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The role of similarity and complementarity in the selection of potential partners for open innovation projects in family firms

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Abstract Despite the increasing importance of open innovation endeavors, the process by which firms select partners for open innovation is not well understood. Even less is known about how family firms, which are characterized by their resource scarcity and desire for control, handle these processes. We aim to address this gap in the literature by investigating this selection process using a qualitative approach. Our findings are based on data gathered in 53 interviews from ten case studies and expert interviews, as well as secondary data. We find that, in order to engage in collaboration, family firms must manage their perceptions of the similarities and complementarities between themselves and their potential partner and integrate these into an accepted level of anticipated fit. During the selection phase, the elements of fit are weighed in light of the openness of the given firm and preferred levels and mechanisms of control, which are influenced by the family in the family firm. If the fit is deemed sufficient to enter into a partnership, the partnership is then advanced to the collaboration phase, where anticipated fit is translated into experienced fit, and aspects of similarity and complementarity are reassessed; this may potentially end existing partnerships, feeding back to future evaluations of fit and accordingly influencing future partnerships.

Plain English Summary Family firms have unique ways to balance the openness, which is required to enter open innovation collaborations, and their preferences for control. They evaluate and reevaluate the fit with the potential innovation partner at several points in time. This might lead to the end of the relationship if the potential collaboration partner turns out to show less fit than expected. In the early phase of the process, firms tend to focus on complementary, e.g., in terms of bringing in skills that the family firm has not. While in the later phase of partner selection similarity, e.g., in terms of values and working style becomes more important. Being aware of the mechanisms that are at play might help firms develop more successful open innovation partnerships, as they can deliberately take measures to address the lack of perceived similarity by engaging in trust-building activities.

Keywords Open innovation · Family firms · Partner selection · Fit · Complementarity · Similarity

JEL Classification M14 · D8 · L14 · L21

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1 Introduction

Selecting the right partner is an important success factor for interfirm collaborative endeavors (Geringer, 1991; Hitt et al., 2000). This includes open innovation, in which a firm works with customers, suppliers, universities, or even competitors to make innovation strategies more efficient and effective (Chesbrough, 2003). It is hence surprising that research on the selection process for open innovation partners remains sparse (De Groote and Backmann, 2020).

Initial insights into the open innovation processes of family firms indicate that peculiarities induced by family influence, such as resource scarcity and nonfinancial goals, influence the attitudes and behavior of family firms regarding open innovation (Brinkerink et al., 2017; Casprini et al., 2017; Lambrechts et al., 2017). The extant literature suggests that family firms tend to be rather reluctant to relax their firm boundaries and tend to have fewer open innovation partners than nonfamily firms (Classen et al., 2012). The tension between the family's ability and willingness to enter open innovation relationships affects their behavior during the selection process (De Massis et al., 2014; Kotlar et al., 2020). Furthermore, because of the known heterogeneity among family firms (Chua et al., 2012), selection processes regarding open innovation partners might also differ substantially among these firms.

We know little about how family firms tackle the issue of the unwillingness to lose control when collaborating with external parties (Feranita et al., 2017). Furthermore, scant research specifically examines the relative role of various fit characteristics in the selection process (Shah and Swaminathan, 2008), and its temporal importance during the open innovation process. The importance of each selection criteria might vary depending on the type of project (Hitt et al., 2000) and the peculiarities of the family firm (Brinkerink et al., 2017). Because open innovation in general (Faems et al., 2005) and selecting the right partner for open innovation, in specific, are important success factors (Geringer, 1991; Hitt et al., 2000), it is important to better understand the partner selection process in family firms. Therefore, we pose the following research question: *How do family firms select open innovation partners?*

We aim to answer this research question by inductively and deductively analyzing ten case studies, using data based on 53 interviews with family firm members and open innovation experts. The present study contributes to the literature in several ways. First, we contribute to the literature on open innovation in family firms by developing a process model of the selection process in open innovation partnerships of family firms. We shed light on how perceptions of fit between partners evolve throughout the process of screening, selecting, and collaborating with external partners. We show that firms weigh facets of similarity and complementarity continuously throughout the process and that this weighing is closely linked to the difference between anticipated fit and experienced fit. While prior research has highlighted the importance of fit perceptions and the related concepts of complementarity and similarity (Bierly III and Gallagher, 2007; Emden et al., 2006), the mechanisms underlying the evaluation process of these criteria, and the interplay with firm characteristics, have thus far remained uninvestigated. Second, herein, we contribute to the understanding of how family firms are able to handle their unwillingness to lose control when entering open innovation partnerships (Feranita et al., 2017). Third, we further elaborate on the idiosyncratic preferences and drivers in family firms that influence this weighing process, for example, the family CEO him- or herself, thereby addressing calls to shed further light on the heterogeneity of family firms (Neubaum et al., 2019; Rau et al., 2019) and contribute to a better understanding of the role of the owner family in open innovation processes.

2 Theoretical background

2.1 Open innovation

Our definition of "open innovation" is based on the original definition provided by Chesbrough and Crowther as "the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. [This paradigm] assumes that firms can and should use external ideas as well as internal ideas and internal and external paths to market, as they look to advance their technology" (2006: 1). In family firms, cooperation with network partners compensates for the common scarcity of resources (De Massis et al., 2018; Lee et al., 1999) by enabling the firm to develop new

technologies despite those limited resources (Parida et al., 2012; Werner et al., 2018). For example, companies purchase technological applications that have already proven useful to innovate their own products (Chesbrough and Crowther, 2006) or aim to acquire relevant knowledge (Casprini et al., 2017).

Although studies on family firms and innovation have recently proliferated (Broekaert et al., 2016; Calabrò et al., 2019; Cassia et al., 2012; Decker & Günther, 2017), very few studies on family firms and open innovation have been conducted (Brinkerink, 2018; Classen et al., 2012; Kotlar et al., 2013). The question addressed by most of these articles is whether family firms are more receptive toward open innovation than nonfamily firms, or vice versa (Gjergji et al., 2019). These articles suggest that family social capital and the desire to connect with stakeholders might enhance the ability and willingness to engage in open innovation partnerships (Miller et al., 2008; Sirmon and Hitt, 2003). Barriers to open innovation in family firms mentioned in the literature, which point to a more closed innovation focus, are limited diversity in management, the protection of control, and other socioemotional wealth components (Chrisman et al., 2016; Classen et al., 2012; Nieto et al., 2015). Most quantitative studies evince that family firms acquire external technological resources to a lesser extent than firms without significant family involvement (for a review, see Gjergji et al., 2019, and for individual studies, see, for example, Classen et al., 2012; Kotlar et al., 2013; and Nieto et al., 2015), indicating that ability barriers and a lower proclivity toward open innovation are pronounced in family firms.

