



The Role of Corporate Parent Support for Spinoff Innovation Performance

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Abstract. Spinoff innovation performance and its prerequisites is a relatively under-researched domain. Despite the innovative drive and remarkable growth rates that spinoffs exhibit, the majority of spinoff research focuses on stock market performance, board composition or simply growth in terms of revenues or employees. The empirical analysis in this paper combines two largely uncharted topics in spinoff research. First, it measures the innovation performance of the spinoff by utilizing product innovation as a key variable. Second, innovation performance is analyzed with regard to the level of corporate parent support. Results from a German startup sample show that obstructive interference by a corporate parent is positively associated with innovation performance of a spinoff – especially compared to spinoffs that receive parent support. Moreover, the analysis reveals that results are mainly driven by high-tech industry branches.

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1. Introduction

Spinoffs represent an important means to introduce new technologies, products and services to the market that would otherwise be left unexploited. Their drive for innovative solutions is unique since spinoffs reveal high growth rates with lower failure rates than other startups (Tubke, de Toledo Saavedra, and Gonzalez, 2004). Abundant opportunities within corporations as well as entrepreneurial-driven employees form the blend for spinoff foundations. Since not every opportunity can be seized, thoroughly evaluated and realized within corporations, spinoffs are an alternative route for these opportunities to be exploited. Spinoff founders thereby use the knowledge and experience gained during their previous employment. Understanding in greater depth the mechanisms that encourage or

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inhibit innovation in spinoffs during the foundation phase is the central purpose of the current analysis.

The reasons for the formation of a spinoff are as multifaceted as the type of spinoff itself. Corporate parents may choose to spin off a business in order to further new technologies or to enter new markets (Covin and Miles, 1999; Fryges and Wright, 2014; Kuratko and Audretsch, 2009). They might also want to restructure and streamline their operations (Parhankangas and Arenius, 2003). However, in many cases former employees decide to leave their company and start a new business with the input they gathered during their previous tenure (Agarwal et al., 2004; Dahl and Sorenson, 2012; Furlan and Grandinetti, 2014; Klepper and Sleeper, 2005; Andersson and Klepper, 2013). These different types of spinoffs in turn influence the relationship with the corporate parent. This is especially evident during the founding and startup phase of the venture. While some corporate parents initiate or support the spinoff formation (Parhankangas and Arenius, 2003), others do not have any interest in the new entities. In some instances, as in the case of the semiconductor manufacturer Intel, the parent even actively tries to obstruct the new foundation, which is typically referred to as a hostile spinoff (e.g. Jackson, 1998). Empirical studies analyzing the different degrees of support from the corporate parent are, however, rare. The same goes for empirical evidence on spinoff innovation performance in general. Only a fraction of performance studies covers innovation performance. Instead, most studies focus on financial performance, growth or survival. Consequently, this paper will delve into the topic of spinoff innovation performance depending on corporate parent support and deliver new insights into how the support level influences innovation efforts at the time of spinoff. The analysis utilizes the startup panel (SuP) from the Centre of European Economic Research (ZEW) aggregating comprehensive data of more than 6,000 startups from manufacturing and service sectors in Germany in 2009. Results show that spinoffs experiencing negative parent interference aimed at obstructing the foundation are associated with strong innovation performance regarding both the introduction of product innovation as well as market novelties. The overall results are mainly driven by high-tech industries.

The paper is structured as follows: the subsequent section provides an overview of the relevant literature for the analysis and presents the hypothesis development. Sections three and four focus on the methodology and empirical results. The study ends with a discussion of the findings, a conclusion and ideas for future research.

2. Literature Review and Hypothesis Development

Spinoffs can be a booster for innovation (Chesbrough and Rosenbloom, 2002; Maselli, 2013). On the basis of this common notion, research derives its

motivation from the fundamental assumption that spinoff founders often develop their business ideas resting upon the tenure with their previous employer (Bhide, 1994; Cooper, 1985; Fryges and Wright, 2014). From a resource base perspective, during that tenure the employee has insight into (and is also part of) the company's knowledge and technology infrastructure, which forms the basis for its competitive advantage (Barney, 2001). With the decision to spin off a new entity, a knowledge transfer occurs, whereby the spinoff founders apply the absorbed knowledge in a new context (Furlan and Grandinetti, 2014). In applying said knowledge and capabilities, the newly formed spinoff has an advantage compared to other ventures that cannot apply the same type of knowledge or capabilities (Dahl and Sorenson, 2012; Buenstorf, 2007; Chatterji, 2009; Klepper, 2002; Vivarelli, 2013).

The literature on corporate spinoffs is multifarious and focuses on a variety of different topics. Growing interest arises from the corporate strategy, innovation and entrepreneurship research fields (Tubke et al., 2004). Among the intensely researched topics are the motivations of the founders as well as the intentions and the role of corporate parents (Agarwal et al., 2004; Burton, Sorensen, and Beckman, 2002; Klepper, 2001; Klepper and Sleeper, 2005). Some studies aim at defining spinoffs and creating a typology thereof (Caiazza and Audretsch, 2013; Lindholm, 1994; Narayanan, Yang, and Zahra, 2009; Parhankangas and Arenius, 2003; Tubke et al., 2004). In essence, corporate spinoffs are new business entities that are founded based on, at least, the idea from a parent company. The idea itself can arise from the knowledge base instilled among the employees or the technologies that are utilized by the parent. The only exception to this definition are restructuring spinoffs that serve the parent company as an organizational tool to focus its core business efforts in tough market situations (Parhankangas and Arenius, 2003).

