar, 2014; Colombo & Grilli, 2010; Ko & McKelvie, 2018).

First, *industry experience* describes the extent of individuals social ties to important stakeholders, but also the team's knowledgeability about customers' needs which was found as a key factor in success within a specific industry (Ko & McKelvie, 2018). The experience of the team is positively associated with the future success of the new venture, as it results in more realistic expectations to future growth (Cassar, 2014). In addition, greater industry experience broadens the scope and variety of identified opportunities in the process of creating new ventures (Gruber, MacMillan, & Thompson, 2013). As a result, having individuals with previous industry experience on the team allows for the mobilization of critical resources, as they can process and combine the available information more efficiently (Kotha & George, 2012). Therefore, industry experience within the team of the startup serves as a credible signal for investors (Colombo & Grilli, 2010; Franke et al., 2008). Hence, the industry experience of a startup is supposed to positively influence the relationship with established firms due to the increased stability of the startup and we hypothesized that:

Hypothesis 3a: *The startup's quality signal of industry experience is positively associated with a successful engagement between established firms and startups.*

Second, the history of the founder and in particular previous *founding experience* is a further component of startups' human capital that also signals their capabilities to investors (Ko & McKelvie, 2018). Previous founding experience is part of an individual's track record, and it increases the startups' valuation and the likelihood of getting funded by a venture capitalist (Hsu, 2007). These competencies allow entrepreneurs to recognize patterns and opportunities as well as to focus on the most critical assets needed to start a successful business (Baron & Ensley, 2006). Hence, previous startup experience indicates that a founder can turn an idea into a business and it strengthens the ability to select among potential investors (Falik, Lahti, & Keinonen, 2016). Therefore, entrepreneurial experience is beneficial for overcoming a variety of challenges to commercialization (Fisher et al., 2017). In this regard, experience in establishing a firm is valuable for the young venture and affects the overall performance of the startup (Gruber, MacMillan, & Thompson, 2008). Consequently, previous founding experience signals the entrepreneur's quality and the ability to manage and overcome uncertain situations (Courtney et al., 2017; Hsu, 2007; Ko & McKelvie, 2018). We proposed the following hypothesis regarding successful interaction with established firms:

Hypothesis 3b: *Startups' quality signal of previous founding experience is positively associated with a successful engagement between established firms and startups.*

3.2.3.2 Alliance Capital - Strategic Alliances

The alliance capital of a firm relates to the number of interfirm relations with a variety of potential business partners, as well as research institutions (Baum & Silverman, 2004). Hence, the alliance capital of new ventures is positively associated with their performance, as it unlocks their access to complementary resources (Baum et al., 2000; Baum & Silverman, 2004, 2004; Stuart, Hoang, & Hybels, 1999). Therefore, startups' *strategic alliances* serve as a valuable signal of the quality of young ventures because they support the startups' ability to overcome early challenges and provide insights regarding the prospects of the new venture (Baum & Silverman, 2004; Ozmel et al., 2013). A strategic alliance can be defined as "any voluntarily initiated cooperative agreement between firms that involves exchange, sharing, or co-development, and can include contributions by partners of capital, technology or firm-specific assets" (Pollock & Gulati, 2007, p.341). Therefore, alliances allow for the further development of startups because they profit from the partner's knowledge, resources, and established linkages with additional stakeholders (Baum et al., 2000; La Rocca et al., 2017). Subsequently, startups

can signal their value through the reputation of their alliance partners (Stuart et al., 1999). As a result, the existence of strategic alliances decreases the adverse selection risk of established firms (Ozmel et al., 2013). Consequently, the strategic alliances of startups act as a credible quality signal for potential partners, and we therefore hypothesized:

Hypothesis 4: *Startups' quality signal of strategic alliances is positively associated with a successful engagement between established firms and startups.*

3.2.3.3 Third Party Endorsement - Venture Capital Backing

In addition to the alliances and the human capital of startups, third party endorsement such as the presence of *venture capital backing* serves as an indicator of the credibility and quality of startups (Courtney et al., 2017; Hsu, 2004; Plummer et al., 2016; Pollock & Gulati, 2007; Stuart et al., 1999). Third party endorsement relates to signals stemming from any affiliation of a new venture and it was found to strengthen the startup's authenticity and it reduces the uncertainty of potential investors (Plummer et al., 2016). As a result, a venture capitalist (VC) serves as a valuable resource for startups to receive funding in order to prepare for current and future business activities (Hsu, 2007). VC's commonly have long experience in the selection of startups which is also reflected in an advanced due diligence process before the most promising targets are selected (Baum & Silverman, 2004). In this regard, the VCs decision whether to support a particular new venture and how much to invest serves as an indicator of the current but also the expected future value of the startup (Hsu, 2007). The backing of a VC is beneficial for startups, as prominent investors have access to multiple information sources (Reuer, Tong, & Wu, 2012). Hence, VC's possess a vast information network (Pollock & Gulati, 2007), experience in working with startups, and typically great startup supporting mechanisms (Hsu, 2004). Consequently, the selection risk for startups that are already backed by prominent venture capitalists decreases for potential partners (Ozmel et al., 2013). Therefore, the advanced due diligence system, the experience with startups and also the established network of VC's serves as a credible signal of the startup's prospects and survival rate. As a result, we proposed the following hypothesis:

Hypothesis 5: *Startups' quality signal of venture capital backing is positively associated with a successful engagement between established firms and startups.*

3.3 Method

The methodology of this research is twofold. It utilizes a regression analysis to determine the applicability of established supplier criteria and a discrete choice experiment for the examination of quality signals. Consequently, the methodology and the analysis part are divided into two studies (in the following termed investigation 1 and investigation 2 for clarity of presentation). The aforementioned two methods were chosen because they allow to differentiate between attributes that are observable and unobservable in the startups' business plan. The regression analysis in investigation 1 focuses on the traditional purchasing selection criteria, which are commonly unobservable in the business plan of a startup. So, the traditional variables of cost, delivery, quality as well as the criteria of flexibility and innovation cannot be judged appropriately by reading the business plan of a startup. In contrast, investigation 2's discrete choice experiment focuses on the modern investor's selection of startups as well as the observable quality signals that can be found in the business plan of many startups. Therefore, it requires a different type of measure.

3.3.1 Investigation 1: Regression Analysis - Traditional Purchasing Selection

The first investigation utilizes an OLS regression analysis to assess the impact of the traditional supplier selection criteria on successful engagement with startups. The traditional supplier criteria were deliberately *not* included in the DCE, as too many attributes easily overstress the participants (Fischer & Henkel, 2013); additionally, the integration of a variety of attributes leads to an inappropriate level of dimensionality of the model (Verma & Thompson, 1997). Consequently, participants were asked about the variables of cost, delivery, quality, innovation, and flexibility separately, and responded on a 7-point Likert scale. Participants completed the subsequent DCE in the same questionnaire.

3.3.1.1 *Dependent Variable: Success*

This research operationalized *success* as the dependent variable and follows the definition of a successful collaboration provided by Kotlarsky & Oshri (2005). Therefore, a successful collaboration is "the process through which a specific outcome, such as a product or desired performance, is achieved through group effort" (p.4). The definition deliberately incorporates qualitative criteria as a way to consider a partnership a success, which is of crucial importance in an engagement with startups. Hence, the success of a partnership between an established firm and a startup in our study might also be achieved through qualitative factors. According to Kale and Sing (2007), these factors include the learning of some critical skills or capabilities

of the partner (1), the enhancement of the firm's competitive position (2), or the achievement of a strong and harmonious partnership (3). Slowinski & Sagal (2010) add that "the quick realization that a mutually acceptable relationship is not possible" can also be seen as a success (p. 43). Consequently, the respondents were asked to report their number of successful partnerships with startups, ranging from zero to more than five successful partnerships.

3.3.1.2 Independent Variables: Cost, Quality, Delivery, Innovation, Flexibility

The independent variables in the study – cost, quality, delivery, innovation, and flexibility – are the most commonly applied traditional selection criteria, and are based on the competitive priorities introduced by Krause et al. (2001). The respondents were asked to rate the importance of these criteria on a scale from 1 "not important at all" to 7 "highly important."

In line with Krause et al. (2001), the *cost* variable includes the unit price of the startup's innovation and the potential supplier development efforts to build up and maintain the relationship (Narasimhan, Talluri, & Mahapatra, 2006). Product *quality* relates to the maturity and competitiveness of the product itself, and *delivery* involves compliance with the agreed terms and conditions between the established firm and the new venture (Ho et al., 2010). Lastly, *flexibility* reflects the willingness of a startup to adapt its innovation to the established firm's needs and *innovation* delineates the innovative potential of the startup's product itself (Chan & Chan, 2004). These explanations of the variables were provided to the participants to ensure that all participants had the same understanding of the applied criteria.

3.3.2 Investigation 2: Discrete Choice Experiment - Modern Investor Selection

The second investigation utilizes a DCE to identify the imperative *quality signals* of established firms in selecting and collaborating with startups. A DCE allows for investigating, analyzing and predicting the behavior and decision making of individuals, and the approach was already utilized in a variety of application fields including marketing research, transportation or supply chain management (Elshiewy, Guhl, & Boztug, 2017; Louviere, Hensher, & Swait, 2000; Merath, Bode, & MacDonald, 2018; Rose & Bliemer, 2009; Verma & Thompson, 1997). The origins of the DCE stem back to the work of McFadden (1974), who investigated the travel behavior of individuals. This situation reflects a complex decision-making process with a high number of influencing factors. Moreover, previous researchers already found differences in the stated vs. revealed preferences of participants, which can be mitigated with an experimental design (Merath et al., 2018). Therefore, a DCE approach serves as a valuable tool to improve managers' decision making by increasing the effectiveness and implementation of its strategic

plans (Verma, Plaschka, & Louviere, 2002). Consequently, a DCE enables researchers to systematically estimate the utility function of an individual by presenting a predefined number of choice sets (Louviere & Timmermans, 1990). Each choice set consists of two or more choice alternatives that have different levels of the same predefined attributes (Verma & Thompson, 1997). As a result, the participants are faced with decisions involving trade-offs because they have to choose one of the outlined choice alternatives over the others based on the attribute expressions (Anderson, Coltman, Devinney, & Keating, 2010; Street, Burgess, & Louviere, 2005). The application of a DCE for evaluating different startups already proved its value for the investigation of a startup's likelihood of attracting venture capital financing (Franke et al., 2008; Hoenig & Henkel, 2015). Thus, the DCE is an applicable approach for examining the most valued startup signals in the selection process of established firms.

3.3.2.1 *Experimental Design*

Designing the experiment is considered to be the key task of conducting a DCE because the parsimony of the model needs to be balanced with appropriate explanatory power (Louviere et al., 2000). According to Anderson et al. (2010), the development of a DCE consists of the following steps: the identification of the attributes (1), the definition of the expressions of the attribute levels (2), the development of the design (3), the decision on how to present the choices to the participants (4), and lastly the estimation of the choice model (5).

First, this investigation followed a thorough literature review and expert interviews to identify appropriate and valued attributes for startup scouting, as recommended by Verma et al. (2002). The literature review served as a starting point for selecting the attribute categories that serve as valuable quality signals in the startup context. Prior research identified alliance capital, human capital, intellectual capital and third party endorsement as key quality signals (Baum & Silverman, 2004; Courtney et al., 2017). However, the current study deliberately excludes the category of intellectual capital, which is commonly measured by the patents of a firm (Hsu & Ziedonis, 2013). Nevertheless, the underlying study aims for high applicability across startups as well as industries, and early-stage ventures are often unable to protect their innovation with patents (Mann, 2005; Mann & Sager, 2007). As a result of the literature review, the *industry experience of the team* (1), the *previous founding experience* (2), the available *strategic partnerships* of the new venture (3), and the amount of backing by *venture capitalists* (4) were outlined as the most critical drivers. To be more specific, the study focuses on attributes that are related to alliance capital (strategic alliances), human capital (industry experience,

and previous founding experience of the founder), and third party endorsements (venture capital backing) of startups. The number of attributes was set at four to keep the dimensionality of the model at an appropriate range, as proposed by Verma & Thompson, (1997). In line with previous research, the selected attributes are observable and codifiable and can be found in the startup firms' business plan or through desk research. Both characteristics were outlined as essential preconditions for a DCE in the startup context (Hoenig & Henkel, 2015).

Second, the expression of the attribute levels needs to be aligned with the overall goal of the research (Louviere & Timmermans, 1990). Thus, we followed previous studies by operationalizing the levels as binary variables (yes/no). The binarity allows for the investigation of the importance of the selected attributes in the startup scouting process without overwhelming the participant (Anderson et al., 2010; Hoenig & Henkel, 2015; Merath et al., 2018).

Third, the research utilized a fractional, d-optimal design instead of a full fractional design. The approach allows for covering the main effects of the investigation without testing and presenting all possible combinations of the attribute levels to the participants (Verma et al., 2002). The design and d-optimality were developed with the support of the statistical software JMP. A d-optimal design was chosen because it allows for estimating statistically significant choice experiments (Bech, Kjaer, & Lauridsen, 2011; Carlsson & Martinsson, 2003; Hensher, Rose, & Greene, 2005). Consequently, nine choice sets were developed for the final DCE.

Fourth, the overall presentation of the choices needs to be as realistic as possible without overloading the participants (Fischer & Henkel, 2013). The DCE of this research consists of three parts, including the introduction of the most important terms (1), the presentation of the nine choices (2) and a section to examine the personal success rate of the participants (3). As has been common in previous research, we developed a fictional reference setting, allowing us to create a common and shared starting point for all participants (Fischer & Henkel, 2013; Franke et al., 2008; Hoenig & Henkel, 2015; Merath et al., 2018). The participants were requested to act like a startup scout for an established firm by utilizing observable signals based on their own experience of successful relationships with new ventures. In line with the DCE of (Franke et al., 2008; Hoenig & Henkel, 2015), a description of the startup's background was provided to the participants as illustrated in Table 2. The setting ensures a clear and identical picture of all participants.