The existing qualitative studies focus on the comparison between family firms and nonfamily firms (Cassia et al., 2012), and they suggest that family firms are less willing to collaborate than nonfamily firms and that this has a negative effect on new product development. In addition, the role of trust (Hatak and Hyslop, 2015), the flow of knowledge (Casprini et al., 2017), and engagement in open innovation partnerships or barriers have been considered (Lambrechts et al., 2017).

2.2 Partner selection

The selection of open innovation partners can be broken down into three phases: screening potential partners (screening phase), actually making a selection decision (selection phase), and entering a collaboration (collaboration phase), which often includes the decision concerning whether to continue the collaboration or not (Emden et al., 2006). Partner selection is not only of importance in the context of open innovation but has been investigated in related contexts, such as the selection of strategic alliances (De Groote et al., 2021; Shah and Swaminathan, 2008). As the existing knowledge on open innovation partner selection in family firms is limited, we draw additionally on findings from this related stream of literature.

Choosing the right partner for cooperation means finding desirable matches between the resources, goals, and strategies of those partners (Das and Teng, 2003). From the outset, and with consideration given to the overall lifecycle of strategic alliances, firms have to look for a certain degree of fit between partners. Fundamentally, most criteria that result in a fit between partners of strategic alliances can be allocated to two main clusters, which we label as "complementarity" and "similarity." Beyond these two clusters, the concept of "fit" is often used; in some studies, this term is used to refer to either complementarity or similarity, or a combination thereof.[1]

Partner complementarity is typically defined as the extent to which a partner contributes resources and capabilities that the other partner lacks to the partnership (Dyer and Singh, 1998; Manotungvorapun and Gerdsri, 2016). Companies are more likely to enter into a partnership if the external partner has complementary resources, which the company can use in addition to its own resources (Chung et al., 2000). Such resources include, for example, specific market or technology knowledge (Emden et al., 2006). Partner similarity is typically investigated regarding cultural and organizational characteristics (Russo and Cesarani, 2017; Swoboda et al., 2011) and, in particular, the content dimensions of values, norms, and mindsets (Yoon and Song, 2014).

The understanding of "fit" does contain a positive connotation. It refers to aspects related to the

[1] While in strategic alliance literature in particular a number of different concepts have been put forward, including (among others) compatibility (Prashant and Harbir 2009), configurational fit (Swoboda et al., 2011), or organizational fit (Douma et al., 2000), no consensus has been reached regarding terminology and definitions. This is particularly true of the strategic alliance literature, but it also applies to related literature streams (De Groote et al. 2019).

similarities between firms but is also related to aspects beyond that. It can also encompass aspects of different resource bases that may be leveraged (i.e., complementary resources), and in some contexts, it is regarded as an input into (and in others, as an outcome of) relationships. To be able to potentially discover new content dimensions of characteristics, which are of relevance to our research context, and to understand patterns of how these dimensions interact, we conceptually differentiate among "similarity," "complementarity," and "fit." We define the "similarity" of the partners as those shared characteristics that explicitly neither include a positive (or negative) connotation nor imply positive outcomes. We understand "complementarity" as characteristics of the firms that are dissimilar in their nature or value. We define "fit" broadly as the perception of how well firms mesh together.

2.3 Partner selection for open innovation in family firms

Several studies have investigated whether family firms differ from nonfamily firms in the depth and breadth of their search for external partners (Basco and Calabrò, 2016; Classen et al., 2012; Lazzarotti and Pellegrini, 2015). Such studies, however, have not focused on the partner search process in general but rather on the motivation for entering into a collaborative external partnership with a particular partner. To minimize the risk associated with uncertain innovation activities, family firms are assumed to work primarily with local partners, such as local suppliers or customers (Basco and Calabrò, 2016), since collaboration with competitors is less attractive for family firms, because of their inherent fear of loss of control (Chrisman et al., 2015). With regard to this topic, and the importance of complementarity and similarity considerations, two empirical studies on open innovation in family firms offer some initial insights and pointers for future research. While it was not at the core of their study's intended goal, Casprini et al. (2017) found evidence concerning partner selection in family firms. When elucidating the distinctive barriers to knowledge transfer, the problems of finding a partner with the right fit regarding similarity (e.g., same language, same family values) were noted. One important aspect mentioned by Lambrechts et al. (2017) in terms of partner selection is that family firms aim to keep control and influence over the family firm, even in open innovation partnerships. This objective contrasts significantly with engagement in open innovation activities, which typically involve open innovation partners surrendering part of this control. Interestingly, family firms might stay in control during the collaboration phase by taking up the role of orchestrator in the collaboration phase. However, loss of control might also play an important role in the partner selection process, for example, by influencing trading up between complementarity and similarity perceptions.

3 Method

As our research addresses questions of "how," we chose an explorative qualitative approach (Yin, 2014). Our overall approach is based on recent state-of-the-art recommendations for qualitative research projects in the field of family business (Kammerlander and De Massis, 2020; Leppäaho et al., 2016; Reay and Zhang, 2014). We followed the case study approach by Eisenhardt (1989) and collected data based on semistructured interviews as well as secondary data (e.g., business reports, company websites). The collected data were subsequently inductively and deductively analyzed (Langley and Abdallah, 2011) using the MaxQda software package. To ensure transparency and replicability, we followed recent guidelines by Aguinis and Solarino (2019). Table A1 in the online Appendix shows a summary of how we addressed the different criteria of transparency and replicability.

3.1 Data collection

We conducted a total of 53 interviews; 40 of these were conducted with 38 representatives of 10 Swiss family firms. No consensus has been reached so far in the scientific community on how a "family firm" is to be defined (Diaz-Moriana et al., 2019; Hernández-Linares et al., 2018). For the current study, we have chosen a definition that encompasses the aspects of management and ownership but also the intergenerational element (Howorth et al., 2010). Based on Chua et al. (1999), we define a firm as a "family firm" when it meets the following criteria: at least 50% of the business is owned by a family, at least one family member is part of the top management team,