The support level of the corporate parent can vary substantially. Some spinoffs keep formal ties with their parent. The parent may be a shareholder of the new entity or may sub-license rights for technologies (Parhankangas and Arenius, 2003). Moreover, the parent can share resources and know-how in order to provide the spinoff with a head start (Phillips, 2002; Zahra, 1996). On the other hand, employees might initiate a spinoff without any parent support (Agarwal et al., 2004; Wright, Hoskisson, and Busenitz, 2001). This can be due to a parent company that does not believe in the spinoff idea (Hellmann, 2007) or is not willing to dedicate resources to the idea (Moore and Davis, 2004). In some cases an employee initiates a spinoff against the express will of the corporate parent, which is referred to as a hostile spinoff (Tubke et al., 2004). In his theoretical contribution, Kaivanto (2005) adds that hostile spinoffs are initiated spontaneously with a pull motivation and compete with the corporate parent instead of being neutral or supplemental to the parents' product or service portfolio.² For the purpose of this study, the empirical analysis is going to

2. The author contrasts hostile spinoffs with research-based spinoffs that are planned and thus non-spontaneous.

distinguish between cases in which spinoffs were either initiated by the corporate parent or supported during the foundation³, cases where the parent remained neutral and did not take any actions and cases where the parent interfered during the initiation phase and tried to obstruct its foundation.

2.1. Corporate Parent and Spinoff Performance

Qualitative approaches defining and describing spinoffs as well as their corporate parent support are one part of the existing research landscape, while a variety of studies analyse the performance of the corporate parents or spinoffs respectively. Performance in this context is mostly seen as financial performance, growth and survival.

Oftentimes performance analyses focus on stock market performance of the parent and the effects of the executive board composition (Narayanan, Yang, and Zahra, 2009). Chesbrough (2003) finds that an independent board dominated by venture capitalists shows better financial performance than spinoffs with members who initially worked for the corporate parent. Dick et al. (2013) analyze spawned venture financial performance in dependence of the corporate parent performance for a Dutch sample of more than 26,000 ventures, showing that spinoffs that are spawned by successful firms financially outperform ventures from poorly performing parents.

Another stream of spinoff performance studies explores spinoffs' growth trajectories and compares them to a peer group. Dahlstrand (1997) compares the performance of 60 entrepreneurial spinoffs and non-spinoff new technology-based companies in Sweden. Results show that only after ten years spinoffs start outperforming non-spinoffs in terms of revenue growth. Moreover, the inventiveness of both groups as measured by the number of patents is not significantly different from one another. Three studies comparing the performance of corporate and university spinoffs show different results for samples from Belgium (Clarysse, Wright, and Van de Velde 2011), the US (Zahra, Van de Velde, and Larraneta, 2007) and Sweden (Wennberg, Wiklund, and Wright, 2011). Findings from the latter indicate that spinoffs founded by entrepreneurs with corporate experience⁴ show better performance in terms of spinoff growth.⁵ The reasons for this finding are that human capital, specifically entrepreneurial as well as industry experience, is more concentrated in corporate spinoffs. For the Belgian sample, the authors confirm that university spinoffs

3. Support can be of financial as well as non-financial nature such as the use of R&D facilities, distribution networks or management support.

4. In contrast to a mere academic education.

5. Further research on founding team characteristics reveals that founding teams outperform single founders (Cooper, 1985; Roberts, 1991). Roberts (1991) explains that founding teams do not necessarily have a broader technical expertise, but share greater marketing and organizational experience, which in turn improves performance.

have less market knowledge, whereas corporate spinoffs benefit from their executives' market experience and utilize it to focus on niche markets, which positively supports their growth path.

The final stream of performance studies focuses on spinoff survival. Franco and Filson (2000) research spinoff survival and the length of survival in two distinct models. Analyzing data from 192 firms of the US rigid disk drive industries, the authors find that the richer the technology of the spinoff, the higher its chance of survival. Similarly, being an early mover positively influences the survival probability, as does firm growth. Surprisingly, prior founding experience in the disk drive industry does not have a positive impact on survival. In summary, empirical studies show mixed results regarding spinoff performance, indicating however that technological knowledge, corporate parent support and a founding team are promising prerequisites to a spinoff's growth.

2.2. The Corporate Parent - Spinoff Relationship

Some of the criticism voiced against spinoff research is geared towards the lack of advancement in the field by not focusing on the existing research gaps. Parhankangas and Arenius (2003) and Bruneel, Van de Velde, and Clarysse (2013) state that too little is known about the relationship between the corporate parent and the spinoff. This lack of knowledge includes the factors influencing spinoff performance (Furlan and Grandinetti, 2014). Building on that gap, recent contributions from Bruneel et al. (2013) as well as Furlan and Grandinetti (2014) tackle these less researched areas.

