Journal of the Knowledge Economy
https://doi.org/10.1007/s13132-022-01039-1

To Compete or Cooperate? A Case Study of Innovation and Creativity Labs in Berlin

Daniel Feser[1]

Received: 18 December 2020 / Accepted: 13 September 2022

Abstract

Innovation intermediaries provide support during innovation processes and contribute to clients' innovativeness. In a growing body of literature, innovation intermediaries are considered as knowledge brokers and boundary spanners in regional innovation systems. While previous studies have highlighted insights into intermediaries' impact on clients, observations of their internal policies and working mechanisms remain scarce. Based on a case study of Berlin-based innovation and creativity labs, this paper sheds light on the innovation strategies chosen by intermediaries. I find that a distinct dualism of cooperation and competition shapes the innovation strategies of innovation intermediaries. The growing number of competitors and a lack of transparency shape the role of regional policy that offers information and market coordination. I present policy recommendations based on the results.

Keywords Regional innovation systems · Innovation intermediation · Innovation strategy

Introduction

Innovation intermediaries serve as change agents to foster knowledge exchange (Howells, 2006). Key concepts like competitiveness and resilience have contributed to a research focus on the role of innovation intermediaries within regions (Bristow, 2010; Budd & Hirmis, 2004). In particular, considering the growing importance of open innovation platforms for local knowledge ecosystems, intermediation is key to understanding current changes in the knowledge economy (Agogué et al., 2013; Hossain & Lassen, 2017; Randhawa et al., 2017). Based on place-based approaches, such as clusters (Porter, 1990, 1998) and regional innovation systems (Cooke, 1992, 2001), studies have presented evidence of varying regional innovation caused

This article is part of Topical Collection on *Open Innovation Platforms Fostering Knowledge Ecosystems*

✉ Daniel Feser
daniel.feser@posteo.de

[1] Georg-August University of Goettingen, 37073 Göttingen, Germany

Published online: 26 September 2022

by path dependencies like historical characteristics and lock-in effects (Martin & Sunley, 2006). Recently, studies on specialization policies have reinforced the need to analyze region-specific configurations (Balland et al., 2019; McCann & Ortega-Argiles, 2013). The role of intermediaries in regional innovation systems is central to understanding innovation-induced interaction at the regional level (Carayannis & Campbell, 2009; Etzkowitz, 2018).

Ranging from conceptual to empirical studies, intermediaries' effect on the diffusion of innovative products, services, and business models has been thoroughly discussed. From a systemic perspective, intermediaries perform boundary-spanning and knowledge-brokering activities during the innovation process (Huyghe et al., 2014; Parjanen et al., 2011). In regional innovation systems, intermediaries are part of the interplay between academic research, businesses, and administration (Hsieh et al., 2015; Smedlund, 2006), and thus, they contribute to firms' innovativeness directly and indirectly (Lichtenthaler, 2013; Russo et al., 2019).

The internal value creation of intermediaries has recently been discussed to broaden the understanding of intermediaries' role during knowledge-sharing processes (Kant & Kanda, 2019; Sieg et al., 2010; de Silva et al., 2018; Tran et al., 2011). The perspective on internal processes allows the identification of the contribution of intermediaries to regional innovation and the hampering and promotion of factors stemming from internal value creation to understand how the mechanisms through which intermediaries maintain value for themselves help them renew their internal capabilities and keep pace with new knowledge. Despite acknowledging openness as a key strategic element for fostering innovative capacity (Agogué et al., 2013; Aquilani et al., 2017; Randhawa et al., 2017), only a few papers have presented empirical evidence considering the internal perspectives of intermediaries (Krenz et al., 2014; de Silva et al., 2018). The observed "lack of the interaction between value generation for both the clients of intermediaries and intermediaries" (de Silva et al., 2018, p. 80) highlights the need for further research. Moreover, "little insight on the contribution of intermediaries to the broader innovation system" (Kanda et al., 2019, p. 1137) exists to date to comprehensively understand how intermediaries influence the innovation process.

Compared with direct interaction between industry and universities (Benneworth et al., 2017; Ranga et al., 2008), the strategic dimension of intermediaries has been neglected thus far, meaning their long-term orientation toward goals and underlying activities impact their role in regional innovation. By default, the openness of intermediaries is assumed to be a standard mode that accelerates knowledge sharing in regional innovation systems (Kerry & Danson, 2016), while this assumption has not yet been intensively analyzed. Thus, despite previous research having concentrated on general implications regarding the role of intermediaries, analyzing intermediaries' strategies is fruitful with regard to deepening the understanding of regional innovation systems. Furthermore, regional innovation policy-makers rely on knowledge about such structures to improve regional support and the regional capability to innovate. Innovation strategy as a channel for the effectiveness of intermediaries in regional settings has been under-explored to date. In this paper, I analyze how innovation intermediaries implement innovation strategies and explore

their potential impact on regional innovation systems and the latter's performance. This paper contributes to the discussion on how intermediaries can serve to spark co-creation innovation processes and be positioned as open innovation platforms.

For this purpose, I conducted an exploratory case study on a sub-group of innovation intermediaries (Yin, 2003), Berlin-based innovation and creativity labs, which are defined as "physical spaces for testing innovative ideas, alternative business models, new economic practices or flexible cooperation structures" (Schmidt et al., 2014, p. 232). This study builds upon a project about identifying challenges and growth-induced changes in the regional innovation system for Berlin-based innovation and creativity labs. Using a qualitative case study design, I analyze semi-structured interviews with lab managers and CEOs to explain their specific innovation strategies and infer implications for regional innovation activities.

Overall, I find that labs focus their innovation strategies on connecting different owners and participants of innovation projects to improve clients' innovative capacity and source external knowledge. The increased number of innovation and creativity labs in Berlin has led to the challenge for intermediaries of maintaining a comprehensive market overview and advancing their competitive advantage. Innovation and creativity labs use coopetition elements to collaborate with competing market participants to improve their capacity to serve during the innovation process. Specifically, long-term cooperation with competitors is used for specialization and learning. In particular, for digital innovation knowledge, exploration is used as an explanation for cooperating with competitors. Regional policy-makers and administrators play a crucial role in improving the quality of information and supporting increased transparency in the innovation intermediation market.

This paper adds to the existing literature with regard to two dimensions. First, to date, intermediaries have been seen as a central actor in fostering innovation processes, although the strategic behavior of intermediaries has been neglected, especially regarding its implications for intermediaries' role in regional innovation systems. This paper demonstrates that intermediaries react by implementing a coopetition mode to appropriate innovation and search for niches to generate value. Second, this paper highlights the need for coordinating intermediaries in environments with a high density of such organizations. The regional innovation perspective can integrate these aspects to understand and support structural embedding in regional networks.

The remainder of this paper is structured as follows. In the "Literature Review" section, I review the relevant literature on innovation intermediaries' impact on regional innovation systems and intermediaries' internal perspectives, specifically regarding strategic decision-making. Subsequently, in the "Data and Methods" section, the method and data collection are described. The "Results: Strategic Perspective of Innovation Intermediaries" section presents insights from the case study interviews in Berlin. In the "Discussion" section, I discuss the findings from the perspective of the relevant coopetition literature. Finally, I conclude with policy implications and outline further research recommendations.

Literature Review

Innovation Intermediaries and Regional Innovation Systems

Howells (2006) functionally defined an innovation intermediary as "an organization or body that acts as an agent or broker in any aspect of the innovation process between two or more parties" (p. 720). Innovation intermediaries represent a heterogeneous group of private, public–private, and public actors in the innovation process, ranging from independent organizations to sub-units of larger organizations like universities and large enterprises (LEs) (Bocquet et al., 2016; Huyghe et al., 2014; Schmidt et al., 2014). Based on Howells's seminal paper, a large strand of literature has discussed the role of innovation intermediaries in regional innovation systems (Kanda et al., 2019; Lichtenthaler, 2013; de Silva et al., 2018; Tran et al., 2011). Research has focused, in particular, on the positive effects when clients benefit from the transfer of innovative knowledge by the intermediaries (Abbate et al., 2013; Johnston & Huggins, 2016; Shearmur & Doloreux, 2013). Due to their role as key actors, it is crucial to analyze the regional embeddedness of intermediaries (Nilsson & Sia-Ljungström, 2013). Intermediaries can support innovation by improving interactions with stakeholders in regional innovation systems (Agogué et al., 2013; Howells, 2006; de Silva et al., 2018). Innovation intermediaries provide support for firms through networking, integrating new knowledge, and improving their absorptive capacity (Garengo, 2019). During new knowledge creation, knowledge transfer and knowledge recombination intermediaries are involved in the interplay between universities, the government (Lee et al., 2017), industry (Johnston & Huggins, 2016), and societal actors (MacGregor et al., 2010). Specifically, the interaction of regional actors in quadruple (MacGregor et al., 2010; Stier & Smit, 2021) and quintuple (Carayannis & Rakhmatullin, 2014; Carayannis et al., 2012; Grundel & Dahlström, 2016) helix structures play a magnificent role in understanding collaborative innovation processes.

