

Psychological ownership as a driving factor of innovation in older family firms

Sabine B. Rau^{a,*}, Arndt Werner^b, Sabrina Schell^c

^a ESMT Berlin, Schlossplatz 1, 10178 Berlin, Germany

^b University of Siegen, Unteres Schloß 3, 57072 Siegen, Germany

^c University of Berne, Engehaldenstrasse 4, 3012 Bern, Switzerland

ARTICLE INFO

Keywords:

Innovation
Family business
Psychological ownership
Generation

ABSTRACT

Innovation is often key to long-term success. While some family firms innovate less when growing older, others are very successful and innovative over multiple generations. We provide a new explanation for this phenomenon by showing that psychological ownership can influence the relationship between generation in ownership and innovation output. In line with the literature, we find that over the generations, innovation output decreases, being significantly lower in the third and later generation than in the founder generation. However, if the third and later generation owner-managers have high levels of psychological ownership, innovation output is as high as in the founder and second generation. Our hypotheses are supported by data obtained from 942 German firms. Innovation in the third generation and beyond seems more feasible when not only legal ownership, but also psychological ownership, is passed down to the succeeding generation.

1. Psychological ownership as driver in older family firms

Innovation has not only led to the creation of new industries but has also changed established industries dramatically in the last decade, e.g. the fashion industry (Bhardwaj & Fairhurst, 2010) and digital photography (Tripsas, 2009). This “new time” of economy has to handle digitization, globalization and faster industry lifecycles (Barkema, Baum, & Mannix, 2002). In affected industries, long-term success of a firm is severely endangered without innovation (Ahuja, Lampert, & Tandon, 2008; Crossan & Apaydin, 2010; Kammerlander & Ganter, 2015).

Innovative activities of privately held and, often, family managed firms drive growth of firms and economies over long periods (Ahlstrom, 2010; Cucculelli, Le Breton-Miller, & Miller, 2016; De Massis, Audretsch, Uhlener, & Kammerlander, 2018; Garud, Tuertscher, & van de Veen, 2013). Whether firms create new products and services, enter new markets, adopt new production technologies, develop new raw materials, or implement new ways of organizing business activities, the development of small and large firms, as well as markets, is possible only with innovative activities (Matz Carnes & Ireland, 2013; Schumpeter, 1912/1934; Schumpeter, 1912). Consequently, innovation, an “old” topic (Schumpeter, 1912/1934; Schumpeter, 1912; Thompson, 1965), has triggered numerous studies (Crossan & Apaydin, 2010; Fagerberg, Fosaasa, & Sappraserta, 2012), addressing the context for innovation (Adler & Kwon, 2002; Ahuja, 2000), the organizational

structures that foster/hinder innovation (Burns & Stalker, 1994; Smith & Tushman, 2005; Tsai, 2002; Zahra, 1996), the team as nexus of innovation (Dougherty & Hardy, 1996; Hambrick, Cho, & Chen, 1996), and, more recently, the impact of CEO characteristics on innovation (Kammerlander, Dessi, Bird, Floris, & Murru, 2015; Krafczy, Hack, & Kellermanns, 2014; Tripsas & Gavetti, 2000; Wu, Levitas, & Priem, 2005).

In the family businesses realm, older firms tend to be less innovative than younger ones (Block, 2012; Cruz & Nordqvist, 2012; Werner, Schröder & Chlosta, 2018), but overall innovation output is higher in family firms than in non-family firms (Block, 2012; Feranita, Kotlar & De Massis, 2017; Rondi, De Massis, & Kotlar, 2018). Interestingly, input into innovation is lower whereas output is higher (Duran, Kammerlander, van Essen, & Zellweger, 2016), thus, the conversion rate from innovation input to innovation output is more efficient in family firms compared to non-family firms. While we do have explanations why innovation output lessens with age (Block, 2012), we do not yet know why some older family firms still are highly innovative. A recent literature review by Röd (2016) emphasizes that the family system itself leads to an advantage or disadvantage for innovative behavior, which include family ownership, management and governance as well as generational effects.

Particularly, the lower innovation input but higher output phenomenon is more pronounced if in later generation family businesses

* Corresponding author.

E-mail addresses: sabine.rau@esmt.org (S.B. Rau), arndt.werner@bwl.uni-siegen.de (A. Werner), sabrina.schell@iop.unibe.ch (S. Schell).

the CEO is a member of the owning family (Duran et al., 2016). Despite these results, we know of outstandingly innovative family firms in later generations. For instance, Jaskiewicz, Combs, and Rau (2015: 36) show in their qualitative study of German wineries that in especially innovative family firms of later generations the families in business share an “entrepreneurial legacy” defined as “easily recalled narratives about past entrepreneurial achievements or resilience.” Specific behavioral patterns such as strategic education, generational overlap and strategic succession ensure that entrepreneurial behavior of the next generation is fostered. Kammerlander, Dessi et al. (2015) identified shared family firm stories as an important precursor and antecedent for family firm innovation. In particular, shared stories focusing on the family have a positive impact on innovation. Thus, innovative behavior in later generation family firms seems to originate in the family members involved in the firm, the way they relate to the firm and how they become engaged.

What we do know is that ownership structure influences innovation output (Lumpkin, Steier, & Wright, 2011; Porter, 1992; Röd, 2016). Surprisingly, however, results on family (legal) ownership and innovation remain fragmented (Chrisman & Patel, 2012; Duran et al., 2016; Hsu, Huang, Massa, & Zhang, 2014; Matzler, Veider, Hautz, & Stadler, 2015; Munari, Oriani, & Sobrero, 2010). Because ownership has typically been defined in terms of stock ownership or voting rights, legal definitions prevail in empirical studies. We argue that ownership definitions in legal terms fall short, especially in privately held firms, where “...ownership manifests itself as a legal phenomenon, and it is also realized as an important psychological state” (Brown, Pierce, & Crossley, 2014: 318). We therefore integrate the legal with the “soft side” of ownership, namely psychological ownership, and develop a more comprehensive ownership model of family firms, which may be better suited to explain how family firms can maintain their level of innovation. While legal ownership constitutes the right to influence the firm’s strategy, psychological ownership addresses the motivation to do so (Bernhard & O’Driscoll, 2011; Pierce, Rubinfeld, & Morgan, 1991; Rantanen & Jussila, 2011). Pittino, Martinez, Chirico, and Galván (2018) show in their study that psychological ownership can be a primary determinant of entrepreneurial orientation and suggest that the relationship between psychological orientation and entrepreneurial orientation is mediated by knowledge sharing. Although there have been many studies on the innovation activity of family firms, focusing on psychological ownership as a main driving force behind these innovation activities in later generational family firms is still in its infancy. For this reason, we consider the following research question: “How does psychological ownership of family CEOs influence innovation in later generation family firms?”