Furlan and Grandinetti (2014) conceptualize a network approach with regard to survival and growth of spinoffs, including but not limited to the corporate parent as a prominent and important network stakeholder. They claim that the more intense and broad a network for the spinoff during the emergence phase is, the better the performance of the spinoff. This approach emphasizes the importance of the emergence phase that is characterized by the initial incubation period followed by the start of market operations. During this stretch, the spinoff can develop from a mere idea to a market participant elucidating for one the significant growth as well as the importance of the network to fuel this growth. The network breadth is predominantly influenced by the corporate parent, which provides access to potential future stakeholders such as banks, suppliers and customers.⁶ The authors call for empirical research to substantiate their approach, providing an opportunity this paper takes by analyzing the spinoff performance with regard to the relationship to one important stakeholder, the corporate parent. Bruneel et al. (2013), on the other hand, empirically analyze performance by

6. It is explicitly mentioned that this set-up is only applicable when the spinoff foundation is initiated or backed by the corporate parent. However, in case of a hostile spinoff the new entity might still use the parents' network, for instance by poaching customers.

spinoff type for a sample of 46 Belgian corporate spinoffs. The analysis distinguishes between incumbent-backed spinoffs, necessity (e.g. adverse developments in the parent such as bankruptcy, acquisition, restructuring or discontinuation for research projects) spinoffs and opportunity (no support by corporate parent) spinoffs. The authors refer to the nature of opportunities as new technologies and new products. Results show that opportunity spinoffs perform better regarding employment and revenue growth than the other spinoff types despite the non-support of the parent. The fact that spinoffs successfully grasp the arising opportunities in the form of new products and services shows that they are conducive to innovation. Especially in high-tech branches, where innovations are marketed at a tremendous speed (Christensen, 2013), they are vital to a company's success. Hence, marketing innovative products and services is the driving factor for the decision to spin off.

This paper tries to fill part of the research gap by focusing on the innovation performance of the spinoff rather than on growth, financial performance indicators or the impact of the spinoff formation on the corporate parent. It builds on and extends the spinoff definition by Parhankangas and Arenius (2003) as it, similarly to the approach by Bruneel et al. (2013), explicitly includes spinoffs that are not supported by their corporate parent or experience corporate parent interference.⁷ In addition to the contribution of Bruneel et al. (2013), the analysis will, as mentioned, focus on the innovation performance instead of growth in employment and revenue, since spinoffs are often founded to introduce new technologies, products or services to the market.

2.3. Hypothesis Development

The following hypotheses address innovation performance of spinoffs given their respective corporate parent support. Spinoffs that experience corporate parent support can rely on the expertise and resources the parent organization possesses. It will support the development of new products or services that do not fit the core business strategy and reveal uncertain success probabilities. Furthermore, the technologies and products being developed within the spinoff can be very risky (such as radical innovation), in which case market potential is difficult to assess (Parhankangas and Arenius, 2003). Especially these types of projects can have long development horizons of more than ten years (Agarwal and Bayus, 2002). In order to sustain the necessary efforts, parent company support includes, but is not

7. Davenport, Carr, and Bibby (2002) as well as Rasmussen, Mosey, and Wright (2014) qualitatively describe one hostile spinoff each in a case study on the spinoff strategy of Industrial Research, a New Zealand research institute, and the role of university departments on spinoff development respectively. Neither of the studies focuses on performance aspects of the spinoffs. Other than the above-mentioned studies and theoretical contributions by Kaivanto (2005) and Tubke et al. (2004), no other studies that focus on hostile spinoffs are known to date.

limited to, better financing options. Independent startups or non-supported spinoffs often experience increased financial constraints due to the risky nature of their innovation projects (Czarnitzki and Hottenrott, 2011; Hall and Lerner, 2010). A parent-backed spinoff, on the other hand, will be able to experience superior access to financing through its parent. Additionally, another positive influencing factor for the financing of spinoffs is the corporate parents' frequent utilization of external venture capitalists that engage as co-financers for the spinoff venture (Hill et al., 2009). Besides financing opportunities, the corporate parent can also offer support regarding skilled labor and managerial expertise and, even more importantly for innovative spinoffs, in R&D planning and management (Lee et al., 2010). As a consequence, it can be hypothesized:

H1a: Spinoffs with corporate parent support will show better innovation performance compared to spinoffs that experience no parent support.

In contrast, spinoffs with no parent support do not have to cope as much with external influences that might be related to non-core activities of the new entity such as overall corporate targets they need to meet. Depending on the degree of independence of parent-backed spinoffs, this advantage can be more or less distinct. Nonetheless, the advantage for spinoffs that do not receive support from their corporate parent is the absence of organizational inertia that the parent might impose on the spinoff and thus hamper the development of innovative products and services (Hannan and Freeman, 1984; Scherer, 1991). Hence, the independent spinoff is driven by the opportunities the founders see in their products and services.