Table 2: Discrete Choice Experiment - Reference Setting

As the study aims to investigate the described signals, the following information is granted for all startups:	
Patents	The innovation has no patent protection
Industry	No specific industry focus (e.g., Automotive, Mobility Services, Big Data, Blockchain, Cybersecurity)
Value Proposition	The value proposition is clearly visible
Customer	B2B & B2C
Market	The market attractiveness is high
Strategic Fit	High

As a mandatory *consistency check*, the respondents had to agree to the value and applicability of the reference setting as illustrated in Appendix 2. In the case of failing the consistency check, the data were excluded from the final sample. So, prior to the rest of the DCE portion of the questionnaire, the respondents were asked to confirm the reference setting by indicating that Max (fictional person) is working as a startup scout for an established firm as well as by confirming that the described situation is realistic. In the second part of the survey, the participants either had to pick *Startup A*, *Startup B* or *Neither* of them in each of the nine choice sets, as shown in Appendix 3. So, each choice set consisted of three different possibilities, which is the recommended number for an efficient DCE (Verma & Thompson, 1999). The third part of the experiment related to the participants' success rate in working with startups to validate the credibility of the study.

3.3.3 Sample

The questionnaires were distributed to 254 startup experts of established firms who are actively scouting and working with new ventures in the automotive industry. The distribution took place from the beginning of January 2018 to the end of March 2018 and therefore lasted three months. The participants were carefully pre-selected and identified as startup champions within their departments, and all of the respondents worked for car manufacturers at the time of the online survey. As a result, participants from nine different automotive manufacturers were invited to take part in the research. The survey was sent to OEM experts from China, the United States, Germany, Israel, and the Czech Republic to cover a broad range of experience in working with different types of startups. The survey had a response rate of 46% ($n = 117$). Eight questionnaires were excluded from the final dataset, as five respondents failed the previously described consistency check, while another three respondents marked all choice sets with the same answer. As a further characteristic of the sample, more than 70% of the participants had more than one year of experience in working with startups, and 85% of the sample ($n=102$) already had successful partnerships with new ventures. Hence, the participants were appropriate for

investigating partnerships with startups from an established firm perspective, which was outlined as an essential precondition of effective choice models (Verma et al., 2002). The sample size of a DCE is often a subject for discussion, but small sample sizes are commonly used in health economics, and d-optimal designs were found to provide significant and unbiased results even with small sample sizes (Carlsson & Martinsson, 2003).

3.4 Analysis and Results

3.4.1 Investigation 1: Regression Analysis - Traditional Purchasing Selection

To test hypotheses 1a, 1b 1c, 2a, and 2b, we utilized an ordinary least squares (OLS) regression and the following function was developed:

$$Y_x = \beta_{cost} + \beta_{quality} + \beta_{delivery} + \beta_{innovation} + \beta_{flexibility} \quad (1)$$

The regression of equation (1) allowed us to identify the effects of the established supplier selection criteria on the success rate of working with startups and to test the first two hypotheses. The results show no indications of multicollinearity; the correlations are shown in Table 3.

Table 3: Pearson Correlations of the OLS Regression

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) Success	1					
(2) Innovation	0.46 ***	1				
(3) Flexibility	0.21 ***	0.08 ***	1			
(4) Cost	-0.37 ***	-0.03 ***	-0.02 ***	1		
(5) Quality	-0.41 ***	-0.09 ***	-0.08 ***	0.39 ***	1	
(6) Delivery	-0.38 ***	-0.04 ***	-0.07 ***	0.39 ***	0.54 ***	1
Mean	1.35	5.53	5.52	4.87	4.87	4.89
Standard Deviation	0.96	1.11	1.17	1.32	1.32	1.19

Note. $n = 117$. Pearson product-moment correlation coefficients are shown.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed).

Furthermore, we tested for variance inflation factors (VIF), and the results are all below 1.2 and therefore in an appropriate range. So, the results support the appropriateness of the model. The OLS regression of the independent variables shows positive *and* negative effects on the startups' success rate. Moreover, four out of six variables are significant at $p < 0.05$. Consequently, the findings suggest the relevance of the selected variables.

First, the results for cost, quality, and delivery address the first hypothesis. The analysis outlined significant negative effects for the *cost* ($\beta_{cost} = -0.20, p < 0.00$), *quality* ($\beta_{quality} = -0.16, p < 0.04$) and *delivery* criteria ($\beta_{delivery} = -0.17, p < 0.04$) on the success rate of working with startups. Thus, hypotheses 1a, 1b and 1c were supported. The cost factor shows the strongest negative impact on the success rate of working with startups, followed by the criteria of delivery and quality. Therefore, consistent with these three hypotheses, the startup scouts in our sample with a strong focus on cost, quality and delivery performance experienced a lower success rate in partnerships with a new venture. As a potential explanation, startups are not able to focus on cost and quality performance from the very beginning as they are not able to produce in their innovations in high volumes as well as to evaluate the quality of their prototypes in every detail.

Second, the flexibility and innovation criteria pertained to testing hypotheses 2a and 2b. In line with our expectations, product *innovation* ($\beta_{innovation} = 0.40, p < 0.00$) and *flexibility* of the product ($\beta_{flexibility} = 0.14, p < 0.03$) were positively and significantly associated with the success rate of a partnership. Thus, the findings support hypotheses 2a and 2b. The innovation criterion shows the strongest effect of all measured variables, which indicates the established firms' aspiration to benefit from the startups' innovative performance and its impact on the overall success of the dyad. Therefore, the startup scouts in our sample who focus on the innovation performance of the startup were experiencing a higher success rate in working with startups. Likewise, the results depict the same qualitative interpretation with a weaker effect on the flexibility criteria. Hence, the participants in our sample who valued the flexibility of startups to adapt their innovations according to the established firm needs were more successful in working with startups.

Overall, the R^2 for our model displayed a good value of 0.45 and therefore allows us to explain 45% of the variance. The summary of the regression analysis of Model 1 can be found in Table 4.

Table 4: Regression Results of Analysis 1

Variables	Model 1				Hypothesis	Result
	β	SD	p-value			
Constant	1.35	0.67	***			
Cost	-0.20	0.67	***		H1	Supported
Delivery	-0.17	0.82	**		(a,b,c)	
Quality	-0.16	0.83	**			
Innovation	0.40	0.67	***		H2	Supported
Flexibility	0.14	0.67	**		(a,b)	
R ²	0.45					
Adjusted R ²	0.43					
F – Value	18.50					
#Respondents	117					

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.4.2 Investigation 2: Discrete Choice Experiment - Modern Investor Selection

The estimation of the multinomial logit model (MNL) allowed us to test the remaining hypotheses 3, 4, and 5. A DCE assumes that individuals are aiming to maximize their utility U by deciding upon the alternative that maximizes their individual value (Ben-Akiva & Lerman, 1985). According to the random utility model that was introduced by McFadden (1973), the utility of an individual is determined by an *observable* term but also one *unobservable*, stochastic component that needs to be estimated (Ben-Akiva & Lerman, 1985; Temme, 2007). The MNL is commonly applied for the estimation of choice models due to its simplicity as well as the quality of the estimation results (Louviere et al., 2000). The utility function U of an individual n for the option i is expressed in equation 2 as:

$$U = \beta V + \varepsilon \quad (2)$$

where ε is the random component that needs to be estimated and V is the observable term of the equation. Based on the assumption of utility maximization as well as a higher utility of one alternative among the decision options, the unobservable term is commonly integrated into the MNL Model (Temme, 2007) as shown in equation 3:

$$P_{n(i)} = \frac{e^v}{\sum e^{v_{jn}}} \quad (3)$$

where $P_{n(i)}$ is the probability of an individual n of choosing one alternative i of the choice set j in dependency on the attributes of the alternative (Temme, 2007). Each participant in the

discrete choice experiment had to choose between three alternatives in one choice set. Therefore, the following three equations were developed for the *Startup A* (4), the *Startup B* (5) or the *Neither* (6) alternative. Consequently, the following functions were developed in order to test hypotheses 3a, 3b, 4 and 5.

$$U_A = \beta_{asc} + \beta_{foundexp} * foundexp + \beta_{indexp} * indexp + \beta_{vcback} * vcback + \beta_{stratall} * stratall \quad (4)$$

$$U_B = \beta_{foundexp} * foundexp + \beta_{indexp} * indexp + \beta_{vcback} * vcback + \beta_{stratall} * stratall \quad (5)$$

$$U_{nochoice} = \beta_{neither} \quad (6)$$

Equation 4 reflects the utility of selecting *Startup A*, equation 5 represents the utility of a participant choosing *Startup B* and the equation 6 reveals the utility of a participant for the choice of none of the proposed startups. The equations 4 and 5 reflect that a selection for or against *Startup A* or *Startup B* is based on the expression of the previously described attributes. Equation 4 and Equation 5 incorporate the four selected startup attributes of the founding experience (*foundexp*), industry experience (*indexp*), strategic alliances (*stratall*) and venture capital backing (*vcback*). The variable β_{asc} explains the alternative specific effects.

3.4.2.1 Model Estimation

The results of the estimated equations 4, 5 and 6 can be found in Table 5. The MNL estimation in Model 2 is based on the four startup attributes of the founding experience (*foundexp*), industry experience (*indexp*), strategic alliances (*stratall*) and venture capital backing (*vcback*). The estimation allows us to test the hypotheses 3a, 3b, 4 and 5.

Table 5: Discrete Choice Experiment - MNL Estimation and Results

Variables	Model 2			Hypothesis	Result
	β	SD	p-value		
Constant	0.47	0.17	***		
Foundexp	0.92	0.10	***	H3	Supported
Indexp	1.12	0.10	***	(a,b)	
VCBack	0.50	0.09	***	H4	Supported
Stratall	0.59	0.11	***	H5	Supported
Log-likelihood	-989.97				
#Observation	1053				
#Respondents	117				
McFadden Pseudo R ²	0.45				

Note. Model was estimated in NLOGIT 6

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The result was that the *industry experience* of the team ($\beta_{indexp} = 1.12, p < 0.00$) showed the strongest positive effect as a quality signal for established firms. Hence, hypothesis 3a is supported: the startup's industry experience was seen as having great value for the established firms and the success of the partnership. Moreover, the previous *founding experience* of the startup ($\beta_{foundexp} = 0.92, p < 0.00$) showed the second strongest and positive effect as a startup's quality indicator. So, established firms value a previous failure or success of the startups' founder as it might signify experiences in managing upcoming challenges as a new venture. As a consequence, hypothesis 3b is supported as the founding experience of new ventures positively relates to a successful relationship between established firms and startups. As a first summary, the data outlined the strongest quality effects for the two human capital characteristics of founding experience and industry experience. Established firms that focus on the startup's human capital in the selection of new ventures are more likely to achieve a mutually beneficial and successful relationship.

Moreover, the *strategic alliances* of the new venture ($\beta_{stratall} = 0.59, p < 0.00$) showed the third strongest and positive effect as a quality attribute for established firms. Hence, the strategic alliances of a startup convey vital information to the established buying firms about the startup's credibility and legitimacy and reduce uncertainty regarding the upcoming partnership. As a result, the fourth hypothesis can be confirmed as the data showed a positive association between the success of a relationship with startups and the existence of new ventures' strategic alliances.

Lastly, *venture capital backing* also showed a positive effect as a quality criterion for established firms, but had the weakest effect of any of the tested variables ($\beta_{vcback} = 0.50, p < 0.00$). However, venture capital backing was still respected by the established firms in our

sample, as the participants had the opportunity to reject the presented startups. Therefore, hypothesis 5 can be confirmed as venture capital backing of a new venture was seen as having positive value for established firms and the success of the entire dyad. The venture capital backing of a startup decreases the information asymmetry between the two partners and therefore acts as a credible signal for established firms in the uncertain startup context. In line with signaling theory, established firms appreciated the four chosen attributes as signals for the startups' legitimacy and it increased the probability for a successful and mutually beneficial buyer-supplier relationship.

In addition, the participants were requested to directly rate the importance of the four attributes on a 7-point Likert scale to validate our findings. The results were ranked according to their means and standard deviations. The outcome supported the previously described findings, as the startups' industry experience was ranked first ($M = 5.67$; $SD = 1.18$) by the participants. However, in contrast to the DCE results, strategic alliances ranked second ($M = 5.40$; $SD = 1.07$) and founding experience ($M = 5.35$; $SD = 1.36$) scored minimally lower. Lastly, venture capital backing ($M = 4.11$; $SD = 1.45$) was ranked as the signal with the lowest quality implications for startups, which are in line with the DCE results. Consequently, the findings underline the value of a DCE because differences exist in the stated vs. revealed preferences of the participants. The results for the attribute ratings can be found in Table 6.