Table 1 Overview of family firm cases and interviews included in the study

No	Firm code	Industry	Number of employees	Generation	Position of interviewee	Number of interviewees	Number of interviews	Number of data collection points
1	C1	Medical engineering	1604	2nd	C1-I1 = CEO; C1-I2 = Head of Concept Development; C1-I3 = SVP Technology; C1-I4 = Innovation & BD Manager; C1-I5 = former Member of the Board; C1-I6 = former Head of Concept Development; C1-I7 = SVP Marketing & Sales; C1-I8 = SVP HR; C1-I9 = International HR Manager; C1-I10 = Digital Innovation Manager; C1-I11 = Business Process Manager; C1-I12 = Engineer	12	14	14
2	C2	Manufacturer of beverages	255	2nd	C2-I1 = Head of BD; C2-I2 = Brand Manager; C2-I3 = Senior Business Developer; C2-I4 = Senior Innovation Manager; C2-I5 = CEO; C2-I6 = COB	6	6	6
3	C3	Real estate activities	9	2nd	C3-I1 = Successor, C3-I2 = CEO	2	2	2
4	C4	Manufacturer of food products	150	2nd	C4-I1 = CEO, C4-I2 = Head of Food Department	2	3	3
5	C5	Specialized construction activities	500	2nd	C5-I1 = COB; C5-I2 = Chief Product Officer; C5-I3 = CEO	3	3	3
6	C6	Manufacturer of machinery and equipment	300	3rd	C6-I1 = VP IT, HR, Finance & Administration; C6-I2 = CEO; C6-I3 = VP Technology & Innovation; C6-I4 = Head of Research & Design	4	3	4
7	C7	Manufacturer of food products	20	5th	C7-I1 = CEO; C7-I2 = COB	2	2	2
8	C8	Manufacturer of textiles	70	7th	C8-I1 = Head of Production; C8-I2 = Head of Development	2	2	2
9	C9	Medical engineering; manufacturer of watches and clocks	400	3rd	C9-I1 = CEO; C9-I2 = Head of Development	2	2	2

Table 1 (continued)

No	Firm code	Industry	Number of employees	Generation	Position of interviewee	Number of interviewees	Number of interviews	Number of data collection points
10	C10	Manufacturer of food products	570	4th	C10-I1 = Corporate Development; C10-I2 = Marketing Manager; C10-I3 = Product Manager	3	3	3
Total						38	40	41

No., case number; *CX*, case X; *IX*, interviewee X; *CEO*, chief executive officer; *BD*, business development; *SVP*, senior vice president; *HR*, human resources; *COB*, chairman of the board; *VP*, vice president; *IT*, information technology

and succession is planned/is in progress/has already occurred. To be part of our sample, family firms had to fulfill all of these criteria.

We collected our data in Switzerland. Previous research has demonstrated that national institutional environments influence entrepreneurial activity and innovation (Spencer et al., 2005) and the strategic choices of firms (Dacin et al., 2007). Specifically, Vasudeva et al. (2013) empirically showed that strategic partner selection is contingent upon corporatist institutional structures, which reflect differences in underlying cooperative norms, such as the importance of a partner's social versus technological values.

Since our focus lies on family firms and their peculiarities in the selection process, we needed to find an institutional context that was not dominated by a pure market logic (which might place too much attention on complementarity issues) but, equally, was not dominated by a pure family logic (which might place similarity considerations at the fore) (see Cardinal et al., 2017). In this regard, moderately regulated regions, such as Switzerland, should provide an appropriate context for finding a balanced view between the family and the business for selection logics and mechanisms of how selection takes place (see the CASE project, Culturally sensitive Assessment Systems and Education, Gupta and Levenburg, 2010).

We started data collection with an in-depth explorative case study (C1) comprising 14 interviews. Over the course of conducting the interviews, we developed a trust-based relationship with the firm, specifically with the family CEO. Preliminary results were discussed with this key informant. Afterward, we followed a theoretical replication logic (Yin, 2014). Accordingly, we chose family firms from different industries, of different sizes and with different levels of ownership and management participation of the owner family (Morse et al., 2002). Using this approach, we were able to identify similarities and "contrasting results but for anticipatable reasons" (Yin, 2014: 57). To identify further cases, the authors contacted firms that were known to them due to the firm's innovation activities. Additionally, based on internet research, a research assistant compiled a list of family firms that presented themselves as being innovative. One data source for this compilation was a list of the winners of Swiss innovation awards. To identify relevant cases and gain additional insights and outside perspectives, we contacted Swiss (open)

innovation experts and conducted interviews with them. The experts were then asked to refer further experts and relevant family firms. During data collection, we reached a saturation point, where new interviews tended to add little new information (O'Reilly and Parker, 2013; Wray et al., 2007).

We conducted semistructured interviews (Horton et al., 2004; Rabionet, 2011), and an outline of the questionnaire is shown in the online Appendix. For the expert interviews (Bogner et al., 2009), the focus was more on their overall insights into open innovation partnerships of family firms and less on the idiosyncratic processes in one company. All interviews and, whenever possible, phone calls and discussions of the preliminary research findings were recorded and transcribed. During interviews and meetings, notes were taken and discussed afterward among the research team. Respondents were generally part of the owner family and the top management team. In addition to the 40 family firm-specific interviews, we conducted 13 interviews with 15 Swiss open innovation experts. All interviews were recorded and transcribed verbatim immediately afterward, resulting in 1304 pages of transcript (348 pages for the expert interviews; 956 for family firm informants).

3.2 Data analysis

To structure and reduce the mass of data and information, we needed a data structure in the analysis process, for which we applied the Gioia method (Gioia et al., 2013) to support our positivist case study approach (Eisenhardt, 1989; Gehman et al., 2018; Leppäaho et al., 2016). We initially extracted first-order concepts from the interviews. In a subsequent step, we interpreted these concepts in the study context and aggregated them to second-order concepts. This aggregation was an iterative process and was undertaken by all authors moving back and forth between the data and the literature (Eisenhardt, 1989). In the final step, we subsumed the second-order concepts into three overarching themes. We began the data analysis by individually analyzing the cases. We then moved on to the cross-case analysis. To identify common patterns and themes across cases (Eisenhardt and Graebner, 2007), we iteratively analyzed the data while considering the extant literature (Eisenhardt, 1989), and we steadily refined emerging themes and patterns by revisiting the single cases. A major part of our effort was dedicated to ensuring the reliability of our analysis (Golafshani, 2003). We triangulated our data whenever possible by comparing the responses of the interviewees with the information we gained from secondary data, as well as with information provided by the external experts and, in some cases, innovation cooperation partners of the firms (Flick, 2004). Any differences of opinions among the authors about the interpretation of the data were discussed until a consensus was reached (Onwuegbuzie and Leech, 2007). Based on these discussions and feedback from interviewees and external experts, we refined our interpretation. We condensed our findings into a visual process model, which is presented in the findings section. To externally validate our model and the mechanisms of initiating and sustaining open innovation partnerships in family firms, we presented initial versions of the model to study participants, as well as experts external to the present research (e.g., other researchers, members of family firm unions), and we carried out discussions with them (Tables 1 and 2).