For the founders, previous employment serves as a catalyst for the spinoff foundation where he or she is able to gather ample experience. More precisely, since the risks associated with the establishment of the spinoff are considerable, the founders are likely to embody a set of entrepreneurial attitudes, industry experience and market pioneering, combined with the technological know-how necessary to successfully launch new products and services (Agarwal et al., 2004). With this acquired skill set as a springboard, the founders identify an opportunity and develop an idea on how to realize it. This catalyst process can proceed further in two ways which both lead to the same outcome. First, as Klepper (2001) identifies, the entrepreneur does not reveal his intentions to the employer and chooses to pursue his idea independently. Second, as Hellmann (2007) describes, the parent firm disregards the initiative, leading the future entrepreneur to eventually leave the company with his idea. The rejection of an innovative idea can be based on the inefficient allocation of resources when the corporate parent focuses too strongly on existing products (Ghemawat, 1991). In any case, the spinoff founders will realize their idea and terminate their previous employment. Since the experience and knowledge base of the founders is shaped through the former tenure, Klepper and Sleeper (2005) find that the potential

opportunity can be considered a competitive move against the incumbent, taking advantage of the fact that the corporate parent is reluctant or too slow to realize it. Taking into account both the entrepreneurial drive of the founders and the opportunity that might yield the potential to challenge the corporate parent, leads to the following hypothesis:

H1b: Spinoffs without corporate parent support will show better innovation performance compared to spinoffs that experience parent support.

The presented hypotheses embody two opposing views on how parent behavior could influence the spinoff innovation performance. The results of the following empirical analysis will depend on which of both forces is stronger in affecting the relationship. Prior research on spinoffs often focused exclusively on spinoffs from high-tech industries in general (e.g. Klepper, 2001), spinoffs from the same parent company such as US-based printing technology company Xerox (Chesbrough, 2003; Chesbrough and Rosenbloom, 2002), from universities (Rasmussen, Mosey, and Wright, 2014; Roberts, 1991) or specific industry branches such as lasers (Klepper and Sleeper, 2005), disk drives (Agarwal et al., 2004; Franco and Filson, 2000), semiconductors (Brittain and Freeman, 1986), high-tech industries within a specific region (Bruneel et al., 2013) or on the general country-level (Andersson and Klepper, 2013 for Sweden; Sørensen and Phillips, 2011 for Denmark). Shah and Tripsas (2007) note that previous studies have a bias towards technology-based companies. Moreover, innovation is more likely to happen in high-tech sectors where spinoffs are characteristic for these industries, regardless of whether they are founded by an employee or initiated by a corporate parent (Chatterji, 2009; Parhankangas and Arenius, 2003). This circumstance leads to the following hypothesis:

H2: The association between corporate parent support and spinoff innovation performance is more pronounced in high-tech sectors.

3. Data, Estimation Strategy, Variables and Descriptive Statistics

The analysis utilizes the anonymized version of the startup panel (SuP) of the Centre for European Economic Research (ZEW) in collaboration with the German Development Bank (KfW) and Creditreform, the largest German credit rating agency. The sample is a comprehensive database of entrepreneurial startups in Germany with several participants from manufacturing and service industry branches. The survey, that is conducted via telephone, aims at a variety of different aspects when starting a business, such as the composition of the founding team, their members' educational background, their motivation and company fundamentals (industry, sales, financing).

For the analysis the sample year 2009 is utilized. It is the only survey of the SuP that specifically investigates the role of corporate spinoffs, the relationship with their corporate parent and their challenges to becoming an independent entity. Hence, the sample is limited to this one survey wave as no others include the independent variables. In total, the sample comprises 1,325 spinoff observations.

In the empirical part of the analysis which follows in section 4, probit regressions will be estimated with product innovation and market novelties as the dependent variables. In general, the analysis will distinguish between high-tech and low-tech industries in order to answer hypothesis 2 and check for any significant differences among these industries. Finally, possible endogeneity concerns will be addressed in a further probit regression analysis followed by a robustness check with market novelties as the dependent variable.

3.1. Variables

3.1.1. Dependent Variable

The dependent variable for the initial analysis is binary in nature and asks to respondents whether the company introduced a product innovation in the year of observation.

3.1.2. Independent Variables

The independent variables are categorical in nature and distinguish the degree of parent support the spinoff experiences during its foundation phase according to the answer of the sample respondents. The relevant categories are:

- Parent initiated the spinoff (corporate parent drives the foundation of the new entity)
- Parent supported the spinoff (by [non]-financial means, but initiation by employee[s])
- Parent remained neutral (neither support, nor obstruction during spinoff phase)
- Parent interfered in spinoff foundation (attempt to obstruct the spinoff foundation)
- Irrelevant / Parent does not exist anymore

All five different answer categories are included in the different estimation models (*Parent_initiated*, *Parent_supported*, *Parent_neutral*, *Parent_interfered* and *Irrelevant/Non-exist*), but the reference category will vary according to the specific hypothesis under consideration.