Furthermore, research has focused on innovation intermediaries' influence on client firms' innovativeness with regard to understanding the role and effectiveness of intermediaries. Conceptually, intermediaries can reduce size-related impediments, such as a scarcity of staff and financial resources, resulting from small and medium-sized enterprises' (SMEs) innovation activities (Betz et al., 2016; Fukugawa, 2018; Garengo, 2019; Laperche & Liu, 2013). In addition to business-university cooperation, companies benefit from intermediaries via extra knowledge transfer capabilities (Tether & Tajar, 2008). More specifically, intermediaries offer to support clients' innovativeness by improving the network, interaction, and absorptive capacity (Garengo, 2019). Empirical studies provide insights into how companies benefit from cost reductions while cooperating with intermediaries during the innovation process. They improve their productivity regarding cooperating with innovation intermediaries (Fukugawa, 2018; Jarmin, 1999; Knockaert & Spithoven, 2014). Moreover, intermediaries increase the probability of client firms implementing production innovation (Rocio Vasquez-Urriago et al., 2014) and fostering collaborative research and development (R&D)

(Fukugawa, 2018) and eco-innovation (Kanda et al., 2018). Furthermore, engaging with intermediaries reduces innovation-related transaction costs for manufacturing enterprises (Lichtenthaler, 2013), improves their absorptive capacity (Knockaert & Spithoven, 2014; Lin et al., 2016), and increases their possibility of benefiting from knowledge spillover (Ponds et al., 2010).

As intermediaries have been described as key players with regard to fulfilling innovation policy goals, public policy has consistently concentrated on supporting intermediary structures to sustain and enhance regional competitiveness (Agogué et al., 2013; Arenas & González, 2018; Papamichail et al., 2022). The growing number of intermediaries demands an in-depth systemic analysis of networks and intermediaries supporting new services, products, and business models (Russo et al., 2019). For innovation intermediaries to remain effective over the long term, clarification of the internal value creation for public and private innovation intermediaries is also required to understand the need to support intermediary development in regions with a growing number of intermediaries.

Internal Perspective of Innovation Intermediaries

The key idea behind examining intermediaries' internal value creation is motivated by the need to better understand intermediaries' contribution to innovation processes and the development of innovation systems (de Silva et al., 2018). In particular, given that it is difficult to capture the performance of intermediaries, the literature sheds light on the internal perspective of intermediaries (Dalziel, 2010; Russo et al., 2019). A large share of previous research into the internal perspective has focused on intermediaries' activities and the services offered by them (Alexander & Martin, 2013; Garengo, 2019; Howells, 2006). Overall, intermediaries often specialize in the complementary needs of clients regarding value creation (Landry et al., 2013).

Studies on the role of intermediaries' internal value creation have analyzed their survival over time (Kant & Kanda, 2019), evaluation capacities (Winch & Courtney, 2007), and collaboration with universities (Lee & Miozzo, 2019). Furthermore, the configuration of knowledge bases (Pina & Tether, 2016), intermediaries' absorptive capacity (Bocquet et al., 2016), and non-financial and financial returns from collaborative innovation projects (Boon et al., 2011; Polzin et al., 2016; de Silva et al., 2018) support the knowledge-building capacity of intermediaries and their ability to satisfy clients' demands.

While I can build on results regarding the internal perspective of intermediaries, the role of innovation strategies regarding innovation intermediaries has been under-explored. Implicitly, the literature has discussed elements with relevance for the long-term orientation of intermediaries. Belso-Martinez et al. (2018) offer first insights into highlighting the relevance of analyzing the institutional framework for intermediaries offering knowledge-brokering services. Moreover, Sengupta and Ray (2017) indicate that the characteristics of universities influence the choice of strategy in the case of knowledge transfer offices. A comprehensive analysis of innovation strategy is still missing. The growing number of intermediaries requires further exploration of how strategy affects their role and activities.

Innovation Intermediaries' Choice of Innovation Strategy

Innovation intermediaries have been conceptually linked to the open innovation framework to enable their function in regional innovation systems (Chesbrough, 2003; Leydesdorff & Ivanova, 2016). In order to benefit from the knowledge sharing and boundary spanning of intermediaries, openness has been highlighted as a strategic factor for regions fostering knowledge exchange (Alexander & Martin, 2013; Kerry & Danson, 2016). The term "open innovation intermediaries" (Porto Gomez et al., 2016) emphasizes the conceptual idea of following this paradigm. However, empirical insights into intermediaries dealing with the requirements to implement systematically open innovation strategies are missing to date.

The open innovation literature describes the implementation of open innovation strategies as challenging. Originating from examples such as the open source community, the application of open innovation strategies has been discussed in various sectors and organizations (Remneland Wikhamn, 2020; de Oliveira et al., 2019; Schmidt & Brinks, 2017). In particular, organizational capacities and the management of change processes are predominant for the successful application of open innovation perspectives (Chesbrough & Appleyard, 2007). As a strategic approach, open innovation relies on the idea of benefiting from external knowledge sources stemming from other sub-systems (Bayat et al., 2022; Leydesdorff & Ivanova, 2016). Organizational capacities play a critical role for organizations looking to benefit from open innovation strategies, while their success largely depends upon internal resources and staff that follow the strategic approach.

Another strand of literature investigating innovation strategies focuses on the value captured by commercialization strategies that protect the innovative advantage (Levie, 2014; Vivas, 2016). This strategy seeks to benefit from innovations by overcoming problems of knowledge spillover to competitors. Traditionally, intellectual property rights – particularly patents – have been used to protect technological innovation and give patent actors monopoly rights for a limited time (Blind et al., 2006). Additionally, informal mechanisms have been used to protect businesses' innovations (Agostini et al., 2015; Thomä & Bizer, 2013). These studies mostly survey firms, and transferring the findings to intermediaries' strategies is challenging. Nevertheless, for intermediaries, the choice of innovation strategy in terms of open and closed approaches is not straightforward.

The internal perspective of intermediaries and behavioral aspects influencing innovative capabilities remain unclear. This paper investigates the role of innovation strategies for innovation intermediaries and its effect on regional innovation. Therefore, the following research questions were chosen to gain a comprehensive picture of the role of intermediaries:

1. How do the strategic behaviors of intermediaries influence the selection of cooperation partners, especially clients, during innovation processes?
2. How do choices concerning closed and open innovation strategies influence efficacies concerning regional innovation?

Data and Methods

In order to answer the research questions, this paper builds upon a comparative case study design (Eisenhardt & Graebner, 2007; Yin, 2003). Since I address an under-explored research topic, and due to the lack of reflexive and qualitative research, this method is suitable for exploring the internal perspective of intermediaries. To understand "how" intermediaries implement innovation strategies, this inductive approach can create new insight based on case study research (Yin, 2003). I consequently embed the results in the existing literature and discuss the new findings.

Thus, while large-scale data sets are common in innovation research to analyze innovation processes, a broad mix of methods has been established in recent years. Qualitative, mixed-method, and ethnographic research approaches are used in innovation studies (Ametowobla et al., 2015). A multiple case study was chosen to conduct research into three dimensions: First, case study research can account for heterogeneous actors and the dynamic development of regional innovation in SMEs (Ceci & Iubatti, 2012), network analysis (Almodovar & Teixeira, 2014), and process analyses (Batterink et al., 2010; Huyghe et al., 2014). Second, the analysis of innovation strategies requires a deeper understanding of activities like knowledge brokering and boundary spanning (Kanda et al., 2018; Kant & Kanda, 2019; Pina & Tether, 2016). Third, a multiple case study in a defined geographical area allows the identification of heterogeneity among intermediaries operating in a common regional innovation system (Bank et al., 2017; Gao & Hu, 2017).

I conducted a case study in Berlin since several researchers have presented insights into its favorable conditions for innovation intermediaries (Bank et al., 2017; Schmidt & Brinks, 2017; Schmidt et al., 2014). Moreover, Berlin was chosen as the area for study due to its high density and heterogeneity of intermediaries, which allows the systematic analysis of intermediaries' innovation strategies. In the case study, I focus on innovation and creativity labs in the Berlin innovation system as part of a Berlin City Council project. The project aimed to screen activities, identify challenges, and formulate policy recommendations for innovation and creativity labs.Interviews and a feedback workshop were included in the project activities.

The interviews were selected following the idea of purposeful theoretical sampling (Eisenhardt, 1989). While large-scale studies use random sampling as a means to present representative arguments, purposeful selection enables the choosing of a limited number of cases from a sample that reflects the most information about the research question. For the case study, I selected interviewees, assuring heterogeneity among the innovation labs represented based on their categories, foci, and locations (Table 1). To assure a broad variety of cases, I consulted and discussed the selection process and structure of the questionnaire with regional innovation experts from the Berlin City Council.[1]

[1] The interviews followed the definition of Schmidt et al. (2014), with four categories of innovation and creativity labs: (1) academic-driven innovation labs: initiated by research organizations, boundary spanners between research and market participants; (2) accelerator/incubator: set up to support and develop startups, selection of potentially fast-growing successful entrepreneurs; (3) firm-driven labs: founded by domestic and international LEs, access restricted by LEs depending on the innovation strategy; and (4) grassroots labs: established by private stakeholders, spaces for creative collaborative work, low participa-

The semi-structured questionnaire mostly comprised open guiding questions to receive the unbiased perspective of interviewees on the research topic. The questionnaire was structured in three parts (Table 2).[2] The first part focused on the analysis of labs' activities. In particular, innovation process and performance-guided measures were guiding questions. In the second part, the analysis and evaluation of the current market situation were discussed. This included specific impediments for the lab and general barriers for the region. The third part concluded with recommendations for addressing specific challenges and the need for support from administrative and political actors in Berlin. To ensure the quality of the results, I used follow-up questions to clarify the respondents' answers.