3.3 Data structure

An overview of the data structure is presented in Fig. 1. *Fit* emerged from our data as the main driver of selection and, later, of relationship building between open innovation partners. We found that aspects of complementarity and similarity represented the subdimensions of fit. The interview partners stated that they look for partners who can offer knowledge, skills, and/or resources that they lack, i.e., *complementarity*. While we find that firms search for complementarity, they simultaneously look for *similarity* between themselves and their partners. This similarity is not restricted to factors such as the values and cultures of the firms, and it also refers to criteria such as firm size or geographical location (in our case Switzerland and the specific canton (state) in Switzerland). Moreover, the firms in our sample differ in their general standpoint on open innovation, which we label as *openness* in the following. In the data analysis, two main drivers of this openness emerged: the *family-internal* and *family-external influences*. The *family-internal influences* are driven by the openness of the owner family, the owner family's decision maker (e.g., risk propensity), and its lifecycle. Older generations still formally or informally involved in

the firm may act as obstacles to the process of opening firm boundaries, especially in multigenerational firms. The openness of the family firms within the study was also determined by *family-external influences*. We found one important driver to be the industry in which the firm operates. In some of the industries that were represented in the study, firms would simply be unable to operate without taking advantage of open innovation activities. For example, firms in the medical engineering industry are obliged to rely on fundamental research conducted by universities (e.g., C1). Industry characteristics might, however, also limit open innovation activities. Moreover, we found that the specific geographical context of Switzerland plays an important role. For example, we observed that some of the firms were influenced in their decisions by the "Swissness" of potential partners, with this term denoting firms that are perceived as being particularly Swiss.

All family firms in our sample demonstrated that they wished to remain in control. The way firms sustain this *preferred level and mechanisms of control*, despite opening their firm boundaries to outsiders, is driven by two main factors: *trust* and *contracts*. *Trust* is mentioned in most cases as an important driver of relationship building in the open innovation process. This category encompasses, for example, positive experiences in the past, the goodwill of the partner in the network, and the type of partner, which is often based on perceived trustworthiness. *Contracts* are used to realize control, e.g., to ensure intellectual property rights, or to ensure that information is protected. Table A1 in the online Appendix provides an overview of sample quotes for all categories of the coding structure.

4 Weighing complementarity and similarity in the process of partner selection for open innovation in family firms

We integrated our findings into a process model, which is displayed in Fig. 2. In what follows, we derive the model from our data.

4.1 Screening phase

The screening phase is the first phase of the selection process. When defining partner search criteria, most firms focus on complementary resources, technology, and knowledge because a firm that already has all the knowledge and resources it requires would be unlikely to perceive a need for collaboration. This phenomenon is illustrated by the following quote:

> "Complementarity is certainly always important, in the sense that they need to bring in more or different knowledge. Most importantly, they need to have deeper knowledge in a specific field, and we have to need this knowledge." (C2-I3)

However, beyond looking for complementary knowledge, resources, and technology, firms also prefer companies that have attributes similar to theirs for collaboration:

> "In our case, this also means that we prefer companies that have a similar structure. For example, we have 500 employees; we are a family-run business. Now, if I take a big corporation that has 30,000 employees and an extremely complex corporate structure and we are there, even if I take a few million, we are small fry. That never really works [laughs]; they won't align themselves with us either." (C5-I3)

Thus, companies look for partners that are complementary and similar to them, e.g., in terms of company size, values, being owner-managed, or speaking a common language. The practical problem is that firms that are clearly complementary tend to be less similar. For example, while a complementarity in knowledge (e.g., being a software provider) is not by definition linked to dissimilarity in firm culture (e.g., status-based mindset), in practice, it is much more likely that dissimilarities in one dimension (e.g., being technology driven) are accompanied by dissimilarity in another dimension (e.g., company values). This discrepancy can be illustrated by a recurring example that we encountered during our research. Some of the family firms in the sample intended to work with start-ups in search of complementary resources. However, as early as during the screening (and selection) phase, the family firms became aware of dissimilarities, e.g., pace of decision-making or working methods, which then ended the potential collaboration before it began (e.g., C1, C2, C5, and E11). It is often impossible to find a partner that fulfills both criteria simultaneously, and hence, a *perfect* fit is unlikely to be found.

Table 2 Overview of expert interviews included in the study

No	Firm code	Type of expert					Number of interviewees	Number of interviews	Number of data collection points
		Expert background	Family firms						
			Industry	Number of employees	Generation	Position of interviewee			
1	E1	University	–	–	–	E1-I1 = Chief Operating Officer	1	1	1
2	E2	University	–	–	–	E2-I1 = Professor	1	1	1
3	E3	University	–	–	–	E3-I1 = Director	1	1	1
4	E4	Consultancy for open innovation	–	–	–	E4-I1 = CEO	1	1	1
5	E5	Start-up specialist	–	–	–	E5-I1 = Head of Specialized Department; E5-I2 = Head of specialized Department; E5-I3 = CEO	3	2	4
6	E6	Institution for open innovation	–	–	–	E6-I1 = Open Innovation & BD	1	1	1
7	E7	Metal industries	–	–	–	E7-I1 = CEO; E7-I2 = Wife of CEO	2	1	2
8	E8	–	Metal industries	380	3rd	E8-I1 = CEO	1	1	1
9	E9	–	Printing and reproduction of recorded media	10	2nd	E9-I1 = CEO	1	1	1
10	E10	–	Specialized construction activities	16	2nd	E10-I1 = CEO	1	1	1
11	E11	–	Manufacturer of instruments and appliances for measuring, testing, and navigation	200	6th	E11-I1 = Head of Research & Design	1	1	1
12	E12	–	Advertising and market research	420	2nd	E12-I1 = COB	1	1	1
Total							15	13	16

No., case number; *EX*, expert X; *IX*, interviewee X; *CEO*, chief executive officer; *BD*, business development; *COB*, chairman of the board