Table 6: Quality Signals 7-Point Likert Scale Results

Variables	Mean	SD
<i>Please indicate the importance of the following criteria from 0 not important at all" to 7 "most important"</i>		
Industry Experience	5.67	1.18
Strategic Alliances	5.40	1.07
Founding Experience	5.35	1.36
VC- Backing	4.11	1.45

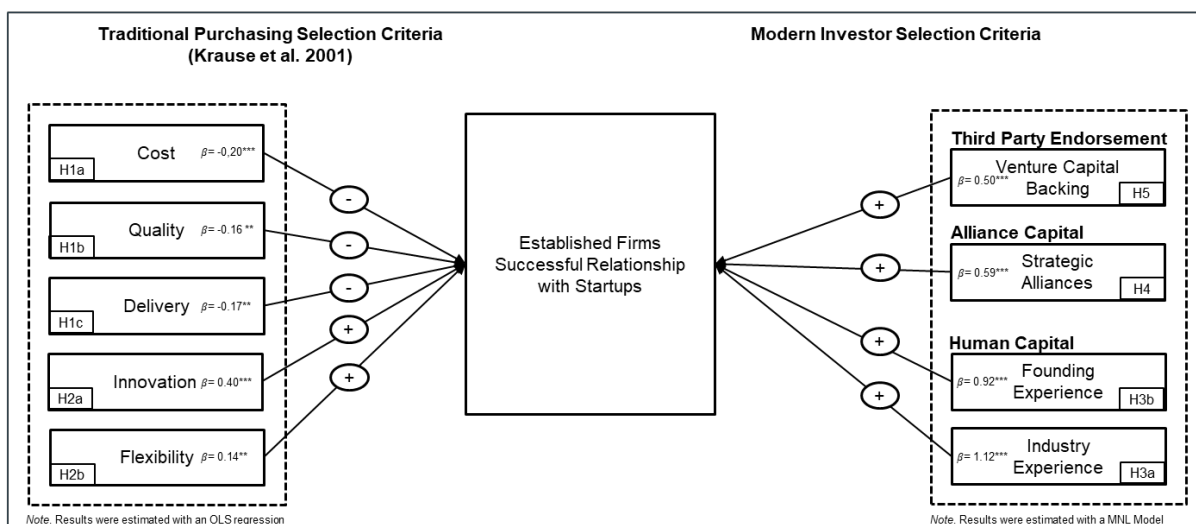
Note. $n = 117$

3.4.3 Summary of the Results of Investigation 1 and Investigation 2

The findings of the regression analysis of investigation 1 and the DCE of investigation 2 are illustrated and summarized in Figure 3. The traditional purchasing selection criteria of cost, quality and delivery were covered by the hypothesis (H1a, H1b, and H1c), which showed a negative association to a successful relationship between established firms and new ventures. In contrast, the traditional purchasing selection criteria of innovation and flexibility revealed a positive relation to a successful partnership with startups which is indicated by hypotheses

(H2a) and (H2b). Moreover, the figure reveals the positive effect of the modern investor selection criteria of human capital, alliance capital and third party endorsement on the success-rate of working with startups. The human capital which was measured by the industry experience (H3a) as well as the founding experience (H3b) of the startup showed the strongest effects amongst the modern investor criteria. The positive effect of the startups' strategic alliances as one indicator of the startups' alliance capital was investigated by hypothesis 4 (H4) and the positive association of venture capital backing as equivalent for third party endorsement was discovered by hypothesis 5 (H5). In sum, the two distinct analyses demonstrated the impact of the traditional purchasing selection criteria but also the modern investor selection criteria on a successful relationship between established firms and new ventures.

Figure 3: Summary of the Results of Investigation 1 and Investigation 2



3.5 Discussion and Implications

The quantitative investigation of the supplier selection criteria from a traditional purchasing perspective and a modern investor perspective adds valuable theoretical and practical insights to a successful relationship between established firms and startups.

3.5.1 Theoretical Implications

The study provides three main theoretical contributions because it adds to the discussion of the supplier selection criteria, the quality signals of startups and it draws a link between the two distinct research areas.

Firstly, the research increases the understanding of the supplier selection criteria for new venture suppliers and contributes to the debate regarding the buyer-supplier relationship between new ventures and established firms (La Rocca et al., 2017; Zaremba et al., 2016, 2017).

We found strong negative relationships between the traditional supplier selection criteria of *cost*, *quality*, and *delivery* and the success of working together with startups. The qualitative study of Zaremba et al. (2017) already outlined the difficulties in applying the traditional selection criteria for a buyer-supplier relationship with a startup. Nevertheless, we quantified the findings and narrowed down the criteria to specific attributes. However, our findings are contrary to the traditional understanding of the purchasing department to incorporate the cost, quality and delivery factors into any supplier selection decision (Ellram, 1990; Krause et al., 2001). So, our work underlines the established buying firm's needs for new instruments in a relationship with new ventures. In contrast, we found a significant positive association between the emerging supplier selection criteria of *flexibility* and *innovation* and the success rate of working with new ventures as an established firm. Innovative potential showed the strongest effect of the established supplier selection criteria in the context of new ventures. However, previous supplier selection research revealed flexibility and innovation to be the least important criteria for established firms among the traditional supplier criteria (Chan & Chan, 2004). Therefore, our study shows the significance of adjusting the weighting of the traditional supplier selection criteria in the startups' ecosystem in favor of innovation and flexibility.

Secondly, the study contributes to the literature about the observable quality signals of startups. So far, the application of the quality signals was limited to external investors financing decisions or the likelihood of receiving funding as a startup (Baum & Silverman, 2004; Hoenig & Henkel, 2015; Ko & McKelvie, 2018; Plummer et al., 2016). Our discrete choice experiment showed a positive effect of the startups' alliance capital (*strategic alliances*), human capital (*industry experience* and *founding experience*) and third party endorsement (*venture capital backing*) on the success in working with startups. Industry experience and founding experience of the startup were found to be the most critical quality signals for established firms. Consequently, our study supports the significance of both characteristics as valuable startup signals and further supports previous research (Fisher et al., 2017; Franke et al., 2008; Hsu, 2007; Ko & McKelvie, 2018). Moreover, strategic alliances and venture capital backing were also valued as legitimacy signals of startups, but to a lesser extent. Interestingly, the findings expressed differences in the valuation of the quality signals between established firms and investors. In our sample from an established firm perspective, the startups' human capital showed a stronger effect than alliance capital and third party endorsement. In contrast, (Hoenig & Henkel, 2015) found alliances to be the most critical quality signal for investors in assessing the new venture's technological quality.

Thirdly, the study draws a link between the seemingly unrelated startup's quality signals and the supplier selection context. This research outlines the value of observable quality signals as a complementary information source in the selection of new venture suppliers. The supplier selection literature traditionally distinguishes between quantitative and qualitative criteria, but the quantitative criteria are commonly preferred due to the ease of calculation and observation (Thiruchelvam & Tookey, 2011). Nevertheless, the supplier's human capital, such as team characteristics, gets limited attention in the context of supplier selection, and it is not apparent as a criterion in recent supplier selection reviews (Ho et al., 2010; Wu & Barnes, 2011). Our research challenges the omnipresent application of the traditional supplier selection criteria and shows the importance of evaluating human capital in a startup context. The supplier landscape is changing, and new types of suppliers such as new ventures are emerging as critical sources for innovation. Hence, this research stresses the increasing importance of qualitative factors in the context of new ventures as future suppliers and suggests the utility of examining both quantitative and qualitative factors in making the final decision (Ellram, 1990; Kannan & Tan, 2002; Thiruchelvam & Tookey, 2011; Wu & Barnes, 2011). Therefore, the findings outline the necessity for a more collaborative buyer-supplier relationship between established firms and new ventures.

In sum, our research quantifies the need for the purchasing department to identify novel techniques in supplier selection if the buying firm aims to benefit from the startup's innovations. The analysis shows the adverse effects of applying traditional supplier selection criteria of cost, quality, and delivery in the startup environment and outlines the increasing importance of flexibility and innovation performance. We further propose the value of observable quality signals as a complementary assessment tool for established firms. In a nutshell, the study sketches a method to reduce the uncertainty in the selection of new venture suppliers and supports the call for developing new venture partnering capabilities as an established firm (Zaremba et al., 2016, 2017).

3.5.2 Managerial Implications

Our study also conveys three valuable messages for practitioners from established firms and startups alike.

First, a buying firm's selection of capable suppliers is a highly complex process and needs ongoing improvement (Koufteros et al., 2012). So, the data indicates the necessity of established firms decision-makers to adopt the supplier selection in the sourcing of startups as future suppliers. Therefore, we recommend that firms shift their focus towards a long-term

perspective on evaluating partnerships with new ventures instead of relying on the cost and quality performance of the startup in the short-term. Hence, the key performance indicators need to be aligned once a startup is a supplier.

Second, the findings further raise awareness of purchasing department employees that novel suppliers from different industries are emerging. In this regard, the provision of specialized training for buying firms' own workforce might increase the well-being of a partnership between established buying firms and startups as suppliers.

Third, the study points to the value of broadening the horizon of the purchasing department by utilizing unconventional instruments as a complementary source of information. The utilization of observable signals serves as a common tool for investors' funding decisions but its application in the supply chain context might also reduce the uncertainty of the buying firm in working with startups. Consequently, the recruitment of investment managers or startup experts as the purchasing department potentially allows for building a bridge between the startups as new suppliers and the traditional purchasing department.

Fourth, and from a startup perspective, the study indicates ways to signal the new venture's capabilities and legitimacy to established firms. Hence, transparent communication of the startup's expertise, their third party engagement or their existing strategic alliances serves as a powerful device for new ventures to reduce the underlying information asymmetry. As a result, it is recommended that startups highlight these attributes in their business plan to reduce information asymmetry for potential partners.

Fifth, startups need to be aware of the cost-driven selection approach of established buying firms in the determination of their supply base. Therefore, the findings suggest the utility of shifting the focus of discussion of the buyer-supplier relationship with established firms towards the future prospects of the collaboration. Consequently, the strengths of startups that need to be highlighted in communications with potential partners lay in their innovativeness as well as in their flexibility in adapting the product according to the requirements of the established firm.

Last, the data shows the significance of the startups' human capital and especially the previous industry and founding experience. Therefore, new ventures are recommended to incorporate the founding and industry experience of the applicants in the hiring process as it positively affects the partnership with established firms.

3.5.3 Limitations and Future Research Opportunities

This research is not without limitations but it also offers directions for future research.

One limitation is that the study merely investigates the effect of four quality signals, although many further attributes exist such as media coverage or crowdfunding success (Courtney et al., 2017). Moreover, the study did not account for any supplementary aspects of the relationship between established firms and startups which might affect the selection, such as the strategic fit or patent protection (Song et al., 2008). Consequently, the generalizability of the study is limited. However, it also offers an excellent opportunity to examine the effects of additional quality signals and further influencing factors from an established firm perspective.

As a further limitation, the underlying research only included the established firm perspectives and therefore neglected the perspective of the new ventures. So, the findings need to be interpreted with caution because it does not reflect the wisdom of independent experts or employees of startups. Consequently, a replication of the study with new ventures might yield valuable results in the future as it complements the conducted study.

Moreover, we applied two different measures for the investigation of the traditional supplier selection criteria (regression analysis) and the quality signals of startups (DCE). Although both approaches have produced valuable insights, the twofold measure can be seen as a limitation of the study and restricts the generalizability. As a consequence, the findings of Figure 3 need to be interpreted in isolation. Nevertheless, a replication of the study that implements all investigated factors in one DCE emerges as a prosperous research initiative in order to validate our findings for the selection of startups from an established firm perspective.

We utilized a qualitative success variable due to the limited measurable outcomes of the collaboration between the established firms in our sample and the new ventures. However, the number of partnerships is increasing and also the length of engagements is growing. Consequently, a quantitative investigation of the success of the partnership between established firms and startups is needed in the future.

The present study shows the value of creating a link between the supply chain management literature as well as entrepreneurial research and therefore opens up new opportunities for future research. As one concrete example, supplier development for new ventures might differ significantly from that for traditional suppliers, and therefore calls for a qualitative or quantitative examination.

CHAPTER 4 UTILIZING STARTUP ENGAGEMENT MODELS AS SUPPLIER DEVELOPMENT TOOLS FOR NEW VENTURES

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ABSTRACT

Established firms increasingly utilize a variety of startup engagement models to tap into the startup ecosystem. However, the purchasing function as the gatekeeper for supplier innovations does barely implement those models into their supplier development practices. The purchasing function is considered as an expert in the further development of established suppliers but the traditional instruments are hardly applicable in the startup context. As a result, engaging and further developing startups towards a reliable supplier is challenging for established firms and the purchasing function. Therefore, this work follows a qualitative investigation to examine the applicability of three startup engagement tools in the context of direct and indirect supplier development initiatives. Subsequently, the study outlines the value of corporate accelerators, strategic partnerships, and corporate venture capital investments as supplier development activities for new ventures.

4.1 Introduction

Established firms are increasingly forced to leverage the potential of their suppliers and the supplier relationships serve as a valuable source for new technologies but also to cope with the growing competitive pressure (Krause & Ellram, 1997; Lawson et al., 2015). Hence, and in line with the resource dependence theory, firms are reaching out to external partners as they are not capable of producing all necessary resources within their firm boundaries (Nienhüser, 2008). As a consequence, established firms are broadening their supply base, also by tapping into the emerging startup environment (Blomqvist et al., 2005; Hogenhuis et al., 2017; Zaremba et al., 2017).

However, the collaboration between established firms and startups is subject to unique characteristics and a certain degree of risk as more than half of the partnerships are a subject of failure (Bernhard et al., 2019). Therefore, established firms are accelerating their activities to enter the startup world in a systematic and prosperous way (Baum & Silverman, 2004; Kuckertz & Allmendinger, 2017). As a result, large organizations utilizing a variety of collaboration models such as a *corporate accelerator* (Kanbach & Stubner, 2016), a *corporate venture capital* investment (Chesbrough, 2002) or a non-equity *strategic partnership* (Mocker et al., 2015). Nevertheless, choosing the right model of cooperation is a vital endeavor as well as highly demanding as it determines whether a company can develop innovations or technologies with its partners in the long-run (Pisano & Verganti, 2009).

Likewise, the purchasing department as the gatekeeper of new suppliers is an expert when it comes to the development of established suppliers, which is already supported by a variety of studies (Krause & Ellram, 1997; Krause, Scannell, & Calantone, 2000; Modi & Mabert, 2007; Wagner, 2010; Wagner & Krause, 2009). In this regard, established firms are applying *direct* but also *indirect* development activities that are tailored to the relationship with their suppliers (Monczka, Trent, & Callahan, 1993; Wagner, 2006, 2010). However, once the focus shifts to a buyer-supplier relationship with startups, the purchasing function has to implement novel approaches for the development of emerging suppliers because startups require tailored support mechanisms and the established processes are hardly applicable to the startup ecosystem (Zaremba et al., 2017). As a consequence of the recently started activities of established firms to cooperate with startups, academia about the buyer-supplier relationship between new ventures as the supplier and the established firms as the buying firms have still an infant nature (Bjorgum & Netland, 2017, 2017; La Rocca et al., 2017; Zaremba et al., 2016, 2017).