Following the definition of Schmidt et al. (2014), I selected the interviewees from a public list of Berlin-based innovation and creativity labs that Berlin City Council (2018) initiated and administered. Being listed ensured that the interviewees had a higher possibility of possessing knowledge about their labs' involvement in regional innovation processes since the labs had publicly committed to innovation activities and had engaged in regional development. I selected the interviewees according to labs that were publicly known for their innovation activities. The interviews were conducted via phone and in person. The respondents were CEOs and senior lab managers who all worked for Berlin-based labs. One case included the founder of a lab who was no longer working for said organization. The interviews lasted, on average, 45 min and took place between September and November 2018. In a seminar with more than 40 participants, to which the interviewees and regional innovation experts were invited to, I presented and discussed the preliminary results. I used this discussion as input and as a complementary source for this paper.

To guarantee the anonymity of the participants and to allow them to express their opinions openly and to receive an unbiased perspective on internal strategic behavior, the interviews were not recorded. To minimize the information loss, detailed memos were written, and the data were enriched by public information, such as research articles, web pages, and social media content. Based on Mayring (2000, 2014), I conducted a qualitative content analysis, which structures content according to the distinct research questions. Qualitative content analysis aims to describe the content provided by actors and is useful for presenting the "whole picture." This offered the advantage of benefiting from reflexivity by using a combination of inductive and deductive categories. These deductive categories stem from the literature review, as depicted in Fig. 1. To ensure the reliability of the data collected, the memos and coded content were discussed with other researchers.

Footnote 1 (continued)
tion restrictions. Co-working spaces were not included since their active role in the innovation process is not clear.

[2] The basic structure of the semi-structured questionnaire was based on peer-reviewed case studies in similar survey situations with expert interviews and used a three-part framework composed of analysis, evaluation, and recommendations, like in Feser and Runst (2016) and Muench et al. (2014).

Table 1 Summary of Interviewees

Interviewee	Category	Focus	Geographic	Position	Gender
A	Academic-driven innovation labs	Tech, data	City center	Head of lab	Male
B	Academic-driven innovation labs	Tech	Peripheral	CEO and senior manager	Male and male
C	Academic-driven innovation labs	User experience, tech	Peripheral	Leading project manager	Female
D	Academic-driven innovation labs	Tech, data	City center	Leading project manager	Female
E	Academic-driven innovation labs	Energy, smart home	Peripheral	Leading project manager	Female
F	Accelerator/incubator	Industry, healthcare, FinTech	City center	CEO and senior manager	Male
G	Accelerator/incubator	Mobility, energy, infrastructure	City center	Senior project manager	Male
H	Accelerator/incubator	Healthcare	City center	Senior project manager	Female
I	Accelerator/incubator	Smart, energy, data	City center	CEO/co-founder	Male
J	Accelerator/incubator	Internet of things, tech	City center	Managing director/co-founder	Male
K	Firm-driven labs	Sectoral	City center	Leading project manager	Female
L	Firm-driven labs	Smart city, data	City center	Technical leader and project manager	Male and male
M	Firm-driven labs	Smart home, mobility, Internet of things	Peripheral	Head of lab	Female
N	Firm-driven labs	FoodTech	City center	Senior project manager	Male
O	Firm-driven labs	ICT	City center	Founder	Male
P	Grassroot labs	Media, smart city	City center	Artistic director and founder	female
Q	Grassroot labs	Female empowerment, social	City center	General manager and founder	Male

Table 2 Structure of questionnaire

Topic	Guiding questions/statements
Analysis of the current situation	Describe the activities of the innovation lab.
	Describe how success is measured for your lab/fulfillment of your task.
Evaluation of the current situation	Describe barriers to innovation lab.
	Describe barriers for the region.
Recommendations	How can these challenges be addressed?
	How can the administration/political actors support the innovation labs in the region?

Results: Strategic Perspective of Innovation Intermediaries

In the following section, based on cross-case analysis, I present insights into the strategies of innovation and creativity labs in Berlin. The interviewed experts operate within the interplay of research, businesses, administration, and societal groups, formulating a broad spectrum of perspectives on the role of intermediaries and their innovation strategies in the regional innovation system.

The interviewees substantiated our reason behind the choice of location by pointing out the favorable conditions for innovation activities in Berlin. First, the Berlin innovation system has noticeably improved its innovative capacity in the last decade. Historic events, such as the reunification of the Eastern and Western parts of the city as well as the relocation of the seat of government, have shaped Berlin's economic

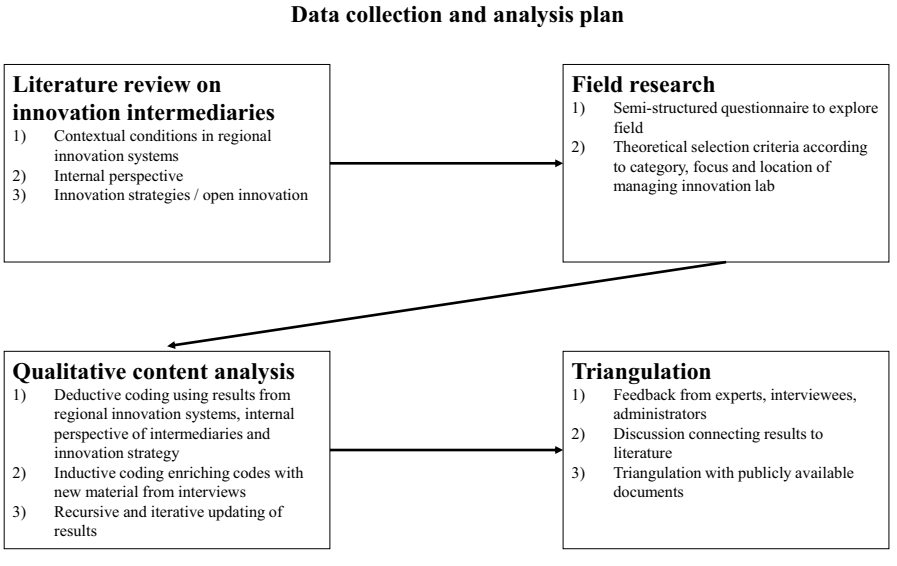

Fig. 1 Data collection and analysis plan

development. A growing scientific community with various universities and research organizations (Belitz & Schiersch, 2018), highly innovative SMEs (Feser, 2019), internationally recognized entrepreneurship activities (Startup Genome, 2019), and a large creative and cultural sector (Schmidt et al., 2014) has increased the awareness of the innovation system. Additionally, the growth of venture capital with regard to the digital technologies of Berlin-based companies has contributed to the city's growing visibility (Scheuplein & Kahl, 2016). Second, advantageous economic conditions, such as low living costs and infrastructure, are supportive of those looking to found or invest in innovation and creativity labs in Berlin. Third, an ecosystem of innovation and creativity labs has developed in the last decade, with Berlin City Council counting 150 innovation and creativity labs in Berlin in 2018. In a non-representative German-wide survey, 28% of innovation and creativity labs were found to be situated in Berlin (Capital & Infront Consulting, 2019). In particular, larger companies have founded labs in Berlin. In addition to labs of international LEs, more than half of the German DAX-listed companies have established or plan to establish innovation and creativity labs in Berlin (Berlin City Council, 2018).

Intra-lab Cooperation and Labs' Brokering Activities

This section addresses the role of intra-lab cooperation in innovation strategy, which includes not only bilateral cooperation between a lab organizer and participants but also further multilateral interaction between participants. Labs rarely launch innovative products by themselves, but instead provide services and infrastructure for clients to commercialize new services, products, and business models, serving as brokers of knowledge. By definition, innovation and creativity labs rely on a network and the cooperative behavior of external stakeholders. The initiation of innovative cooperation and the enhancement of clients' innovative capacity are central to creating value. In the interviews, the respondents emphasized facilitating broker activities for cooperation as their standard mode during the innovation process. Labs target the fostering of client cooperation between two or more parties, including startup-LE or investor-entrepreneur cooperation, to support the diffusion of innovative products and services and to identify new business models.

This intra-lab cooperation has two dimensions: First, labs offer spaces and infrastructure to enable cooperation in a creative environment for their target groups. Such cooperation comprises heterogeneous lab participants, ranging from students and freelancers to startups and teams from SMEs and LEs. Additionally, grassroots labs cooperate with societal groups and artists for social innovation. Labs often select participants from heterogeneous groups to enable interactions between clients from different backgrounds. In particular, the labs' broker function is important for recursive learning processes, which aim to improve organizational capacity. Teams from LEs and established SMEs ideally offer insights into structuring innovation processes and provide market knowledge, while startups and freelancers share their experiences of innovating flexibly and adaptively.

Second, labs cooperate with experts, such as consultants, researchers, and experienced employees from companies of the parental organizations, to offer lab users knowledge to create added value and foster benefits from internal cooperation. Labs cooperate with external partners to source knowledge about entrepreneurial education and company development, financing, and networking with LEs for their clients. Furthermore, knowledge concerning legal advice, developing prototypes, services, and product testing, as well as market information, are integrated into the labs' services. Berlin lab managers publicly appreciate the favorable innovation system due to the high density of cooperative stakeholders (Reintjes, 2019). Furthermore, labs seek to source knowledge to add value to their own services, including that directly emerging from their external partners.