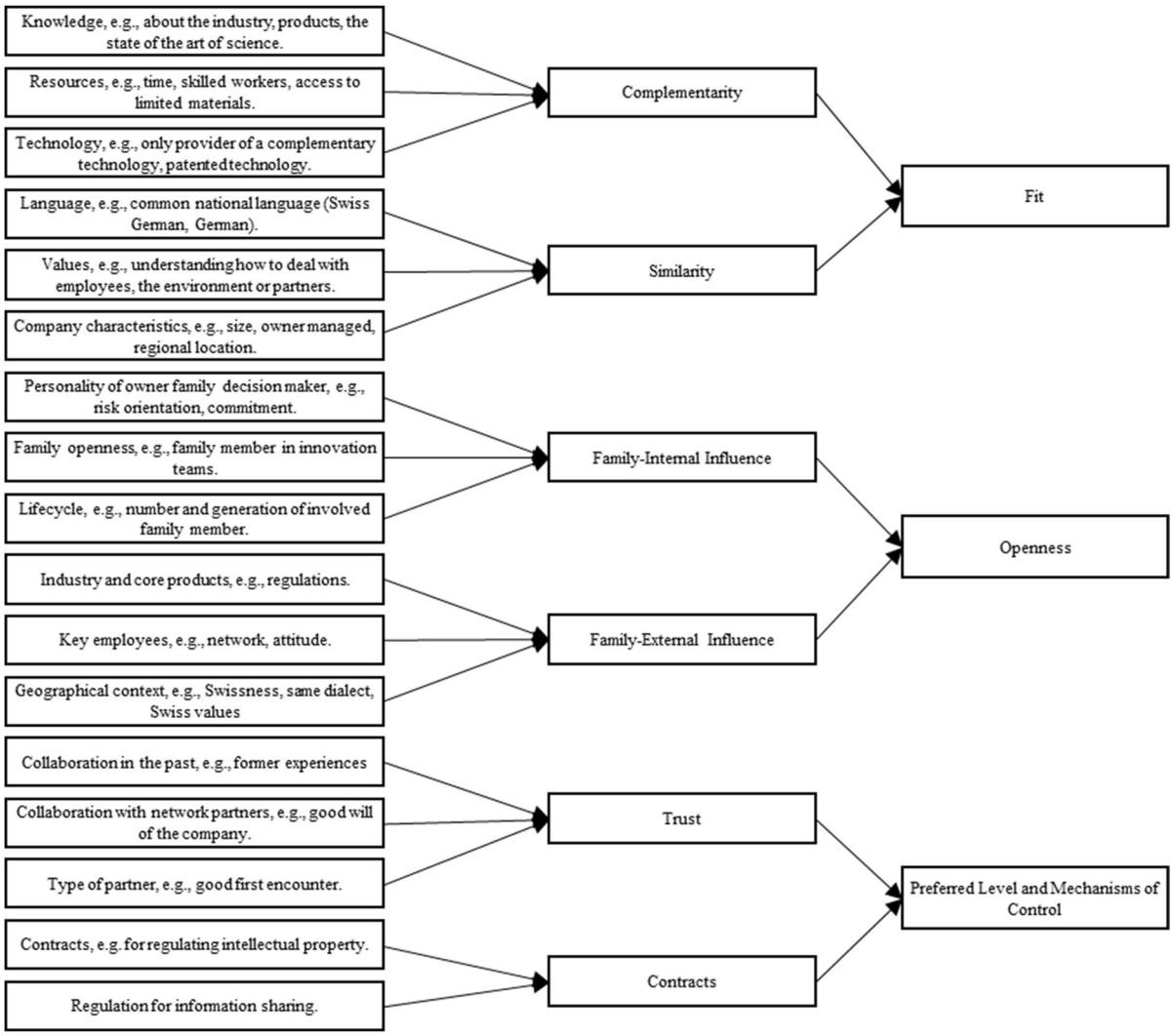

Fig. 1 Data structure

Companies deal with the difficulty of finding a perfect fit both in terms of similarity and complementarity by integrating perceptions of complementarity and similarity into an expectation of how well the firms will work together in the future. We label this expectation as "anticipated fit." To reach an accepted level of anticipated fit, firms have to reach minimum levels of complementarity as well as similarity. Firms further assume that low levels of one (complementarity/similarity) may be compensated by high levels of the other (similarity/complementarity). Reaching an accepted level of anticipated fit is the basis for further evaluation of a potential partner.

> "We want a sense of whether the team is reliable, whether you can work with them, whether you have the same philosophy, whether you somehow sense they're giving you the razzle-dazzle. We don't want salespeople on the other side; we want technology experts. These are the most important factors." (C1-I1-T2)

We use the term "anticipated fit" because, at this point in time, firms have no definite inside knowledge regarding the different dimensions of complementarity and similarity, which constitute fit. Hence, as soon as the firms have developed a perception of the

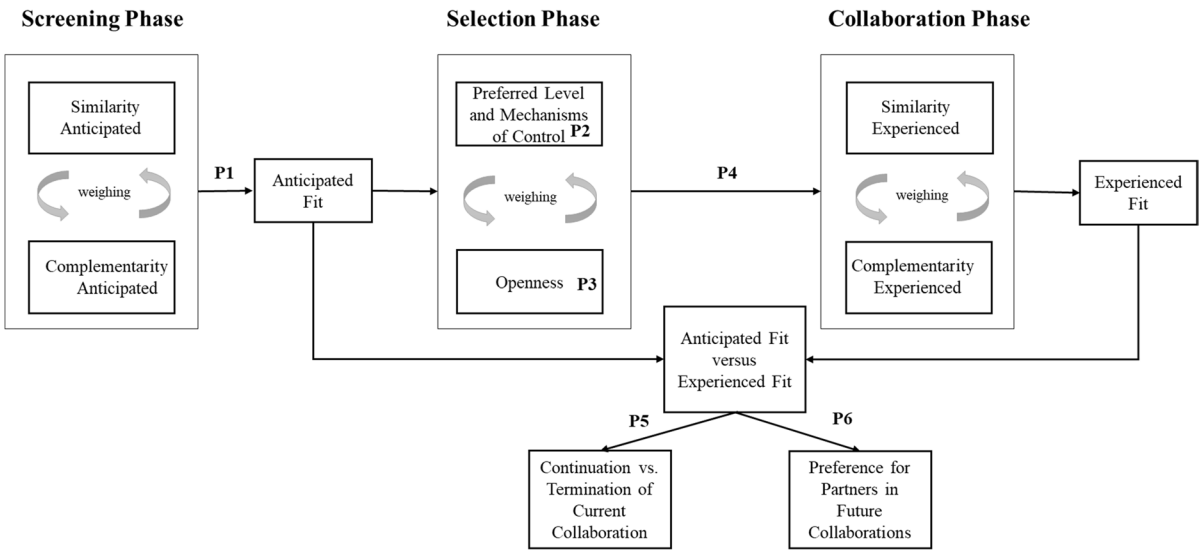

Fig. 2 A process model for weighing complementarity and similarity in partner selection for open innovation

fit between the partners that they expect in the future relationship, they enter the next phase of the process, which we designate the "selection phase."

Proposition 1: *To enter an open innovation partnership, family firms weigh their perceptions of anticipated similarity and complementarity to reach an accepted level of anticipated fit during the screening phase, which represents the precondition to enter the selection phase.*

4.2 Selection phase

We refer to the second phase of the process as the "selection phase." In this phase, family firms start to closely evaluate the different criteria, for which they previously screened their partners. We identify two main drivers (preferred level and mechanisms of control; openness) that influence whether the anticipated fit is translated into final partner selection or not.