In sum, a variety of cooperation models with startups do exist in the market but the purchasing department faces the challenge to reach out to the startup ecosystem as well as to further develop and implement the new ventures to their supply base. However, the value of the cooperation models as supplier development tools for established firms is not outlined so far, in spite of the inherent supporting mechanisms of the programs to increase the startup's capabilities in the long-run (Weiblen & Chesbrough, 2015). Therefore, this work follows a qualitative research approach based on 15 expert interviews from the buying firm's perspective. Hence, the study aims for *two* main contributions and seeks to enrich the upcoming research at the intersection between supply chain management and entrepreneurship (Bjorgum & Netland, 2017; La Rocca et al., 2017; Zaremba et al., 2016, 2017).

First, the research intends to enhance the entrepreneurial literature with new insights of the different collaboration models between young ventures and established firms (Cohen, 2013; Cohen & Hochberg, 2014; Kanbach & Stubner, 2016; Kohler, 2016; Pisano & Verganti, 2009; Weiblen & Chesbrough, 2015). As a starting point, this work wants to outline the characteristics and *tradeoffs* of a corporate accelerator, a corporate venture capital investment as well as a strategic partnership by applying the resource dependence theory. Therefore, this study qualitatively examines the advantages and disadvantages of the models from an established firm perspective and firstly applies a purchasing department lens.

Second, this research sets out to add a novel perspective to the supplier development literature (Krause et al., 2007; Krause & Ellram, 1997; Modi & Mabert, 2007; Wagner, 2010; Wagner & Krause, 2009). Thus, this work intends to investigate the applicability of the three outlined collaboration forms and creates a link to the indirect and direct supplier development literature (Monczka et al., 1993; Wagner, 2006, 2010; Zaremba et al., 2016).

So, the underlying study aims to develop a set of propositions as well as a framework for the purchasing function that indicates *when* and *how* to use the different collaboration forms for the development of new ventures as upcoming suppliers. As a result, the investigation examines the following research question: *How can established buying firms utilize a corporate accelerator, a corporate venture capital unit and a strategic partnership for the development of new venture suppliers, and what are the main tradeoffs of the cooperation forms?*

The subsequent study is structured as follows: Firstly, the conceptual background lays the theoretical foundation of the resource dependence theory, the direct and indirect supplier development literature, the unique characteristics of working with startups as well as it outlines

three different engagement models with startups. The description of the methodology, the analysis of the interviews as well as the presentation of the results follows the conceptual background and precedes the discussion of the results for theory and practice.

4.2 Conceptual Background

4.2.1 Resource Dependence Theory

The resource dependence theory (RDT) was introduced by Pfeffer & Salancik (1978) and set out to elucidate the significance of the external environment and the firm's context for their organizational behavior. According to the theory, organizations are dependent on critical resources and the exchange with their external ecosystem because merely a fraction of the required resources can be found within the firm boundaries (Nienhüser, 2008). The theory concentrates on resources but also abilities that an organization needs to realize its desired objectives (Jajja, Kannan, Brah, & Hassan, 2017). Hence, firms are restricted by their environment but they can pursue particular tactics and actions to manage these environmental constraints (Pfeffer & Salancik, 1978). Consequently, the theory assumes that firms are decreasing their dependency on specific resources and their environmental uncertainty by pursuing inter-organizational arrangements such as mergers & acquisitions, joint ventures or alliances (Hillman, Withers, & Collins, 2009; Pfeffer & Salancik, 1978).

As a consequence, firms are forming ties with those partners that can satisfy their resource (Pfeffer & Salancik, 1978). as well as knowledge needs (Katila et al., 2008). So, the RDT is one of the leading theoretical lenses to explain relationships between organizations and their environment (Dress & Heugens, 2013). Researchers already applied the theory to a variety of contexts, including the startup ecosystem (Katila et al., 2008) as well as the buyer-supplier relationship (Ebers & Semrau, 2015; Jajja et al., 2017). Consequently, the exploitation of a connected supply chain allows for the development of innovative products as one organization can hardly possess all necessary resources on its own (Jajja et al., 2017).

4.2.2 Direct and Indirect Supplier Development

Supplier development is defined as “any effort of a buying firm with its supplier to increase the performance and/or capabilities of the supplier and meet the buying firm’s supply needs.” (Krause & Ellram, 1997, p.21). Hence, supplier development initiatives cover a broad range of activities and it aims to increase the supplier capabilities but also to trigger the dedication of humans, time and relational specific investments from the supplier point of view (Krause et al., 2007). Consequently, the literature outlines supplier development as a powerful tool to enhance

supplier capabilities and performance (Lawson et al., 2015; Li, Humphreys, Yeung, & Edwin Cheng, 2007; Wagner, 2010). Supplier development can be further classified into *direct* and *indirect* activities based on the resources that the buying firm is willing to commit (Monczka et al., 1993; Wagner, 2006, 2010; Wagner & Krause, 2009; Zaremba et al., 2016, 2017).

Direct supplier development is a proactive approach as the buying firm dedicates relational specific resources, education, on-site support, as well as a temporary transfer of their own experts (Zaremba et al., 2016). Nevertheless, direct supplier development requires safeguarding mechanisms as it offers a window for opportunistic behavior of the supplier (Wagner, 2006).

In contrast, indirect supplier development characterizes the provision of merely limited support (Monczka et al., 1993; Wagner, 2006). In this case, the buying firm commonly monitors the performance of the supplier and provides vital feedback. Besides, indirect supplier development tries to unlock the supplier's motivation to further develop themselves by providing incentives for a long-term relationship (Wagner, 2006, 2010; Zaremba et al., 2016). Consequently, suppliers are monitored and measured in the case of indirect supplier development and they achieve resources and timely support in the case of direct development activities (Zaremba et al., 2016).

In the context of a buyer-supplier relationship with new ventures, La Rocca et al. (2017) points to the significance of the first relationship of a startup to its supplier for their further development. The relationship allows the young venture to advance their capabilities and to gain access to necessary complementary resources. However, the development of new ventures as suppliers requires established firms to build new venture partnering capabilities as the traditional supplier development approaches are hardly applicable to the startup ecosystem (Zaremba et al., 2017). Hence, the configuration of the supply chain with new ventures is a challenging task. The level of integration and the strengths of the ties determine the established firm's flexibility of switching between suppliers in case of poor performance (Bjorgum & Netland, 2017).

4.2.3 The Tradeoffs in Working with Startups

The partnership with startups provides established firms with access to innovations, but the individual characteristics of the partners result in a variety of challenges (Weiblen & Chesbrough, 2015; Wrobel, Schildhauer, & Preiß, 2017). Established firms commonly have a proven track of past performance (Rothaermel, 2002), excellent access to the market (Lindgreen, Horn, Bowier, & Beune, 2015), but they are faced with enormous bureaucracy and slow

information-sharing routines (Fang et al., 2008). In contrast, startups are agile and possess innovative ideas (Hogenhuis et al., 2017), but they are lacking legitimacy and require access to complementary resources (Fang et al., 2008; Pahnke et al., 2015). Nevertheless, the collaboration with startups via engagement models is complex and established firms are faced with an array of strategic *tradeoffs* that are crucial to consider in the determination of their cooperation approaches (Pisano & Verganti, 2009). As outlined by the literature, partnering with startups is risky and uncertain (Baum & Silverman, 2004), the new ventures are dependent on tailored support (Zaremba et al., 2017) as well as the governance arrangements determine the flexibility of the partnership (Weiblen & Chesbrough, 2015). In the following, and based on the importance of the dimensions, the *risk and uncertainty*, the *governance mechanisms*, and the *support mechanisms* are described in more detail.

4.2.3.1 Risk and Uncertainty

Firstly, working with startups is surrounded by risk and uncertainty (Baum & Silverman, 2004; Callaway & Hamilton, 2006). As outlined before, startups are confronted by various challenges and the real value of the new venture is hard to assess for externals (Baum & Silverman, 2004). Hence, the partners might act opportunistic and large corporations are forced to cope with the startup's financial instability (Doz, 1988; Minshall et al., 2010). However, established firms have to accept a certain degree of risk if they want to benefit from the startup's innovations (Kuckertz & Allmendinger, 2017). Consequently, large organizations are continually searching for ways to mitigate the uncertainty of the startup engagement (Wrobel et al., 2017).

4.2.3.2 Governance Mechanisms

Secondly, the governance mechanisms of a collaboration profoundly affect the well-being of the partnership because it determines the partner's willingness to engage in value-adding activities (Dyer & Singh, 1998). The agreements range from flexible, lightweight approaches that are easy to exit to legally binding contracts and exclusive equity involvements (Weiblen & Chesbrough, 2015). So, established firms are seeking for flexibility through appropriate arrangements as it allows for quickly switching one partner in contrast to lock-in situations that occur with exclusive deals (Bjorgum & Netland, 2017). Therefore, a well-balanced mix between trust and contracts need to be developed in the relationship between large firms and startups (Blomqvist et al., 2005). As a result, the governance mechanisms determine the flexibility and exclusivity of the partnership between established firms and new ventures.

4.2.3.3 Support Mechanisms

Thirdly, established firms are required to establish and apply startup support mechanisms in a variety of areas (Hogenhuis et al., 2017). The support ranges from minimal and more general mentorship to intense and ongoing interactions (Cohen, 2013). Hence, startups are commonly reaching out to partners in order to access the necessary resources (La Rocca et al., 2017). As an essential restriction in partnering with new ventures, researchers already outlined the specificity of the applied initiatives as an indispensable precondition to further develop the startup idea (Zaremba et al., 2017).

4.2.4 The Engagement Models with Startups

A variety of engagement models exist in the market to tap into the startup world but the models follow different objectives which need to be tailored to the established firm's intentions (Bruse, Böhmer, & Lindemann, 2016; Hajizadeh-Alamdary & Kuckertz, 2015; Pisano & Verganti, 2009; Weiblen & Chesbrough, 2015). These models include, amongst others, a corporate venture capital investment (Chesbrough, 2002), a corporate accelerator (Kanbach & Stubner, 2016) but also strategic partnerships (Mocker et al., 2015). Consequently, selecting the right model as an established firm is a complex task because an assortment of instruments exists in the market and the new ventures vary in their starting conditions. In the following, the three models are described in detail and the definitions of the engagement forms can be found in Table 7.

Table 7: Definitions of the Corporate-Startup Engagement Models

	Corporate Accelerator	Strategic Partnership	Corporate Venture Capital
Definition	A time-limited initiative of corporates to collaborate with external startups by providing all the necessary resources to develop a product or service without equity involvement of the sponsoring firm	A voluntary arrangement between two firms with the aim to solve a particular business need in a pilot project via ongoing exchange of knowledge and resources that are related to the problem	The strategic investment of corporate funds in high potential ventures in return for an equity stake through a separate but closely connected business unit
Objective of Model	Evaluation of a cohort of early stage ventures team, product and identification of "supporting spots"	Evaluation of working with startups and examination of the scalability and maturity of the young venture	Investing money and time in scalable startups

4.2.4.1 Corporate Venture Capital

Corporate venture capital refers to the "investment of corporate funds directly in external startup companies" (Chesbrough, 2002, p. 5). CVCs commonly invest in promising startups that are searching for funding in return for an equity stake to influence the startup's decisions and

to gain new market insights (Brigl et al., 2016; Dushnitsky & Lenox, 2005; Gaba & Meyer, 2008; Weiblen & Chesbrough, 2015). Therefore, CVC investments serve as a tool to cope with the future development of the focal firm (Reimsbach & Hauschild, 2012; Weiblen & Chesbrough, 2015). A CVC department often acts as an independent business unit, which operates beyond the traditional corporate procedures as it allows for closing the gap to the startup ecosystem (Weiblen & Chesbrough, 2015). The corporate's investments commonly pursue two primary goals. Strategic investments are aiming to support the growth of the new venture and financial investments intend to achieve attractive returns in the future (Chesbrough, 2002; Reimsbach & Hauschild, 2012). However, CVC units mostly focus on gaining strategic advantages by accessing new technologies of the startup which are forwarded to their parent corporation (Katila et al., 2008; Pahnke et al., 2015). Consequently, the CVC tool serves as a corporate mean for fast market access (Dushnitsky & Lenox, 2006). As a result, this work defines corporate venture capital investments as the strategic investment of corporate funds in high potential ventures in return for an equity stake through a separate but closely connected business unit.

4.2.4.2 *Corporate Accelerator*

Corporate accelerators are “company-supported programs of limited duration that support external cohorts of startups during the new venture process via mentoring, education, and company-specific resources” (Kohler, 2016, p.348). The corporate accelerator is often termed as a subcase of an incubator but accelerators differ in the short time frame of support, the cohort structure as well as the work intensity (Yin & Luo, 2018). The tool supports startups to prepare for the future by identifying customers and by defining and enhancing their product (Cohen & Hochberg, 2014). The program commonly runs between three and six months and allows for intense interaction in a challenging environment for the participants (Cohen, 2013). The model exists in a variety of expressions but corporate accelerators are commonly project-based and generally do not take any equity of the sponsoring firm (Cohen & Hochberg, 2014). The focus lies on supporting cohorts of startups at the same time to create a co-working and supportive atmosphere (Cohen & Hochberg, 2014; Kohler, 2016; Miller & Bound, 2011; Weiblen & Chesbrough, 2015). However, some corporate accelerators in the market also following equity-taking approaches to create a legal bond between the partners (Kanbach & Stubner, 2016). Nevertheless, this work defines corporate accelerators as a time-limited initiative of corporates to collaborate with external startups by providing all the necessary resources to develop a product or service without equity involvement of the sponsoring firm.

4.2.4.3 *Strategic Partnerships*

The strategic partnerships of established firms and startups can take different forms but the product co-development is a common approach to independently working together (Mocker et al., 2015). Ellram (1990) defines a strategic partnership as “ mutual ongoing relationship involving a commitment over an extended time period, and a sharing of information and the risks and rewards of the relationship” (p.8). Alliances regularly refer to the joint development of a product or service in conjunction with a partner for a specified or unspecified time (Borah & Tellis, 2014; White, 2000). The engagement is based on “voluntary arrangements” and characterized by ongoing sharing and exchanging of resources between both parties (Gulati, 1998). Strategic partnerships aim to solve a particular business problem and the solution is jointly generated and tackled via a pilot project (Mocker et al., 2015). Therefore, a strategic partnership is an adequate governance arrangement as it allows for implementing knowledge- and resource-sharing routines (Capron & Mitchell, 2010). Consequently, this work defines a strategic partnership as a voluntary arrangement between two firms to solve a particular business need in a pilot project via an ongoing exchange of knowledge and resources that are related to the problem.