Following open innovation approaches, mutual experience exchange in labs has been considered as important for intra-lab cooperation. CEOs and lab managers aim to design lab spaces that foster innovative cooperation. Co-working spaces, showrooms, and workshop rooms are planned and operated to support learning processes and intensify the role of labs as brokers of learning opportunities. Events are essential for networking and engaging lab participants and stakeholders from the Berlin innovation system. Respondents evaluate engagement within the innovation system as essential to establish a lab's role as a knowledge node. The offer of networking events varies between the different labs. It ranges from short-term events to multi-day training and intensive guidance programs that can last for several months.

Overall, intra-lab cooperation with clients or knowledge suppliers and labs as networking spaces are methods to help sustain the labs' innovativeness, and they are therefore relevant factors in and a major focus of labs' innovation strategies. Accordingly, the first proposition is as follows.

Proposition 1 Intra-lab cooperation is a key part of the business models of innovation and creativity labs, and the labs' strategic orientation focuses on clients' satisfaction regarding the cooperation opportunities and brokering activities available to stimulate learning.

Competition in the Berlin Regional Innovation System

In the interviews, competition among the labs emerged as an important topic for managing innovation and creativity labs and implementing their respective innovation strategies. While interviewees recognized the screening of the relevant competitors in the region in the past as a feasible benchmarking task, currently, the large number of market participants impedes a holistic overview of labs' activities. Furthermore, the heterogeneity of private, public–private, and public stakeholders has caused a lack of transparency about the incentives and innovation strategies of other operating labs. Consequently, interviewees perceived difficulties in evaluating information about the current market situation at a reasonable cost. Recently founded labs, in particular, have to deal with high costs in

terms of information acquisition due to the dynamic changes in innovation activities and the lack of regional networks.

When asked about measuring a lab's performance according to the organization's purpose, most of the participants referred to capturing competition with business-related indicators and management tools, such as key performance indicators (KPIs). The interviewees concentrated on enabling the best possible utilization of the labs' resources and maximizing revenue through products, service contracts, network services, participation fees, and shares of firms. Scaling up revenues is a central task for lab managers and CEOs when developing a lab's innovation strategy. Only a small number of respondents reported surveying innovation-related indicators, such as the number of new firms and knowledge transfer projects, due to requirements regarding public funding. Despite innovation being at the core of the labs' activities, it is evaluated as a by-product. The interviewees pointed out innovation in the form of anecdotal evidence about successful products, services, and entrepreneurs. Systematic evidence concerning innovative outcomes and regional impact is seldom available.

The dynamic changes in the innovation system have created challenges for labs in terms of adjusting their position in the innovation process. The perception of growing competition has enforced the necessity to adapt the business models of labs. Additionally, not only changes induced by regional competition but also external demands, such as technological processes in specific sectors, increase the dynamics in the innovation system. In the case of academic-driven labs, the changing requirements of public funds have resulted in the need to adapt their services. Firm-driven labs have often changed their innovation strategies in the past when their parent organizations demanded general organizational restructuring and strategic realignment. Consequently, CEOs and lab managers devote a noteworthy share of their resources to searching for market niches and identifying specific target clients in the innovation system.

The increased national and international awareness of the Berlin innovation system has affected the labs both positively and negatively. Entrepreneurs, students, and specialists appreciate Berlin's reputation and are willing to cooperate in innovation and creativity labs. On the one hand, they recognize the dynamic innovation system, but on the other hand, investment prices have become more expensive, services need to be more specialized, and promising entrepreneurs have become scarce.

Overall, competition with other labs and other organizations with similar service offerings is central to the evaluation of CEOs' and lab managers' performance. High information costs, business indicators directed at competition, and the increasing number of market entrants require labs to include the role of intensified competition in their innovation strategies. While the location of Berlin has benefited from a regional competitive advantage due to its favorable conditions, competitive pressure currently influences the need to adapt innovation strategies. Therefore, the second proposition is as follows.

Proposition 2 The growing number of intermediaries has prompted strategies more focused on benchmarking, adopting best practices, and niche searching to renew their business models.

Inter-lab Cooperation

The assessment of inter-lab cooperation in innovation strategy differed among the interviewees. I found groups of labs that choose to cooperate with other labs, while others purposely prefer not to cooperate with competitors. Labs founded by larger entities like universities and LEs often strategically pursue the goal of initiating and sustaining innovation cooperation between labs. Here, boundary spanning is a strategic goal for labs to acquire knowledge from other stakeholders in the innovation system. Additionally, academic-driven labs seek to commercialize academic knowledge via project cooperation. The lack of resources and specific knowledge is mentioned by interviewees as a reason to cooperate with other labs. In the case of firm-driven labs, risk sharing when testing prototypes and trying new methods is the aim of inter-lab cooperation. In cooperation with competitors, the respondents expect to collectively learn during projects, apply the new knowledge, and prospectively integrate it into their parent organizations. Independent grassroots labs as well as accelerators and incubators often evaluate horizontal cooperation as challenging due to unintended knowledge spillover and an increasingly competitive market. Inter-lab cooperation can be found in informal cooperation. Apart from these more established forms, I found one lab with a specialized business model to assist in the setting up of new labs in Berlin.

Three different motives can be found for inter-lab cooperation. First, motives to cooperate to explore new knowledge can be explained by a parent organization's open innovation strategy. Labs choose to cooperate with competitors to explore new knowledge. Firm-driven labs use coopetition as a component of their strategies to benefit from open innovation. Companies tend not to outsource their core R&D activities to firm-driven labs but rather to find and operate labs for experimenting and testing purposes. In particular, companies with little or no experience in specific fields of expertise use inter-lab cooperation to gain a basic understanding, identify challenges, and obtain experience before the companies proceed with upscaling in their parent organizations. Often, labs are intermediaries for starting innovation projects that are difficult to implement in parent organizations. Therefore, labs set up cooperative projects for collaborative learning in time-limited projects to absorb knowledge and compensate for their lack of experience. During the very preliminary stage of the product, service, or process development, knowledge spillovers are not considered as particularly problematic by the interviewees.

Second, another motive for inter-lab cooperation is collaborative learning. It has the advantage of accelerating learning processes and improving the industry's competitive position in international markets. In particular, LEs operate firm-driven labs to conduct projects with competitors. These labs implement coopetitive projects, which do not affect their core business models or competitive positions. The density

of labs demonstrates an advantage obtained through parent units setting up cooperative work with other labs. Labs stemming from different sectors and technological foci cooperate, while their parent organizations normally do not cooperate. For instance, an alliance of firm-driven innovation labs developed a cooperation project with the broader societal purpose of supporting integration into the labor market. This project established a web-based training tool for disadvantaged groups, offering firm visits, language education, and job training, as well as more activities to enable up-skilling processes. LEs sent employees to train the participants. Although it was established as a non-profit social innovation project, the labs involved benefited from gaining insights into the other cooperating labs, which accordingly enlarged their innovative capacities.

Third, learning about digital technologies is a motive for cooperation with other labs. The majority of labs' activities focus on the use, development, and application of digital innovation. Digital technologies serve as a justification for implementing labs and initiating coopetitive projects. Companies perceive upcoming digital technologies as challenging to adapt to the German innovation system. Recognizing the relevance of digital technologies, the labs operate with the perception of accelerating innovation processes and the increased need for knowledge-intensive sourcing from various sectors and fields. Respondents emphasized the distinctive role of Berlin in coopetitive projects. This can be explained by the perception of Berlin as a favorable location for developing and diffusing digital technologies. Labs often operate as platforms to establish contact for interdisciplinary cooperation. Cross-sectoral cooperation with labs, also stemming from grassroots, academic-driven labs, as well as incubators and accelerators, has led to various events and networks to exchange knowledge about digital tools, methods, and trends in the innovation system. Learning about best practices plays an important role in improving labs' performance.

While the interviewees largely support inter-lab cooperation, barriers hamper the use of it as an innovation strategy. The growing number of actors in the Berlin innovation system has fostered the specialization of labs' services, which has increased the willingness to participate in inter-lab cooperation. As smaller labs search for niches to offer their services, such as specialization in specific developmental stages of young enterprises, their successful performance depends on matching their offers to demands occurring in the innovation system. Some academic-driven labs cooperate with accelerators and incubators, offering complementary services. These labs teach entrepreneurship classes and guide entrepreneurs at the beginning of their careers. They have direct access to advanced students and researchers interested in becoming entrepreneurs. Due to restricted infrastructure and resources, academic-driven labs concentrate on supporting participants in gaining their first experience. For incubators and accelerators, this service is often not within the scope of their business activities because it is evaluated as too risky due to the lack of experience of academic-driven lab users. When enterprises grow and entrepreneurs become more experienced, the subsequent development stage requires enterprises to receive more specialized knowledge. Incubators and accelerators offer additional services and access to more specialized knowledge sources concerning product upscaling and financial and market information. The transition between different labs is organized

by the lab managers and CEOs. The respondents describe the organization as a value chain that is organized based on lab employees' informal networks.

