

Chirico, F. and Salvato, C. (forthcoming). Knowledge Internalization and Product Development in Family Firms: When Relational and Affective Factors Matter, *Entrepreneurship, Theory & Practice*.

**Knowledge Internalization and Product Development in Family Firms:
When Relational and Affective Factors Matter**

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Abstract

Understanding the forces that support and inhibit product development (PD) in family firms is central to explaining their long-term success and survival. Our study reveals that social capital and relational conflict among family members do not affect PD directly, as existing theory suggests, but only through the internalization of knowledge among family members. In contrast, family members' affective commitment to the family firm is so powerful that it has both a mediated and a direct effect on PD. These results differ across generations of the controlling family, therefore offering an extension of existing theories of knowledge and PD in family firms.

Keywords: Social Relationships; Affective Commitment; Relationship Conflict; Knowledge Internalization; Product Development; Family Firms.

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Product development (PD) is essential to a family firm's success and survival (Kellermanns & Eddleston, 2006; Salvato, 2004; Sardeshmukh & Corbett, 2011). PD denotes the creation or modification of products (goods and services) to meet the demands of current or future market needs (Marsh & Stock, 2006; Subramaniam & Venkataraman, 2001; Zahra and Covin, 1995). It occurs through collective processes of knowledge recombination, in which organizational members leverage each other's expertise to understand market trends and create new product configurations (Grant, 1996a, 1996b; Kogut & Zander, 1992; Subramaniam & Youndt, 2005). In family firms, the collective processes behind PD have unique features. Cooperation is affected by trust, reciprocity, and proximity among family members, complex interactions between interpersonal and task conflicts, and shifting levels of commitment across generations (Cabrera-Suárez, De Saá-Pérez & García-Almeida, 2001; Sardeshmukh & Corbett, 2011).

Nonetheless, our understanding of how these social and affective factors contribute to PD outcomes in family firms is limited (Sardeshmuk & Corbett, 2011) because research has not directly addressed this topic. The dependent variables in most studies are entrepreneurial outcomes broader than PD, such as opportunity recognition, firm entry, longevity, and venture growth. The empirical context is usually startups and small entrepreneurial firms (e.g., Bosma, van Praag, Thurik, & de Wit, 2004) that are often family-owned, but these studies do not focus on the family entity to explain PD-related outcomes (e.g., Baum & Locke, 2004; Corbett, 2005, 2007). In addition, these studies focus on the individual level and investigate how general and family firm-specific human capital affects entrepreneurial behavior (Kellermanns, Eddleston, Barnett, & Pearson, 2008; Sardeshmuk & Corbett, 2011). In response to a call for research that studies "the influences of relationship patterns, and family aspect of the family business" to understand knowledge processes and the intensity of entrepreneurial phenomena (Sardeshmuk &

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Corbett, 2011: 121; see also Discua Cruz, Howorth, & Hamilton, 2013), this study theorizes and empirically examines how family social and affective mechanisms influence the recombination of knowledge across generations, determining PD outcomes in family firms. Although there is significant research that supports the role of external knowledge in PD (e.g. Cassiman and Veugelers, 2006), the focus of our study is on knowledge that is internal to the family firm given the centrality of the family in entrepreneurial processes (Chirico & Salvato, 2008; Kellermanns, Eddleston, Sarathy, & Murphy, 2012). As such, we center our attention on the internal family-based sources of PD-related knowledge.

Specifically, we examine how PD is determined by the controlling family's capability of *knowledge internalization*, which denotes family members' collective ability to *recognize* (identify and value), *assimilate* (understand), and *exploit* (build on and use) each other's knowledge for PD (Kale & Singh, 2007; Nonaka, 1994; Zahra, Filatotchev, & Wright, 2009). We propose that family social capital, affective commitment, and relationship conflicts influence a family firm's ability to internalize its members' knowledge for PD. We also argue that the effects of these factors depend on which generation controls the firm. We predict that later generations enhance the positive effect of social capital, reduce the influence of affective commitment, and ease the negative impact of conflicts on knowledge internalization and thus on PD. We test these relationships through a sample of Swiss family firms, with multiple respondents per firm.

Our study is the first to explore knowledge internalization in entrepreneurial families and its effect on PD. It offers three contributions. First, the role of collective knowledge processes involving active family members has been largely overlooked in the literature. We extend existing knowledge by suggesting that entrepreneurial outcomes are not determined exclusively by the quality of individual family members' expertise. The ability of the collective family entity

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to recognize, assimilate, and exploit each other's knowledge is essential to PD. Second, we theorize that close social relationships, affective commitment to the business, and emotional conflicts among family members determine PD outcomes through the internalization of family members' specialized knowledge. Rather, existing research has been mainly focused on the direct effects of family-specific features on entrepreneurial behaviors. Yet, our study reveals that in contrast with family social capital and relationship conflicts, family members' affective commitment to the family firm is so powerful that it has both a mediated and a direct effect on PD. Third, we enhance the understanding of family-specific factors affecting PD in family firms by exploring how well family firms in which later generations retain control can identify, understand and use family members' specialized knowledge for PD. These insights result in a model of PD in family firms premised on the knowledge-based view, which offers a richer perspective on how PD occurs in family firms controlled by earlier or later generations of the controlling family.

THEORETICAL BACKGROUND AND HYPOTHESES

A Knowledge-Based Approach to Knowledge Internalization and PD in Family Firms

Firm resources, especially knowledge-based ones, enable PD – “the ability of a company to create new products or modify existing ones” (Zahra & Covin, 1995: 45) – because new products embody knowledge accessed from diverse sources (Grant, 1996a; Marsh & Stock, 2006; Subramaniam & Youndt, 2005). Firms that engage in PD must locate and leverage the knowledge held by different organizational actors (Rothaermel & Hess, 2007). This effort requires “the constant interaction of a multidisciplinary team whose members work together from start to finish” (Nonaka & Takeuchi, 1995: 242).

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For firms to leverage requisite knowledge, team members must internalize their team's unique expertise (Grant, 1996a, 1996b; Kale & Singh, 2007; Nonaka, 1994; Tiwana & McLean, 2005). *Knowledge internalization* denotes team members' ability to recognize, assimilate, and exploit each other's specialized knowledge collectively for PD (Kale & Singh, 2007; Lee, 2001; Nonaka, 1994; Tiwana & McLean, 2005; Van den Bosch, Volberda, & Boer, 1999; Zahra et al., 2009). *Knowledge recognition* refers to team members' ability to identify and value peers' knowledge so that expertise within or outside the firm is not overlooked (Cohen & Levinthal, 1990; Tiwana & McLean, 2005; Zahra et al., 2009). *Knowledge assimilation* denotes team members' ability to understand each other's different knowledge and how it fits together (Cohen & Levinthal, 1990; Tiwana & McLean, 2005). *Knowledge exploitation* refers to team members' ability to build on and use their knowledge so that the collective knowledge facilitates PD (Cohen & Levinthal, 1990; Van den Bosch et al., 1999; Tiwana & McLean, 2005; Zahra et al., 2009).

Knowledge internalization raises individuals' awareness of the pool of available knowledge in their team, lowers interpretive ambiguities, and breaks individual team members from their own thought worlds (Grant, 1996a, 1996b; Marsh & Stock, 2006; Rothaermel & Hess, 2007; Subramaniam & Youndt, 2005; Tiwana & McLean, 2005). As such, it requires team members to not only be competent in their individual areas, but also to be familiar with other team members' expertise and skills.

In contrast to knowledge sharing and knowledge transfer, which focus on disseminating knowledge from its source to its receiver (e.g., Gardner, Gino, & Staats, 2012; Reinholt et al., 2011), internalization emphasizes the absorption of relevant knowledge by team members and its collective use. For instance, Tiwana and McLean (2005) argue that team members' abilities to recognize the potential value of their peers' knowledge and interrelate it, are essential to stimulate

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creativity. Knowledge internalization thus involves more than transferring knowledge between individuals. It is team members' collective ability to absorb each other's specialized knowledge and to use it collectively and efficiently for PD projects (Nonaka, 1994; Kale & Singh, 2007). Yet, without patterns of constructive social interaction, and affective commitment towards organizational goals, knowledge internalization may not happen (Cabrera & Cabrera, 2005; Camelo-Ordaz, Garcia-Cruz, Sousa-Ginel, & Valle-Cabrera, 2011; Reinholt et al., 2011). Below, we address how PD occurs within teams of family members. Such teams are more stable and socially dense organizational forms than are PD teams in non-family firms. They thus offer a richer representation of how knowledge can be internalized within teams than extant research provides (Arregle et al., 2007; Chirico & Salvato, 2008).