We contribute to the literature in the following ways: We introduce a behavioral theory of innovation in later generation family firms where innovation depends not only on the transfer of legal ownership but at least as much on the transmission of psychological ownership to the successors. We find that in third and later generation family firms with high levels of psychological ownership, levels of innovative output equal that of former generation family firms. Thus, and in line with our main hypotheses, we conclude that psychological ownership is crucial for understanding why some later generation family firms are still highly innovative whereas others are not.

Second, our behavioral theory of innovation in family firms explains how the interplay of legal ownership (property rights) and psychological ownership influences family firm behavior and outcomes such as innovation (Dawkins, Tian, Newman, & Martin, 2017). Psychological ownership (i.e., the perception of knowing and controlling the firm and investing one’s self in it (Pierce, Kostova, & Dirks, 2001)) stimulates the constant search for new ways to better organize the firm, serve its customers, and educate employees. The interplay of legal and psychological ownership becomes the “glue” in later generation family firms, ensuring that past achievements do not lead to path dependency (Sydow, Schreyögg, & Koch, 2009) but inspire future innovative

behavior (Jaskiewicz et al., 2015).

After laying ground in the interplay of ownership and innovation, we develop our hypotheses, which we subsequently test with a sample of 942 small and medium sized family firms held in different generations and drawn from the population of German SMEs. We find that innovation in later generation family firms depends upon the interplay of legal and psychological ownership, the first giving the right to act, the latter the motivation to do so. We conclude our study with a discussion and outlook.

2. Ownership and innovation in family firms

Ownership structure influences innovation outcomes. Lone founder firms, in particular, are considered more innovative than their anonymously owned peers and – even more so – than true family firms (Block, 2012; Werner et al., 2018). Innovation in the sense of bringing new products to market or introducing new processes is risky. Although family firms, especially small and medium-sized ones with an owner-manager leading the firm, make decisions faster (Carney, 2005), they are also more risk-averse than non-family firms (Chrisman & Patel, 2012).

2.1. Multi-faceted ownership of family firms

Before focusing on the relationship between ownership and innovation, the term ‘family firm’ has to be defined which has been an ongoing struggle for family business researchers (Astrachan, Klein, & Smyrnios, 2002). While the realm of economics and strategy refers to legal ownership as the main distinguishing factor (Anderson & Reeb, 2003; Burkart, Panunzu, & Shleifer, 2003; La Porta, Lopez-De-Silanes, & Shleifer, 1999), the family business literature also considers ‘soft’ factors, such as family business behavior, engagement in the firm, and shared values between the family and the business (e.g., Chua, Chrisman, & Sharma, 1999; Jaskiewicz et al., 2015; Kammerlander, Burger, Fust, & Fueglistaller, 2015; König, Kammerlander, & Enders, 2013). The question posed by the different approaches to define ‘family firm’ is whether influence on the firm results from legal ownership rights or whether individuals and groups influence the firm’s strategic behavior through shared values, organizational culture, and individual role models (Rantanen & Jussila, 2011).

Influence stemming from legal ownership rights is contingent on institutional settings (e.g., Fiss & Zajac, 2004; Zahra, 1996). In market-oriented economies, such as the Anglo-American economies, relatively low levels (> 5–10%) of ownership rights constitute major influence on the firm (Anderson & Reeb, 2003); in control-oriented economies, such as the EU economies, relevant influence requires a much higher ownership stake (> 20% for stock quoted firms, > 50% for privately held firms (European Commission, 2009)). In this paper, we apply the EU definition where a private firm is called a family firm when the family controls at least 50% of the legal ownership rights and at least one family member is on the board of the company (European Commission, 2009).

However, to draw a more complete picture of ownership influence on strategic behavior of firms, we suggest incorporating both the legal and psychological aspects of ownership. While legal ownership establishes the right to exert influence, psychological ownership explains the motivation to do so. Psychological ownership, defined as “the state of mind in which an individual feels as though the target of ownership or a piece of it is “theirs” (Pierce et al., 2001: 299), is expressed by emotional phrases, such as “my job,” “my organization,” or “this is MINE” (Pierce et al., 2001; Vandewalle, Van Dyne, & Kostova, 1995). Whether or not a legal owner of a family firm feels that the family’s firm is truly hers/his, alters her/his identification with the firm and most likely the engagement for the firm. Because innovative output is rooted in constantly looking for better solutions, psychological ownership can possibly explain differences in innovation.

Following such reasoning, three fundamental human motives can be satisfied through psychological ownership: (a) the need for efficacy and effectance, (b) the need for self-identity, and (c) the need to have a place. Individuals want to experience the ability to produce an effect, in other words, to be efficacious (Pierce et al., 2001). This human motive can be satisfied by finding better solutions for questions related to one's business. Furthermore, a family's business with which one identifies serves as an extended self and helps to self-identify. Last, not least, a family firm can be a home. Thus, psychological ownership of the family firm satisfies three basic human needs. Moreover, three routes can lead to psychological ownership in the business context: a) controlling the object of possession, b) gaining intimacy of knowledge, and c) investing oneself into the object (Pierce et al., 2001). These routes include a high degree of psychological attachment to the target; consequently, the object (the family firm) increasingly becomes a part of the extended self. As a result, individuals start to protect their firm, take care of it, and constantly seek more information about it (Pierce et al., 2001). Moreover, the internal drive to protect what is psychologically owned causes individuals to change their behavior (Avey, Avolio, Crossley, & Luthans, 2009; Hernandez, 2012).

The concept of psychological ownership has attracted attention as an explanation of different phenomena in family firms. Examples of research on psychological ownership are addressing the relationship between family business CEOs and their leadership styles and psychological ownership among non-family employees (Bernhard & O'Driscoll, 2011; Henssen, Voordeckers, Lambrechts, & Koiranen, 2014; Ramos, Man, Mustafa, & Ng, 2014; Sieger, Bernhard, & Frey, 2011; Sieger, Zellweger, & Aquino, 2013). Bernhard and O'Driscoll (2011) for example, demonstrate that both transformational and transactional leadership styles in small family-owned businesses have a significant positive effect on feelings of psychological ownership for the organization and the job among non-family employees while a laissez-faire leadership style has a negative influence. Whereas Henssen et al. (2014) show that a CEO with a high level of autonomy more likely behaves as a steward, Sieger et al. (2013) focus on agency theory and claim that psychological ownership can align the interests of agents and principals. Pittino et al. (2018) show in their study that psychological ownership can be a primary determinant of entrepreneurial orientation and suggest that the relationship between psychological ownership and entrepreneurial orientation is mediated by knowledge sharing. In sum, however, research integrating the construct of psychological ownership into the family business realm is still in its infancy and, as discussed earlier, up to date there is no research focusing on the role of psychological ownership on innovation in (later generational) family firms.