The fear of knowledge spillovers and benefits emerging from innovative cooperation also influence the role of inter-lab cooperation. The tension inherent in coopetition, cooperating strategically with competitors, was brought up in the interviews. Only a few lab managers – mainly from firm-driven labs – explicitly referred to coopetition as a strategy. Most of the interviewees expressed an implicit coopetitive strategy by mentioning both cooperative and competitive aspects while describing their innovation strategies. Both elements have been evaluated as important for inter-lab cooperation. The cooperative environment is identified as an advantage with regard to offering a stimulating learning environment inside the labs, while the competitive pressure requires CEOs and managers to adapt their innovation strategies and to specialize to develop their labs' business models and find sustainable market positions. Accordingly, the third proposition is as follows.

Proposition 3 Labs use coopetition to decide to cooperate selectively to achieve long-term goals and improve their innovative capabilities.

Regional Innovation Perspective

Coopetitive innovation strategies and the growing number of labs influence the innovation system in Berlin. Sustaining the network structure is a leitmotif for labs, and it concerns the regional innovation system in terms of three different dimensions. First, non-separable elements of cooperative and competitive behavior often challenge market participants when positioning their services. In particular, the lack of transparency has led to the perception of lower openness in the Berlin innovation system. Second, publicly funded labs fulfill an essential function in the innovation system. To support the diffusion of knowledge at the beginning of the value chain, labs are often publicly funded. The differentiation of labs has resulted in a functional organization aligning labs' business models at different developmental stages of companies. Interviewees emphasize the importance of sustaining funding for the labs concerning their services. Phasing out and restructuring public support programs have been considered as impediments to the network structure. Third, interaction with policy-makers is seen as the key to expanding lab activities to stricter regulated markets. The adaptation of a regulatory framework to enable innovation in regulated branches, such as the medical and pharmaceutical sector, requires discussions between relevant stakeholders to enable entrepreneurial activities in these fields.

The change in innovation strategies shapes labs' roles in the regional innovation system. Labs search for new alternative cooperation partners and opportunities to exploit new network resources in the region. For instance, cooperation with policy-makers and administrators offers opportunities for labs to potentially expand their networking activities. Moreover, with a higher degree of specialization, labs develop their knowledge networks to offer services fulfilling clients' needs. Thus, the search

for specialized knowledge, such as sector- and technology-specific expertise, demonstrates an impediment to labs' development. Moreover, the internationalization of knowledge drives labs to develop new business models. Competitive advantages, such as linking regional knowledge with internationally available knowledge sources, play an important role in exploiting new market niches.

The role of regional policy with regard to supporting and sustaining the network structure, as well as supporting dynamics in the innovation system, was emphasized in the interviews. Concerning the network structure, Berlin City Council is perceived as a neutral actor, supporting the function of labs in the innovation system. Public policy has been seen as an essential part of the innovation system that influences the innovation activities of labs. Besides indirectly influencing labs' strategies through state funding for entrepreneurial activities, educational offers, and support events, interviewees point out two important functions of the regional policy:

First, public information about the innovation system is crucial for improving its transparency. The existing offers by the city council with regularly updated information about the funding scheme, research activities, and mapping of the existing labs demonstrate a first step to reducing information costs and lowering access-related impediments for labs. Market participants perceive information from neutral sources as helpful when validating their own information and adding new sources to adapt their strategies. Smaller and newer labs that cannot benefit from an extensive network especially acknowledge the value of such information. Besides labs benefiting from information, more actors, such as prospective clients and experts, serve as knowledge sources. They may also profit from higher information availability and transparency in an increasingly differentiated innovation system.

Second, market coordination becomes increasingly relevant. In the interviews as well as at the stakeholder event, lab managers and CEOs confirmed the need for a common innovation framework for the labs in Berlin. The city council could potentially support the first steps toward this since the heterogeneity of the actors has complicated the coordination to date. To support the business models of labs, the definition of sectoral rules and the establishment of a formal network are demanded to foster institutional development. The sectoral development of established sectors, such as the automotive or manufacturing sector, in Germany is a role model for establishing markets with a common framework and with a set of defined rules to enable coopetitive conditions for innovation activities. This can foster the cooperation of labs for innovation while still encouraging them to compete in the same market. As a first step, a formal network of labs as an integrative organization could establish a framework to discuss challenges, regulatory frameworks, and the innovation system's perspective with regard to sustaining the regional advantage of the openness of the Berlin innovation system. Nevertheless, the tension between cooperative and competitive behavior hampers coordination. Therefore, the fourth proposition is as follows.

Proposition 4 Without a set of common operational rules, coopetitive innovation strategies of intermediaries can negatively affect regional innovation.

Discussion

The results provide insights into how coopetition is implemented into intermediaries' innovation strategies. Since the literature strands on innovation intermediaries and coopetition are only loosely connected, I discuss how innovation intermediaries relate to the coopetition literature, which mostly discusses inter-firm coopetition. This case study shows the relevance of the simultaneous appearance of competitive and cooperative elements in intermediaries' strategic orientation to fulfill organizations' goals. I contribute to the literature on coopetition by offering exploratory evidence of the role of coopetition for innovation intermediaries. The large body of coopetition literature has specifically addressed the role of coopetition in the innovation process (Quintana-García & Benavides-Velasco, 2004). Companies choose coopetition as a strategy to overcome technological complexity in knowledge-intensive innovation (Gnyawali & Park, 2011). I specifically connect three strands through which intermediaries influence coopetition.

First, firm-driven labs are an organizational form that integrates new knowledge sources into a parent organization. LEs search for ways to explore knowledge and implement radical changes (Bouncken et al., 2018). Collaborating with competitors to recombine knowledge for innovation and implement collaborative learning processes is a strategic choice. The literature on coopetition has discussed challenges for collaborating partners with a focus on the tensions between protecting their business models and sharing knowledge to improve innovativeness (Bouncken & Kraus, 2013; Bouncken et al., 2015). It has been demonstrated in case studies that the complexities involved in collaboratively developing technological innovation require sufficient resources to successfully coordinate (Chiambaretto et al., 2019; Gnyawali & Park, 2011). In the case study, the creation of firm-driven labs describes making a choice to deal with the coordination problem. The reorganization of coopetitive resources in labs helps to develop capacities, test cooperative models, and later upscale for complex innovation regarding, for example, digital technologies. LEs organize risk-minimizing coopetitive innovation projects in labs to reduce the risks related to failure for the parent organization. Specifically, intra-lab innovation is a way of cooperating with smaller companies and obtaining knowledge about the flexible structures and development of open innovation projects.

Second, the literature on coopetition focuses on entrepreneurial ecosystems. The first results show that a coopetitive environment can lead to a competitive advantage for innovation systems. Few studies include a regional perspective on the coopetition mode (Crick et al., 2020; Felzensztein et al., 2018; Ooms & Ebbekink, 2018). The knowledge-broker and boundary-spanner role of regional innovation systems determine coopetition and capabilities with regard to benefiting from cooperating with competitors (Bacon et al., 2019; Bouncken et al., 2015, 2018). The results confirm the relevance of intermediaries for regional innovation systems benefiting from better competitiveness enhanced by intermediary activities. Nevertheless, the increased competition between intermediaries also influences their position in the regional innovation system. Inter-intermediary cooperation has been evaluated as ambiguous. In particular, intermediaries that strongly rely on innovative outcomes see inter-lab collaboration as critical.

Third, one role of intermediaries has been proposed to overcome the tensions between firms at a conceptual level. The hope is that intermediaries can serve as boundary spanners, helping in coopetitive settings to improve knowledge transfer and improve the conditions for innovation capacity building. A case study on intermediaries at Ubi Soft shows that they can help to reduce sharing costs via a standard setting in the innovation process and supporting diffusion processes as knowledge brokers due to credibility and trust cooperation (Chiambaretto et al., 2019). The results indicate that the business models of intermediaries in coopetitive settings have been widely acknowledged. Nevertheless, coopetitive tension also influences intermediaries' role in the innovation process. In the future, further studies are needed to shed more light on the role of coopetition for intermediaries that are not firm-driven labs as, in my case study, an impact on innovation strategy was detectable for all labs, but the literature is still lacking.

Conclusion

This study analyzes innovation intermediaries' innovation strategies and their effect on regional innovation systems. I have provided comprehensive insights and formulated propositions about innovation intermediaries' innovation strategies, building upon a case study of Berlin-based innovation and creativity labs, a sub-group of innovation intermediaries. While the literature has concentrated on the impact on clients and regions, this study contributes to the recently growing strand of literature on the internal perspective of innovation intermediaries (Kant & Kanda, 2019; de Silva et al., 2018).

Innovation and creativity labs choose innovation strategies that mix cooperative and competitive elements. Intra-lab cooperation is the core of such labs' innovation strategies. The added value of labs' services depends on the interaction of clients and external experts and the functioning of networking activities. In addition, the perception of higher competitive pressure due to the increased number of labs is relevant to their positioning in the market. In particular, information costs regarding the regional market have increased due to the growing number of labs. Orientation is offered by indicators screening the direct environment. In a dynamic innovation system with incoming intermediaries, the intermediaries' management uses niche searching as a means to sustain their business models. Inter-lab cooperation plays an ambiguous role for labs. On the one hand, cooperation with labs to explore new knowledge sources – often for digital innovation – has been valued. On the other hand, cooperation with competitors can threaten the labs' business models due to the increasingly relevant competition intensity in recent years. While labs with a parent organization explicitly choose coopetition strategies for specialization, independent labs only implicitly use elements of coopetition. Regionally, the choice of innovation strategy influences the systemic configuration due to the need to sustain the network structures' and intermediaries' growing differentiation. Consequently, regional policy is needed to grant neutral information and support the foundation of a coordination framework.