4.3 Method

4.3.1 Study Design

The underlying study conducts interviews and applies a qualitative research design as it is a highly applicable approach to gather rich data about a rare phenomenon (Eisenhardt & Graebner, 2007; Rowley, 2012). Hence, a qualitative investigation of the different engagement models in the context of new venture supplier provides us with valuable insights even with a small sample size (Rowley, 2012). Furthermore, case studies and interview research already proved its value in previous studies that investigated the emerging relationships between new ventures and established firms (La Rocca et al., 2017; Zaremba et al., 2017). Consequently, the approach is in line with prior studies. Likewise, every single case or interview can be seen as its own experiment and therefore provides us with unique data for the subsequent analysis (Eisenhardt & Graebner, 2007). The link between the startup collaboration forms and the supplier development literature is to the best of our knowledge missing in the current literature. So, a qualitative investigation allows us to discover a rich set of results that covers a broad spectrum. As proposed by (Eisenhardt, 1989), the interview questions were carefully designed by developing constructs before the data collection. The questions were classified into the *introduction*, the

general scouting activities, the *specific engagement models*, the *purchasing department integration* and the applied *development efforts* towards the new ventures. The study purposely focuses on the three cooperation models of a corporate accelerator, corporate venture capital investments as well as non-equity strategic partnerships. The corporate incubator is not part of our investigation, as the terms accelerator and incubator are often used interchangeably by practitioners (Brigl et al., 2016). Consequently, we are focusing on the partnership with external startups and therefore do not concentrate on incubators, which are commonly accelerating the ideas of their own employees (Mocker et al., 2015). As a result, the interview questions are steered to answer the stated research question. Prior to the development of the categories, the RDT and the previously described theoretical background about the relationship between startups and established firms served as a guideline. The questions allowed us to gain rich insights about the engagement models *tradeoffs*, including the underlying *governance mechanisms*, the *supporting mechanisms* and the inherent *risk and uncertainty*. The questionnaire can be found in Appendix 4.

4.3.2 Data Sample

One of the biggest challenges of conducting interviews lies in selecting applicable informants (Rowley, 2012). Consequently, the sample consists of 15 carefully selected experts, as proposed by (Eisenhardt & Graebner, 2007). The interview questions were designed as a semi-structured approach because it offers flexibility to the researcher during the interviews (Rowley, 2012). The semi-structured interviews were conducted as face to face meetings and ranged from 20-35 minutes. The data collection was stopped at the time we reached theoretical saturation and additional interviews only add up marginal new insights (Eisenhardt, 1989). All of the informants worked at one out of five different European car manufacturers at the time of the data collection. The automotive industry was chosen as it offers an appropriate context for examining supplier development activities as well as the emerging relationship between established firms and startups. As one of our authors was also working in the automotive industry, we were able to identify and contact the startup experts within the corporation previously to our study. As a precondition, all of the participants were required to have at least one year of experience in working with startups from an established firm perspective. Accordingly, the participants had experience in working with startups up to 11 years. Furthermore, the interview partners were obliged to possess experience with strategic startup partnerships, corporate venture capital units and corporate accelerators as their everyday business. Importantly, all of the

participants were provided with the previously described definitions of the different collaboration forms to ensure that the informants had the same understanding of the models under investigation. As a result, the selected participants were active startup scouts in their organization and they were partnering with corporate accelerators, corporate venture capitalist and strategic partnerships which makes them valuable for the study. The informants possess a diverse background from research & development, innovation management, purchasing but also from mergers & acquisitions. So, the diversity of the sample allows for constructive insights from different perspectives. Moreover, the automotive companies in our sample had no department that was entirely responsible for the startup scouting and startup relations. Instead, the startup scouting and partnerships were supervised by cross-functional teams, which justifies the diverse background of our sample. The informants were asked to refer their answers to their recent experience with startups that are younger than six years, which is in line with previous research (Song et al., 2008; Zaremba et al., 2017). Details about the sample can be found in Table 8.

Table 8: Sample Composition of Study 3

Interview Partner	Job Description	Department	Industry	OEM	Experience (Years)
1	Startup Scout & Innovation Manager	Trend Scouting	Automotive	OEM 1	3
2	Technology & Startup Scout	Innovation Management	Automotive	OEM 2	1
3	Startup Scout & Area Manager	Purchasing	Automotive	OEM 1	1
4	Startup Scout & Innovation Manager	Purchasing	Automotive	OEM 1	5
5	Startup Scout & Innovation Manager	Purchasing	Automotive	OEM 1	6
6	Startup Scout & Leader Business Developer	Merger & Acquisition	Automotive	OEM 3	3
7	Startup Scout & Investment Manager	Merger & Acquisition	Automotive	OEM 1	1
8	Startup Scout & Innovation Manager	Purchasing	Automotive	OEM 4	4
9	Head of Corporate Startup Platform	Innovation Management	Automotive	OEM 4	1
10	Startup Scout & Investment Manager	Production Management	Automotive	OEM 2	5
11	Startup Scout & Innovation Manager	Research & Development	Automotive	OEM 1	4
12	Startup Scout & Startup Relation Manager	New Mobility & Innovations	Automotive	OEM 1	4
13	Technology & Startup Scout	Trend Scouting	Automotive	OEM 1	2
14	Startup Scout & Startup Relation Manager	New Mobility & Innovations	Automotive	OEM 1	3
15	Startup Scout & New Partner Manager	Business Relations	Automotive	OEM 5	11

4.3.3 Data Analysis

The analysis of the interviews followed a structured approach and all of the 15 interviews were recorded and transcribed in detail as recommended by (Miles & Huberman, 1984). Before the interviews were conducted, further researchers were consulted to increase the validity of the study and questionnaire as proposed by (Rowley, 2012). In line with (Eisenhardt, 1989), the examination of similar patterns across the cases was analyzed after a thorough within-case investigation of each interview. Consequently, the within-case analysis allowed us for the identification of the tradeoffs of the different engagement forms between established firms and startups. We listened to each of the cases in detail as it allowed us to identify the different perspectives and to examine the key points of our study (Rowley, 2012). Thus, the within-case analysis provided us with valuable insights about the different use cases of each engagement form in the context of supplier development. As a second step of the analysis, an across case analysis was applied as proposed by (Eisenhardt, 1989). The examination across cases enables us to detect similarities but also differences in the usage of the engagement models with new ventures. The analysis was divided into two steps: Firstly, the *tradeoffs* of the cooperation forms were analysed based on the respondents' answers towards the first two parts of the questionnaire. Secondly, the interview questions from the third and fourth part were consulted to combine the startup engagement models with the further development of new ventures as suppliers. Consequently, the reviewed literature and one expert interview served as a construct to analyse the characteristics of a corporate accelerator, a strategic partnership, as well as the corporate venture capital unit. Prior to the study, we consulted one startup expert from the Silicon Valley to ensure the validity of the questionnaire based on his long-term experience of more than ten years. As a result, the analysis is structured as follows: we were able to depict the *overall objectives, the associated risk and uncertainty, the specificity of the support mechanism and the applied relational governance* as the most important aspects to consider. To provide a common understanding, the startup expert highly recommended starting the analysis with the overall objectives of the engagement models because many different expressions of the models' exist in the market.

4.4 Analysis and Results

4.4.1 Tradeoffs of the Startup Engagement Models

The interviews allowed us to identify the different *tradeoffs* of a corporate accelerator, a strategic partnership, as well as a corporate venture capital investment in the context of supplier development with new ventures.

4.4.1.1 *The Objectives of the Engagement Models with New Ventures*

According to the RDT, not all inter-organizational arrangements are equally applicable to increase organizational stability as they follow distinct rationales (Dress & Heugens, 2013). In line with the literature, the overall objectives of the models emerged as an essential attribute for our participants in the development of new venture suppliers. The outcome of working with new ventures were highly dependent on the collaboration itself and determined the value of a partnership in the long-run as outlined by Interviewee (3): “*Not all startups are equally applicable for our accelerator or an investment and we have to tailor the relationship and the applied governances according to our goals*”.

As explained by Interviewee (12), the *corporate accelerator* served as a tool for the assessment of a variety of low-mature venture ideas but also for the provision of general support: “*Our accelerator allows us to identify but also test early-stage ventures in a concise time and we are able to provide general mentorship towards different kind of startups*”. Hence, the model enables the detection of a variety of different startups at the same time to identify the requirements of the startup towards becoming a new key supplier in the future. From a purchasing perspective, the program proposed new possible suppliers on an ongoing basis as several startups graduated during the year as explained by Interviewee (1): “*Our accelerator supplies us with at least 12 young graduates every year and the good thing is that we already know the idea, the team and what needs to be done for further development*”. Consequently, a corporate accelerator serves as a tool to increase organizational stability by ensuring the flow of essential resources of the future, which is a vital declaration of the RDT (Oliver, 1991). However, due to the limited duration of the program, the access to the innovation was only ensured for a short time-frame and the graduates commonly required further development.

The RDT outlines alliances between organizations as a tactic to cope with resource dependencies as well as to enhance its legitimacy (Dress & Heugens, 2013). The interviews designated a *strategic partnership* as an excellent way for established firms to test the scalability of a new venture as explained by Interviewee (5): “*We are using pilot-partnerships to learn about working with a particular startup but also to identify what needs to be done for scaling*”.

their idea in our company". Therefore, the strategic partnership allows for testing a buyer-supplier relationship with a particular startup and a particular project in comparison to the cohort-approach of a corporate accelerator.

According to the RDT, a merger or the partial acquisition of a firm is the most inclusive way to manage the resource dependencies of a firm (Pfeffer & Salancik, 1978). The interviews pointed out that a *corporate venture capital* unit served as a mean for established firms to invest in high potential startups that were ready to scale with a long-term perspective as explained by Interviewee (6): "We are investing in startups for two reasons: firstly to create barriers for our competitors or secondly, to gain financial returns in the long-run". In line with the RDT, organizational arrangements potentially increase the legitimacy of a firm (Oliver, 1991). Therefore, the engagement with a particular startup through a CVC further has the power to increase the established firm's legitimacy. Hence, a CVC investment allowed established firms in our sample to specifically advance the capabilities of the new venture as a future supplier and it provided access to everything the new venture supplier had to offer.

4.4.1.2 Risk and Uncertainty of the Engagement Models with New Ventures

According to the RDT, the inter-organizational arrangements of a firm serve as a tactic to mitigate the resource dependency (Pfeffer & Salancik, 1978). Our interviews further outlined risk and uncertainty as critical attributes in the engagement with startups because the potential outcome was hard to quantify as interviewee (4) explained: "Working with startups is often a risky endeavor and from an economic point of view it is tough to justify the engagement towards our management team".

Nevertheless, the risk of developing a new venture supplier in a *corporate accelerator* was outlined as very limited. In this regard, the predefined time of support, the high applicability towards an entire cohort, as well as the limited financial investment were emphasized by interviewee (14) "The predefined structure as well as the fixed payments highly reduces the risk of the partnership in our accelerator". However, interviewee (2) pointed to the risk of dedicating time towards the unsuccessful participants of the accelerator as the startups were still not corporate-ready: "Unfortunately, not all of the graduates are ready for series-production, or they do not fit strategically to our vision, but we know that the approach offers the opportunity to identify the next Uber or Facebook amongst all applicants". So, a corporate accelerator offers a possibility for established firms to keep the uncertainty of the startup collaboration at an appropriate range because it allows them to screen the resources of the startups as well as to experience the actual value of the new venture at first hand.

The interviews also depicted a certain degree of uncertainty in a *strategic partnership* with new ventures. Large organizations were faced by the uncertainty of knowledge spillovers in a strategic partnership because the new ventures were able to act opportunistic and to exploit the gained know-how outside the partnership as illustrated by Interviewee (6): “*Doing a pilot-project with startups requires the disclosure of our sensitive technological details to proceed in a mutually beneficial way*”. Hence, the uncertainty in a strategic partnership stemmed from the disclosure of tacit knowledge but the financial risk was considerably low as explained by Interviewee (5): “*The good thing about the pilot approach is the low upfront investments as we are not providing a fixed investment at the beginning*”. Consequently, a strategic partnership entails a manageable degree of uncertainty for established firms but it is riskier than a corporate accelerator because it requires sharing of tacit know-how.

Our interviews portrayed the highest uncertainty in startup investments via a *CVC* investment. Interviewee (7) displayed the complexity of quitting the partnership as well as the potential adverse effect on the established firm’s reputation: “*Startup investments are achieving high media coverage and many investments from our competitors have shown that it might result in losing a high amount of money*”. The investment served as a massive commitment of the established firm but it also protected the startup against competitors and provided access to resources as explained by Interviewee (1): “*The investment provides us with ongoing market access and we are not facing the risk of losing the startup to one of our competitors*”. On the one hand, such an endeavor is risky because it requires financial investments but on the other hand, it also ensures a stable resource flow in the future, which is a core activity to reduce the resource dependence of a firm (Oliver, 1991). Consequently, the interviews characterized the *CVC* investments with high risk in comparison to the medium risk of strategic partnerships as well as the low uncertainty of the engagement via a corporate accelerator.

4.4.1.3 Relational Governances of the Engagement Models with New Ventures

The RDT points to an organizations’ ability to ensure resource stability by utilizing different organizational arrangements with appropriate governance mechanisms (Ebers & Semrau, 2015). In line with the theory, the interviews showed significant differences in the applied governance mechanism of the organizational arrangements because it determined the ease of switching between partners as outlined by Interviewee (3): “*Finding the balance between exclusivity and flexibility is one of our core tasks because startups are always faced by a high failure-rate and we have to react quickly*”.