Family firms are organizations in which a family possesses significant ownership and multiple family members are involved (Sirmon, Arregle, Hitt, & Webb, 2008). Social structures and affective commitments are very salient in family firms because they involve the intersection of family and business systems (Sirmon & Hitt, 2003; Zahra, Neubaum, & Larrañeta, 2007). Examining knowledge internalization and PD in family firms may offer a nuanced picture of the social and emotional antecedents of knowledge recognition, assimilation, and exploitation among individuals who are both members of the controlling family and active within the controlled firm.

Some family firms leverage rich interpersonal ties among family members and strive for entrepreneurial outcomes, and others are plagued by conflicts, conservatism, and stagnation. We contend that such differences, particularly in regard to PD, can be ascribed to how the combination of three attributes – social capital, affective commitment, and relationship conflicts – affects knowledge internalization within the family and thus the family firm's PD capability. First, the controlling family's social capital determines the *ability* to internalize knowledge by

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family members. Second, family affective commitment reflects the *willingness* to internalize knowledge. Finally, family relationship conflicts embody *obstacles* to knowledge internalization within the family and may lead to path dependency and stagnation. Depending on which generation controls the family firm, these factors will affect knowledge internalization and hence PD in distinct ways (Casillas, Moreno, & Barbero, 2010; Kellermanns & Eddleston, 2006; Kellermanns, Eddleston, Barnett, & Pearson, 2008).

Factors Affecting PD through Knowledge Internalization within the Family

Family Social Capital. We hypothesize that family social capital enables a family firm to modify or build new products, in particular when it facilitates knowledge internalization. Social capital refers to the level of trust, reciprocity, and proximity of interaction among organizational participants (Nahapiet & Ghoshal, 1998). It creates value by enhancing knowledge flows among organizational members (Tsai & Ghoshal, 1998). It exists in all organizational types, but family firms foster uniquely “strong” social ties (Arregle et al., 2007; Salvato & Melin, 2008). Members of the controlling family develop intense relations with each other both through organizational interactions and outside the work context. These ties are more conducive to information flows, and are hence likely to facilitate knowledge internalization within the family. For example, Salvato and Melin (2008) and Chirico and Nordqvist (2010) found that teams of family members are more entrepreneurial (in terms of product-line extension, product diversification, expansion into new markets, adoption of new technology) when they identify and understand how their knowledge and perspectives are complementary (see also Arregle et al., 2007; Yli-Renko, Autio & Sapienza, 2001).

The effect of family social capital on knowledge internalization has three dimensions. First, due to close interaction among family members, the family firm structure facilitates the

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recognition, assimilation, and use of the tacit elements of specialized knowledge held by family members (Rothaermel & Hess, 2007; Tiwana, 2008; Zahra & George, 2002). Second, family members typically develop a common system of meanings (language, words, expressions, and body movements), which is necessary to exploit multiple forms of knowledge (Grant, 1996a). It allows family members to identify and understand information easily and to perform specific tasks or activities efficiently and rapidly through predictable patterns of collective behavior (Nahapiet & Ghoshal, 1998; Sirmon & Hitt, 2003). Third, family relationships are developed through a history of interactions that fosters shared values, cooperative norms, and a sense of reciprocity and mutual respect. These features make it more likely that family members value each other's ideas and perspectives as they attempt to solve problems and capture opportunities (Arregle et al., 2007; Salvato & Melin, 2008; Sirmon & Hitt, 2003).

Therefore, family social capital enhances PD primarily because close social relations, mutual trust, and time spent together allow family members to internalize and thus use their expert knowledge to modify or build new products (Salvato & Melin, 2008). The mere presence of social ties may not lead to PD outcomes because closed social interactions may limit team members' ability to follow alternative course of actions (Arregle et al., 2007), thus leading to inertia (Cohen & Levinthal, 1990; Rothaermel & Hess, 2007; Tiwana, 2008). As such, family members need to recognize, assimilate, and exploit each other's knowledge in order for PD to fully occur. These ideas are summarized in the following hypothesis:

Hypothesis 1: *Family social capital has a positive effect on PD that is mediated by knowledge internalization within the family.*

Family Affective Commitment. If voluntary processes of knowledge internalization are obstructed, knowledge will remain in the individual and will have a negative impact on the firm's ability to develop new products (Camelo-Ordaz et al., 2011). Organizations cannot internalize

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knowledge unless the individuals holding it willingly contribute it (Cabrera & Cabrera, 2005; Hislop, 2003; Reinholt et al., 2011). This willingness depends in part on commitment (Cabrera & Cabrera 2005; Chang, Yeh, & Yeh, 2007), which binds an individual to an entity or to a course of action (Allen & Meyer, 1990). Meyer and Herscovitch (2001) distinguish three forms of commitment: affective (the desire to follow a course of action); normative (the perceived duty to follow a course of action); and continuance (the perceived cost of not following a course of action). Of these, affective commitment most influences entrepreneurial behaviors, fueling employees' attention towards PD outcomes and driving them to overcome their resistance to autonomous knowledge internalization (Camelo-Ordaz et al., 2011; Herscovitch & Meyer, 2002; Sharma & Irving, 2005).

Investigating PD as a social process requires contexts in which affective commitment is salient. Empirical work in diverse fields such as cognitive psychology, social cognition, neuroscience, and neurophysiology suggests that, in addition to cognition, affect plays a key role on judgment and behavior (Cohen, 2005). These insights are leveraged by entrepreneurship scholars to suggest that affective states may significantly determine creative outcomes within organizations (Amabile et al., 2005; Baron, 2008). For instance, Hayton & Cholakova (2011) theorize that positive affective states increase the probability that knowledge and information will be accessed, assimilated and used in novel and creative ways to produce an entrepreneurial idea. This is because a wider range of information search actions to reduce uncertainty will be considered. Similarly, in a family firm context Chirico and Salvato (2008) argue that family members' affective commitment towards change has the potential to affect the development of new PD capabilities through knowledge integration.

Accordingly, we argue that when family affective commitment is high, family members

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will do their best to identify and understand family members' unique knowledge and to exploit it collectively to achieve PD outcomes. They will more likely support future-oriented initiatives, hence making knowledge internalization within the family more timely and efficient (Sirmon & Hitt, 2003). To recapitulate, family affective commitment can support PD when it eases the voluntary and collective use of family members' individual knowledge (Chirico & Salvato, 2008; Chirico, Sirmon, Sciascia, & Mazzola, 2011; Salvato & Melin, 2008). As we suggest in the following hypothesis:

***Hypothesis 2:** Family affective commitment has a positive effect on PD that is mediated by knowledge internalization within the family.*

Family Relationship Conflicts. Family relationship conflicts are detrimental to a family firm's PD efforts, in particular when they obstruct knowledge internalization. We concentrate on relationship conflicts, rather than on task or process conflicts (Jehn & Bendersky, 2003), given our focus on interpersonal relationships and their influence on the social exchange mechanisms implied by PD. Conflicts focused on the task at hand, or on how the related process should be performed, may facilitate novel outcomes, but interpersonal conflicts can obstruct or retard PD (Corbett & Hmieleski, 2007; Harvey & Evans, 1994; Jehn, 1995).

Relationship conflicts result from interpersonal emotional incompatibilities among actors within a group (Jehn, 1995). They generate tension, irritation, suspicion, and resentment among organizational members. They undermine the potential advantages of group interaction and reduce an organization's effectiveness by preventing the cross-understanding and exploitation of different individual team members' knowledge (Jehn, 1995). Family firms are a "fertile environment for conflict" because of "the dominant presence of the family, setting the rules and having ultimate power, the lack of formalized systems and structures to deal with conflict ... and the commingling of business and family roles" (Harvey & Evans, 1994: 345). The family and

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business are so entwined that the potential for discord can be greater than it is in firms with other governance forms (Kellermanns & Eddleston, 2004). These firms should therefore guard against the negative effects of conflicts on PD.

Family relationship conflicts enhance negative reactions and displease family members. They lead family members to fight each other rather than to use their combined knowledge. Such distractions reduce family members' ability to translate diverse sources of information into new products (Eddleston & Kellermanns, 2007; Kellermanns & Eddleston, 2004; Zahra et al., 2007). Also, when family members are distracted from their work and are less motivated to work as a team because of interpersonal conflicts, they will spend more effort and time to resolve interpersonal tensions. They will "focus on reducing threats, increasing power and attempting to build cohesion rather than working on the task at hand" (Jehn, 1997: 531). Some family members may avoid or impede efforts to recognize, assimilate, and use other family members' ideas. Family relationship conflicts may hence increase the risk that the family firm will fall into a familiarity trap, in which team members search for solutions that "limit the openness to information and to alternative ways of doing things, producing collective blindness" (Nahapiet & Ghoshal, 1998: 245). In contrast, low relationship conflict helps family firms use the viewpoints that each family member brings to an issue, favoring knowledge internalization and thus PD (Chirico & Salvato, 2008; Eddleston & Kellermanns, 2007).