2.2. Innovation

Because innovation is one of the main drivers of business growth (Ahlstrom, 2010; Baumol, 2004), longevity of a business depends on successful innovation (Ahlstrom, 2010). Adjusting the firm to environmental changes, whether retroactively or proactively, is inevitable for survival. In his meta-analysis of the innovation literature, Damanpour (1991: 556) therefore defines innovation as "...a means of changing an organization, whether as a response to changes in its internal or external environment or as a preemptive action taken to influence an environment". Nearly twenty years later, Crossan and Apaydin (2010) systematically reviewed the literature and warn against equating change and innovation. In order to distinguish mere change from real innovation, they introduced the term "value-added novelty" (Crossan & Apaydin, 2010: 1155) to the academic discussion. Accordingly, and for the sake of simplicity, we define innovation as new products that have been brought to market and/or new processes that have been implemented in the business in order to reduce costs or enhance product quality (Crossan & Apaydin, 2010; Klein & Knight, 2005; Schumpeter, 1942).

3. Hypotheses development

3.1. Decreasing innovation in later generation family firms

In the following section, we attempt to explain why innovation output in some later generation family firms is high while it is low in others. We start our discussion by referring again to the main result of a meta-analysis conducted recently by Duran et al. (2016). This study shows that family firms, on average, invest less in innovation (Chrisman & Patel, 2012) but have a better conversion rate than non-family firms (Duran et al., 2016). The key idea underlying this line of research is that family firms behave differently when it comes to innovation (Matz Carnes & Ireland, 2013): First, because the family invests their own money in the firm, decisions whether to invest in R&D are taken with greater care. In other words, the family business owners tend to act "parsimonious". Second, based on the unity of ownership and leadership as the main defining characteristic of family firms, family firms have fewer constraints in decision-making. Put differently, allowing for "personalism" can lead to faster decision-making processes and less conflict in management because the owner managers are usually influenced by similar preferences. Finally, because of the greater freedom in decision-making, owner-managers can employ "particularistic" interests of the family and do not have to follow managerial governance prescriptions (Carney, 2005). Thus, in sum, the impact of family's control rights over a firm's assets can generate three dominant propensities, which, consequently, also influence the firm's innovation activities: i.e., parsimony, personalism, and particularism (Carney, 2005: 249).

Adapting these points to a multiple generational approach, the key idea is that founders of family firms are often outstanding innovators. Many family firms led by subsequent generations, however, seem to lose this ability (Koberg, Uhlenbruck, & Sarason, 1996; Kraiczy, Hack, & Kellermanns, 2015; Rosenbusch, Brinckmann, & Bausch, 2011). Following this line of thought, it can be argued that if a sense of entitlement rather than of parsimony develops during the upbringing of the successor, the personalistic and particularistic tendencies can lead to nepotism, lack of professionalism and even corruption (Jaskiewicz, Uhlenbruck, Balkin, & Reay, 2013). Consequently, instead of constantly seeking new opportunities, the tendency to optimize existing strategies can dominate in many older family firms. As a result, the subsequent loss of innovativeness may endanger the firm's longevity. Moreover, other factors such as harmful family conflicts (Eddleston & Kellermanns, 2007), insufficient governance systems (Stewart & Hitt, 2012), and lack of competence and/or legitimacy of the successor (Carney, van Essen, Gedajlovic, & Heugens, 2015; Stewart & Hitt, 2012) often add to the detrimental effect of loss of innovativeness.

Accordingly, the saying "from shirt sleeves to shirt sleeves in three generations" describes a world-wide phenomenon documented in various proverbs in different languages. Looking more deeply into this phenomenon, we uncover several differences between the generations of family firms. These sayings are consistent with theory and evidence (Beck, Janssens, Debruyne, & Lommelen, 2011; Kraiczy et al., 2015; Pittino & Visintin, 2009). While the founding of a family firm is a means to an end that is often the only opportunity for the family to gain financial independence and a higher standard of living, it also involves a high level of risk and the liability of newness (Aldrich & Ruf, 2006; Wiklund, Baker, & Shepherd, 2010). Stewart and Hitt (2012: 70) propose that "...the superior performance for public family firms is because of entrepreneurial effects and not because of family effects." This distinction does not take into consideration the high overlap of the family and the business in the first generation, and the equally high dependence of both upon the founder. Thus, whether business or family, during the first generation both depend upon the founder and her/his innovativeness.

The second generation is frequently considered as being "under the founder's shadow" (Davis & Harveston, 1999). The family firm is still

the main means to an end for the family's financial security while the immediate risk of failure is less likely for second generation owner-managers (Wiklund et al., 2010). As the firm becomes more established, returns are more predictable than in the first generation, and professionalization becomes an issue. The second generation owner-manager grew up during a period of high network overlap between the family and the business; the mimetic pressures for the two 'organizations' to become more alike (Arregle, Hitt, Sirmon, & Very, 2007; Reay, 2009) are imprinted in her/his values and attitudes. The parsimony of the founder generation often directly impacted on the second generation's attitude toward the relation of family and firm and related spending. Some of the resulting behaviors might raise some opposition from newly joining in-laws who have not experienced the frugal early years of the family business. During the second generation, outsiders tend to join the family (e.g., in-laws from a non-family business background, employees who have not experienced the first volatile years) and enhance the family firm's top management team (TMT) profile (Patel & Cooper, 2014). Thus, while the owner-manager, as a family member, is still deeply embedded in family business system, her/his partner usually is not nor are all of the TMT members or key employees.

A dramatic shift often occurs with succession from the second to the third generation. Family firms that have survived until the third generation are successful to the extent that allows survival; i.e., they have shown sufficient innovative activity over the course of the first two generations to remain active in the market. While family owners of public traded family firms in countries with well-organized and sufficiently liquid capital markets tend to gradually reduce their ownership share, family owners of privately held family firms in control oriented markets (e.g., continental Europe) tend to maintain more important stakes in their businesses (Franks, Mayer, Volpin, & Wagner, 2012). At the same time, these owners "could become hesitant to pursue risks that may jeopardize their wealth endowment" (Patel & Cooper, 2014: 1626); they become increasingly risk averse with amassed overall wealth which, in consequence, drives them away from innovation (Chrisman & Patel, 2012; Zellweger, Kellermanns, Chrisman, & Chua, 2012). Not all changes are innovations, but innovation always includes change. As change is perceived as risky, a more risk adverse third generation consequently becomes less innovative.