The participants highlighted the great flexibility of a *corporate accelerator* due to the lightweight contract and the fixed time-frame of the startup support as outlined by Interviewee (2): “*The good thing about our accelerator lays in the fact that we can quit the cooperation after six months if we do not see the use case for us or the new venture*”. Consequently, the accelerator provides established firms with the possibility to work with many startups in many use cases at the same time and terminating the relationship can be done in short notice. However, Interviewee (12) emphasized the adverse impact of the flexibility on the exclusivity of the partnership “*The short-time engagement and the low formality in our accelerator bears the risk of losing a good startup to competitors as we are not taking any equity from the very beginning*”. Hence, the corporate accelerator does not provide exclusive access to the startup’s innovative resources but it offers a flexible way to interact with a variety of new venture ideas.

Likewise, the interviews also exhibited flexibility as one feature of a *strategic partnership* but with vital distinctions in contrast to an accelerator. Within the arrangement, a project-based contract existed which offered great independencies without making strong commitments as outlined by Interviewee (4): “*We are signing a formal but project-based contract with the startups to determine the desired objectives of the engagement*”. Consequently, established firms can access the appropriate resources of the startup for the time of the project without signing further long-term commitments. According to the RDT, organizational arrangements with legal contracts acts as the strongest way to increase its autonomy because the collaboration can be terminated without legal effects (Dress & Heugens, 2013). In contrast, the time-limited and project-based nature also affected the exclusivity of the established firms. Interviewee (5) emphasized the missing exclusive rights in a strategic partnership with a startup but highlighted the opportunity to use the mutually developed outcome: “*We make sure from the very beginning that we can use the results of the pilot-project beyond the partnership itself*”. So, a strategic partnership is a flexible and contract-based tool for established firms but it does not secure exclusive access to the startup's innovation.

On the contrary, our interviews displayed the highest exclusivity but the lowest flexibility for established firms that were engaging in *CVC* investments. The formal contract that supplemented the investments was interlinked with losing the flexibility but it enhanced the exclusivity as outlined by Interviewee (6): “*Taking equity in a startup makes switching very costly but it serves as an anchor for us to ensure the access to innovations*”. Subsequently, the exclusivity reduces the risk of opportunistic behavior of the startup or the investment of a competitor into the same venture. Nevertheless, the RDT perceives a merger & acquisition as the most constraining possibility of a firm to decrease its resource dependency because it decreases the

firm's autonomy and requires high investments (Davis & Cobb, 2010). Consequently, the organizational arrangement of a CVC makes switching the startup complicated but it provides exclusive access to the startup's resources.

As a result of our interviews, the lowest flexibility but the highest exclusivity were found in a CVC investment and the highest flexibility but the lowest exclusivity was expressed by the governance mechanisms of a corporate accelerator.

4.4.1.4 Support Mechanisms Specificity of the Engagement Models with New Ventures

The data emphasized the provision of tailored and ongoing support as one of the critical elements in working with startups as newly suppliers as explained by Interviewee (15): “*The startups know that they are dependent on external support but the support needs to be tailored to the particular startup as all of them face unique challenges*”.

The *corporate accelerators* in our sample supported a cohort of new ventures with general mentorship and training in different fields but the engagement did not provide highly specific and steered development endeavors as outlined by Interview (14): “*We are supporting all participants with everything they need such as office spaces or seminars to further develop their business idea in a quite general way*”. Hence, established firms benefit from the high applicability of the support mechanisms towards all kinds of startups but it negatively affects the specificity because it is not tailored to a particular project.

In contrast, the interviews underscored the work on a specific problem and towards a predefined goal as a vast benefit of a *strategic partnership* as interviewee (10) explained:” *Strategic partnerships with new ventures are great for testing a particular startup idea in our corporate environment with a predefined pilot-project*”. However, the data indicated the tendency of strategic partnerships to neglect specific startup support and to focus on the provision of merely financial resources as explained by Interviewee (5):” *We are supporting the startup with financial resources if the project requires it but we are not providing any mentorship or training towards the startup*”. Nevertheless, the close interaction in the project phase allows established firms to detect weaknesses of the startup as well as to provide tailored support mechanisms.

The interviews revealed the highest specificity of the development efforts in a *CVC* investment because of the contractual commitment. The support was tailor-made towards a specific project as well as to the capabilities of the overall startup as explained by Interviewee (15): “ *An effective CVC investment is characterized by the ongoing support of the startup to*

push the idea but also the entire business forward". Hence, a CVC investment permits established firms to specifically increase the capabilities of the new venture as a future supplier. The model provided the established firms with the access to everything the new venture supplier had to offer. Nevertheless, the specificity of the efforts was associated with high costs and required the ongoing interaction and engagement of a dedicated team as explained by Interviewee (2): *"The equity investments, as well as the supporting mechanisms, require a lot of manpower and financial contribution"*. Consequently, the interviews uncovered the lowest specificity in a corporate accelerator, medium specificity in a strategic partnership and the highest specificity in a CVC investment. A synthesis of the findings can be found in Table 9.

Table 9: Tradeoffs of the Engagement Forms with New Ventures

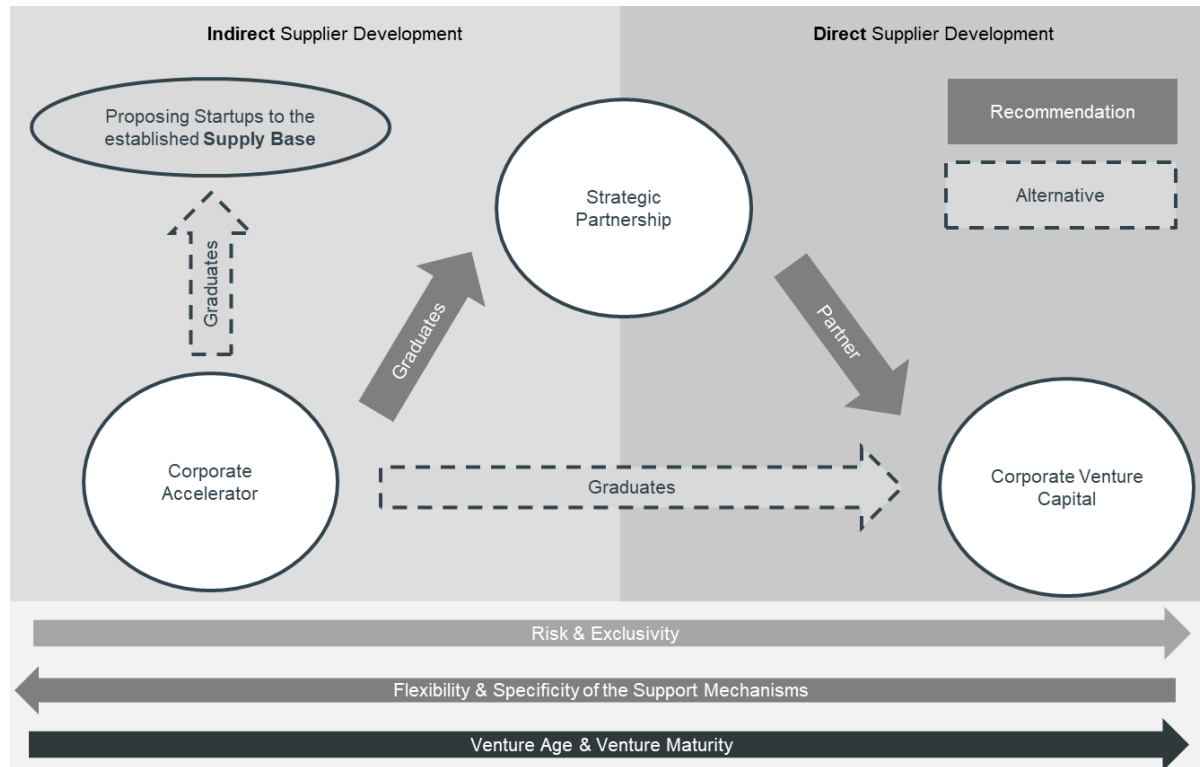
	Corporate Accelerator	Strategic Partnership	Corporate Venture Capital
Support Mechanisms Specificity	Low	Medium	High
Risk and Uncertainty	Low	Medium	High
Governance Mechanism	Non-Equity	Non-Equity	Equity
Flexibility	High	High	Low
Exclusivity	Low	Medium	High
Venture Stage	Early-Stage	Medium-Stage	Later-Stage
Maturity of the Product	Low	Medium	High

4.4.2 Framework: The Engagement Models of Startups as Direct and Indirect Supplier Development Tools for New Ventures

Krause et al. (2000) emphasize the value of increasing the competitive pressure amongst the established suppliers as it serves as an incentive for their further development to stand the competition. Based on the interviews, this work proposes a way to make sense of the distinct new venture engagement forms for the direct but also indirect development of startups as new suppliers. In line with our findings, the supplier development tools differed in their *associated risk and uncertainty, the specificity of the support mechanism and the applied relational governance*. As outlined in Figure 4, the framework suggests to utilize the corporate accelerator, the strategic partnership as well as the corporate venture capital investments in a sequential

manner to reduce the inherent uncertainty of working with startups as recommended by Interviewee (2) “The investment in a startup should be the last step of a thorough evaluation of the idea and after we worked on a project to mutual satisfaction”.

Figure 4: Framework - Sequential Supplier Development with New Ventures



Firstly, the framework suggests applying a corporate accelerator as a starting point for the supplier development of new ventures as it serves as an instrument for the identification, selection and initial evaluation of early-stage venture ideas. The most significant advantage of the accelerator lies in the low formality of the cooperation, which decreases the uncertainty of the partnership to a minimum level. So, the corporate accelerator exemplifies an indirect supplier development tool. On the one hand, the provided resources are limited but on the other hand, it incentivizes and monitors new ventures to further develop themselves by providing valuable feedback. Thus, the corporate accelerator signals the opportunities of a long-term engagement to the startup after a successful graduation of the program which is in line with the indirect supplier development literature (Wagner, 2006, 2010; Zaremba et al., 2016). Hence, the corporate accelerator functions as a valuable mean for supplier evaluation that was outlined as a critical element for the further development of suppliers (Krause & Ellram, 1997; Modi & Mabert, 2007). Consequently, the following proposition is stated:

Proposition 1: *A corporate accelerator serves as an indirect supplier development tool for established firms by selecting, evaluating, generally supporting and incentivizing early-stage ventures to become a key supplier of the future.*

As a second step in the development of startups as suppliers, the framework suggests the engagement with a successful graduate of the corporate accelerator in a strategic partnership. In this case, the startup's team and the idea are already evaluated but the scalability and the project itself needs to be assessed as explained by Interviewee (14): "We are aware that the graduates of our accelerator are commonly not ready for series-production and that we still have to invest much effort to make it series-production ready". Modi & Mabert (2007) depict the importance of an initial supplier evaluation for the development of knowledge-sharing routines within the supplier development activities. Hence, the pilot-project allows for initiating a buyer-supplier relationship that is characterized by the exchange of knowledge for achieving a pre-defined goal. It also empowers the established firm to recognize what needs to be done for the further development of the startup to become a supplier in the future. Likewise, the uncertainty of a strategic partnership is restricted due to the time-limited nature of the arrangement. Consequently, the strategic partnership acts as a proactive means for both, direct and indirect supplier development in the startup context. The pilot-partnership is characterized by the dedication of resources, which is in line with the characteristics of direct supplier development (Wagner, 2010; Zaremba et al., 2016). Besides, the findings revealed that a strategic partnership also entails indirect supplier development aspects. The engagement in a pilot partnership prospects a potential long-term investment towards the new venture and therefore, incentivizes the startups to further develop themselves. Subsequently, the following proposition is stated:

Proposition 2: *A strategic partnership serves as a direct and indirect supplier development tool for established firms by incentivizing the new ventures to engage in a long-term relationship through close interaction and by providing the startups with specific and tailored support to solve a particular problem.*

As a last and most exclusive supplier development activity, the framework proposes a corporate venture capital investment in a mature and later-stage venture. In an ideal situation, the startup already proved its value and its scalability in a prior strategic partnership and corporate accelerator program. Hence, corporate venture capital investments provide the established firm with exclusive access to the startup's resources but terminating the relationship is more complicated due to the fixed legal arrangements. As a result, the investment in startup serves as a tool for specific and direct supplier development initiatives by following the direct

involvement strategy proposed by (Krause et al., 2000; Monczka et al., 1993). As an example, Toyota and Nissan also pursue a direct involvement strategy with its suppliers by taking minor equity and by providing a variety of supporting mechanisms such as human and capital investments (Dyer, 1996). Thus, a corporate venture capital financing functions as a direct supplier development instrument. The model dedicates a vast amount of resources and capabilities towards the new venture to become a key supplier of the future. Consequently, the following proposition is stated:

Proposition 3: *A corporate venture capital investment serves as a direct supplier development tool for established firms, by investing in later-stage startups and by providing specific and tailored support for the further development of the new venture.*

As a result, the framework depicts the value of following a sequential approach as an established firm to reduce the inherent uncertainty in working with startups. Besides, it suggests to increase the exclusivity of the partnership step by step as an ongoing process. Therefore, the following proposition is stated:

Proposition 4: *The sequential use of a corporate accelerator, a strategic partnership and a corporate venture capital investment allows for direct and indirect supplier development efforts and reduces the risk for established firms in working with new ventures.*

Lastly, the framework proposes the use of already identified startups as an indirect supplier development tool for an already established long-term supplier. As Interviewee (3) indicated, established suppliers were also searching for innovations and partnerships with startups: “We are constantly working on innovations with our key suppliers and we are trying to support our suppliers by all means to improve the performance of our components”. Therefore, the data pointed to the purchasing functions possibility to leverage its supplier network for sharing the identified startups with the established supply base as explained by Interviewee (4): “Not all of the startups fit 100% but we should forward them to our key suppliers as was further incentive to work closely with us”. As a consequence, the framework suggests forwarding the strategically non-fitting startups to the established supplier base. Creating a link between the startup world and the established supplier network serves as an indirect supplier development effort for established suppliers. In this case, the established suppliers are incentivized to achieve ac-

cess to the startup ecosystem as a reward. Therefore, sharing startups with established key suppliers serve as a proactive tool to improve the capabilities of the established suppliers which was outlined as critical in the supplier development (Krause & Ellram, 1997; Lawson et al., 2015). Consequently, the following proposition is stated:

Proposition 5: *Sharing strategically non-fitting startups with the supply base serves as a proactive and indirect supplier development tool for buying firms by supporting the established suppliers to increase their innovation performance.*

Nevertheless, the surrounding circumstances sometimes call for immediate actions of the established firms. Therefore, testing a startup in a corporate accelerator or strategic partnership in a sequence was not always possible as Interviewee explained (2): “*All of our competitors are screening the market for high potential startups and therefore we do not have the time for a detailed evaluation in all cases*”. Subsequently, investing in a startup after the graduation of the corporate accelerator without engaging in a strategic partnership provides a mechanism for exclusivity but it also entails even higher risk and uncertainty for the buying firm.