We therefore hypothesize that family relationship conflicts prevent family members from combining their knowledge for PD. As Jehn and Bendersky (2003: 207) explain, relationship conflicts "reduce employees' ability to recognize alternative approaches" because they "prevent them from integrating [and using] diverse sources of information into innovative products," making it harder to assess and accept others' ideas, and to incorporate them into new products.

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Similarly, Kellermans and Eddleston (2004) and Eddleston and Kellermans (2007) argue that relationship conflicts may decrease mutual understanding and information sharing among family members and thus their ability to achieve higher firm outcomes. Thus, because family conflicts negatively influence PD when they impede family members' ability to recognize, understand, and exploit each other's knowledge, we expect that their influence on PD is mediated by knowledge internalization within the family. These ideas are summarized in the following hypothesis:

***Hypothesis 3:** Family relationship conflicts have a negative effect on PD that is mediated by knowledge internalization within the family.*

The Moderating Role of Family Generation in Control

Our hypotheses so far have referred to family firms in general. Yet PD efforts are likely to vary across different family businesses. Family generation in control, defined as the generation that currently manages the firm (Cruz & Nordqvist, 2012), influences the entrepreneurial behavior of family firms (Beck, Janssens, Debruyne, & Lommeln, 2011; Cruz & Nordqvist, 2012; Casillas et al., 2010; Kraiczy, Hack, & Kellermans, forthcoming; Ling & Kellermans, 2010). Earlier and later generations differ in their responsiveness to entrepreneurial behavior because of the distinctive knowledge and patterns of interpersonal relationships that each generation possesses (Gersick, Davis, Hampton, & Lansberg, 1997). Consequently, controlling family members who belong to different generations will have different abilities to internalize each other's knowledge. In particular, we predict that the interaction between later generations in control and family social capital, affective commitment, and relationship conflicts will lead to higher or lower levels of knowledge internalization, thus sustaining or hampering family firm PD.

The Interaction of Generation in Control and Family Social Capital. Early in their history, family firms may find it easy to internalize their expert knowledge due to the limited

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number and greater cohesiveness of family members involved in the founder's generation (Salvato & Melin, 2008). However, empirical work suggests that over time, earlier generations find it difficult to rely on their collective knowledge and have innovative ideas “without the fresh momentum added to the firm by second- [or later] generation members” (Salvato, 2004: 73). Accordingly, we suggest that a family's ability to leverage its stock of social capital to internalize knowledge and hence perform PD will increase across generations.

Three trends shape family members' ability to use their social capital to recognize, assimilate, and exploit each other's knowledge collectively across generations. First, over time, entrepreneurial families tend to recognize and codify a shared understanding of who knows what within the family, or a family's transactive memory system—TMS (Lewis & Herndon, 2011; Salvato & Melin, 2008). TMS is based on unique social processes that take time and familiarity to develop. It lets the controlling family leverage the expert knowledge residing in the group as if it were stored and retrieved by the family, rather than by its individual members. Second, later generations in control tend to increase the professionalization and formalization of social relationships, knowledge management and key entrepreneurial processes, thus increasing the collective understanding and use of knowledge in the firm (Casillas et al., 2010; Kellermanns et al., 2008; Stewart & Hitt, 2012). Third, succession processes help family members balance and combine their firm-specific human capital, which is rooted in social ties within the organization (Sardeshmukh & Corbett, 2011). In particular, greater joint experience and role models offered by senior generation members help successors understand social dynamics within the family and firm context, facilitating knowledge internalization and entrepreneurial opportunities (Cruz & Nordqvist, 2012; Salvato, 2004; Sardeshmukh & Corbett, 2011).

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Therefore, later generations will find it relatively easier than previous ones to recognize, assimilate, and apply each other's knowledge through collective processes of interaction. We hence predict that generation in control positively moderates the relation between family social capital and knowledge internalization within the family. Formally:

Hypothesis 4: *Later family generations in control will increase the positive effect of family social capital on knowledge internalization within the family.*

The Interaction of Generation in Control and Family Affective Commitment. Affective commitment encourages family members to work cooperatively and to perform assigned tasks in order to accomplish organizational goals (Herscovitch & Meyer, 2002; Sharma & Irving, 2005). Although no empirical study has directly investigated the impact of affective commitment on knowledge internalization, a number of works suggest that the role of affective commitment in entrepreneurial decisions is less pronounced across generations (e.g., Corbetta & Salvato, 2012; Gersick et al., 1997). We suggest that this phenomenon is determined by the decreased impact of affective commitment on patterns of knowledge internalization among family members.

Family firm expansion and the gradual increase in the number of family and non-family managers active within the firm in later generations prompt the introduction of increasingly formal and hierarchical approaches to knowledge management in the organization (Stewart & Hitt, 2012). Although the level of family members' commitment to the business may be stable, if not higher in the case of radical rejuvenation and strategic change (Salvato, Chirico, & Sharma, 2010), professionalization induces more detached relationships among family members who hold complementary expert knowledge. This trend can significantly reduce knowledge internalization (Corbetta & Salvato, 2012; Stewart & Hitt, 2012).

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In line with this prediction, Chirico and Nordqvist (2010) found that family firms' ability to translate family members' devotion and attachment into positive knowledge outcomes weakens across generations. Discua Cruz et al. (2013) discovered that knowledge recombination within family entrepreneurial teams requires strong affective bonds among family members and within the family firm. Positive reciprocal affect prompts family members to search for each other's contribution towards the common goal of advancing the family firm's prospects. When such affective bonds are complemented with formal managerial procedures and hierarchical relations in multi-generational family firms, knowledge internalization is hampered and younger-generation members tend to exit the family firm to pursue entrepreneurial initiatives in which new affective bonds will play a more central role. A complementary result emerged in Björnberg and Nicholson (2012) study on the antecedents of emotional ownership. Their eight case studies and a survey of 960 next-generation family members highlighted the substantial impact of emotional attachment on organizational attitudes and behaviors, which tends to play a decreasing role across generations (see also Kraiczy et al., forthcoming).

Therefore, family members in later generations will be less aware of the value of their affective commitment in collective efforts. Whatever its intensity, affective commitment in later generations will have less influence on family members' efforts at knowledge recognition, assimilation, and exploitation in the family (Corbetta & Salvato, 2012; Gersick et al., 1997). We hence predict that generation in control negatively moderates the relationship between family affective commitment and knowledge internalization within the family. Formally:

Hypothesis 5: Later family generations in control will decrease the positive effect of family affective commitment on knowledge internalization within the family.

The Interaction of Generation in Control and Family Relationship Conflicts. As discussed earlier, we predict that relationship conflicts negatively affect knowledge

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internalization within the family. Apparently, the detrimental impact of conflicts on knowledge processes may be exacerbated as later family generations assume control of the family firm, due to the greater complexity of social interactions among family members (Corbett & Hmieleski, 2007; Gersick et al., 1997). Yet this view overlooks other important aspects related to the participation of later generations in the business, which may smooth the negative impact of relationship conflicts on knowledge internalization.

First, the greater number and complexity of intra-family relationships are often balanced by their more detached nature, as cousins and members of different family branches may engage in more formal and unconnected relationships, hence reducing the likelihood that interpersonal conflicts transfer to the business (Corbetta & Salvato, 2012). Second, the increasing relationship distance among relatives strengthens their attention to the negative effects of antagonism and feuds on the family firm's viability, hence prompting them to guard against nascent conflicts and to find ways to reduce them, such as through family meetings or external support from trusted advisors (Kellermanns & Eddleston, 2004; Salvato & Corbetta, 2013). Finally, the increasing professionalism of controlling family members in later generations reduces relationship conflicts among relatives, turning them into manageable task conflicts among colleagues, which in turn facilitates processes of knowledge recombination (Chirico et al., 2011; Stewart & Hitt, 2012).