Although the firm has become one mean (among others) for the family's well-being, traditionally financial assets are not well diversified – especially in business-owning families with small and medium-sized family firms (e.g. Carney, 2005). While family members may work outside the business and become independent, the business may require higher qualifications for leading positions and has access to a highly qualified work force from the labor market (Stewart & Hitt, 2012). Thus, the interdependence of business and family is much lower in the third generation than in the first and second generation. Consequently, the interaction between the third generation and the firm is avoidable to a higher extent and with increasing avoidance of daily interaction input for innovation becomes less likely. Financial resources are available from the market; the family is no longer the sole source of financial resources and legitimacy. Finance comes from operations as well as partly from debt financing (Carney et al., 2015). While interaction within the close family as well as between family and firm is frequent in the first two generations, the increasing number of family members, often highly dispersed, and the decreasing level of closeness among them results in less exchange between family and firm. Less exchange, though, results in fewer suggestions for improvement and innovation. The third generation owner-manager is more distanced from the firm, does not see the firm as the only available opportunity, and becomes involved with other activities, not all of them related to the firm. In order to duplicate existing research as a starting point for our analysis, we therefore conclude with the following hypothesis:

Hypothesis 1. *With a growing number of generations, innovation output in family firms continuously decreases.*

3.2. The moderating role of psychological ownership on innovation in later generation family firms

Innovative processes need individual drivers (Felin & Hesterly, 2007). Research on family businesses too often omits the human element. This is especially astonishing as the individual in the family business is part of different systems, e.g. the ownership system based on shares, the family system based on kinship, and the management system based on leadership functions (Pieper & Klein, 2007). In addition, Crossan and Apaydin (2010) conclude that research on innovation focusing on the individual level is still relatively scarce. Since both search and decision-making activities contribute to innovation (Greve, 2003), innovation rates are highly variable over time. Viewed positively, family firms represent an ideal population to focus on the role of the owner-manager – especially as individuals in small and medium sized family firms who hold important decision making power (Carney, 2005; Fama & Jensen, 1983; Kraiczy et al., 2015). Because of their high levels of control, Duran et al. (2016), for example, argue that family business owner-managers are especially well suited to monitor middle managers in order to implement innovation projects. The question remains, though, why some owner-managers engage more in constantly searching for new opportunities and better solutions while others refrain from searching and, consequently, from innovating.

Individuals who display specific traits such as generalized self-efficacy, proactive personality, innovativeness, and achievement motives show more entrepreneurial behavior than those who do not (Rauch & Frese, 2007). In particular, openness plays a pivotal role in the innovation process (Zhao & Seibert, 2006) as it triggers the individual to challenge the status quo and to experiment with new and different ideas (Roccas, Sagiv, Schwartz, & Knafo, 2002). Drawing on the CEO's regulatory focus, Kammerlander, Burger et al. (2015) for example find that there is a strong positive effect of a CEO's promotion focus (e.g. an individual's orientation toward potential gains and advancements) on both exploration and exploitation and a negative effect of a CEO's prevention focus (e.g. an individual's desire to avoid failure and loss) on exploration, but not on exploitation. Thus, the perception of the CEO of openness to new ideas, while having control over middle managers at the same time, seems to have an important influence on entrepreneurial output.

Dawkins and colleagues in their literature review of psychological ownership point to a range of attitudes and behaviors (Dawkins et al., 2017). Avey et al. (2009) suggest that two independent forms of psychological ownership exist, promotive and preventative. The promotive form relates to accomplishments and aspirations, while the preventative form is concerned with duties and obligations (Dawkins et al., 2017; Higgins, 1998). Avey, Wernsing, and Palanski (2012) describe the promotive psychological ownership individuals as "individuals feeling more efficacious about working with the target, feeling more accountable for what happens with respect to the target, experiencing a greater sense of belongingness to the target, and feeling a sense of personal identification with the target of ownership" (Avey et al., 2012: 24).

The general feeling of being able/unable to control a target starts to arise in the early childhood. As a child develops motor skills and begins to explore its environment, she/he learns which objects can be controlled and which cannot (Brown et al., 2014). For business owning family members, confronted with the business from early age on, the opportunity to exert control over family firm becomes relevant much later. However, the general attitude toward self-efficacy, which often fosters entrepreneurship (Rauch & Frese, 2007), is developed in early childhood. As children, potential successors could but do not necessarily have to be imprinted with an entrepreneurial legacy from their business family, which triggers their entrepreneurial spirit (Jaskiewicz et al., 2015). In highly entrepreneurial families and family firms, the potential successor observes her/his parents' and the TMT's entrepreneurial actions, which triggers social learning (Bandura, 1986;

Davis & Harveston, 2001). The child might undergo a strategic education furthering the breadth of search for entrepreneurial opportunities in later stages (Classen, van Gils, Bammens, & Carree, 2012) and the child might work together with the incumbent which allows for experimenting (Jaskiewicz et al., 2015). Consequently, the child in her/his role as the potential successor will develop ownership feelings for the firm, gain in-depth knowledge, and start to invest her-/himself in the firm.

Viewed negatively, potential successors who are not exposed to the entrepreneurial spirit of the first and second generation in a convincing way and who do not experience feelings of control, whether because of general lack of self-efficacy or because of the behavior of the first or second generation, may not develop feelings of psychological ownership. The first generation may not allow the second to assume control (Davis & Harveston, 2001), even if the first generation is no longer active in the business; the seniors may interfere with important (and sometimes even unimportant) decisions made by the second generation. The second generation experiences this situation as “disablement,” being torn between loyalty toward the parents and the firm on the one hand and the deeply rooted desire to be independent and responsible on the other (e.g. Kaye, 1996). Expressing these ambiguous feelings to family members may drive the third generation even more away from the family firm (e.g., Bandura, 1986). Thus, the control that parents perceive to have over their own decisions within the family firm influences the next generation’s decision of whether or not to join the firm. Consequently, due to lack of interest, ability, and innovativeness, the next generation is less likely to gain in-depth knowledge and invest themselves in the firm; they become distanced minority investors or, in case of high percentage of ownership rights, financial investors in their family’s firm.

Viewed positively, the above described identification with the business and its customers leads owner-managers to constantly search for new opportunities and to further exploit already existing ones – irrespective of a change in generation (Zahra, 2012). The promotive characteristic of psychological ownership, especially the individuals feeling of being more efficacious about working with the target, feeling more accountable for what happens with respect to the target (Avey et al., 2012) is fostered through active integration of potential successors. Moreover, the promotive focus of psychological ownership is closely connected with fulfilling hopes and aspirations (Avey et al., 2009). This can result, for instance, in knowledge sharing of this benefit to the family firm, because individuals perceive family firm enhancement as personally fulfilling (Dawkins et al., 2017). Likewise, the feeling of being more efficacious and feeling more accountable can occur through active indicated changes. By investing extra time and effort into the firm, family business successors will most likely constantly search for improvements, which, combined with the personalism and particularism prevalent in many family firms (Carney, 2005), will foster innovative outcomes. Changes in the company, which for example lead to a higher performance, can foster the feeling of having control over the target and feeling more accountable for what happens with respect to the target (Avey et al., 2012). Succeeding family business successors/managers in later generation family firms with well-developed ownership feelings for the firm can align potential opportunities with these expectations leading to higher innovative outcomes (Kellermanns & Eddleston, 2006). Following this argumentation, we suggest, that psychological ownership of both generations, the former and the succeeding generation, is an important factor for innovative behavior.