Across cases, we found that all firms were anxious not to lose too much control in the partnership and, thus, tended to reach for an accepted level of perceived control. However, family firms differ in the preferred level of control and in the preferred mechanisms to secure control. For example, C5, a medium-sized family firm in the second generation, with family members in management and on the supervisory board, has a high need for control and generally prefers formal mechanisms (i.e., contractual agreements) to guarantee its influence in the partnership. Emphasis is placed on the importance of independence for the firm (as a family firm and as a cooperation partner). C5 knows and appreciates the concept of open innovation, but it has a very strong need for formal control, which impedes the realization of open innovation projects. This phenomenon is reflected, for example, in the observation that the supervisory board has secured numerous veto rights, even against its internal innovation team:

> "We give the (Scrum) teams much freedom. However, we still have a right of veto. That means proposals from below, so to speak, and approval by the Board of Directors." (C5-I1)

C6, for example, has a preference for parity and, thus, greater willingness to relinquish some control over the process, which they see as key to a functioning collaboration relationship; however, some firms prefer a clear asymmetry in power (e.g., C1). Case 2 has defined a product area where they are actively opening to outside partners (new products with fruits). For this product area, they show low levels of need for control and put much trust in their external partners. A similar approach, demonstrating trust and low needs for control for defined product areas, is demonstrated in case 10.

Typically, family firms ensure this asymmetry by relying on contracts or choosing partnerships in which they are neither obliged to share too much knowledge from within their company nor likely to become dependent in any way on the collaboration partner. However, how exactly the individual preference is displayed in a specific partnership also depends on the given situation. For example, in cases where there is a lack of similarity-based fit, family firms might use the mechanism of increasing their perceived control by regulating their partnerships with contracts as a way to bridge this gap. Trust and contracts complement each other as measures of increasing perceived control. This phenomenon is shown by firms that have established long-term relationships with open innovation partners.

> "But besides the knowledge and the know-how and so on, the interpersonal level must be right. That is perhaps the basic thing, but on top of it there's then also the knowledge, and then it will work out. Those are actually the two most important things. These two elements and trust." (E1-I1)

These findings lead to our second proposition:

Proposition 2: *Family firms differ both in their level of need for control and in the preferred mechanisms to reach control in open innovation partnerships.*

Apart from their preferred level and mechanisms of control, family firms also differ in their openness to engage with a broad set of external actors in their innovation activities. This level of openness arises either from a family-internal propensity to be open or from family-external pressures to do so, or a combination of both.

For instance, C8, a small family firm in the 7th generation and operating in the field of clothing production, has a high degree of openness, as displayed in their numerous innovation partnerships with customers and companies from noncompetitive industries. The following quotes from the owner-manager suggest that this openness is mainly driven by a family-internal proclivity to openness:

> "Yes, for me, it is very clear that family firms that are managed by a family figurehead, or at least strongly influenced by a family owner are more willing to accept changes, to do something new in order to become stronger, than purely management-driven companies." (C8-I1)
> "From my point of view, that's partly connected with culture. You also have to look at it from a psychological perspective, a little bit of ego, of arrogance. Things like: 'Yes, we've [the owner family] been doing this for 150 years, it's good, we're on top of it'." (C8-I1)

Other family firms exhibit a similar openness. For example, C1 uses means such as tech-scouting to integrate ideas from the outside and, consequently, establishes a bridge to other firms. In contrast to C8, though, this firm conducts open innovation projects not because they are internally convinced of the general benefits of openness but because they feel they are forced to do so by external factors such as industry dynamics. These features are especially pronounced in the medical engineering industry in which C1 is competing. Hence, C1 opens up its firm boundaries with the awareness that openness is an inevitable prerequisite to remaining innovative.

Other family firms, such as C2, are also strongly influenced by family-external factors:

> "When it comes to the core area, what we call our secrecy area, where it concerns questions of production, of ingredients, the procurement of innovations is done in-house, by a relatively small circle of people who deal with these topics that have to be kept secret. They have to get the ideas from somewhere, of course. (C2-I6)
> I: Ok. And is there or was there a cooperation with an external person who somehow touched this core area.
> C2-I6: Yes, yes, there is, yes. At some point we reach our limits and we have to."

The perceived external pressure goes beyond the influence of the owner family and positively influences the openness for innovation of the firm, which leads us to the following proposition:

Proposition 3: *Family firms differ in their openness, which is determined by family-internal as well as family-external factors.*

Once an accepted level of anticipated fit is reached, family firms engage in a process to come to

a final selection decision. Within the selection phase, the firms' preferences for control and openness play an important role and interact with one another in a complex weighing process.

> "But it always has to be weighed up, how open I am to the outside world and how much is important now or how important it is to protect my know-how at this point. Through patents, etc. Yes. And if they do, once that is protected, the know-how, then I can become a bit more open." (C5-I2)

As outlined above, family firms are heterogeneous in their preferred levels and mechanisms of control, as well as their openness. Based on these individual configurations, they develop their unique approach toward the final decision concerning whether a potential partner is further taken into consideration for collaboration or not. The following examples illustrate the diverse forms that might be assumed by the weighing-up process.

C3 is a small family firm in the second generation that is active in the real estate sector. Its openness toward engaging with external actors in the innovation process is mainly driven by family-external factors. The decision-makers of the firm would prefer to work completely independently, but simultaneously, they feel that the fast pace of today's world obliges them to open up more. Making things even more complicated, they generally show a high need for control. To dissolve these conflicting needs, C3 decided to cooperate only with external actors without any direct competition to its own business model in their own region and who are members of a trade union. This approach has been followed for many decades.

Interestingly, their specific cooperation approach has had a minimizing effect on their preferred level of control because collaborations with external actors not deemed to be competitors are seen as less threatening both to their existing business model and to their competitive position in the industry. Consequently, C3 relies upon less formal control mechanisms; that is, they trust that their external partners adhere to the obligatory ethical code of the trade union.

A quite different weighing-up process and resulting approach could be identified for C6. C6 is a medium-sized family firm in its third generation that is run by a family CEO. The company is a manufacturer of customized special machines. The company is therefore often the innovation partner of other companies. The firm also feels strong external pressure to collaborate with external partners. Simultaneously, the family effect in fostering openness is very pronounced. Employees refer frequently to the owner family when talking about innovation activities of the firm. While being perceived as entrepreneurial, their need for control is also very pronounced, especially because of the CEO's personality. C6 has chosen an interesting solution to being open to external partners while simultaneously meeting their strong need for control:

> "There was a top engineer who worked in a big corporation as a technology leader. And he went into business for himself. Actually, at first, the idea was that he and his team would found a subsidiary in Italy and he would be hired by us and would do all these developments for us. But I didn't actually want that, because I said that the risk was far too big for us and that he should also take entrepreneurial risk. We said, 'you have to set up the company yourself, you have to hire the people you need […] (C6-I1)

A possible collaboration with a much bigger firm was perceived as more threatening (due to a perceived power imbalance) in comparison to working with a start-up. Asking the potential collaboration partner to set up his own business shifted this perceived power imbalance toward the external partner. This shift resulted in a less pronounced need for control for C6 and, as a consequence, a less pronounced need to formally control the external partner. To "compensate" the external partner, C6 builds on reciprocal trust as an informal control mechanism. They offered exclusiveness and guaranteed the partner's revenue stream.