The detached nature of interpersonal relationships in later generations, the heightened attention to toning down relationship antagonism, and the greater ability to manage task conflicts reduce the negative impact of family relationship conflicts on knowledge internalization within the family. An objective, professional approach to task conflicts among highly-skilled family members may thus turn conflicts into a generative dialectic conducive to knowledge recognition, assimilation, and effective use (Jehn, 1995, 1997; Kellermanns & Eddleston, 2006). We hence

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predict that generation in control positively moderates the relationship between family relationship conflicts and knowledge internalization within the family. Formally:

***Hypothesis 6:** Later family generations in control will decrease the negative effect of relationship conflict on knowledge internalization within the family.*

METHODS

Data Collection

Data for this study were collected through a survey of a sample of Swiss family firms. To select firms, we identified all companies registered with the Chamber of Commerce of one canton in the Swiss Confederation. This effort provided a sample of 967 firms. We called the firms to determine which of these firms were family owned (the majority of equity owned by a family), had multiple family members involved in their operations, and were recognized as a family business by the family CEO or senior executive member. A total of 592 firms were family firms. We then collected data from two respondents (the two highest family executives – the CEO and the next-highest senior position) from each firm through an online survey. When email information was not available, or when the firm explicitly requested a printed questionnaire, we sent the questionnaire by ordinary mail. The cover letter illustrated the purpose of the study, instructions about who had to fill the questionnaire, and an assurance of confidentiality. In total, five reminders were sent to respondents. We received 199 double responses, a response rate of 33.61%. We compared the respondents' size, age, and industry with non-respondents (whose data were provided by the *SwissFirms* database), and found no statistically significant differences. Moreover, no statistically significant differences were found between early and late respondents.

Inter-respondent reliabilities for our dependent and independent variables were high: family social capital (rwg = .93); family affective commitment (rwg = .96); family relationship conflict (rwg = .94); knowledge internalization (rwg = .90); PD (rwg = .96). When a mismatch occurred

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in responses related to objective variables, such as “family generation in control,” we personally called the firm to obtain accurate information.

We addressed common method bias in three ways. First, we used the second respondent’s data for the dependent variable and the first respondent’s data for the independent variables. Second, following Podsakoff, Mackenzie, & Podsakoff, (2003), we analyzed our data with the unmeasured latent factor method approach, which allows all self-reported items to load both on their theoretical constructs and on an uncorrelated method factor. We compared the results of this model with our full factor model, without the latent method factor, and found that the addition of the latent factor does not significantly improve the fit of the measurement model. All factor loadings of the measurement model remain significant, suggesting that common method bias is not likely to have influenced our study's results. Third, we collected objective secondary data for firm size and industry. The diversity in the data sources further reduces the likelihood of common method bias.

Measures

The questionnaire was designed in English. It was then translated into Italian – the official language of the Swiss canton we surveyed – through translation and back-translation. We then tested the questionnaire on six senior executives in three family firms and five academic experts in research methods and family firms. We attempted to ensure that the items were interpreted unambiguously and displayed high content validity. We then pretested the refined items with a convenience sample of 53 family firms. These efforts resulted in a highly reliable instrument (Cronbach’s α ranging from 0.79 to 0.84). Except where noted, the study’s variables and items are measured on a 5-point scale (1= strongly disagree – 5= strongly agree) (see Appendix I).

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Dependent and Independent Variables. Following Tsai and Ghoshal (1998), we adopted a set of six items to measure *family social capital* ($\alpha=0.83$). An eight-item scale from Allen and Meyer (1990) was used to measure *family affective commitment* ($\alpha=0.83$). *Family relationship conflict* ($\alpha=0.84$) was assessed with a three-item scale developed by Eddleston and Kellermanns (2007) based on Jehn (1995). The measure of *knowledge internalization* was challenging to build. To our knowledge, and with few exceptions (Kale & Singh, 2007), there are no validated scales that measure this construct. Established procedures were observed to develop a measure for this construct (see Hinkin, 1995; Jansen, Van Den Bosch, & Volberda, 2005; Pearson & Lumpkin, 2011). In line with Jansen et al., we reviewed existing literature and put together a list of items reflecting the theoretical definition and meaning of the construct (e.g., Cohen & Levinthal, 1990; Kale & Singh, 2007; Lee, 2001; Nonaka, 1994; Tiwana, 2008; Tiwana & McLean, 2005; Van den Bosch et al., 1999; Zahra et al., 2009). Following this literature, and in particular Tiwana and McLean (2005) and Tiwana (2008), we built a three-item scale that assesses the extent of family members' ability to recognize, assimilate, and exploit each other's unique knowledge. This scale provided high reliability ($\alpha=0.79$). Our pretest of the scale on a convenience sample of family firms resulted in minor adjustments in wording. Also, a principal components factor analysis was conducted. As expected, the three items obtained loadings exceeding 0.50 and loaded together in the same factor (Hinkin, 1995). To validate this measure further, we correlated it with another measure of a related concept, realized absorptive capacity within the family ("family members have the ability to transform knowledge, i.e. combine the existing knowledge with new acquired and assimilated knowledge"; "family members have the ability to exploit the gathered knowledge, i.e. refine and extend existing competencies or create new ones by using the acquired and transformed knowledge" ($\alpha=0.87$) (Lee, 2001; Zahra & George, 2002). Knowledge

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internalization and realized absorptive capacity within the family were significantly and positively correlated ($r=0.56$, $p < 0.001$), increasing our confidence in the scale's validity. Given the centrality of this construct in our study, as we explain later we also used the realized absorptive capacity measure to test the robustness of our results. *PD* ($\alpha=0.81$) was measured by adapting a six-item scale developed by Zahra et al. (2007). We also examined prior research on PD and derived items that capture multiple facets of PD (e.g., Marsh & Stock, 2006; Subramaniam & Venkatraman, 2001; Subramaniam & Youndt, 2005). Respondents were asked to rate how their companies performed in specific areas vis-à-vis their competitors (1 = much worse – 5 = much better). To provide evidence of measurement validity, we compared our PD scale with the seven-item scale of entrepreneurial orientation from Miller (1983). In line with previous studies (see Frishammar & Sven Åke Hörte, 2007) the two constructs were positive and significantly correlated ($r=0.49$, $p < 0.001$). Finally, *family generation in control* was operationalized with a single-item question that asked respondents to indicate the generation that currently manages the firm (Casillas et al., 2010; Cruz & Nordqvist, 2012).¹

Control Variables. We controlled for company size, industry, generational involvement, and firm growth.² Company size was measured using the natural log of full-time employees. We used the three-sector hypothesis (Staroske, 1995) and coded industry into primary, secondary, and tertiary.³ The tertiary industry was used as the comparison industry. Size and industry may

¹ After the survey was completed, we called the companies to obtain more detailed information about the family generation in control. In all cases, the family generation in control of the firm's management controlled the firm's ownership, i.e., "hold[ing] the majority of the equity, and thus guid[ing] the firm." (Ling & Kellermanns, 2010: 324).

² We did not include firm age as a control variable in the analyses we report in order to avoid multicollinearity. Age was highly correlated with generation in control (0.84; $p < 0.001$). As a robustness check, we separately ran the analysis including firm age as a control variable. Those results did not substantially differ from those reported. Additionally, results remained substantially similar (except for the model fit) when controlling for the percentage of family members in the TMT.

³ In particular, as literature suggests, we aggregated electronics, trade, construction, and manufacturing into the secondary industry; transportation/communication, finance and services into the tertiary industry; and coded agriculture as the primary industry (see Staroske, 1995). This effort enabled us to substantially improve the model's

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determine the abundance of entrepreneurial opportunities and outcomes (Zahra & Nielsen, 2002).

We also controlled for generational involvement – the number of family generations currently managing the firm – which is believed to affect PD (Kellermanns & Eddleston, 2006; Sciascia, Mazzola & Chirico, 2012). Finally, we expected firm growth to increase the slack resources available and boost investments in PD (Zahra & Nielsen, 2002). We controlled for growth because we are interested in PD rather than PD success or performance.⁴ Firm growth ($\alpha=0.81$) was measured through four measures of growth in market share, number of employees, profitability and ability to fund growth from profits in the last three years. Respondents were asked to rate how their companies performed compared to their competitors (1 = much worse – 5 = much better).

DATA ANALYSIS AND RESULTS

We tested our hypotheses using structural equation modeling (SEM), supported by AMOS 16.0. SEM combines the measurement model (confirmatory factor analysis) and the structural model (regression or path analysis) into a simultaneous statistical test. An established approach for applying SEM implies a two-stage model (Anderson & Gerbing, 1988; Byrne, 2010). In the first stage, confirmatory factor analysis examines the validity of the measurement model, hence specifying how latent variables are measured in terms of the observed variables. In the second stage, the structural model tests hypothesized relations among latent variables, hence specifying causal relations (Anderson & Gerbing, 1988; Byrne, 2010; Shook, Ketchen, & Hult, 2004). With this approach, convergent and discriminant validity are evaluated during the measurement phase, while the structural model provides an appraisal of nomologic validity.