Organization-based psychological ownership can be a strong predictor of key employee attitudes (Dawkins et al., 2017). These findings are transferable to family business owners. The owner-manager with high level of psychological ownership in later generation family firms will have in-depth knowledge, will maintain control, and will have invested her/himself into the company (Pierce et al., 2001; Pittino et al., 2018). The identification of family business managers/successors

passed with the business stemming from high levels of psychological ownership is connected with attitudes and behaviors. Especially the will to work with the target and the feeling of being more accountable for the target will foster innovative behavior. This innovative behavior resulting from psychological ownership can be the antecedent for innovation output in later generation family firms. Motivating, enabling, and supporting innovative behavior is directly related to the level of knowing, controlling, and investing one’s self in the firm. We therefore conclude with the following moderating hypothesis:

Hypothesis 2. *Psychological ownership positively moderates (i.e. mitigates) the decreasing effect of later generations on family firm innovation output.*

4. Method and sample

4.1. Sample

We derived our data from a random sample of German small and medium-sized privately held firms. We deliberately chose this sample for two reasons. First, most research on innovation is conducted with publicly listed large firms (e.g. Block, 2012; Czarnitzki & Kraft, 2009), leaving the question open of whether results apply as well to smaller privately held firms. Second, the German Mittelstand consists predominantly of family businesses and is widely known for its successful, innovative firms many of which are world leaders in their respective market niches (Carney, Gedajlovic, & Strike, 2014 ; De Massis et al., 2018; Simon, 1992). Therefore, we believe that at least some of the German Mittelstand firms outperform in terms of innovation – an important source of competitive advantage (De Massis et al., 2018; Greve, 2009) – which leaves us with a sample with a high level of variance.

The original data were gathered as part of a larger research project by Creditreform e.V. Twice every year, Creditreform, Germany’s largest credit rating agency, founded at the end of the 19th century to protect its members from unreliable debtors, conducts a survey generating data from telephone interviews with the company’s CEO as key informant. We consider a company’s CEO to be a reliable source of knowledge about the different activities of the organization, especially in small and medium-sized companies (Kellermanns & Eddleston, 2006). As discussed in detail below, although such resulting self-reported measures can be a potential limitation when considering our results, we are quite confident that this approach is appropriate. Previous research, for example, has yielded broad support for the reliability and validity of self-reported measures (Eddleston, Kellermanns, & Zellweger, 2012; Zahra, 2005). While Creditreform is especially interested in financial data of the respondents to satisfy their customers’ and members’ requests (www.creditreform.de), they allow selected scholars to submit additional questions for specific research projects.

For our research project, we used the original representative sample of 4175 independent companies (e.g., subsidiaries of MNC were removed from the data) which was randomly drawn by Creditreform in the second quarter of 2011 from their data bank of 165.000 companies, targeting companies with less than 50 million € turnover and less than 500 employees. A total of 1691 questionnaires usable for our analysis were completed. The characteristics (e.g., distribution of firms across sector and size classes) of the sample of these 1691 firms and the total sample of the 4145 companies were nearly identical. Thus, non-response bias should not be a significant problem.

In a next step, we excluded non-family firms from the sample due to our focus on family firms. By doing so, a variety of indicators can be used to measure family involvement in firms in general (Astrachan et al., 2002; Miller, Le Breton-Miller, Lester, Cannella, 2007; Villalonga & Amit, 2006). To identify a company as a family firm in our sample, we applied the definition of the EU commission which considers a firm as a family firm if the family owns at least 50% of shares and at least one family member is part of the TMT (European Commission, 2009; see also Chua et al., 1999; Eddleston & Kellermanns, 2007; Peng &

Table 1
Description of Variables.

Variable Name	Variable Description	Mean	Std.dev
	<u>Dependent Variables</u>		
Innovation Output	Has the family firm realize at least one product innovation or at least one process innovation in the past three years [No = 0; Yes = 1]	0.544	0.498
	<u>Family Firm Measure</u>		
Generation of Family Firm	In what Generation is your business in family ownership? [Else = 0; First Generation (Founding Generation) = 1]	0.510	0.500
	[Else = 0; Second Generation = 1]	0.255	0.436
	[Else = 0; Third Generation and more = 1]	0.236	0.425
	<u>Psychological Ownership</u>		
Psychological Ownership (six Items) ^a	Constructed mean scale (Cronbach's alpha = 0.75) [min = 1, max = 5]	4.22	0.778
	<u>Controls</u>		
Firm's Age	Age of the company? [10 years and less = 0; Older than 10 Years = 1]	0.781	0.414
Firm's Size	How many employees does your company have? [Else = 0; 20 Employees and Less = 1]	0.612	0.488
	[Else = 0; 21–100 Employees = 1]	0.327	0.469
	[Else = 0; more than 100 Employees = 1]	0.062	0.241
Industrial Sector	Which of the following sectors does your company operate in? [Else = 0; 1 = Manufacturing]	0.306	0.476
	[Else = 0; 1 = Construction]	0.153	0.360
	[Else = 0; 1 = Trade]	0.233	0.423
	[Else = 0; 1 = Service]	0.269	0.444
Region	The location of your company is in the following regions of Germany [Else = 0; 1 = South Germany]	0.273	0.446
	[Else = 0; 1 = North Germany]	0.333	0.472
	[Else = 0; 1 = West Germany]	0.339	0.474
	[Else = 0; 1 = East Germany]	0.055	0.229
Firms' Investments	Has your company invested continuously in the last years in expansion investments?: [No = 0; Yes = 1]	0.270	0.444

^a The respondents were asked to answer the following questions by stating whether they strongly disagree, disagree, are indifferent, agree or strongly agree: "I sense that this organization is OUR company". "This is OUR company". "It is hard for me to think about this organization as MINE (reverse coded)". "I feel a very high degree of personal ownership for this organization". "I sense that this is MY company". "This is MY organization".

Jiang, 2010; Westhead & Cowling, 1998; Zellweger et al., 2012). By applying this definition we were able to identify 749 non-family firms, which were subsequently removed from the data, resulting in a subsample of 942 family firms. Of these, 51% are in the hands of the first generation (founder generation), 25% are in the second generation, and 24% are in the third generation and beyond (Table 1). In total, around two thirds of the firms in our dataset were identified as family firms, which is consistent with the extant family business literature (e.g., Chrisman, Chua, & Litz, 2004; Klein, 2000; Westhead & Cowling, 1998). Furthermore, in the subsample of family firms the family (member) CEO answered the survey.

4.2. Measures

4.2.1. Innovation

As our dependent variable, we measured innovation in terms of innovation output (self-reported). Specifically, the family (member) CEO was asked if her/his company had placed a completely new or significantly improved product or service (innovative product or service) in the market within the last three years. In a similar manner, a set of questions was aimed at process innovation, defined as the implementation of a new or significantly improved production process

(process innovation) to the market. Please note that purely organizational innovations were explicitly excluded from the questionnaires. For our regression analysis, we merged this information in a single 0/1 (dummy) variable (coded as '1' if the companies have realized at least one product or process innovation in the past three years, and '0' if this was not the case). On average, 54.4% of the companies in our data realized at least one product or process innovation in the past three years.