3.1.3. Control Variables

A comprehensive set of control variables is included in the model. First, the number of full-time employees is utilized to control for firm size of the spinoff (*Employees*). Second, the overall investment volume of the spinoff is controlled for in order to check for the capital intensity of the business (*logInvest_Intensity*). The variable displays the logarithm of investment amounts in Euro currency to limit the potential influence of outliers. Third, two variables with regard to personnel characteristics are employed. The first one is to control for a team foundation (*Team*) and is binary in nature. According to Roberts (1991), team foundations are more likely to be more successful than single founder ventures. Additionally, prior industry experience of the founders is measured as an ordinal variable since the experience in the industry can well influence the spinoff's success (*Industry_Experience*).⁸ Fourth, with regard to the innovativeness of the venture, control dummies for process innovation (*Process*) and R&D personnel (*R&D*) are in place. The process innovation variable is binary and assesses whether the spinoff introduces process innovation in addition to its new products or services. The R&D variable provides the effective number of R&D dedicated personnel. Fifth, firm age is controlled for by subtracting the year of the spinoff foundation from 2009, our sample year (*Firm age*). Finally, a full set of industry dummies is included in the model to account for the specific manufacturing or service industries. Industries are defined by levels 3 and 4 of the NACE industry classification.

3.2. Descriptive Statistics

Table 1 provides an overview of the distribution of the independent variable answer categories. There are no significant differences between the high-tech and low-tech industries (see also Table 2).⁹ For both types of industries, slightly less

8. The scale of the control is interval and right-censored as follows: 1: $x \leq 3$, 2: $3 < x \leq 7$, 3: $7 < x \leq 14$, 4: $14 < x \leq 21$, 5: $21 < x \leq 32$, 6: $x > 32$.

9. The high-tech industry classification follows the German Classification of Economic Activities of 2003 (WZ 2003 code) published by the Federal Statistical Office of Germany. The WZ codes included in high-tech industries are: 23.30, 24.20, 24.41, 24.42, 29.60, 30.02, 32.10, 32.20, 32.30, 33.10, 33.20, 33.30, 35.30, 24.13-4, 24.16-7, 24.51, 24.61, 24.63-4, 24.66, 25.11, 25.13, 26.15, 29.11-4, 29.24, 29.31-2, 29.41-3, 29.52-6, 30.01, 31.10, 31.20, 31.40, 31.50, 31.61-2, 33.40, 34.10, 34.30, 35.20, 64.3, 72, 73.1, 74.2, and 74.3.

than half of the sample states that the corporate parent remained neutral during spinoff foundation while about 13% (high-tech) respectively 12% (low-tech) interfered with the foundation. For about 25% of the sample, the corporate parent either initiated or at least supported the spinoff.

Table 1: Independent variables

Corporate Parent Support	High-tech	Low-tech
Parent initiated spinoff	40 (6.6%)	45 (6.3%)
Parent supported spinoff	120 (19.8%)	155 (21.6%)
Parent remained neutral	288 (47.5%)	342 (47.6%)
Parent interfered in spinoff foundation	80 (13.2%)	85 (11.8%)
Irrelevant/Parent does not exist anymore	78 (12.8%)	92 (12.8%)
Total	606	719

Table 2: Descriptive statistics

Variable	High-tech		Low-tech		Mean Dif.	t-test
	Mean	Std. Dev.	Mean	Std. Dev.		
Product Innovation	0.487	0.500	0.374	0.484	0.113	***
Parent_initiated	0.066	0.248	0.063	0.242	0.003	
Parent_supported	0.198	0.399	0.216	0.412	-0.018	
Parent_neutral	0.475	0.500	0.476	0.500	0.000	
Parent_interfered	0.132	0.339	0.118	0.323	0.014	
Irrelevant/Non-exist	0.129	0.335	0.128	0.334	0.001	
Team	0.444	0.497	0.289	0.454	0.155	***
Firm age	2.528	1.070	2.434	1.049	0.094	
R&D	0.749	1.550	0.256	0.870	0.493	***
Employees	2.480	4.946	2.214	5.912	0.266	
Process	0.309	0.462	0.228	0.420	0.080	***
logInvest_Intensity	6.252	4.809	5.358	4.917	0.894	***
Industry_Experience	3.955	1.164	3.833	1.168	0.122	*

*** (**, *) indicate a significance level of 1% (5%, 10%)

Table 2 shows the descriptive statistics for the selected variables split into high-tech and low-tech industries. The product innovation mean is significantly higher in high-tech sectors, confirming the notion that high-tech branches are a stronger driver for innovation. Team foundations are significantly more frequent for high-tech spinoffs. Industry experiences of the founders are almost equal in the respective industries. Less surprising is the substantially higher mean rate for R&D staff in high-tech spinoffs compared to low-tech spinoffs. On the other hand, full-time employed staff is almost equal among the different industries, indicating that with about the same firm size, high-tech spinoffs dedicate more human resources to R&D. Finally, the mean process innovation rate as well as the logarithm of investment intensity are also significantly higher for high-tech

industries, signaling that in order to develop new products or services, innovative solutions to plan, design and manufacture are more important for high-tech spinoffs and require significantly higher investments.