Stage 1: Results of the Measurement Model

fit to the data. We also run our analyses while considering all the industries separately. Those results remained substantially similar to those reported here (except for the model fit).

⁴ We thank one of the anonymous reviewers for this insightful comment.

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We tested the measurement model in three steps. First, we used the acceptability of the measurement model in terms of the model's fit to test for unidimensionality. We used three criteria to assess model fit (see Byrne, 2010; Hu & Bentler, 1995; Lado, Dant, & Tekelab, 2008; Marsh, Hau, & Wen, 2004a): (i) comparative fit index (CFI), incremental index of fit (IFI), and Tucker-Lewis index (TLI) greater than 0.90; (ii) root mean-square error of approximation (RMSEA) lower than 0.06; (iii) the normed χ^2 (i.e., the ratio between χ^2 and the degree of freedom) lower than 3 (Bagozzi & Yi, 1988).⁵ As suggested by Hulland (1999: 198), items with loadings less than 0.4 or 0.5 should be dropped, as they add little explanatory power to the model and bias parameter estimates (Byrne, 2010). Accordingly, we dropped four items with a factor loading lower than 0.4 to ensure item reliability (see Appendix I).

Initial confirmatory factor analysis exhibited acceptable levels of fit, with two exceptions: CFI and TLI were 0.90 and 0.89, respectively, and thus a little lower than the desired level. As Shook et al. (2004: 401) explain, model respecification is needed "when one tests a proposed model and then seeks to improve model fit ... Respecification is common in the social sciences because *a priori* models often do not adequately fit the data" (*italics in original*). Accordingly, we examined the Modification Indices in AMOS 16.0 that showed the need to add one error covariance between items # 6 and # 8 in the affective commitment scale (see Appendix I)⁶ (c.f. Byrne, 2010; see e.g., Lado et al., 2008 for a similar approach). As a result, all the fit indices showed acceptable levels of fit: normed $\chi^2=1.20$, CFI=.96, IFI=.96, TLI=.95, and RMSEA=.03.

⁵ In particular, we chose CFI, IFI, and TLI because they are less sensitive to the influence of sample size than other fit indices are (Byrne, 2010; Eddleston & Kellermanns, 2007).

⁶ An error covariance generates correlated error terms in which knowing the residual of one item helps in knowing the residual associated with another item. Such correlation means that the unique variances of the associated items overlap; that is, they measure something in common other than the latent variables that are represented in the model (Anderson & Gerbing, 1988; Byrne, 2010). This possibility may occur, for instance, when two items are worded similarly, as in our case.

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In the second step, we examined convergent validity by computing the indexes of average variance extracted, which is the level of variance in the variable not due to measurement error. An average variance extracted of at least 0.50 (i.e., 50 percent) provides support for convergent validity (Anderson & Gerbing, 1988; Fornell & Larcker, 1981; Shook et al., 2004). All our variables exceeded this cutoff. In the third step, we evaluated discriminant validity by comparing the squared correlation between two variables with their respective average variance extracted (Fornell & Larcker, 1981). Discriminant validity exists if the average variance extracted of both variables exceeds the squared correlation. This condition was met for all the variables.⁷

Stage 2: Results of the Structural Model

Table 1 presents the descriptive statistics and correlations of our variables. To check for normality, we used the skewness/kurtosis tests. Our dependent variable, PD, appeared significantly normal in skewness (Pr=0.335), kurtosis (Pr=0.189), and in both statistics considered jointly (adj chi2(2)=2.69; prob>chi2=0.2608) (Wooldridge, 2002). We tested our hypotheses using the measures derived from the measurement model analysis.

Hypotheses 1, 2, and 3. To test hypotheses 1, 2, and 3, we developed a series of nested models (Anderson & Gerbing, 1988; Eddleston & Kellermanns, 2007) and performed the nested model comparisons test (Byrne, 2010; Hu & Bentler, 1995). As shown in Table 2, we compared the fit of the fully mediated model (i.e., Model 1)⁸ with a partially mediated model (Model 2). The χ^2 difference tests of the partially mediated model led to an improved fit over Model 1, but the regression weights of the added paths in this model between family relationship conflicts and PD, and between family social capital and PD are insignificant; knowledge internalization fully mediates this relationship. The only significant added path is the one between family affective

⁷ Detailed results of average variance extracted and squared correlation are available from the authors.

⁸ In Model 1, all the model-fit indices exceeded their respective common acceptance levels, suggesting that the displayed model fitted the data well: normed $\chi^2=1.40$, CFI=.91, IFI=.91, TLI=.91, and RMSEA=.05.

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commitment and PD, where knowledge internalization partially mediates this relationship. These results suggest that the best fitting model is the one in which knowledge internalization within the family partially mediates the relationship between family affective commitment and PD, and fully mediates the relationships between family social capital and PD, and between family relationship conflicts and PD (see Model 3 in Table 2). Further, the χ^2 difference tests of Model 3 led to an improved fit over Model 1 (Table 2), and Model 3 exhibits acceptable fit indices: normed $\chi^2=1.39$, CFI=.91, IFI=.92, TLI=.91, and RMSEA=.04.

Additionally, to test for mediation we also followed Baron and Kenny's (1986) multistage method as a robustness check. The analysis in STATA 12 fully confirms our results in SEM of full and partial mediation of knowledge internalization. Second, we conducted the Sobel test (Sobel, 1982), which shows that all three mediation effects are significant ($z= 3.14$, $p<0.01$ for family social capital; $z= 2.45$, $p<0.05$ for family affective commitment; $z= -3.73$, $p<0.001$ for family relationship conflicts). In particular, while the indirect effects were significant in all three mediations ($r= 0.10$, $p<0.01$ for family social capital; $r= 0.06$; $p<0.05$ for family affective commitment; $r=-0.13$, $p<0.001$ for family relationship conflicts), the only significant direct effect was the one between family affective commitment and PD ($r=0.22$; $p<0.001$).

--- Insert Tables 1 and 2 About Here ---

Figure 1 schematically represents the structural model, including the standardized path coefficients estimated via maximum likelihood estimation. It reports our findings pertaining to the best-fitting partially mediated model (Model 3). As expected, knowledge internalization within the family positively affects PD. Family social capital and family affective commitment positively affect knowledge internalization within the family, and the effect of family relationship conflict is negative. Additionally, family affective commitment has a direct positive effect on PD.

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Hence, our analyses support *hypotheses 1, 2 and 3*, and reveal that knowledge internalization fully mediates the family social capital and family relationship conflicts-PD relationships, and partially mediates the family affective commitment-PD relationship. ***Hypotheses 4, 5, and 6***. To test the moderation effect of generation in control, we followed the “*mean-centered unconstrained approach for estimating interaction effects*” from Marsh, Wen, & Hau (2004b) and Marsh et al. (2007).⁹ Moderation was also tested through an OLS analysis in STATA 12. Before creating the interaction terms, we centered the variables to minimize multicollinearity problems (Marsh et al., 2004b; 2007). The interaction terms between family generation in control and family social capital and between family generation in control and family relationship conflict are positive and significant, thus supporting *Hypotheses 4 and 6*. In contrast, the interaction term between family generation in control and family affective commitment is insignificant, although it is in the hypothesized direction. Thus, *Hypothesis 5* is not confirmed (see Figure 1).

--- **Insert Figure 1 About Here** ---

As expected, the results of the OLS analysis were substantially similar for Hypotheses 4, 5 and 6 (see Table 3). Inspection of the variance inflation factors showed that multicollinearity was not a concern in this analysis. Using the ‘margins’ command from STATA 12, we also graphed the interaction of family generation in control and family social capital on knowledge internalization (Figure 2a), and the interaction of family generation in control and family relationship conflict on knowledge internalization (Figure 2b), respectively.

⁹ In applying SEM, interactions should be favored over multi-group analysis. As Sauer and Dick (1993: 639) suggest, “1. multi-group analysis may have lower statistical power [because of the split of the sample] and may confound group variance differences with true moderator effects...2. a median split into groups may create [artificial] groups...and, 3. observed relationships can sometimes be very sensitive to cutoff points used to form groups”. In SEM the effects of moderating variables are modeled “using interaction terms... in a manner similar to that used in multiple regression... modeling involves forming a new variable which is the product of two variables, one of which is the moderator variable” (see also Marsh et al., 2004b, 2007).

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--- Insert Table 3, Figures 2a and 2b about here ---

Finally, as a robustness check we run the analyses using as mediator the realized absorptive capacity construct (Lee, 2001; Zahra & George, 2002). Results were similar to those reported in Figure 1, including the partial mediating role of family affective commitment (*direct effect*: 0.21; $p < 0.05$; *indirect effect*: 0.06; $p < 0.01$). However, although the coefficients were in the expected directions this further test did not confirm Hypotheses 3 ($r = -0.13$, ns) and 5 ($r = 0.12$, ns).