We are aware of the difficulty of clearly defining "innovativeness" of (family) firms. That is, in general, a variety of indicators can be used to measure a (family) firm's innovative activity (see, e.g., Acs & Audretsch, 1990; De Massis, Frattini, & Lichtenthaler, 2013). These are typically R & D expenditure, number of patents held, average R&D-intensity on a firm level or in an industry, or various subjective measures of innovation. With regard to self-reported measures of innovation, a considerable body of empirical evidence however supports the notion that measuring innovation in terms of self-reported numbers of new products or processes output is quite common – also in family business literature (e.g. De Massis et al., 2013; Mihalache, Jansen, van den Bosch, & Volberda, 2012; Pérez-Luño, Wiklund, & Valle Cabrera, 2011). Moreover, in their review of 23 empirical studies on innovative family firms, De Massis et al. (2013) conclude that family business studies operationalize the firm's "innovativeness" by either focusing either on input factors (e.g., R&D expenditures), innovation activities (e.g., leadership in new product development projects) or on innovation output measures (e.g., number of new products). With regard to the studies using innovation output as a proxy, most of the studies draw on the above mentioned self-reported measures; e.g., by asking CEOs/owners how many ideas for new products and services were discussed and actually introduced during the previous year (Gudmundson, Tower, & Hartman, 2003), by asking if the family firms had used a wide range of new products or services (Westhead, 1997), or by asking if the family firm had shown a strong commitment to research and development, technological leadership and innovation (Kellermanns, Eddleston, Sarathi, & Murphy, 2012). One family business study that comes close to how we measure "innovativeness", for example, is that of Classen, Carre, van Gils, and Peters (2014). The authors operationalized innovation output by sales per employee in 2006 from products/services newly introduced or significantly improved between 2004 and 2006. Moreover, Backes-Gellner and Werner (2007) showed that a variety of different innovation measures (e.g. number of patents, R&D expenditures at industry level, venture capital backing, and collaboration with external research facilities) are all positively correlated and, thus, can all be used as reasonably reliable innovation indicators.

4.2.2. Psychological ownership

To comprehensively capture the varied aspects of this construct, we draw on Pierce, O'Driscoll, and Coghlan (2004), who developed, tested, and validated a measure to capture psychological ownership. As psychological ownership was developed primarily to capture employees' ownership feelings, we apply the adapted scale of Bernhard and O'Driscoll (2011), who dropped one item from the original scale ("Most of the people that work for this organization feel as though they own the company") because it did not reflect ownership feelings of business owners. In sum, the respondents were asked to answer the following questions by stating whether they strongly disagree, disagree, are indifferent, agree or strongly agree: "I sense that this organization is OUR company". "This is OUR company". "It is hard for me to think about this organization as MINE (reverse coded)". "I feel a very high degree of personal ownership for this organization". "I sense that this is MY company". "This is MY organization". Following Bernhard and O'Driscoll (2011), we applied the validated translation to German by Martins and colleagues, which was tested by translation, re-translation, and comparison (Martins, Pundt, Horsman, & Nerdinger, 2008). The respondents' scores on the six items were summed up and the average score was used in the analysis. Cronbach's alpha coefficient was 0.75 for

psychological ownership, which exceeded the recommended minimum of 0.70 and indicated very good reliability (Hair, Anderson, Tatham, & Black, 2010). The average psychological ownership value was 4.22 with a standard deviation of 0.78.

4.2.3. Generational stage

To analyze the generational stage of the family firm, we used the three-item quasi-continuous scale variable reflecting the number of successfully accomplished successions of the firms in the past within the family (the first generation being the founder generation). Originally, this semi-continuous variable had three different values: “1” for first-generation and founder, “2” for second generation and “3” for third and later generation. As we expected nonlinearity (i.e. different effects of each generational stage on innovation output), we generated three 0/1 binary (dummy) variables from the original variable and used dummy specification in our multivariate analysis to analyze the expected nonlinear effects of different generational stages on innovation output. In doing so, we generated three 0/1-variables (one for each generation stage) from the original three-item scale variable and selected the 0/1-variable “1” = first-generation and founder firms, “0” = otherwise as our reference category for the multivariate analysis.

4.2.4. Control variables

In addition to these measures and in line with prior research on family firm innovation (e.g., Choi, Lee, & Williams, 2011; Duran et al., 2016; Kammerlander, Burger et al., 2015; Zahra, 1996), we included a set control variables that might simultaneously affect psychological ownership, generational stage, and our dependent variables. *Firm size* and *Firm Age* were included as prior studies showed that both variables influence innovation output in family firms differently (e.g., Camisón-Zornoza, Lapiedra-Alcamí, Segarra-Ciprés, & Boronat-Navarro, 2004; Werner et al., 2018). Both, *regional influences* (northern, western, southern, and eastern Germany) and *industry sectors* (construction, trade, service industry, and manufacturing) can affect innovation output as for example clusters of more innovative industries such as IT-services or biochemistry can be found in specific regions, e.g. in North-Rhine-Westphalia or Bavaria rather than in Mecklenbourg (i.e. Duran et al., 2016). Last but not least, we controlled for innovation input activities by including a variable catching prior investing activities of the firm. An overview of the variables with their means, standard deviations, and correlations appears in Table 2. Because the correlation between the explanatory variables is of only moderate size, multi-collinearity should not be an issue.

Table 2
Pair-Wise Correlations among Key Variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Innovation Output														
2. Generation of Fam. Firm	-0.085*													
3. Psychological Ownership	0.063	0.019												
4. Firm's Age (> 10 years)	0.067*	0.375*	0.087*											
5. Firm's Size (> 20 employees)	-0.044	-0.253*	-0.029	0.211*										
6. Manufacturing	0.264*	0.074*	0.085*	0.137*	0.066*									
7. Construction	-0.280*	0.085*	0.017	0.018	0.055									
8. Trade	0.0150	-0.058	-0.022	0.024	-0.165*									
9. Service	0.070*	-0.093*	-0.083*	-0.184*	0.043									
10. South Germany	0.169*	-0.133*	0.015	0.019	0.069*	0.030	-0.022	-0.016	-0.001					
11. North Germany	-0.008	0.118*	0.009	0.086*	0.028	0.025	0.000	-0.080*	0.049					
12. West Germany	-0.074*	-0.005	0.016	-0.126*	-0.092*	-0.016	-0.055	0.063	0.002					
13. East Germany	-0.161*	0.024	-0.082*	0.049	-0.002	-0.078*	0.116*	-0.065*	-0.105*					
14. Firm's Investments	0.149*	-0.007	0.121*	-0.217*	0.016	0.076*	-0.085	-0.068*	0.053	-0.012	0.047	0.035	0.147*	

Note: Industry dummies and regional dummies are designed to be exclusive so correlations between them are not reported.

N = 942.

*p < 0.05.

4.3. Analyses

Hypotheses were tested using hierarchical (nested) Logit regression models. We regressed innovation output on the potential innovation drivers discussed above with a specific focus on psychological ownership in different generational stages. By doing so, we first calculated a model only with the control variables (Model 1). Then we calculated a model including the generational stage variable dummies (the first generation (founder) family firms being the reference group), the psychological ownership measure (a generated variable representing the mean scores for the six items described above – ranging from “1” (very low) to “5” (very high)), and the control variables discussed above (Model 2). This model shows how different generational stages of family firms affect innovation output when not taking interactions into account. We then included interaction terms reflecting the effect of different degrees of CEO psychological ownership in different generational stages on innovation output (Model 3). Please note, when illustrating our results (Fig. 1), we display the predictive probabilities; i.e. the firms' likelihood of realizing product or process innovation output compared the situation in which the firms have no innovation output in the period covered while fixing all other covariates at their mean values. Moreover, please note that all models have standard errors with correction for heteroskedasticity.