4. Empirical Results

Table 3 shows the estimation results for the probit regression with product innovation as the dependent variable. Two models are estimated with different reference categories. The first model has *Parent_neutral* as the reference category to test for hypothesis 1a, whereas the second model uses *Parent_supported* as the respective reference category to test for hypothesis 1b. *Parent_interfered* is the only independent variable that is significantly positive at the 10% significance level in both models, which indicates that hostile spinoffs are most likely to introduce product innovation to the market. Specifically, variables *Parent_initiated* and *Parent_supported* both have non-significant coefficients in Model 1 and hence, hypothesis 1a is rejected. Looking at the second model, it partly supports hypothesis 1b as variable *Parent_interfered* is significantly related to product innovation but *Parent_neutral* is not. The estimation result points to the notion that despite obstructive corporate parent interference, spinoff founders are able to capitalize on the competitive idea gathered during their previous employment and simultaneously utilize their abundant experience to successfully market the initial opportunity. Similar to the results of Bruneel et al. (2013), the founders seem well aware of the opportunities and risks associated with the spinoff and seem to possess considerable industry experience on how to market new products. The fact that such spinoffs even outperform parent-initiated spinoffs (although not significantly) with superior access to finance and other resources suggests that motivation and commitment are crucial drivers for success (Baum and Locke, 2004). Additionally, this result at least partially challenges the theoretical network approach by Furlan and Grandinetti (2014), who expect better performance through a broad and intense network during the emergence phase. At least for one crucial part of this network, the corporate parent, the model cannot be substantiated with empirical evidence.¹⁰

Regarding the control variables, *R&D* is significantly positive, signaling that more personnel devoted to research will boost product innovation. Moreover, the controls for investment and process innovation are significantly positive, showing that product innovation is often accompanied by supporting process innovation to manufacture the product.¹¹

10. Possible spillover effects to stakeholders closely associated to the impeding corporate parent are left out of consideration.

11. Utilizing the process innovation dummy as an independent variable and the product innovation as a control dummy in a separate probit regression (*ceteris paribus*) does not yield any significant results.

Table 3: Probit regression explaining product innovation

Model	Model 1		Model 2	
Dependent variable	Product innovation		Product innovation	
	Coef.	Marginal effect	Coef.	Marginal effect
	(s.e.)	(s.e.)	(s.e.)	(s.e.)
Parent_initiated	0.105	0.038	Parent_initiated	0.145
	(0.152)	(0.055)		(0.163)
Parent_supported	-0.040	-0.015	Parent_neutral	0.040
	(0.095)	(0.034)		(0.095)
Parent_interfered	0.191*	0.069*	Parent_interfered	0.231*
	(0.115)	(0.042)		(0.130)
Irrelevant/Non-exist	-0.093	-0.034	Irrelevant/Non-exist	-0.053
	(0.114)	(0.041)		(0.128)
Team	0.118	0.043	Team	0.118
	(0.079)	(0.028)		(0.079)
Firm age	-0.019	-0.007	Firm age	-0.019
	(0.034)	(0.012)		(0.034)
R&D	0.091***	0.033***	R&D	0.091***
	(0.031)	(0.011)		(0.031)
Employees	-0.001	-0.000	Employees	-0.001
	(0.007)	(0.003)		(0.007)
Process	0.549***	0.199***	Process	0.549***
	(0.084)	(0.029)		(0.084)
logInvest_Intensity	0.016**	0.006**	logInvest_Intensity	0.016**
	(0.008)	(0.003)		(0.008)
Industry_Experience	-0.001	-0.000	Industry_Experience	-0.001
	(0.032)	(0.012)		(0.032)
_cons	-0.341*		_cons	-0.381**
	(0.178)			(0.191)
N	1325		N	1325
Logl	-838.613		Logl	-838.613
Pseudo R ²	0.072		Pseudo R ²	0.072

Notes: *** (**, *) indicate a significance level of 1% (5%, 10%). The reference categories for corporate parent support are *Parent_neutral* in Model 1 and *Parent_supported* in Model 2. The regressions also include a set of industry dummies.

Since the probit model does not allow interpreting the coefficients in terms of size, average marginal effects from the same model are estimated. The results reveal that spinoffs experiencing obstructive parent interference have a 7% higher chance of introducing a product innovation. Similarly, when a process innovation is introduced, the chance of introducing a product innovation is 20% higher. Another positive and significant connection can be drawn to R&D staff where an increase by one employee increases the probability of introducing a product innovation by 3%.

In order to allow for a deeper understanding of the results, the data set is split into high-tech and low-tech industries. Table 4 shows the results of Model 1 for the split data set. An interesting difference occurs. In contrast to the main findings, the high-tech industries spinoffs reveal two-sided results. For these industries, not only spinoffs experiencing impeding parent interference are positively significantly related to product innovation, but also the parent-initiated ones. Parent-interfered spinoffs have a 17% higher probability of introducing a product innovation (compared to spinoffs without corporate parent support), while for parent-initiated spinoffs the probability is even 20% higher in high-tech branches. All other parent support variables remain insignificant.¹² Again, the process innovation dummy, R&D staff and investment intensity controls are positive and significant. Moreover, the spinoff age control is negative and significant, suggesting that older spinoffs have a lower chance of introducing a product innovation to the market.