DISCUSSION

Entrepreneurial outcomes such as PD are essential to a family firm's survival and prosperity. Existing research at the intersection of family business and entrepreneurship has linked these outcomes directly to family-specific social and affective features (e.g., Kellermanns & Eddleston, 2006; Sharma & Irving, 2005; Sciascia, Nordqvist, Mazzola, & De Massis, forthcoming), or to the knowledge of individual family members, rather than to the family as a collective (e.g., Kellermanns et al., 2008; Sardeshmukh & Corbett, 2011). Yet in family firms PD takes on distinct features due to the complex social interactions and affective elements underpinning the requisite knowledge recombination processes. In this study we advance family business theory by proposing collective knowledge recombination among family members, and its social and affective antecedents, as determinants of PD in family firms. Our findings suggest that family firms can achieve and sustain PD by effectively internalizing their members' specialized knowledge. Knowledge internalization within the family and its antecedents enable action, leading to the transformation of family members' specialized knowledge into new products. These results offer several theoretical contributions to entrepreneurship and family business theory.

Family Features Do Not Determine Entrepreneurial Outcomes Directly

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Our empirical findings show that both family social capital and relationship conflicts affect PD *only* through knowledge internalization (full mediator). The mere presence of family social capital and family conflicts does not affect family firm PD directly, as most existing studies suggest. Therefore, our study partially refutes existing knowledge by offering theoretical grounding and empirical evidence of knowledge internalization as a crucial intermediate variable for the relationship between family-specific dimensions and PD in family firms. The resulting model in Figure 1 indicates how family firms differ in using family members' specialized knowledge to determine PD and extends existing research on the effects of social and affective factors on entrepreneurial outcomes in family firms (e.g. Chrisman, Chua, De Massis, Frattini, & Wright, forthcoming; De Massis, Frattini, & Lichtenthaler, 2013).

First, our study highlights the risks associated with social capital in family firms, in relation to its ability to determine PD outcomes directly. Dense social relationships constrain members' ability to challenge existing paradigms and explore creative solutions. Family members may become too homogeneous in their thinking, unless effective processes of knowledge internalization within the family are promoted (Arregle et al., 2007; Kellermanns & Eddleston, 2004). We show that family social capital increases mutual understanding among family members, thus facilitating knowledge internalization, which, in turn, enhances PD outcomes.

Second, family relationship conflicts do not negatively affect family firm PD directly. It is likely that when these conflicts exist, some PD projects may be led by one (or two) skilled family member(s), probably together with some external non-family executives (Salvato et al., 2010). Also, such conflicts may be coupled with positive task conflicts, which mitigate and neutralize their negative effects (see Chirico et al., 2011). Our results suggest that interpersonal conflicts harm PD indirectly when they hamper knowledge internalization within the family. Family

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relationship conflicts based on strong, often negative, emotions obstruct knowledge internalization by leading family members to oppose each other, rather than to benefit from the joint utilization of specialized knowledge.

Third, in contrast with our predictions, a positive *direct* effect of affective commitment on PD exists, and this effect is even higher than the indirect one (0.04; $p < 0.05$), signaling a *partial* mediation effect. This result suggests an important boundary condition to our model of PD in family firms. Some family-specific dimensions, like affective commitment, may be so influential, that they can have a direct impact on organizational outcomes such as PD, besides their mediated effect through knowledge internalization. Affective commitment is one such dimension; it is so strongly related with family members' willingness to change (Chirico & Salvato, 2008), that it may directly discriminate family firms that are successful at PD, from those that are not. Prior work has suggested that affective commitment may be among the most important influences on change in terms of PD both directly and by promoting knowledge internalization among organizational members (Marsh & Stock, 2006; Nonaka, 1994). Our study confirms the power of affective commitment on these outcomes.

Product Development in Family Firms is a Collective Knowledge Internalization Effort

Our data suggest that to effectively modify or build new products in family firms, the team of family members involved in the business must attempt to collectively internalize knowledge. This result augments previous research that linked entrepreneurial outcomes, such as opportunity recognition, to the stock of knowledge held by individual family members. Sardeshmukh and Corbett (2011), for instance, found that the ability of individual successors to generate new ideas leading to entrepreneurial opportunity perception results from a combination of their family firm-specific human capital built through experience within the family firm and general human capital

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built through education and other work experience (Criaco, Minola, Migliorini & Serarols-Tarrés, 2013). These and similar results in the context of family firms (e.g., Cabrera-Suarez et al., 2001) support earlier evidence on the role of the individual entrepreneur's human capital in opportunities identification, business longevity and venture growth (Corbett, 2007).

However, PD differs from the identification of an entrepreneurial opportunity (Corbett, 2005). As Van de Ven (1986: 591) explains, “[w]hile the invention or conception of innovative ideas may be an individual activity, innovation (inventing and implementing new ideas) is a collective achievement of pushing and riding those ideas into good currency.” An empirically informed understanding of the collective dimension of PD in family firms is missing in the literature. For instance, Cabrera-Suarez et al. (2001) and Sirmon and Hitt (2003) offer theoretical arguments about the importance of knowledge management and recombination processes in family firms as the basis for developing competitive advantages and thus fostering entrepreneurial success. Similarly, Chirico and Salvato (2008) theorize that knowledge integration among family members is positively associated with dynamic adaptation of family firm capabilities (e.g., in product-making). In a similar vein, Patel and Fiet (2011) argue that managers in family firms can combine their knowledge effectively, which provides them with distinct advantages over nonfamily firms in identifying entrepreneurial opportunities.

However, this literature falls short of identifying the social mechanism through which collective family knowledge yields PD outcomes. Our study proposes knowledge internalization as a specific process through which family members mutually leverage their individual knowledge to determine new product outcomes. In particular, we concur, and empirically test, that social and collective processes of interaction and knowledge recombination are needed to blend the knowledge bases of individual family members, as required by the identification and

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implementation of entrepreneurial ideas. This result enhances our understanding of the role of knowledge, experience, and human capital in family firms. Unlike previous studies, we do not suggest that entrepreneurial outcomes depend on the quality of the endowment of individual knowledge held by the family CEO or successors (e.g., Kellermanns et al., 2008; Sardeshmukh & Corbett, 2011). The quality of human capital is essential, but equal emphasis should be placed on how the knowledge endowment of individual family members is internalized across the family through social and affective mechanisms. In sum, our focus on the family entity enabled us to offer a deeper understanding of the sources of competitive advantage that are potentially available to a family firm through the distinctive bundle of knowledge resources originating from the interaction of its family members.

Later Generations Have Positive Effects on Entrepreneurship

Our study extends recent research on the positive effect of later generations on entrepreneurial behavior by empirically demonstrating possible mechanisms through which this effect unfolds. Early statistics indicated that only a third of family businesses survive to the second generation, and that less than 10% make it to the third generation within the same family (Handler, 1994). One reason provided for this finding is that business founders and successors are unwilling to behave entrepreneurially (Cabrera-Suarez et al., 2001; Kellermanns & Eddleston, 2006). More recent empirical investigations have tempered such arguments by providing evidence of greater entrepreneurial activity in later generations. Existing research attempted to directly link family generation in control to measures of entrepreneurial outcomes, such as entrepreneurial orientation (e.g., Cruz & Nordqvist, 2012), growth (e.g., Casillas et al., 2010), or performance (Ling & Kellermanns, 2010). It yielded contradictory results because it did not explore the underlying mechanisms by which controlling generations affect firm outcomes (e.g.,

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Beck et al., 2011; Casillas et al., 2010; Cruz & Nordqvist, 2012; Kellermans et al., 2012; Ling & Kellermans, 2010; Salvato, 2004).

We offer a better-specified model by using interaction terms to test how social capital, affective commitment, and relationship conflicts differently affect knowledge internalization processes, and therefore PD, in earlier and later generations. Our results suggest that later generations in control strengthen the positive effect of social capital and ease the negative impact of conflicts on knowledge internalization within the family. We thus imply, and statistically show, that family firms are not homogeneous. In particular, Figure 2a shows that knowledge internalization is maximized when social capital is high and later family generations control the family firm. Rather, Figure 2b shows that family relationship conflicts determine a greater negative effect on knowledge internalization when earlier family generations control the business. In line with our arguments, however, later family generations appear more likely to translate relationship conflicts into productive task conflicts, with increasing (although slightly) positive effects on knowledge internalization. Our results did not support the negative moderating role of family generation in control on the relationship between family affective commitment and knowledge internalization. This result is probably related to the difficulty of predicting multi-generational family members' emotional commitment (Corbetta & Salvato, 2012).