> "[…] we guarantee you [the engineer], that for one to two years, we will fill your pipeline so that if you work exclusively with us, you will have enough work coming your way to employ these people'. That's what we actually guaranteed." (C6-I1)

Both examples highlight the complex interplay of several influencing factors. The family firms in our sample find different ways to weigh preferred levels

and mechanism of control with their levels of openness. Thus, we posit the following proposition:

Proposition 4: *Given an accepted level of anticipated fit, the weighing-up of partner characteristics and situational characteristics against preferred levels and mechanisms of control and openness influences if and how partnerships are taken forward to the collaboration phase*.

4.3 Collaboration phase

The considerations based on anticipated fit, perceived control, and openness define the starting point of the *collaboration phase*. After the decision to collaborate has been made, the fit between the firms is experienced. The anticipated fit between them is transformed into an experienced fit. Some family firms emphasize that it takes time to determine whether their partners *truly* fit. Above all, it is important to develop a common understanding of the project, as the following quotation illustrates.

> "And what I actually believe is that we really want to collaborate with partners. A partner only becomes a partner when we work together on several projects and on several topics. You know each other, you're faster, you get to know the language. Now we have two or three companies with which we collaborate… when a topic comes up, we ask them first. We know each other, it's fair, the costs are fair, and we know what we can expect from each other." (C6-I1)

The way similarity and complementarity perceptions are weighed as the basis of fit changes over the course of the selection and collaboration process. When initiating collaborations (in the screening phase), family firms search for new input, for example, in the form of technologies. As outlined above, these complementarities typically come with differences in, for instance, company size or age. For example, the partners tend to speak a different language, have different processes, and operate at different paces. While differences in language and culture do not, as a rule, harm the perceived value of the knowledge or technology to be acquired (which is the driver of the selection in the early phase), they might substantially harm the partnership in the long run when they become obvious in the collaboration.

> "It's a bit like the foundation of the project. What would I give more weight to? If I have confidence in someone and he can't live up to it, that doesn't help me either. So, I think it's important that the technical requirements have to be met; otherwise, we won't even get into conversation with them. And then the soft factors come to the fore over time I think." (E11-I1)

This quote illustrates that, over the course of the selection and collaboration process, the characteristics related to similarity tend to become more important than at the beginning, where the focus often lies on acquiring complementary knowledge, resources, and technology. There are frequently discrepancies between previous perceptions of fit and the experience of fit. First, it becomes apparent during cooperation whether complementarity and similarity have been correctly assessed.

> "If someone tells me: 'Yes, I can do that', and afterwards can't do it, then the topic is also finished [...]" (C6-I3)

Second, it is also noticeable when partners change, and the fit is no longer sufficient for the relationship to continue.

> "I have my requirements. We also had an external partner who changed in the course of the collaboration. He just grew to be too big for his boots, and I told him it doesn't work like that, and then we just said goodbye." (C7-I2).

One of the main reasons for ending a potential partnership was negative experiences in the past, where the family firms had learned that their values, culture, and language were not compatible with, or sufficiently similar to, those of the partner with whom they intended to collaborate (C1, E1, C2, and C6).

> "There have been cases where we have cancelled a project because it did not fit into our strategy. That happens when a customer says to us: 'Can you develop that for us?' Yes, that sounds extremely exciting, but we start to get bogged down, we are too small. Then we say: 'No, we won't do that,' because it just doesn't fit into our strategic orientation. […] Plus of

course ethical reasons and all sorts of such things, that's logical, that's clear, we would not do it then either. Money rules the world, but not us." (C6-I4)

This leads to our fifth proposition:

Proposition 5: *If the experienced fit deviates substantially from the previously anticipated fit and is too low, the partnership is terminated.*

In most of these cases, when a partnership was ended due to a gap between anticipated and experienced fit, this insight not only ended this specific partnership but also had consequences for future collaborations. The experience gained also allowed firms to define more concrete ideas and expectations for future partnerships.

For example, in C6, the importance of not only the common language "German" but also the subcategory "Swiss German" was emphasized. This was associated with the finding that regional proximity and the opportunity to collaborate at short notice can create proximity and, above all, pay off in cooperation. Prior experience has shown that cost advantages can be exploited through cooperation, e.g., with companies from southern Germany or Italy, but in the firm's view, the common language (Swiss German) and regional proximity outweigh these advantages.

"So, you have to be, I'm not saying rigid... but you must have a clear idea about what is important to you in a partnership." (C2–I1)

The way partnerships evolve, especially in terms of experienced fit, feeds back to how firms evaluate complementarity and similarity in future projects, how open they are to future collaborations, and what their accepted level of perceived control is.

"The implementers, i.e. those who make a business out of it, work differently than the innovators or those who find out where and how it actually works, i.e. the applied researchers. And when they talk to each other, they don't understand each other, because the same words have different meanings. They think differently and they perceive the world differently. And because of this, there is an inherent risk in every case, of misunderstanding. That means you have a… you can say it like this, it's like they speak a different language. They speak the same language, so they all speak, I don't know, Swiss German, but it's a different way of thinking, so to speak. And that needs a translation, like when you have a change of language. And you have to plan for that. You forget it, because you haven't discovered it yet." (E2-I1)

Firm characteristics that are easily perceived in the early phases and are not judged as problematic (e.g., a very small firm size) can become more salient and negatively weighted based on negative experiences (e.g., a collaboration that went wrong with a small firm), which feeds back to how family firms will evaluate potential partners in the future. This applies to unacquainted partners as well as partners the family firm has worked with before. This phenomenon leads to our final proposition:

Proposition 6: *The way firms experience fit based on different facets of similarity and complementarity in the collaboration phase influences how they weigh complementarity and similarity in assessing anticipated fit in future potential collaborations.*

5 Discussion

Open innovation is becoming increasingly important for firms of all sizes and types; however, research on this topic has been slow to progress in the context of family firms (Brinkerink et al., 2017; Feranita et al., 2017). Our findings highlight that family firms can develop successful strategies for open innovation that minimize the perceived loss of control but simultaneously enable effective innovation collaboration (Feranita et al., 2017).