The low-tech branches do not show any significant results for the parent support variables, supporting hypothesis 2 and the notion that their high-tech counterparts drive the main results. Only the R&D staff and process innovation controls are positive and significant, indicating that innovation performance is linked to the intensity of R&D operations. Moreover, the positive process innovation dummy once again points to necessary process innovations in order to be able to market new products or services.

12. Results for model 2 with *Parent_supported* as the reference category provide similar results and are not reported separately.

Table 4: Probit regression high-tech and low-tech industries

Model	High-tech industries	Low-tech industries
Dependent variable	Product innovation	Product innovation
	Marginal effect	Marginal effect
	(s.e.)	(s.e.)
Parent_initiated	0.203** (0.082)	-0.086 (0.077)
Parent_supported	-0.029 (0.052)	-0.002 (0.045)
Parent_interfered	0.167*** (0.061)	-0.034 (0.057)
Irrelevant/Non-exist	-0.032 (0.063)	-0.030 (0.054)
Team	0.046 (0.041)	0.055 (0.040)
Firm age	-0.038** (0.019)	0.011 (0.017)
R&D	0.025* (0.013)	0.064*** (0.021)
Employees	0.001 (0.005)	-0.002 (0.003)
Process	0.156*** (0.042)	0.240*** (0.038)
logInvest_Intensity	0.007* (0.004)	0.003 (0.004)
Industry_Experience	0.011 (0.017)	-0.008 (0.015)
N	606	719
Logl	-393.753	-444.778
Pseudo R ²	0.062	0.064

Notes: *** (**, *) indicate a significance level of 1% (5%, 10%). The reference category for corporate parent support is *Parent_neutral*. The regressions also include a set of industry dummies.

4.1. Endogeneity Concerns

The previous estimations do not entirely dismiss endogeneity concerns. First, the nature of the spinoff idea as well as the relatedness of the product or service to the corporate parent can be potential confounders that need attention to prevent an omitted-variable bias. Hence, a model including a variable measuring the novelty of the founding ideas in relation to the corporate parent is estimated. The dummy variable checks whether the founders try to implement new ideas gathered during previous employment in the spinoff (*New_Idea*). Results are presented in Table 5.

Table 5: Probit regression including idea quality variable

Model	Probit regression
Dependent variable	Product innovation
	Marginal effect (s.e.)
Parent_initiated	0.052 (0.059)
Parent_neutral	0.015 (0.034)
Parent_interfered	0.083* (0.047)
Irrelevant/Non-exist	-0.019 (0.046)
Team	0.043 (0.028)
Firm age	-0.007 (0.012)
R&D	0.033*** (0.011)
Employees	-0.000 (0.003)
Process	0.198*** (0.029)
logInvest_Intensity	0.006** (0.003)
Industry_Experience	-0.000 (0.012)
New_Idea	-0.004 (0.024)
N	1325
Logl	-838.598
Pseudo R ²	0.072

Notes: *** (**, *) indicate a significance level of 1% (5%, 10%). The reference category for corporate parent support is *Parent_supported*. The regressions also include a set of industry dummies.

The dummy variable remains insignificant, while the previous estimation results are confirmed. The correlation coefficient between the parent interference variable and the new idea dummy is 0.004, signaling that new ideas gathered during previous employment are not correlated to corporate parents trying to impede the spinoff foundation. The independent variable for spinoffs experiencing obstruction attempts by the parent remains positive and significant, while all others are insignificant. The effect size is similar to the initial models 1 and 2 as well.¹³ Spinoffs experiencing obstructing parent interference have an 8%

13. Re-estimating model 1 reveals similar results as shown in Table 5.

higher change of introducing a product innovation. Results show that new ideas gathered during previous employment do not seem to be the main source of motivation for spinoffs concerning their innovative efforts. Although the quality of the business idea and its relatedness to the corporate parent business cannot be measured directly, the estimation reveals that spinoff founders seem to rely on different factors regarding innovation when starting a new entity. Since it is not further specified what type of ideas are implemented, results hint at the fact that these ideas do not necessarily have to be related to innovative products, but can also be rooted in implementing a new culture, organizational routines or the penetration of new markets.

Another source for potential endogeneity is that the quality of the spinoff idea influences the parent decision on how to shape its relationship with the newly spawned entity. If the quality of the idea is promising, it might either support the spinoff or try to interfere with the foundation (in case the founders do not want to get the parent involved). Should the quality of the idea not be promising, the parent could remain neutral. In this case of potential endogeneity, employing an IV strategy is adequate. However, no suiting variables are available to effectively utilize instrumental variables.

4.2. Robustness Check

Market novelties are a special type of innovation that target and require special circumstances to be nurtured. For a variety of spinoffs, the goal might not be to tackle specific niches but to introduce innovation that is more radical in nature. In the sample, participants are asked, whether they introduced a market novelty in Germany¹⁴ in the year of interest. These innovation efforts may even be more strongly influenced by the degree of parent support the spinoff receives. Consequently, this robustness check utilizes market novelties as a dependent variable instead of merely focusing on general product innovation.