Limitations

There are three limitations to our study. First, our study focuses on internal knowledge internalization. It assumes that controlling family members hold a stock of knowledge about external markets. It thus does not consider how these members have access to critical external knowledge. Yet, team members often acts as hubs for bringing outside expertise into the firm which needs then to be internalized (Kale & Singh, 2007; Tiwana & McLean, 2005; Yli-Renko et

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al., 2001). As such, knowledge internalization within the family is crucial not only for internalizing existing knowledge, but also for interpreting and using new external knowledge brought in by family members. Relatedly, building on most existing literature (Grant, 1996a; Grant, 1996b; Nonaka, 1994), we assume that PD is a social process which follows knowledge internalization. Yet, a single individual may come up with a new product idea on her/his own or a firm can internalize knowledge well, but for some reason may be unable to connect it to PD. Second, we focus on three determinants of knowledge internalization—family social capital, affective commitment, and relationship conflict. Although extant literature highlights their role in determining, respectively, a family firm’s ability, willingness, and obstacles to recombining expert knowledge held by family members, other factors may influence PD. Trust, for instance, is one of the resources that social capital generates. It can facilitate knowledge internalization and PD. Third, our focus is exclusively on ‘family’ processes (e.g. family social capital, knowledge internalization among family members), although it is reasonable to expect that these processes reflect and result from the activities and work of non-family executives, managers, and employees as well. Fourth, we had to respecify the model to better fit the data. As Anderson and Gerbing (1988) and Shook et al. (2004) suggest, respecifications are acceptable when justified by theory and content-related concerns. In regard to the respecification we performed, the error covariance reflects the “effective” high correlation between the two items. Also, the four items we dropped reflect “ambiguous” questions, two of which are reverse coded (see Appendix D). However, we ran a robustness test that showed the effect of this limitation is minor: our analyses before and after model respecification yielded substantially similar results, besides those of model fit. Finally, our sample is drawn from one country (Switzerland), which raises issues about generalizability. We encourage scholars to add evidence about knowledge internalization and PD

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in family firms in other countries to ensure the relationships we found are not linked to Swiss institutional or cultural variables. Also, although we find support for our hypotheses, we do not have data to infer causality.

Implications for Research and Practice

Our study offers some directions for future research. First, extensions of our model might consider additional factors affecting the stock of knowledge available to the family firm, such as other forms of conflict (e.g., task and process) or commitments (e.g., normative and continuance). It may also be useful to explore how relevant knowledge is accessed from outside the family before it is internalized among family members, as well as between family and non-family managers (Zahra et al., 2007). Exploring how family firms can *combine* or *transform* (see, e.g., Todorova & Durisin, 2007; Zahra & George, 2002) different sources of knowledge (e.g., internal and external or family and non-family based) without becoming subject to core rigidities or other barriers to change is another important path for future research. For instance, Zahra and George (2002) depict knowledge transformation as the result of knowledge assimilation, but Todorova and Durisin (2007) view the former as an alternative process. Further, Lane, Koka, and Pathak (2006) see knowledge transformation as the link between knowledge exploration and exploitation in which new and existing knowledge is combined, allowing the latter to be used in new ways.

Our analysis may also inform organizational practices. For instance, the value of individual specialized knowledge in organizations appears to be tied to social and affective relationships. Thus, to leverage investments in knowledge, organizations may need to foster close and dense relationships in order for their core knowledge workers to network and integrate their expertise. Organizations that neglect the social and affective sides of individual skills and inputs and do not create synergies between their human and social capital are unlikely to realize the potential of

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their employees to enhance PD capabilities. Hence, family firms need to increase their participative environment to challenge the current status quo, mitigate conflicts and promote entrepreneurial behavior. This effort will enable family members to interact intensively and to better draw upon complementary knowledge.

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Table 1. Descriptive Statistics and Correlations

			1	2	3	4	5	6	7	8	9	10	11
Variables	Mean	SD											
1. Size#	1.16	0.56	1.00										
2. Primary Industry	0.03	0.17	-0.13	1.00									
3. Secondary Industry	0.62	0.49	0.17*	-0.23**	1.00								
4. Gen. Involvement	1.54	0.55	0.22**	0.15*	0.04	1.00							
5. Growth	3.38	0.57	0.08	0.06	-0.13	0.08	1.00						
6. Fam. social capital	4.00	0.62	0.01	-0.02	-0.10	0.09	0.10	1.00					
7. Fam. affect comm.	4.04	0.61	0.09	-0.04	-0.12	0.05	0.18*	0.26***	1.00				
8. Fam. relat. conflict	1.97	0.65	-0.07	0.04	0.11	0.00	-0.15*	-0.51***	-0.35***	1.00			
9. Knowl. internalization	3.97	0.58	0.10	-0.01	-0.13	0.08	0.29***	0.52***	0.42***	-0.55***	1.00		
10. Product development	3.69	0.47	0.12	-0.06	-0.05	-0.09	0.34***	0.22**	0.37***	-0.15*	0.31***	1.00	
11. Family Gen in Control	2.02	1.08	0.24**	-0.11	0.33***	0.30***	-0.05	-0.05	-0.04	0.07	-0.02	-0.09	1.00

* p<.05; ** p<.01; *** p<.01; # The values of the mean and standard deviation of size before the transformation are 92.33 and 738.39, respectively.

Table 2. The Test of a Series of Nested Models (Full or Partial Mediation of Knowledge Internalization)#

Model	Description	Normed χ^2	Difference χ^2 compared to Model 1	Difference df compared to Model 1	Statistical Significance of χ^2 and df difference	Note: Significance of the added paths
<i>Model 1</i>	Fully mediated model	1.40	-	-	-	-
<i>Model 2</i>	Partially mediated model	1.38	10.35	3	p<0.05	PD <--- SC: 0.1 PD <--- RC: 0.2 PD <--- AC: 0.2*
<i>Model 3</i>	<i>Partially mediated relationship between AC and PD</i>	<i>1.39</i>	<i>5.41</i>	<i>1</i>	<i>p<0.05</i>	<i>PD <--- AC: 0.2*</i>

* p<.05; #: SC=family social capital; AC= family affective commitment; RC= family relationship conflicts; PD= product development.

Table 3. Moderation Tests through a OLS Analysis

Knowledge Internalization	Model 1	Model 2	Model 3
Size	0.08	0.04	0.03
Primary Industry	-0.16	0.01	0.01
Secondary Industry	-0.14	-0.03	-0.04
Gen. Involvement	0.05	0.01	0.02
Growth	0.27***	0.17**	0.17**
Family generation in control (gc)		0.01	0.01
Family social capital (SC)		0.27***	0.28***
Family relationship conflict (RC)		-0.26***	-0.24***
Family affective commitment (AC)		0.19***	0.18***
gc x SC			0.16**
gc x AC			-0.04
gc x RC			0.11*
R^2	0.11	0.46	0.49
Adjusted R2	0.08	0.44	0.45
F statistic	4.60***	18.01***	14.66***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