In sum, the value of startups as drivers of innovations is indisputable and this framework suggests a way how to identify, evaluate, unlock the potential and support new ventures as future suppliers. A summary of the propositions can be found in Table 10.

Table 10: Summary of Propositions of Study 3

Proposition 1:	A corporate accelerator serves as an indirect supplier development tool for established firms by selecting, evaluating, generally supporting and incentivizing early-stage ventures to become a key supplier of the future.
Proposition 2:	A strategic partnership serves as a direct and indirect supplier development tool for established firms by incentivizing the new ventures to engage in a long-term relationship through close interaction and by providing the startups with specific and tailored support to solve a particular problem.
Proposition 3:	A corporate venture capital investment serves as a direct supplier development tool for established firms, by investing in later-stage startups and by providing specific and tailored support for the further development of the new venture.
Proposition 4:	The sequential use of a corporate accelerator, a strategic partnership and a corporate venture capital investment allows for direct and indirect supplier development efforts and reduces the risk for established firms in working with new ventures.
Proposition 5:	Sharing strategically non-fitting startups with the supply base serves as a proactive and indirect supplier development tool for buying firms by supporting the established suppliers to increase their innovation performance.

4.5 Discussion, Implications and Outlook

This explorative research adds valuable practical but also theoretical insights and proposes a framework for the supplier development with startups from an established firm perspective. The framework demonstrates the benefits of a corporate accelerator, a corporate venture capital investment as well as a strategic partnership as engagement models for established firms to unlock and further develop the potential of new ventures.

4.5.1 Theoretical Contributions

The underlying study adds to the upcoming research at the intersection between entrepreneurship and supply chain management by indicating ways how to initiate and further develop a buyer-supplier relationship between established firms and new ventures (La Rocca et al., 2017; Zaremba et al., 2016, 2017). Therefore, this research firstly applied the corporate-startup engagement models of a corporate accelerator, a strategic partnership and a corporate venture capital investment to the supply chain context and contributes to the literature in two distinct ways.

Firstly, the research supplements the entrepreneurial literature and outlines additional characteristics of the three investigated engagement forms between large organizations and startups (Cohen, 2013; Cohen & Hochberg, 2014; Kanbach & Stubner, 2016; Weiblen & Chesbrough, 2015). As a result, we point attention to the *tradeoffs* of the collaboration models, which are stemming from the associated *risk and uncertainty*, the *specificity of the support mechanisms* and the balance between flexibility and exclusivity of the *governance mechanisms*. Consequently, these categories were found to determine the applicability of a corporate accelerator, a strategic partnership, or a capital venture investment from an established firm perspective.

Secondly, the study adds to the supplier development literature and proposes a way to further improve the capabilities of current and future suppliers (Krause et al., 2007; Krause & Ellram, 1997; Lawson et al., 2015; Modi & Mabert, 2007; Wagner, 2010; Wagner & Krause, 2009; Zaremba et al., 2016, 2017). Therefore, the findings demonstrated the advantages of a corporate accelerator, a strategic partnership and a corporate venture capital as instruments for identifying, evaluating and developing new ventures as future suppliers. As a result, the research creates a link between the supplier development literature and the distinct cooperation forms between established firms and startups. In this regard, we classify a corporate accelerator as an *indirect* supplier development tool, the corporate venture capital investment as a *direct*

supplier development mechanism as well as the non-equity strategic partnership as an arrangement that allows for both direct and indirect supplier development activities.

Furthermore, the supplier development literature found adverse effects of simultaneously applying indirect and direct development initiatives as well as recommends to proceed with indirect development efforts before the direct development activities start (Wagner, 2010; Zaremba et al., 2016). So, we are proposing a sequential and proactive framework for the development of new venture suppliers from an established firm perspective. Consequently, this research revealed a corporate accelerator for identifying new ventures as a starting point, which is followed by a strategic partnership for evaluating the scalability of an idea and the corporate venture capital investment is outlined as the last and most exclusive step. In sum, this work depicts a novel way to increase the established firm's new venture partnering capabilities which were found as a critical task in previous research. (Zaremba et al., 2017).

4.5.2 Managerial Implications

The results are particularly valuable for managers and practitioners from the purchasing context in a variety of ways as this research outlines concrete roads for the engagement and further development of startups as future suppliers.

Firstly, it provides managers with a practical framework of *how* and *when* to utilize the different engagement forms in conjunction to further develop startups. Therefore, the study recommends established firms to organize internally as a vital precondition for the engagement with a startup. Thus, established firms are advised to build up a corporate accelerator, a corporate venture capital unit, as well as to prepare for strategic partnerships as a starting point towards working with startups. In the case that one engagement model is missing, the responsiveness of established firms might be negatively affected because it increases the risk of failure and it does not allow to meet the diverse necessities of new ventures.

Secondly, this work especially supports the purchasing department to secure the supply of innovative goods by tapping into the startup ecosystem. The findings draw attention to consider the three startup engagement models as complements that can benefit from each other rather than adopting an isolated and narrowed perspective. By doing so, practitioners are able to reduce the inherent uncertainty of working with young suppliers as well as to identify innovation fields of the future. More specifically, the purchasing function is advised to play a proactive role by implementing purchasing-related startup batches into a corporate accelerator to profit from the engagement forms flexibility as well as to identify high potential suppliers at an early stage. As a result, the findings support the purchasing department to fulfill its role as

a gatekeeper of innovations, and it provides a novel way to reach out to appealing suppliers without having high investments, high risk, or long-term contracts with a young venture.

Thirdly, this research outlines a strategic partnership with a startup as a practical way for the purchasing department to solve a specific problem without signing a long-term commitment from the very beginning. As one example, managers are recommended to utilize a strategic partnership with a new venture for areas where it is difficult to find appropriate suppliers. So, an innovative pilot project with a startup allows established firms to benefit from the startup's flexibility towards adapting their business model according to the established firm needs. Hence, the findings demonstrate a way to the purchasing department to develop innovations internally with young suppliers with a limited amount of risk.

Fourthly, this work depicts corporate venture capital investments as a tool for the purchasing function to access and further develop valuable startups exclusively. In the automotive industry, this engagement instrument is favorable to ensure access to software startups and software experts, which get increased attention in recent years. Consequently, a corporate venture capital unit that implements the market knowledge but also the market needs of the purchasing department enables established firms to ensure the supply of scarce goods in the future.

Fifthly, this work indicates the significance of the purchasing function's involvement in the startup scouting process. The participation of purchasing experts offers the chance to identify unknown suppliers but also to adapt the commonly standardized negotiation process according to the needs and possibilities of the young venture. As a result, managers need to be aware that not all startups can be treated equally and a tailor-made approach is required.

Lastly, this research demonstrates the practical benefits of the different engagement models from a startup perspective. Startups are advised to proactively reach out to a larger partner to develop their idea further, to test the scalability of their product, or to get access to valuable funding. The application towards a corporate accelerator might unlock the long-term growth of the new venture by developing a close relationship with an established firm. Nevertheless, startups are recommended to define their objectives of the partnership with an established firm from the very beginning as the distinct collaboration forms also follow diverse rationales.

4.5.3 Limitations and Outlook

As a first limitation, the described framework does not cover the entire range of influencing factors that are determining the decision for or against a particular model. Hence, the exploration of additional attributes, such as the activities of the direct competitors, serves as an excellent road for future research.

Moreover, the underlying study investigates the engagement models from the established firm perspective and neglects the startups' point of view. Thus, the analysis of the development activities, as well as the tradeoffs within a corporate accelerator, a strategic partnership, and a corporate venture capital investment from the startup perspective, seems like a promising endeavor. Especially the aims and challenges that the startups experience in the different engagement forms are worth investigating in more detail.

In addition, the study assumes that established firms already have the whole range of cooperation models in place, which limits the generalizability to pioneering firms in the engagement with startups. Nevertheless, this limitation calls for an examination of the most significant cooperation form among the three models to derive guidelines for firms that are not able to install all possibilities to reach out to the startup system.

Furthermore, this work does not provide any quantification of the proposed cooperation models. Consequently, an examination of the cooperation models outcome such as the registered patents, or the completed pilot projects appears as an insightful direction for future research.

As a last endeavor for future research, the study points to the significance of carefully evaluating startups before the development activities start. Hence, the examination of the startup scouting team and especially the value of incorporating the purchasing staff as an integral part, seems like a fruitful direction.

CHAPTER 5 SUMMARY, CONTRIBUTIONS, AND OUTLOOK

This chapter summarizes the key findings and outlines the answers to the main research questions of the dissertation. Moreover, this section states the major academic and practical contributions, depicts the limitations of this research, and indicates promising avenues for future studies.

5.1 Summary of the Research Questions

The underlying research has examined the relationship between established firms and startups from various angles and has increased the understanding of the collaboration between these asymmetric partners. The study started with a broad perspective and investigated the overall aims and challenges of the partnership between established firms and startups in Chapter 2. Subsequently, a more detailed analysis of the startup selection and the further development of these young ventures as suppliers was addressed in Chapter 3 and Chapter 4.

5.1.1 Research Question 1: Aims and Challenges in the Relation between Corporates and Startups

The collaboration between established firms and startups has received growing awareness in recent years because it has been found that both partners can benefit from the affiliation in a variety of ways (La Rocca et al., 2017). However, differences in terms of size, resources, and the underlying organizational culture were found to result in a challenging endeavor for established firms and startups alike (Hogenhuis et al., 2017). Likewise, startups emerge in diverse innovation fields with distinct business models and underlying structures. Consequently, Chapter 2 has discovered the aims and challenges of the dyad and the impact of the startup's type of innovation, thus addressing research question 1.

Despite the increasing interest of large organizations, the research about the relationship between established firms and startups is still in its beginnings, and its entire complexity has not yet been outlined. Researchers have already revealed the impact of the startups' type of innovation on founding a new venture as intangible innovations were found to be far more attractive than physical ideas (Criscuolo et al., 2012; DiResta et al., 2015). Hence, and based on the RV, study 1 examined the impact of the startups' type of innovation (*software vs. hardware*) on the aims and challenges of the collaboration between established firms and startups.

The results of the study show the significance of the startups' type of innovation on the partnership and improve the knowledge about setting up and structuring a relationship with

startups. Software and hardware startups in the sample followed distinct aims in the collaboration with an established firm, which affected the underlying challenges from both perspectives. The findings also challenge the dominant position of corporate “sharks” in the alliance with startups (Katila et al., 2008). Software startups were found to possess high negotiation power due to their high applicability across industries. Moreover, a framework has been developed to display the steering mechanisms and influencing factors of the partnership.

In sum, the explorative study deepens the understanding of the multifaceted collaboration between startups and established firms. The findings further increase the complexity of the relationship between established firms and startups, as the new venture’s type of innovation influences the preparation and outcome of the partnership. Based on the research, it can be concluded that software and hardware startups require tailored approaches in their relationship with established firms. So, established firms need to be aware of the inherent differences to exploit the full potential of the partnership.

5.1.2 Research Question 2: The Selection of Startups as New Suppliers

The selection of innovative suppliers is a fundamental task of the purchasing function and presents established firms with enormous challenges. Nevertheless, the selection of new ventures as suppliers has particularly been delineated as highly uncertain because established buying firms are struggling with the evaluation of the new venture’s actual value and long-term potential (Blomqvist et al., 2005; Zaremba et al., 2017). It has been found that established firms search for novel ways to identify the unicorns among the available startups in order to engage in a successful and mutually beneficial collaboration. Study 2 has quantitatively examined research question 2 with the utilization of a regression analysis and a discrete choice experiment.

To better understand the most significant selection criteria in the context of startups as suppliers, study 2 has created a link between academia about the traditional supplier selection criteria and the observable quality signals of startups. Previous research proposed the adverse effects of applying traditional selection criteria towards new ventures as suppliers (Zaremba et al., 2017) and outlined the positive impact of quality signals to decrease the information asymmetry between startups and potential investors (Baum & Silverman, 2004; Ko & McKelvie, 2018). However, to the best of our knowledge, the utilization of observable quality signals in the supplier selection context of established firms has been overlooked, and the practicality of the traditional selection criteria has not been quantified.

The results empirically demonstrate the negative effects of focusing on the cost, quality, and delivery criteria as an established firm on a successful engagement with startups as suppliers. In contrast, the criteria of flexibility and innovation were positively related to a successful collaboration with startups. In addition, the data illustrate the value of observable quality signals stemming from the startup's human capital, third party endorsement, and alliance capital. The industry experience and the previous founding history showed the strongest positive effects for a successful partnership with startups, followed by the strategic alliances of new ventures and the backing of a venture capitalist.

In sum, the utilization of a regression analysis and a DCE served as a valuable means to achieve significant results from the different perspectives. As a pioneering study that combines the emerging research stream about startups and the well-established literature of supplier selection, the findings depict the value of applying new instruments as the purchasing function. Based on the results, it can be concluded that established organizations are forced to exploit additional selection criteria for the assessment of startups.