14. As the analysis focuses on German spinoffs, only market novelties that are introduced in Germany and not on a global basis are taken into consideration.

Table 6: Probit regression explaining market novelties

Model	Probit regression
Dependent variable	Market novelties
	Marginal effect
	(s.e.)
Parent_initiated	-0.035 (0.045)
Parent_neutral	0.030 (0.024)
Parent_interfered	0.060* (0.031)
Irrelevant/Non-exist	-0.009 (0.034)
Team	-0.003 (0.020)
Firm age	-0.002 (0.009)
R&D	0.014** (0.007)
Employees	0.000 (0.002)
Process	0.039* (0.020)
logInvest_Intensity	0.005*** (0.002)
Industry_Experience	0.001 (0.008)
New_Idea	-0.015 (0.016)
N	1325
Logl	-479.534
Pseudo R ²	0.052

Notes: *** (**, *) indicate a significance level of 1% (5%, 10%). The reference category for corporate parent support is *Parent_supported*. The regressions also include a set of industry dummies.

The results are similar to the main estimation revealing that spinoffs that experience parent interference are best associated with market novelties. *Parent_interfered* is significantly positive while the other three independent variables remain insignificant. Considering marginal effects, parent-interfered spinoffs have a 6% higher probability of introducing a market novelty. The finding still supports hypothesis 1b and the notion that despite corporate parent interference attempts to obstruct the foundation, spinoff founders are able to capitalize on their ideas and have a stringent plan on how to successfully market their ideas.

Regarding the control variables, the R&D staff variable is positively significant again, which hints at the fact that the introduction of novel products or services requires highly qualified personnel in R&D to ensure success. Finally, the process innovation dummy and the investment intensity control are positively significant. This finding shows that the launch of market novelties on the one hand requires new paths to produce a product or provide a service and that these processes need to be newly established as well. On the other hand, the introduction of market novelties is likely to be more capital-intensive and requires investments in order to successfully enter the market.

5. Discussion and Conclusion

Spinoffs are an important vehicle for the introduction of product and service innovation to the market. The results of the present analysis extend the discussion on the relationship of spinoffs with their corporate parent in a variety of ways. First, it is the first study to directly link corporate parent support to innovation performance utilizing market novelties as well as general product innovation as dependent variables. Second, it shows that spinoffs facing obstructive parent interference are associated with higher levels of product and service innovation. Despite the negative interference from the corporate parent, these spinoffs manage to market product innovation and even market novelties at a higher rate than their parent-supported counterparts. This remarkable result could be attributed to a variety of different factors. For one, it is the motivation of the founders that is, as indicated by the results of previous studies, an important driver of spinoff success (Baum and Locke, 2004; Bruneel et al., 2013). These spinoff founders, knowing that they will face obstruction attempts by the corporate parent, are very focused on what they want to achieve and also show great commitment that is vital to the spinoff's success. Creative tensions arising prior to and during the spinoff rooted in the parent obstruction attempts may also partially explain the strong innovation performance. Further reasons can be the quality of the idea as well as the relatedness to the parent's business that might grant higher success probabilities. Third, the analysis reveals that results are mainly driven by high-tech industries. In this sense, it confirms a variety of prior research that focused exclusively on high-tech branches such as lasers, disk drives and semiconductors.

For incumbent companies which place importance on marketing innovation, the results caution them to better recognize and acknowledge the entrepreneurial potential of their employees. Despite corporate entrepreneurship efforts becoming increasingly popular, a considerable number of entrepreneurially spirited employees in Germany prefer to pursue their own trajectory – and their success proves them right. It might be in the interest of parent companies to come up with new entrepreneurial business models that reach beyond the well-known

intrapreneurship and corporate venturing activities in order to keep these entrepreneurs in the company or at least establish a mutually beneficial business relationship. For potential entrepreneurs, the findings may encourage them to follow their idea independently of the reaction of their employer. Even without the commitment of the corporate parent, innovative efforts and market success are accomplishable.

This study is not free of limitations. First, the data set is comprised of self-reported data, which is of particular concern regarding innovation measures. Second, the data set is cross-sectional. It would be interesting to analyze the development of spinoffs during a longer time horizon in order to check whether the different spinoffs develop differently over time. Third, it would greatly benefit the analysis to distinguish in greater detail how interference of the corporate parent influences the spinoff decision. Since the perception of obstructive interference is highly subjective and can be anything from an oral statement of disapproval to litigation action, it would be interesting to find out more on the degree of interference and the subsequent performance of these different spinoffs. Another limiting factor is the endogeneity concern. With the data at hand it is not possible to control directly for the quality of the idea and its relatedness to the corporate parent. Moreover, potential reverse causality cannot be completely ruled out due to data restrictions. Notwithstanding its limitations, the present paper has provided important new insights regarding the role of corporate parent support for spinoff innovation performance. It is left for future research to analyze in greater detail the motivations of the spinoff founders on the one hand and the relatedness to the corporate parent with its potentially moderating influence on innovation performance on the other hand. Understanding in greater detail how entrepreneurial motivation and relatedness influence innovation performance will allow scholars to reach more tangible insights on the success or failure of spinoffs.

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