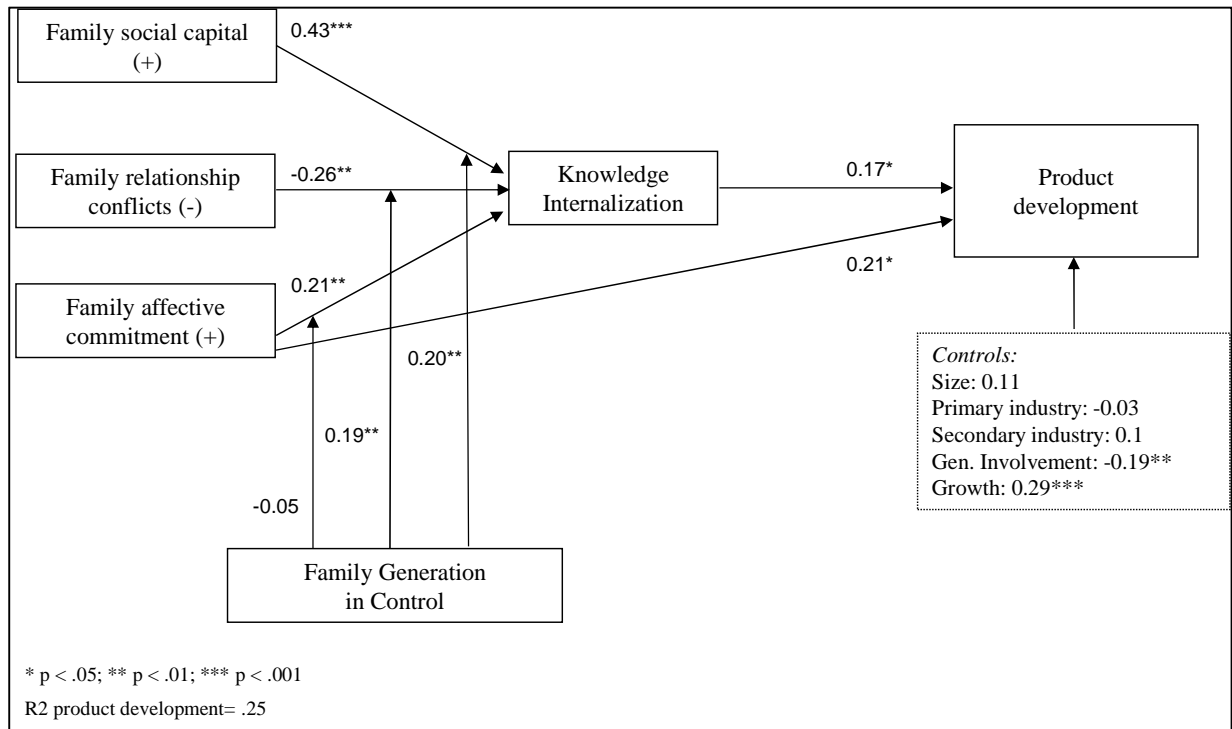


Fig. 1. Results of Structural Model Analysis. Best-Fitting Partially Mediated Model (Model 3)

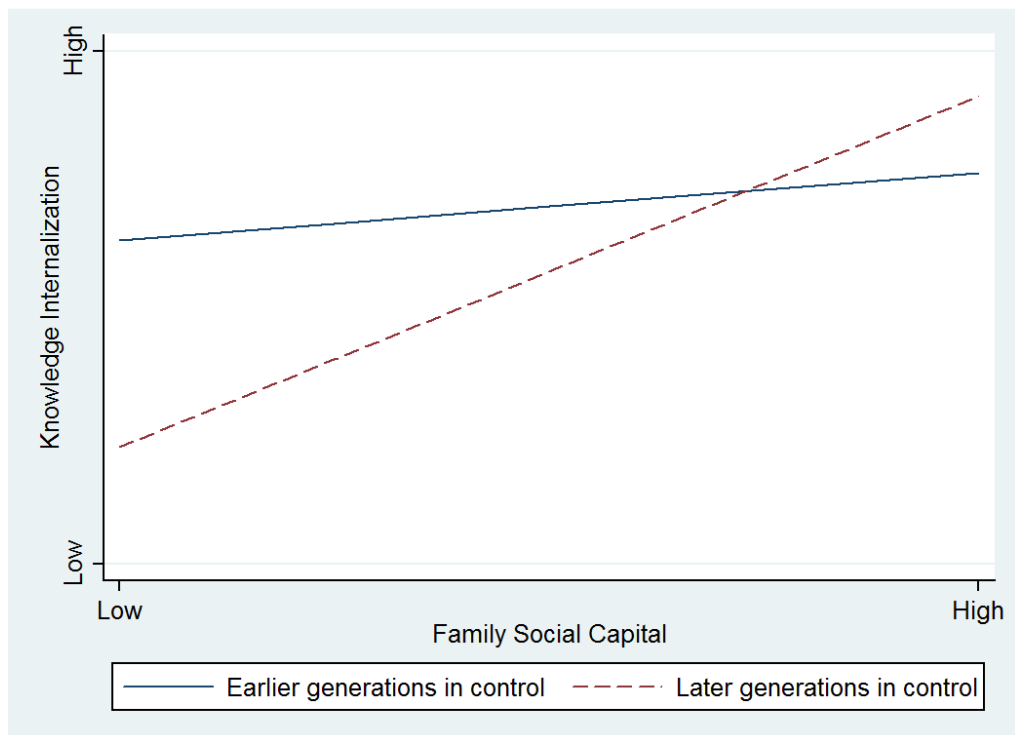


Fig. 2a. The Moderating Effect of Family Generation in Control on the Relationship between Family Social Capital and Knowledge Internalization.

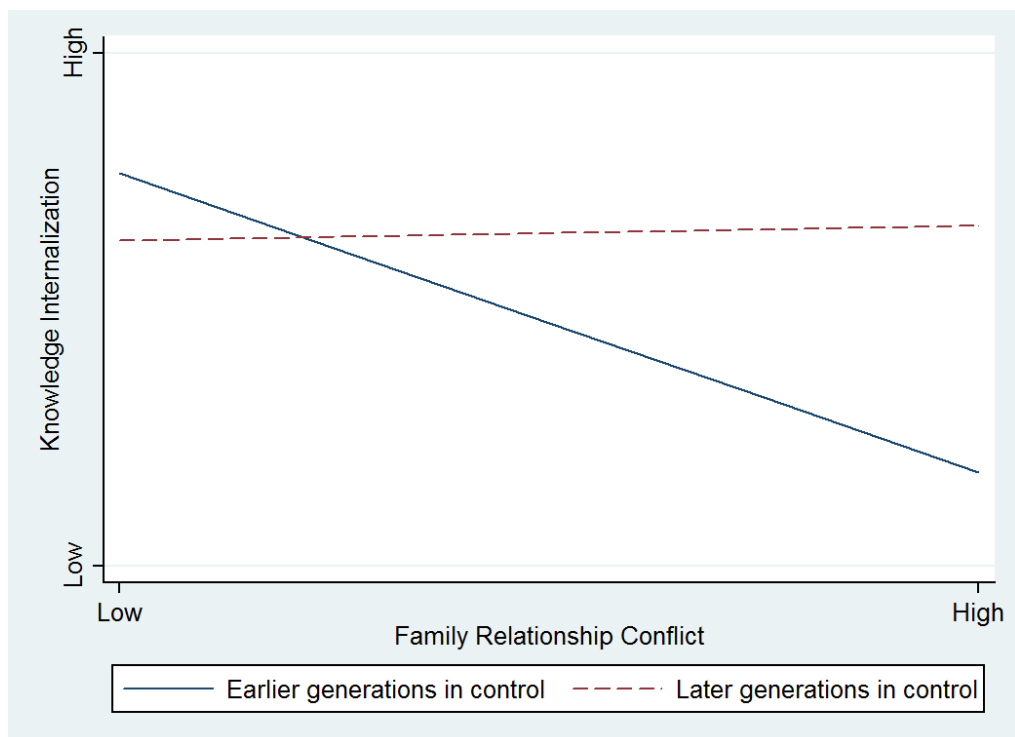


Fig. 2b. The Moderating Effect of Family Generation in Control on the Relationship between Family Relationship Conflict and Knowledge Internalization

Appendix I: Variables and Items

Variables	Items
<i>Family social capital</i>	$\alpha=0.83$
	<ol style="list-style-type: none"> 1) Family members spend time together in social occasions 2) Family members maintain close social relationships 3) Family members can rely on each other without any fear that some of them will take advantage even if the opportunity arises# 4) Family members always keep the promises they make to each other 5) Family members share the same ambitions and vision 6) Family members are enthusiastic about pursuing the collective goals and missions of the whole organization
<i>Family affective commitment</i>	$\alpha=0.83$
	<ol style="list-style-type: none"> 1) Family members would be very happy to spend the rest of their career with this organization # 2) Family members enjoy discussing their organization with people outside it 3) Family members really feel as if this organization's problems are their own 4) Family members think that they could easily become as attached to another organization as they are to this one (reversed coded)# 5) Family members do not feel like 'part of the family' at this organization (reversed coded)# 6) Family members do not feel 'emotionally attached' to this organization (reversed coded) 7) This organization has a great deal of personal meaning for family members 8) Family members do not feel a strong sense of belonging to the organization (reversed coded)
<i>Family relationship conflict</i>	$\alpha=0.84$
	<ol style="list-style-type: none"> 1) There is much relationship tension between family members of the firm 2) Family members very often get angry while working in the family firm 3) There is much family emotional conflict in our family firm
<i>Knowledge internalization</i>	$\alpha=0.79$
	<ol style="list-style-type: none"> 1) Family members can recognize the potential value of their peers' knowledge 2) Family members can clearly understand each other's different pieces of knowledge and how they fit together 3) Family members can efficiently use each other's unique knowledge collectively
<i>Product development</i>	$\alpha=0.81$
	<ol style="list-style-type: none"> 1) Ability in conducting applied R&D 2) Ability to transform R&D results into products/services 3) Ability to build new products/services 4) Ability to modify existing products/services 5) Speed of new product/service development 6) Overall ability to modify or build products/services

Dropped items (Hulland, 1999)