5. Results

Estimation results are presented in Table 3. Hypotheses 1 is strongly supported: As displayed in Model 2, we find that third and more generation family firms are less innovative than our reference group of first generation family firms ($\beta_{3.gen} + = -0.703$, $p < 0.001$). However, as displayed in Model 3, we also find a positive significant interaction effect between psychological ownership and later generational firms ($\beta_{PO*3.gen} + = 0.869$, $p < 0.001$). That is, if later generation family firms CEOs are characterized by high degrees of psychological ownership, the negative generational effect on innovation output is counterbalanced by psychological ownership. Thus, hypothesis 2 can also be verified; i.e., we find strong empirical evidence that higher levels of psychological ownership in later generation family firms mitigate the otherwise negative generational effect on innovation output. To give an impression of the goodness of fit (GOF) for our models we report the following GOF measures (see Table 3): McFadden's R2, log likelihood, LRChi(2) and Δ LRChi(2) which are, fortunately, all on satisfactory levels. Moreover, we have also estimated a Hosmer-Lemeshow (H-L)-GOF-Test which plays an important role in contemporary logistic fit analysis (see e.g. Hilbe, 2009). As a result for Model 3, the test statistics

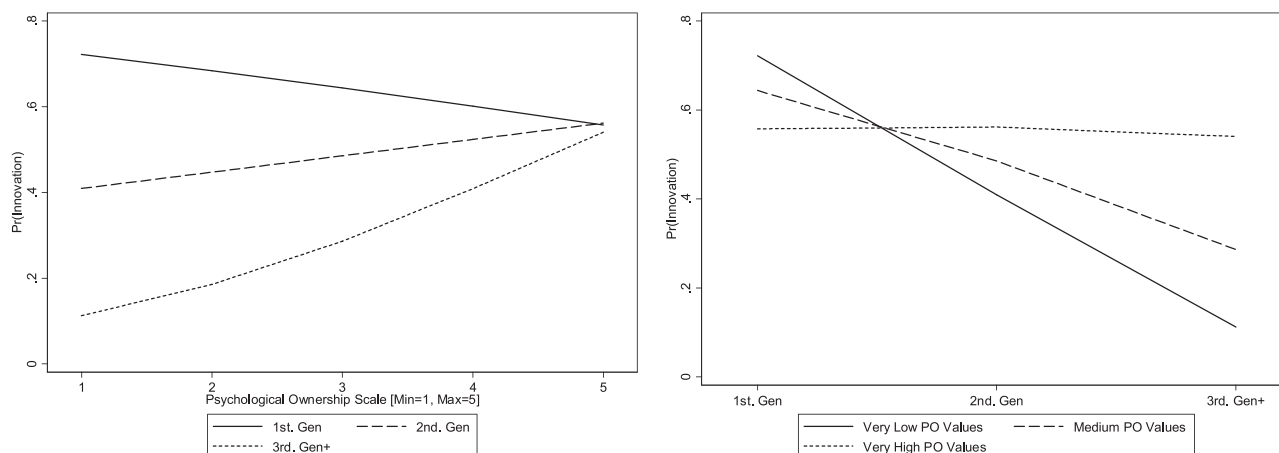


Fig. 1. Moderation Effects of Psychological Ownership in Different Generational Stages on Innovation Output.

Table 3
Estimation Results – Innovation Output of Family Firms and Psychological Ownership.

	Model 1	Model 2	Model 3
<i>Controls:</i>			
Firm's Age (older than 10 years) ^a	0.490** (0.201)	0.490** (0.201)	0.562*** (0.202)
Firm's Size (21–100 employees) ^b	0.211 (0.167)	0.211 (0.167)	0.239 (0.172)
Firm's Size (> 100 employees) ^b	0.466 (0.297)	0.466 (0.297)	0.572+ (0.318)
Firm's Investment	0.683*** (0.173)	0.683*** (0.173)	0.670*** (0.177)
<i>Main Explanatory Variables:</i>			
Psychological Ownership (PO)		0.061 (0.097)	-0.221 (0.142)
Second Gen. Family Firms ³		-0.261 (0.193)	-2.022** (1.005)
Third Gen. + Family Firms ^c		-0.703*** (0.202)	-4.428*** (0.967)
<i>Moderators:</i>			
PO * Second Gen. Family Firms			0.409+ (0.231)
PO * Third Gen. + Family Firms			0.869*** (0.219)
Number of Observations	942	942	942
Log Likelihood	-563.41	-557.19	-550.67
LR Chi2	171.92***	184.35***	197.40
ΔLR Chi2	-	12.43***	13.05***
Hosmer-Lemeshow Chi2	65.90***	22.08**	12.06
McFadden's R ²	0.134	0.142	0.152

Note: Regressions in all columns include indicator variables for industrial sector (construction, trade, service industry, and manufacturing) and regions (North-, West-, South-, and East Germany). Detailed results for all control variables are available upon request. + p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001. Unstandardized coefficients with robust standard errors in parentheses.

^a Age (up to 10 years).

^b Size (up to 20 employees).

^c First Generation (Founder) Family Firms.

indicates an excellent fit (H-L statistics: p = 0.149; a p-value greater than 0.05 is considered as a good fit).

To fully describe and give substantially meaningful interpretations on how the interaction term affects innovation output in the context of non-linear logistic regression results, we illustrate low, medium and high psychological ownership slopes for each generational stage (right panel in Fig. 1) as well as first, second and third and more generation slopes for different psychological ownership values (left panel of Fig. 1) and report the corresponding predictive probabilities (for details, see e.g. Long and Freese (2001)). As theoretically expected, we find that higher PO-scores increase the probability of innovation output for the later generation family firms. Within this context, we also find that this effect is stronger for

third and more generational firms than for second-generation family firms. Moreover, we find that these effects are substantially meaningful. For our third and more generation firms, for example, we can show that only 11.2 percent are innovative if the PO value is at its minimum value (i.e. very low). However, if the PO value is at its maximum value (i.e. very high), 54.1% of the third and more generation family firms are innovative. Focusing on our second-generation family firms, we find a more moderate positive effect (i.e., 41% are innovative on the minimum and 56.2 are innovative the maximum PO value). Please also note that the differences between early and later generational firms with regard to innovation decreases with increasing PO values. Specifically, while later generation firms with low PO value levels are significantly less innovative than first (founder) generational family firms, these significant differences disappear if later generation family firms have high PO value levels. Thus, in sum, we provide both statistically and substantially meaningful results that confirm our hypotheses.