The results contribute to the discussion of intermediaries' role in regional innovation systems in terms of three dimensions. First, this article sheds light on the role of the heterogeneity of intermediaries. This has often been evaluated critically due to disparate roles in the innovation process, which makes comparison difficult. This analysis shows, despite the large heterogeneity of intermediaries in this case study, that labs are adopting coopetitive strategies, which is a response to the emerging competitive market of offering innovation intermediation. Second, this case study enlarges the literature strand on the internal perspective of innovation intermediaries, focusing on their role in regional innovation systems. I demonstrate that while internal cooperation between different participants is performed, the interaction with competing labs is characterized by coopetition. This contributes to understanding the changing role of the open innovation paradigm with increased competition between intermediaries. Third, the discussion on the role of coopetition in innovation processes has almost exclusively focused on firms. Nevertheless, I show that coopetition is also important for non-traditional actors, such as innovation intermediaries. In particular, the discussion on the differences between intermediaries' role in regional economies might be influenced by each intermediary's choice of innovation strategies and, consequently, can contribute to explaining differences in innovative outcomes.

This study points to a relevant topic for innovation policy. The financial and non-financial support of intermediaries is often argued as being part of an open innovation strategy to support regional knowledge spillovers and improve regional innovation capacity. Based on the results, I can carefully formulate two policy recommendations. First, establishing interaction between intermediaries in regional networks is key for the success of the former. Due to heterogeneity, supporting open networks might help to establish inter-sectoral and boundary-spanning knowledge exchange and support regional knowledge spillovers. Especially for intermediaries with limited resources, public policy as a "neutral" actor can help to lower the costs of networking. Second, public policy requires strategies concerning funding intermediaries. A large share of intermediaries benefits from public funding. The knowledge transfer from research to business requires public funding since these activities are often not profitable. For networks including knowledge providers and clients, sustainable funding mechanisms need to be considered as innovation systems grow.

The exploratory design of the study has limitations. First, I only offer insights from one innovation system, and the generalizability of the results is only limited. Historic development paths and increased international perceptions also influenced the emergence of innovation and creativity labs. Nevertheless, as a case study in an environment with a growing intermediary market, this study offers insights into a growing number of market participants regarding their function in the innovation process. Additional case studies in regions with a lower density of intermediaries can help to better understand the coopetition mode during the innovation process. Second, large-scale data sets would be desirable to learn more about intermediaries. Despite its limitations, the study design certainly adds to the literature with purposeful sampling to demonstrate the width and heterogeneity of intermediaries. At present, only a few quantitative studies exist since standardized innovation indicators

for innovation intermediaries are still missing. In the future, studies are needed to develop measuring instruments and to test them in order to gain more knowledge about their role in regional innovation systems. Third, comparative qualitative studies are needed to understand the role of metropolitan areas and the contexts within which innovation strategies vary in different surroundings. Inter-regional and international comparative approaches will help to identify characteristic elements of the strategic behavior of innovation intermediaries.

Acknowledgements Financial support for conducting the interviews from the Projekt Zukunft funded by the Berlin Senate Department for Economics, Energy and Public Enterprises and the Federal Ministry of Education and Research with funding code 16IFI110 is gratefully acknowledged.

Funding Open Access funding enabled and organized by Projekt DEAL.

References

Abbate, T., Coppolino, R., & Schiavone, F. (2013). Linking entities in knowledge transfer: The innovation intermediaries. *Journal of the Knowledge Economy, 4*, 233–243. https://doi.org/10.1007/s13132-013-0156-5

Agogué, M., Yström, A., & Le Masson, P. (2013). Rethinking the role of intermediaries as an architect of collective exploration and creation of knowledge in open innovation. *International Journal of Innovation Management, 17*, 1350007. https://doi.org/10.1142/S1363919613500072

Agostini, L., Nosella, A., & Soranzo, B. (2015). The impact of formal and informal appropriability regimes on SME profitability in medium high-tech industries. *Technology Analysis & Strategic Management, 27*, 405–419. https://doi.org/10.1080/09537325.2014.1003207

Alexander, A. T., & Martin, D. P. (2013). Intermediaries for open innovation: A competence-based comparison of knowledge transfer offices practices. *Technological Forecasting and Social Change, 80*, 38–49. https://doi.org/10.1016/j.techfore.2012.07.013

Almodovar, J., & Teixeira, A. A. C. (2014). Assessing the importance of local supporting organizations in the automotive industry: A hybrid dynamic framework of innovation networks. *European Planning Studies, 22*, 841–865. https://doi.org/10.1080/09654313.2013.771621

Ametowobla, D., Baur, N., & Jungmann, R. (2015). *Methods of innovation research: Qualitative, quantitative and mixed methods approaches*. GESIS, Leibniz Institute for the Social Sciences.

Aquilani, B., Abbate, T., & Codini, A. (2017). Overcoming cultural barriers in open innovation processes through intermediaries: A theoretical framework. *Knowledge Management Research & Practice, 15*, 447–459. https://doi.org/10.1057/s41275-017-0067-5

Arenas, J., & González, D. (2018). Technology transfer models and elements in the university-industry collaboration. *Administrative Sciences, 8*, 19. https://doi.org/10.3390/admsci8020019

Bacon, E., Williams, M. D., & Davies, G. (2019). Coopetition in innovation ecosystems: A comparative analysis of knowledge transfer configurations. *Journal of Business Research*. https://doi.org/10.1016/j.jbusres.2019.11.005

Balland, P.-A., Boschma, R., Crespo, J., & Rigby, D. L. (2019). Smart specialization policy in the European Union: Relatedness, knowledge complexity and regional diversification. *Regional Studies, 53*, 1252–1268. https://doi.org/10.1080/00343404.2018.1437900

Bank, N., Fichter, K., & Klofsten, M. (2017). Sustainability-profiled incubators and securing the inflow of tenants – The case of Green Garage Berlin. *Journal of Cleaner Production, 157*, 76–83. https://doi.org/10.1016/j.jclepro.2017.04.123

Batterink, M. H., Wubben, E., Klerkx, L., & Omta, S. (2010). Orchestrating innovation networks: The case of innovation brokers in the agri-food sector. *Entrepreneurship and Regional Development, 22*, 47–76. https://doi.org/10.1080/08985620903220512

Bayat, P., Daraei, M., & Rahimikia, A. (2022). Designing of an open innovation model in science and technology parks. *Journal of Innovation and Entrepreneurship, 11*, 4. https://doi.org/10.1186/s13731-022-00203-w

Belitz, H., & Schiersch, A. (2018). Forschung und Produktivität: Industrieunternehmen in der Stadt im Vorteil. *DIW-Wochenbericht, 85*(47), 1013–1020.

Belso-Martinez, J. A., Diez-Vial, I., Lopez-Sanchez, M. J., & Mateu-Garcia, R. (2018). The brokerage role of supporting organizations inside clusters: How does it work? *European Planning Studies, 26*(4), 706–725.

Benneworth, P., Pinheiro, R., & Karlsen, J. (2017). Strategic agency and institutional change: Investigating the role of universities in regional innovation systems (RISs). *Regional Studies, 51*, 235–248. https://doi.org/10.1080/00343404.2016.1215599

Berlin City Council. (2018). List of innovation labs in Berlin. Retrieved September 23, 2022, from https://innolabs.berlin/

Betz, F., Carayannis, E., Jetter, A., Min, W., Phillips, F., & Shin, D. W. (2016). Modeling an innovation intermediary system within a helix. *Journal of the Knowledge Economy, 7*, 587–599. https://doi.org/10.1007/s13132-014-0230-7

Blind, K., Edler, J., Frietsch, R., & Schmoch, U. (2006). Motives to patent: Empirical evidence from Germany. *Research Policy, 35*, 655–672. https://doi.org/10.1016/j.respol.2006.03.002

Bocquet, R., Brion, S., & Mothe, C. (2016). The role of cluster intermediaries for KIBS' resources and innovation. *Journal of Small Business Management, 54*, 256–277. https://doi.org/10.1111/jsbm.12298

Boon, W. P., Moors, E. H., Kuhlmann, S., & Smits, R. E. (2011). Demand articulation in emerging technologies: Intermediary user organisations as co-producers? *Research Policy, 40*, 242–252. https://doi.org/10.1016/j.respol.2010.09.006

Bouncken, R. B., Fredrich, V., Ritala, P., & Kraus, S. (2018). Coopetition in new product development alliances: Advantages and tensions for incremental and radical innovation. *British Journal of Management, 29*, 391–410. https://doi.org/10.1111/1467-8551.12213

Bouncken, R. B., Gast, J., Kraus, S., & Bogers, M. (2015). Coopetition: A systematic review, synthesis, and future research directions. *Review of Managerial Science, 9*(3), 577–601.