5.1 Theoretical implications

This study makes at least three contributions to extant research. First, it sheds light on the partner selection process for open innovation projects. Our findings highlight the complex interplay between complementarity and similarity. While "fit" is a commonly used concept in extant literature (Bierly III & Gallagher, 2007), researchers typically are ambiguous regarding

the meaning of "fit." Our findings highlight that perceptions of fit are the most important criterion for partner selection in open innovation processes of family firms and that these perceptions of fit are driven by similarity and complementarity. While complementarity is commonly perceived as the main driver of building open innovation partnerships (Bierly III and Gallagher, 2007; Chung et al., 2000; Emden et al., 2006; Manotungvorapun & Gerdsri, 2016), the interplay of complementarity perceptions and similarity perceptions has been neglected to date. While research has highlighted the importance of both (De Groote et al., 2021), a deeper understanding of the interplay of both in a concrete decision situation has been missing thus far. Furthermore, our process perspective implies that the gestalt of the "ideal open innovation partner" differs across stages, a "one-for-all" solution typically does not exist, and firms hence need to accept trade-offs regarding their partners throughout the process. For example, firms were willing to accept lower levels of complementarity in favor of higher similarity, even if this reduced the potential open innovation outcomes.

Second, while complementarity and similarity as partner selection criteria have been discussed in the broader alliance literature (Chung et al., 2000), the importance of each selection criterion has thus far remained unclear and might depend on the type of alliance project (Hitt et al., 2000). Furthermore, only a little research has examined the relative role of various fit characteristics in the selection process (Shah & Swaminathan, 2008) and how their importance changes during the open innovation process. Hence, our study extends prior research by studying the specific context of (Swiss) family firms and analyzing the relative importance of complementarity and similarity along the collaboration process. Counter to what one might expect from a perspective residing in a financially driven logic, family firms do not take advantage of cost benefits and prefer working with local (as opposed to international) partners whom they already know from their network or whom they could visit on site and, thus, control if necessary. While this is in line with prior findings highlighting that family firms might forgo financial benefits to preserve SEW (Feranita et al., 2017) and due to their risk aversion (Chrisman et al., 2015), the extent to which this kind of behavior was observed in our sample was still surprising, as even partners from different yet comparatively similar and close countries (i.e., Italy and Germany) where in some cases not considered for collaboration despite considerable financial incentives.

Third, our study also highlights the heterogeneity of family firms' innovation behavior. Especially in the domain of innovation research, insights into family firms are often restrained to comparisons of family vs. nonfamily firms (Classen et al., 2012). Therefore, scholars have recently called for more research that seeks to understand family firm heterogeneity (Chua et al., 2012). Our data reveal that family influence can impact open innovation in two ways. First, firm characteristics, such as willingness to engage in open innovation, are typically closely tied to the *values* of the involved family members. This focus is especially salient during the selection phase, when the influence of the specific characteristics of the family firm decision-makers as well as the general openness of the owner family comes into play. Second, in line with the existing literature (Feranita et al., 2017), family firms do indeed strive to retain control, even when entering open innovation partnerships. However, adding a new nuance to extant research, we identified substantial differences between firms that were at times catalyzed by region-specific (Swiss) effects. This finding highlights that not all family firms seek high levels of control for the same reasons, and not all family firms are generally reluctant toward open innovation. Hence, open innovation in family firms is less a question of whether partnerships are established and more about how they are established.

5.2 Practical implications

The present study findings also offer important implications for business practice. By shedding light on the peculiarities of how family firms handle partner selection in the context of open innovation, our findings contribute to a better understanding of why many innovation collaborations fail (Du et al., 2014). An extensive focus on the complementarity of resources during an early phase might cause problems in later stages when firms become aware of a lack of similarity, which ultimately inhibits collaboration. Being aware of the mechanisms that are at play might help firms develop more successful open innovation partnerships, as they can deliberately take measures to address the lack of similarity by

engaging in trust-building activities. In regard to putting open innovation activities into practice, the involvement of the owner family can be both a risk as well as an opportunity. Different measures might help practitioners overcome a lack of openness in the family firm or among family firm decision-makers. One possible solution is to give decision-making authority to independent teams or hiring external experts to drive open innovation. Linking the idea of openness to structures within the family firm can help avoid blind spots regarding the opportunities of such activities. Another solution is to systematically assess the firm's strengths and weaknesses, especially those related to rigid internal rules (e.g., "we do not process fruit"), and to search for external expertise to address specific innovation-related issues. However, our data show that such partnerships would be too much of a stretch for some firms, as they go beyond their accepted level of control. Moreover, requirements of openness and perceived control differ based on the specific partners—an insight that family firm decision-makers must take into account when building up their relationships (Brinkerink et al., 2017). Finally, our results show that family involvement can also promote open innovation projects. Specifically, integrating members of the next generation can be a successful way to promote open innovation in family firms.

5.3 Limitations and future research

The present study has several limitations, which offer promising paths for future research. First, while we collected data from different sources, gathering various perspectives, we mostly used interview data referring to relationship building that occurred in the past. This approach might be prone to retrospective bias (Merkl-Davies et al., 2011). While this methodological shortcoming is common for qualitative studies using interviews (Cox & Hassard, 2007), a promising avenue for future research is collecting longitudinal data on partner selection and investigating how relationships between family firms and individual partners evolve over time. Such an approach could rule out biases regarding the key informants' memories about their initial set of potential partners and hence contribute to a better understanding of the link between partner selection and project performance (Emden et al., 2006; Geringer, 1991).

Second, our sample covers a diverse set of family firms with variance in how the family firms handle their open innovation processes. However, our sample might still be biased toward firms that are particularly willing and able to deal with open innovation. One reason is survivor bias, meaning that family firms who are not willing and able to engage in (open) innovation might not reach the second generation (and thus not be chosen as a case in our study). A second reason is that our sampling process relied on statements referring to the firms' innovativeness. Therefore, truly noninnovative family firms are unlikely to be part of the sample.

Third, our study focuses on family firms in Switzerland. The advantage of this geographical focus is that Switzerland is characterized by medium levels of corporatism. Consequently, firms acting in this institutional context likely attach importance to both cultural (similarity) as well as technological (complementarity) aspects when selecting strategic partners (see Vasudeva et al., 2013). Consequently, the model suggested in this study might not be fully generalizable to other institutional contexts. Therefore, we suggest replicating our study in countries such as the UK, which has a less distinctive corporatist culture, as well as Denmark or Sweden, which exhibit more pronounced corporative norms. Furthermore, the boundaries between the owner family and the family firm are moderately regulated in the Swiss context (Gupta & Levenburg, 2010). The interplay among fit, perceived control, and openness for innovation might hence be more pronounced compared with that in family firms in more strongly regulated institutional contexts. Thus, we suggest comparative studies be conducted contrasting the influence of the owner family on partner selection in strongly vs. weakly regulated contexts.

6 Conclusion

In an increasingly complex and dynamic world, organizations are forced to collaborate and open up their boundaries in order to innovate. This can be particularly challenging for family firms, which are often characterized by risk aversion. Therefore, the selection of a partner and the beginning of cooperation are important as they influence not only the current partnership but also future potential partnerships.

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