5.1.3 Research Question 3: The Development of Startups as New Suppliers

The dependency of established firms on their partners has been growing in recent years because they are seen as a valuable source of high-quality products for the focal firm. (Bernhard et al., 2019; Krause & Ellram, 1997). Especially, the development of startups as future suppliers has been found as a massive challenge for the buying firm, but it also offers the potential to tap into new and unknown solutions. However, the buyer-supplier relationship with startups as the supplier requires established firms to apply tailored support mechanisms, as startups are constantly challenged to overcome their resource constraints. Therefore, study 3 has qualitatively addressed research question 3.

On the one hand, academia already stated the value of a corporate accelerator, a strategic partnership, and a CVC investment for the further development of startups (Chesbrough, 2002; Cohen & Hochberg, 2014; Weiblen & Chesbrough, 2015). On the other hand, the supplier development and the implementation of direct and indirect support mechanisms were outlined as key responsibilities of the purchasing function, but with a focus on established suppliers (Wagner, 2010; Zaremba et al., 2016). However, a connection between both research streams has still been overlooked in the literature, despite the inherent potential of the engagement forms for the purchasing department. Therefore, this study has investigated the applicability of three engagement forms between established firms and startups in the context of supplier development.

Based on the RDT, study 3 expresses that a corporate accelerator, a strategic partnership, and a CVC investment are complementary tools for the purchasing function to select and further develop startups. Nonetheless, the study points out the engagement form's trade-offs for the established firms, as the models vary in the associated risk and uncertainty, the specificity of the applied support mechanisms, and the exclusivity and flexibility of the governance mechanisms. As a result, the research proposes a sequential supplier development framework with startups to reduce the risk of the collaboration and to leverage the startup's full potential from an established firm perspective. In this vein, the study outlines a corporate accelerator as an indirect supplier development tool, the CVC investment function as a direct supplier development tool, and a strategic partnership as a hybrid model.

In short, the explorative examination firstly interlinks the mature supplier development literature with the emerging phenomenon of working closely with startups. Consequently, the study contributes to the interception between entrepreneurship and supply chain management and opens up future research avenues. Based on the findings, it can be concluded that a corporate accelerator, a strategic partnership and a CVC investment are valuable tools for the purchasing function to further develop and pre-select startups.

5.2 Major Academic and Practical Contributions

As outlined and extensively discussed in Chapters 2, 3, and 4, this research contributes to the existing literature in multiple ways. The subsequent section takes a broader perspective and demonstrates the value of the underlying study from scholarly and practical points of view.

5.2.1 Major Academic Contributions

Firstly, the dissertation emphasizes the complexity of collaborations and highlights the importance of understanding and knowing the partners and their underlying business models in detail. The consideration of software and hardware startups as distinct venture types has previously been neglected in the literature. Nevertheless, the narrowed contemplation of startups as a single construct does not cover the entire truth and complexity of young ventures and their particularities. As a result, the dissertation clearly reveals the impact of the startup's type of innovation (*software* vs. *hardware*) on the relationship with established firms and opens up numerous research endeavors for the future. This work points out the impact of the partners' characteristics on the overall well-being of their relationship and the internal readiness of the individual firms'.

Secondly, the thesis challenges the prevailing view that young ventures are the weak part of the relationship with large and established firms. In this vein, the engagement with startups is a novel and uncertain endeavor for established firms as large organizations often struggle to understand the startups innovation in detail. As a consequence, startups possess a certain degree of negotiation power in a relationship with established firms. The negotiation power of the young ventures increases once the startup's innovation is positioned far beyond the core competencies of the established firm.

Thirdly, this dissertation illustrates the value of combining established and well-developed research agendas with upcoming trends in order to tap into new and innovative approaches. As a result, this work firstly challenges the traditional supplier selection and supplier development practices in the engagement with startups and outlines the value of applying startup tools as an established firm. Consequently, the combination of seemingly unrelated constructs might yield beneficial insights into a variety of contexts and offer great potential for future research.

Fourthly, this work emphasizes the significance of the purchasing function in the scouting process, the development of the startup, but also the overall well-being of the relationship. So, the results point to the responsibilities of the purchasing function to act as a gatekeeper for innovations in the long-run as well as to increase the competitiveness of the overall firm. Subsequently, startups do not replace the traditional techniques and activities of the past but young ventures enable established firms to achieve complementarity expertise that lies beyond their own boundaries.

Lastly, the dissertation contributes to academia in a methodological way. The combination of an experimental discrete choice experiment and a regression analysis as outlined in Chapter 3 yielded valuable insights and allowed us to investigate emerging phenomena and traditional measures at the same time. Therefore, this work points to the attractiveness of a twofold methodological approach for the examination of stated versus revealed differences of individuals and displays a fruitful research agenda for the future.

5.2.2 Major Practical Contributions

The results of the dissertation further provide significant insights for practitioners that go beyond the detailed findings of the preceding studies.

First, the dissertation clearly outlines the impact of external trends, such as digitalization, on the organizational culture of the purchasing function. As a consequence, in addition to focusing on cost, decision-makers are well advised to implement an innovation-driven culture in

the engagement with young suppliers. In this regard, a shift needs to be done from a short-term and cost-saving perspective towards an assessment that integrates the potential long-term value of a buyer-supplier relationship with innovative young ventures. Subsequently, this work reveals weak spots of the purchasing function in the collaboration with startups, and also provides decision-makers with valuable indications for steering the purchasing function towards the future.

Second, the research sheds light on the value and particularities of new and unequal partners from an established firm perspective. As discussed in Chapter 2, the findings raise the awareness of established firms to search for innovative partners beyond their core supplier and industry boundaries, in order to access novel resources and take on the competition in the future. Consequently, the purchasing function is recommended to develop appropriate mechanisms and to further develop its own personnel towards working with startups as potential suppliers of the future.

Third, the underlying work supports practitioners from the purchasing context in designing appropriate instruments for the selection and further development of startups as suppliers. Hence, decision-makers can utilize the frameworks to evaluate the risk of startup engagement and to assess the internal readiness towards working with young ventures. As a result, the studies shed light on the different tools that are available in the market to reach out to the startup ecosystem as well as point out practical guidelines for managers.

Fourth, the thesis offers essential information for decision-makers from the automotive industry and supports established OEM experts on their way to keep up its innovativeness in the upcoming e-mobility era. So, the thesis outlines the benefits of young ventures, especially in areas that are far beyond their core activities such as the development and implementation of software solutions, which get increased attention in recent years. As a consequence, established automotive OEM's are advised to collaborate closely with startups in the development of software innovations to overcome the existing knowledge-gaps in a timely and customer-oriented manner.

Fifth, the dissertation provides essential findings for startups with the intention to reach out to large and established partners. The data indicate ways for young ventures to reach out to established firms as well as creates an awareness of the peculiarities and difficulties of large organizations in a relationship with an unequal partner. Subsequently, risk-averse startups are recommended to engage in flexible and non-exclusive partnerships in the beginning in order to understand the intentions of the established firm before long-term and exclusive deals are signed.

5.3 Limitations and Future Research

Despite the contributions of the conducted studies to academia and practice, this research is not without limitations. Five limitations are described in detail and put in context for future research.

Firstly, the qualitative nature of study 1 and study 3, as well as the small sample sizes, allowed us to discover the evolving relationships between established firms and startups in their real-life context (Barratt et al., 2011; Yin, 2014). However, the applied qualitative methodology negatively affects the generalizability of the results. As a consequence, the findings shed light on the collaboration between the asymmetric partners, but the challenges, aims, and development mechanisms might differ in further industries or small and medium enterprises. It is essential to note that the relationship needs to be tailored to the established firm's routines as well as to the characteristics of the startups, as shown in study 1. This limitation calls for a replication of the qualitative studies both in a quantitative manner and outside of the automotive industry. Furthermore, the buyer-supplier relationship between startups and SME companies appears to be an exciting direction for future research, because SMEs differ from established corporations in terms of size, bureaucracy, and hierarchies (Nicholas, Ledwith, & Perks, 2011). Moreover, a longitudinal study that follows a batch of startups from the very beginning of the collaboration to a successful pilot partnership or overall failure looks like a promising avenue for future research.

As a second limitation, the cooperation models illustrated in study 3 do not cover the entire range of engagement forms between established firms and startups. Against the depicted value for established firms of a corporate accelerator, a strategic partnership, and a CVC, further models exist in the market. As a result, study 3 cannot claim to present an exhaustive list of the available collaboration instruments for established firms. However, this limitation evokes a fruitful avenue for future research, such as an in-depth analysis of the different expressions and the applied governance mechanisms of strategic partnerships between startups and established firms. Strategic partnerships are proposed as a valuable subject for investigation because study 3 showed the highest degrees of freedom in the practical realization between established firms and startups. Also, and despite the value of the cooperation models for established firms, the transition phase between those models is not investigated in study 3. However, a structural approach is needed in order to proceed with the relationship with a startup once the time within a corporate accelerator terminates for the successful startups. In this regard, a qualitative in-depth analysis of the transition phase seems like an insightful research agenda.

Thirdly, the quantitative investigation in study 2 did not measure any interaction effects across the four variables in the DCE, which might have resulted in the neglect of exciting insights. Therefore, advancing the utilized model by measuring the interaction effects of the signals that indicate the quality of startups can be seen as one future research avenue. Besides, the sample in study 2 did not differentiate the participants based on their country of origin. However, a replication of the study in different countries might express that the quality signals are weighted contrarily dependent on the country under investigation.

Fourthly, this dissertation does not address the success rate of the collaboration between established firms and startups in detail. Nevertheless, for a strategic long-term decision to be made, the value of the engagement with young ventures need to be quantified from an established firm's point of view. Accordingly, the quantification of successful pilot projects in terms of the generated revenues or the granted patents of the different startup collaboration forms seem to yield promising results for academia and practitioners alike. In this regard, the differentiation between software and hardware startups and the effect of this differentiation on quantifiable success measures serves as an interesting direction for future research.

Fifthly, the research was conducted from the established firm's point of view and therefore neglected the startup's perspective. As portrayed in study 1, the aims and challenges of startups and established firms diverge in the partnership. Thus, the analysis of the relationship from the startup's perspective arises as an indispensable research agenda for practice and theory. More precisely, the examination of the startup's intentions and experiences in the different engagement forms, such as a corporate accelerator, a strategic partnership, and a CVC investment, might yield helpful insights.

Lastly, the conducted studies reveal various threats and challenges for the purchasing function, which introduces a final avenue for future research. An analysis of the required personal skills and capabilities to cope with the emerging changes induces an interesting phenomenon. A comparison of the traditional skills of a purchaser in contrast to the necessary new expertise in the age of digitalization appears to be an interesting research stream for the future.

In sum, the three studies depict fruitful insights into the interface between supply chain management and entrepreneurship and reveal several research proposals for the future.

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APPENDIX

Appendix 1: Interview Questions Study 1

1) Introduction

- Please briefly introduce yourself and your function within the company.
- How many partnerships do you have – How many with corporates/startups?

2) Collaboration with Corporates / Startups

Initiation & Aims of the Relationship

- How does the collaboration with the corporate/startup start?
- Please describe the aims of your firm in the partnership with the corporate/startup
- Why did your firm choose the particular corporate/startup?

Relational Governance

- What kind of formal arrangements or contracts did you sign / agree on within the collaboration?
- What do you think are contractual “no-go’s” in a collaboration with startups/corporates?
- Do you prefer to have an exclusive partnership with a corporate/startup – or do you prefer to collaborate with a variety of partners at the same time?
- According to your opinion, who had the leading role in the negotiation of the contract?

Relational Support – Relationship-Specific Investments

- Did you receive/spend specific investments for the further development of the startup?
- Did your company make specific investments for the further development of your product that cannot be used outside the partnership?
- Did your product/software improve during the partnership?

Communication - Knowledge Sharing Routines

- Please describe how often do you meet with your partner
- To what extent is the communication based on the exchange of know-how?
- Please describe if you are satisfied with the communication of the partnership and are there any aspects that you would like to change?

3) Challenges & Success Factors

- Please describe the biggest challenges in a partnership with a corporate/startup
- Please describe the key success factors of a partnership with a corporate/startup









4) Summary

- Do you consider the partnership as a success?
- Do you want to add something?

Appendix 2: Consistency Check of the Discrete Choice Experiment.

Max is responsible for the scouting of innovative startups	Not true at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Completely true
Max deliberately focuses on observable characteristics in the scouting of startups	Not true at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Completely true
The described situation is realistic	Not true at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Completely true

Appendix 3: Discrete Choice Experiment – Choice Set Example

	Startup A	Startup B	Neither
Previous Startup Experience of the Founder			Neither, because none of the startups seem appropriate
Industry Experience of the Startup Team			
Financial Backing of a Venture Capitalist			
Strategic Partnerships			

Appendix 4: Interview Questions Study 3

1) Introduction

- Please introduce yourself and your role within your organization
- How much experience do you have in working with startups?
- How do you proceed in the scouting of new ventures?

2) The Engagement Models with New Ventures

Corporate Venture Capital

- How do you assess the cooperation with a startup that is based on minority investments?
- Please state the advantages and disadvantages of this form of engagement
- How risky is the collaboration via a CVC Unit for the established firm?
- What kind of governance mechanism was applied?

Corporate Accelerator

- How do you assess the cooperation with a startup in a Corporate Accelerator?
- Please state the advantages and disadvantages of this form of engagement
- How risky is the collaboration via a Corporate Accelerator for the established firm?
- What kind of governance mechanism was applied?

Strategic Partnership

- How do you assess the cooperation with a startup in a Strategic Partnership?
- Please state the advantages and disadvantages of this form of engagement
- How risky is the collaboration via a Strategic Partnership for the established firm?
- What kind of governance mechanisms was applied?

3) The Purchasing Department in the Context of Startup Scouting and Development

- Do you think that the purchasing department should be a part of the scouting team?
- Do you think startups have the potential to become the suppliers of the future?
- Please indicate what needs to be done to integrate startups to your supplier base

4) Startup Development Activities

- Do you provide any development efforts towards the startups?
- Please indicate what needs to be done to further develop the startups

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