Bouncken, R. B., & Kraus, S. (2013). Innovation in knowledge-intensive industries: The double-edged sword of coopetition. *Journal of Business Research, 66*, 2060–2070. https://doi.org/10.1016/j.jbusres.2013.02.032

Bristow, G. (2010). Resilient regions: Re-'place'ing regional competitiveness. *Cambridge Journal of Regions, Economy and Society, 3*, 153–167. https://doi.org/10.1093/cjres/rsp030

Budd, L., & Hirmis, A. (2004). Conceptual framework for regional competitiveness. *Regional Studies, 38*, 1015–1028. https://doi.org/10.1080/0034340042000292610

Capital, & Infront Consulting. (2019). *Konzerne auf den Spuren von Startups 2019. Der steinige Weg zu substantieller digitaler Innovation*. Hamburg. Retrieved April 21, 2020, from https://www.capital.de/wirtschaft-politik/die-besten-digitallabore-deutschlands

Carayannis, E. G., Barth, T. D., & Campbell, D. F. J. (2012). The Quintuple Helix innovation model: Global warming as a challenge and driver for innovation. *Journal of Innovation and Entrepreneurship, 1*, 2. https://doi.org/10.1186/2192-5372-1-2

Carayannis, E. G., & Campbell, D. F. J. (2009). 'Mode 3' and 'Quadruple Helix': Toward a 21st century fractal innovation ecosystem. *International Journal of Technology Management, 46*(3–4), 201–234.

Carayannis, E. G., & Rakhmatullin, R. (2014). The quadruple/quintuple innovation helixes and smart specialisation strategies for sustainable and inclusive growth in Europe and beyond. *Journal of the Knowledge Economy, 5*, 212–239. https://doi.org/10.1007/s13132-014-0185-8

Ceci, F., & Iubatti, D. (2012). Personal relationships and innovation diffusion in SME networks: A content analysis approach. *Research Policy, 41*(3), 565–579.

Chesbrough, H. W. (2003). *Open innovation: The new imperative for creating and profiting from technology*. Harvard Business School Press.

Chesbrough, H. W., & Appleyard, M. M. (2007). Open innovation and strategy. *California Management Review, 50*, 57–76. https://doi.org/10.2307/41166416

Chiambaretto, P., Massé, D., & Mirc, N. (2019). "All for one and one for all?" - Knowledge broker roles in managing tensions of internal coopetition: The Ubisoft case. *Research Policy, 48*, 584–600. https://doi.org/10.1016/j.respol.2018.10.009

Cooke, P. (1992). Regional innovation systems: Competitive regulation in the new Europe. *Geoforum, 23*, 365–382. https://doi.org/10.1016/0016-7185(92)90048-9

Cooke, P. (2001). Regional innovation systems, clusters, and the knowledge economy. *Industrial and Corporate Change, 10*(4), 945–974.

Crick, J. M., Crick, D., & Tebbett, N. (2020). Competitor orientation and value co-creation in sustaining rural New Zealand wine producers. *Journal of Rural Studies, 73*, 122–134. https://doi.org/10.1016/j.jrurstud.2019.10.019

Dalziel, M. (2010). Why do innovation intermediaries exist? Paper presented that the DRUID Summer Conference, Imperial College London Business School, June16–18, 2010.

de Oliveira, L. S., Soares Echeveste, M. E., Cortimiglia, M. N., & Gularte, A. C. (2019). Open innovation in regional innovation systems: Assessment of critical success factors for implementation in SMEs. *Journal of the Knowledge Economy, 10*, 1597–1619. https://doi.org/10.1007/s13132-019-00619-y

de Silva, M., Howells, J., & Meyer, M. (2018). Innovation intermediaries and collaboration: Knowledge–based practices and internal value creation. *Research Policy, 47*, 70–87. https://doi.org/10.1016/j.respol.2017.09.011

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review, 14*(4), 532–550.

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal, 50*, 25–32. https://doi.org/10.5465/amj.2007.24160888

Etzkowitz, H. (2018). *The triple helix: University-industry-government innovation and entrepreneurship*. Routledge.

Felzensztein, C., Gimmon, E., & Deans, K. R. (2018). Coopetition in regional clusters: Keep calm and expect unexpected changes. *Industrial Marketing Management, 69*, 116–124. https://doi.org/10.1016/j.indmarman.2018.01.013

Feser, D. (2019). *Innovationserhebung Berlin 2018*. Innovationsverhalten der Berliner Wirtschaft.

Feser, D., & Runst, P. (2016). Energy efficiency consultants as change agents? Examining the reasons for EECs' limited success. *Energy Policy, 98*, 309–317. https://doi.org/10.1016/j.enpol.2016.08.022

Fukugawa, N. (2018). Division of labor between innovation intermediaries for SMEs: Productivity effects of interfirm organizations in Japan. *Journal of Small Business Management, 56*, 297–322.

Gao, Y., & Hu, Y. (2017). The upgrade to hybrid incubators in China: A case study of Tuspark incubator. *Journal of Science and Technology Policy Management, 8*(3), 331–351.

Garengo, P. (2019). How bridging organisations manage technology transfer in SMEs: An empirical investigation. *Technology Analysis and Strategic Management, 31*, 477–491. https://doi.org/10.1080/09537325.2018.1520976

Gnyawali, D. R., & Park, B.-J. (2011). Co-opetition between giants: Collaboration with competitors for technological innovation. *Research Policy, 40*, 650–663. https://doi.org/10.1016/j.respol.2011.01.009

Grundel, I., & Dahlström, M. (2016). A quadruple and quintuple helix approach to regional innovation systems in the transformation to a forestry-based bioeconomy. *Journal of the Knowledge Economy, 7*, 963–983. https://doi.org/10.1007/s13132-016-0411-7

Hossain, M., & Lassen, A. (2017). How do digital platforms for ideas, technologies, and knowledge transfer act as enablers for digital transformation? *Technology Innovation Management Review, 7*, 55–60. https://doi.org/10.22215/timreview/1106

Howells, J. (2006). Intermediation and the role of intermediaries in innovation. *Research Policy, 35*, 715–728. https://doi.org/10.1016/j.respol.2006.03.005

Hsieh, H.-N., Chen, C.-M., Wang, J.-Y., & Hu, T.-S. (2015). Knowledge-intensive business services as knowledge intermediaries in industrial regions: A comparison of the Hsinchu and Tainan metropolitan areas. *European Planning Studies, 23*, 2253–2274. https://doi.org/10.1080/09654313.2014.958133

Huyghe, A., Knockaert, M., Wright, M., & Piva, E. (2014). Technology transfer offices as boundary spanners in the pre-spin-off process: The case of a hybrid model. *Small Business Economics, 43*, 289–307. https://doi.org/10.1007/s11187-013-9537-1

Jarmin, R. S. (1999). Evaluating the impact of manufacturing extension on productivity growth. *Journal of Policy Analysis and Management, 18*, 99–119. https://doi.org/10.1002/(SICI)1520-6688(199924)18:1%3c99:AID-PAM6%3e3.0.CO;2-S

Johnston, A., & Huggins, R. (2016). Drivers of university–industry links: The case of knowledge-intensive business service firms in rural locations. *Regional Studies, 50*, 1330–1345. https://doi.org/10.1080/00343404.2015.1009028

Kanda, W., Hjelm, O., Clausen, J., & Bienkowska, D. (2018). Roles of intermediaries in supporting eco-innovation. *Journal of Cleaner Production, 205*, 1006–1016.

Kanda, W., Río, P. D., Hjelm, O., & Bienkowska, D. (2019). A technological innovation systems approach to analyse the roles of intermediaries in eco-innovation. *Journal of Cleaner Production, 227*, 1136–1148. https://doi.org/10.1016/j.jclepro.2019.04.230

Kant, M., & Kanda, W. (2019). Innovation intermediaries: What does it take to survive over time? *Journal of Cleaner Production, 229*, 911–930. https://doi.org/10.1016/j.jclepro.2019.04.213

Kerry, C., & Danson, M. (2016). Open innovation, triple helix and regional innovation systems: Exploring CATAPULT centres in the UK. *Industry and Higher Education, 30*, 67–78. https://doi.org/10.5367/ihe.2016.0292

Knockaert, M., & Spithoven, A. (2014). Under which conditions do technology intermediaries enhance firms' innovation speed? The case of Belgium's collective research centres. *Regional Studies, 48*, 1391–1403. https://doi.org/10.1080/00343404.2012.708405

Krenz, P., Basmer, S., Buxbaum-Conradi, S., Redlich, T., & Wulfsberg, J.-P. (2014). Knowledge management in value creation networks: Establishing a new business model through the role of a knowledge-intermediary. *Procedia CIRP, 16*, 38–43. https://doi.org/10.1016/j.procir.2014.01.006

Landry, R., Amara, N., Cloutier, J.-S., & Halilem, N. (2013). Technology transfer organizations: Services and business models. *Technovation, 33*, 431–449. https://doi.org/10.1016/j.technovation.2013.09.008

Laperche, B., & Liu, Z. (2013). SMEs and knowledge-capital formation in innovation networks: A review of literature. *Journal of Innovation and Entrepreneurship, 2*, 21. https://doi.org/10.1186/2192-5372-2-21

Lee, H.-F., & Miozzo, M. (2019). Which types of knowledge-intensive business services firms collaborate with universities for innovation? *Research Policy, 48*, 1633–1646. https://doi.org/10.1016/j.respol.2019.03.014

Lee, S. Y., Noh, M., & Seul, J. Y. (2017). Government-led regional innovation: A case of "Pangyo' IT cluster of South Korea. *European Planning Studies, 25*, 848–866. https://doi.org/10.1080/09654313.2017.1282084

Levie, J. (2014). The university is the classroom: Teaching and learning technology commercialization at a technological university. *Journal of Technology Transfer, 39*, 793–808. https://doi.org/10.1007/s10961-014-9342-2

Leydesdorff, L., & Ivanova, I. (2016). "Open innovation" and "triple helix" models of innovation: Can synergy in innovation systems be measured? *Journal of Open Innovation: Technology, Market, and Complexity, 2*, 11. https://doi.org/10.1186/s40852-016-0039-7

Lichtenthaler, U. (2013). The collaboration of innovation intermediaries and manufacturing firms in the markets for technology. *Journal of Product Innovation Management, 30*, 142–158. https://doi.org/10.1111/jpim.12068

Lin, H., Zeng, S., Liu, H., & Li, C. (2016). How do intermediaries drive corporate innovation? A moderated mediating examination. *Journal of Business Research, 69*, 4831–4836. https://doi.org/10.1016/j.jbusres.2016.04.039

MacGregor, S. P., Marques-Gou, P., & Simon-Villar, A. (2010). Gauging readiness for the quadruple Helix: A study of 16 European organizations. *Journal of the Knowledge Economy, 1*, 173–190. https://doi.org/10.1007/s13132-010-0012-9

Martin, R., & Sunley, P. (2006). Path dependence and regional economic evolution. *Journal of Economic Geography, 6*, 395–437. https://doi.org/10.1093/jeg/lbl012

Mayring, P. (2000). Qualitative content analysis. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research, 1*(2).

Mayring, P. (2014). *Qualitative content analysis: Theoretical foundation, basic procedures and software solution*. Klagenfurt.

McCann, P., & Ortega-Argiles, R. (2013). Transforming European regional policy: A results-driven agenda and smart specialization. *Oxford Review of Economic Policy, 29*, 405–431. https://doi.org/10.1093/oxrep/grt021

Muench, S., Thuss, S., & Guenther, E. (2014). What hampers energy system transformations? The case of smart grids. *Energy Policy, 73*, 80–92. https://doi.org/10.1016/j.enpol.2014.05.051

Nilsson, M., & Sia-Ljungström, C. (2013). The role of innovation intermediaries in innovation systems. *Proceedings in Food System Dynamics, 160,* 180. https://doi.org/10.18461/pfsd.2013.1311

Ooms, W., & Ebbekink, M. (2018). In search of the sweet spot: The role of personal proximity in three Dutch clusters. *Journal of Business Research, 92*, 48–60. https://doi.org/10.1016/j.jbusres.2018.07.010

Papamichail, G., Rosiello, A., & Wield, D. (2022). Addressing public policy implementation challenges in lagging regions through the analytical lens of smart specialisation. *Journal of the Knowledge Economy*. https://doi.org/10.1007/s13132-021-00874-y

Parjanen, S., Melkas, H., & Uotila, T. (2011). Distances, knowledge brokerage and absorptive capacity in enhancing regional innovativeness: A qualitative case study of Lahti region, Finland. *European Planning Studies, 19*, 921–948. https://doi.org/10.1080/09654313.2011.568804

Pina, K., & Tether, B. S. (2016). Towards understanding variety in knowledge intensive business services by distinguishing their knowledge bases. *Research Policy, 45*, 401–413. https://doi.org/10.1016/j.respol.2015.10.005

Polzin, F., von Flotow, P., & Klerkx, L. (2016). Addressing barriers to eco-innovation: Exploring the finance mobilisation functions of institutional innovation intermediaries. *Technological Forecasting and Social Change, 103*, 34–46. https://doi.org/10.1016/j.techfore.2015.10.001

Ponds, R., van Oort, F., & Frenken, K. (2010). Innovation, spillovers and university–industry collaboration: An extended knowledge production function approach. *Journal of Economic Geography, 10*, 231–255. https://doi.org/10.1093/jeg/lbp036

Porter, M. E. (1990). *The competitive advantage of nations: With a new introduction*. Free Pr.

Porter, M. E. (1998). Clusters and the new economics of competition. *Harvard Business Review, 76*(6), 77–90.

Porto Gomez, I., Otegi Olaso, J. R., & Mikel Zabala-Iturriagagoitia, J. (2016). Trust builders as open innovation intermediaries. *Innovation: Management Policy & Practice, 18*, 145–163. https://doi.org/10.1080/14479338.2016.1187574

Quintana-García, C., & Benavides-Velasco, C. A. (2004). Cooperation, competition, and innovative capability: A panel data of European dedicated biotechnology firms. *Technovation, 24*, 927–938. https://doi.org/10.1016/S0166-4972(03)00060-9

Randhawa, K., Josserand, E., Schweitzer, J., & Logue, D. (2017). Knowledge collaboration between organizations and online communities: The role of open innovation intermediaries. *Journal of Knowledge Management, 21*, 1293–1318. https://doi.org/10.1108/JKM-09-2016-0423

Ranga, L. M., Miedema, J., & Jorna, R. (2008). Enhancing the innovative capacity of small firms through triple helix interactions: Challenges and opportunities. *Technology Analysis & Strategic Management, 20*, 697–716. https://doi.org/10.1080/09537320802426408

Reintjes, D. (2019, September 3). Wie ist es um die deutsche Start-up-Hauptstadt bestellt? *Wirtschaftswoche.* Retrieved May 5, 2020, from https://www.wiwo.de/erfolg/gruender/berlin-ladehemmung-in-deutschlands-start-up-hauptstadt-/24941812.html

Remneland Wikhamn, B. (2020). Open innovation change agents in large firms: How open innovation is enacted in paradoxical settings. *R&D Management, 50*, 198–211. https://doi.org/10.1111/radm.12389

Rocio Vasquez-Urriago, A., Barge-Gil, A., Modrego Rico, A., & Paraskevopoulou, E. (2014). The impact of science and technology parks on firms' product innovation: Empirical evidence from Spain. *Journal of Evolutionary Economics, 24*, 835–873. https://doi.org/10.1007/s00191-013-0337-1

Russo, M., Caloffi, A., Rossi, F., & Righi, R. (2019). Innovation intermediaries and performance-based incentives: A case study of regional innovation poles. *Science and Public Policy, 46*, 1–12. https://doi.org/10.1093/scipol/scy028

Scheuplein, C., & Kahl, J. (2016). Berliner venture-capital report 2016: Impulse für die digitale Wirtschaft.

Schmidt, S., & Brinks, V. (2017). Open creative labs: Spatial settings at the intersection of communities and organizations. *Creativity and Innovation Management, 26*, 291–299. https://doi.org/10.1111/caim.12220

Schmidt, S., Brinks, V., & Brinkhoff, S. (2014). Innovation and creativity labs in Berlin Organizing temporary spatial configurations for innovations. *Zeitschrift Fur Wirtschaftsgeographie, 58*(4), 232–247.

Sengupta, A., & Ray, A. S. (2017). Choice of structure, business model and portfolio: Organizational models of knowledge transfer offices in British universities. *British Journal of Management, 28*, 687–710. https://doi.org/10.1111/1467-8551.12224

Shearmur, R., & Doloreux, D. (2013). Innovation and knowledge-intensive business service: The contribution of knowledge-intensive business service to innovation in manufacturing establishments. *Economics of Innovation and New Technology, 22*(8), 751–774.

Sieg, J. H., Wallin, M. W., & von Krogh, G. (2010). Managerial challenges in open innovation: A study of innovation intermediation in the chemical industry. *R&D Management, 40*, 281–291. https://doi.org/10.1111/j.1467-9310.2010.00596.x

Smedlund, A. (2006). The roles of intermediaries in a regional knowledge system. *Journal of Intellectual Capital, 7*, 204–220. https://doi.org/10.1108/14691930610661863

Startup Genome. (2019). *Global Startup Ecosystem Report*.

Stier, J., & Smit, S. E. (2021). Co-creation as an innovative setting to improve the uptake of scientific knowledge: Overcoming obstacles, understanding considerations and applying enablers to improve scientific impact in society. *Journal of Innovation and Entrepreneurship, 10*, 35. https://doi.org/10.1186/s13731-021-00176-2

Tether, B. S., & Tajar, A. (2008). Beyond industry–university links: Sourcing knowledge for innovation from consultants, private research organisations and the public science-base. *Research Policy, 37*(6), 1079–1095.

Thomä, J., & Bizer, K. (2013). To protect or not to protect? Modes of appropriability in the small enterprise sector. *Research Policy, 42*, 35–49. https://doi.org/10.1016/j.respol.2012.04.019

Tran, Y., Hsuan, J., & Mahnke, V. (2011). How do innovation intermediaries add value? Insight from new product development in fashion markets. *R&D Management, 41*(1), 80–91.

Vivas, C. (2016). Commercializing technological research and skills: Drivers from European technology institutes. *Innovation: Management. Policy and Practice, 18*, 389–410. https://doi.org/10.1080/14479338.2016.1219232

Winch, G. M., & Courtney, R. (2007). The organization of innovation brokers: An international review. *Technology Analysis and Strategic Management, 19*(6), 747–763.

Yin, R. K. (2003). Case study research: Design and methods (ed.). *Thousand Oaks*.