We are aware that a variety of indicators can be used to measure innovation output. Accordingly, to test the robustness of our results, we have used another indicator – namely whether the family firms were engaged in R&D cooperation with other firms or institutions to in the last three years to realize their product or process innovations (Duran et al., 2016). The results also confirmed our hypotheses. In addition, further tests for robustness applying different family firm definitions (self-perception (e.g. Westhead & Cowling, 1998) and family ownership (Zellweger et al., 2012)) were executed and did not alter our main results. That is, all of these specifications reveal that if later generation firms are characterized by high degrees of psychological ownership, the negative generational effect on innovation is counterbalanced. Noting that the estimated probabilities in a nonlinear model strongly depend on the contributions of the other covariates (Mitchel & Chen, 2005; Long & Freese, 2001), we also estimated the model with different values of the covariates. These estimations also did not change the substantially meaningful interpretations of our main results.

The models used here have focused on the role of psychological ownership in later generational family firms to estimate the probability of an innovation output, ignoring the decision of the family CEO about whether to work in a later generational family firm prior to the decision to innovate. However, it may be arguable that such an approach might not be appropriate unless the two decisions are independent. Estimating a seemingly unrelated bivariate probit model in which the probability of innovation output is analyzed as a conditional probability of the CEOs prior decision to work in a later generational family firm, can take this problem into account (Baum, 2006; Cameron & Trivedi, 2009). Summarizing, we find that the potential correlation of both decisions (equations) is not significant (ROH), meaning that the estimates in Table 3 are not biased as we do not have to account for this selection problem.

Last, not least we checked for common method bias by performing a Harman's one-factor test (Podsakoff, MacKenzie, & Lee, 2003). The results of our unrotated factor analysis show eleven factors with eigenvalues of more than one, with a maximum variance explained of 13.78 percent. Thus, common method bias is not a significant issue because no single factor accounts for the majority of the variance that emerged.

6. Discussion

6.1. Innovation in family firms over generations

The aim of this study was to understand why some later generation family firms are still innovative whereas others are not. We theorized that, besides legal ownership, psychological ownership plays a pivotal role in solving this conundrum and formulated the following research question: How does psychological ownership influence innovation in later generation family firms? We found that innovation output depends on the interaction of legal and psychological ownership. When later generation CEOs have relatively high levels of psychological ownership, innovative output is significantly higher. Indeed, in family firms of the third and later generation, innovative output is at the same level as in founder firms if the CEO perceives the business to be hers or his (i.e., if the CEO has relatively high psychological ownership over the firm). CEOs with both, high levels of legal ownership and high levels of psychological ownership, are not only motivated to search for opportunities, they also have the power to take decisions and to take responsibility for the related risks (Carney, 2005; Duran et al., 2016; Greve, 2003).

Several conclusions can be drawn from our findings. First, ownership models of family firms need to be enlarged by a psychological dimension. Legal ownership of a firm does not explain innovation outcomes in a comprehensive way. Kraiczy et al. (2014) show that a positive relationship exists between innovation orientation of the top management team and new product portfolio performance. In their study, they indicate that the CEO's risk-taking propensity positively affects innovation, but this effect is higher in earlier generation family firms and in family firms in which the level of ownership of family members which are in the top management team is low. Our findings partly contradict and partly add to these findings. While we agree that earlier generation family firms on average are more innovative, we introduce the distinction of not only legal but also psychological ownership. We argue that considering only legal ownership is not enough. Psychological ownership, which motivates owners to use the power of legal ownership rights, is as important as legal ownership rights themselves. Hsu and Chang (2011) demonstrate that family ownership is significantly related to the use of behavioral strategic controls, which positively impacts innovation. This finding also could be explained by integrating the soft side of (psychological) ownership. We need to develop theory that explains better how legal and psychological ownership co-evolve, how they interact and how different combinations of the two influence (family) firm behavior.

In line with Westphal and Zajac (2013), we therefore suggest applying an enlarged ownership concept when it comes to corporate governance research in the family business field. Although families as a whole own, by definition, more than 50% of the (legal) ownership rights, individual family members in family firms with multiple family owners can own substantially less. Therefore, it is possible to find all four combinations of high/low legal ownership and high/low psychological ownership of family business owners. While a high/high combination as discussed in this paper comes with higher innovative output, the combination of high psychological ownership of a minority family shareholder would offer another interesting field of future research. In the worst of all cases, this could result in an 'activist family shareholder'. Overall, a multi-dimensional ownership model of family firms should lead to more fine-grained research results that take into

account the heterogeneity of family firms (Chua, Chrisman, Steier, & Rau, 2012). Furthermore, it would be interesting to explore how legal and psychological ownership develop and interact in non-family firms such as corporations. If high level of psychological ownership in corporations as well leads to higher innovation output, the question of how psychological ownership can be supported in non-family firms would be relevant.

The riddle of the third generation is documented by several proverbs from around the world and statistically confirmed (e.g. Beck et al., 2011; Kraiczy et al., 2015; Pittino & Visintin, 2009). One conclusion we can draw from our work is that the lack of innovation output in the third and later generation explains an important driver of the failing third generation. While legal ownership can be inherited, psychological ownership has to be passed on through upbringing and education. Without this dimension of ownership being passed on to the next generation, innovation output suffers and ultimately the company fails. About half of the older family firms in our data do show a dramatically low level of psychological ownership which results in a significantly low level of innovation output. This is an alarming result as the level of psychological ownership in the third and later generation drives innovation output and innovation output and, consequently, is an important driver for long-term firm success of these firms. This finding hints to the antecedents of psychological ownership. Besides individual upbringing and education as well as experience with and in the business, family cohesion (Pieper, 2007) might play a pivotal role. Family cohesion in business families is a multidimensional construct in which the interplay of the different dimensions enhances overall cohesion. Whether or not specific dimensions such as family and business emotional cohesion are stronger drivers for the development of psychological ownership than family and business financial cohesion in incoming generations points to an interesting future research route. On a practical note that draws the attention to how to raise and educate the next generation in order to secure psychological ownership.

Our findings also could be an explanation of the findings of the meta-analysis of Duran et al. (2016). As a particular finding, they show that lower input in innovation but higher innovation output is more pronounced if in later generation family businesses the CEO is a member of the owning family. We argue that this is especially the case, if business-owning families are able to transfer psychological ownership from one generation to the other as the feelings of psychological ownership of the next generation motivates its members to get the education and experience and to finally opt for becoming the CEO of their family's business. The respective ownership feelings result in specific attitudes and behaviors (Dawkins et al., 2017), which could explain innovativeness and efficiency of innovation in family firms. As in every family business research, there is a positive selection bias. We were able to show, that in family businesses in later generations with a high level of psychological ownership, the innovation output is high. Following this, we complement the findings of Duran et al. (2016) through an additional explanation of their finding.

Innovation is stronger in family firms with CEOs who bear the imprinting of an entrepreneurial legacy during childhood, supported by later watching and experiencing entrepreneurial behavior within the family firm (Bandura, 1986; Jaskiewicz et al., 2015). Those CEOs most likely invest less in stabilizing (i.e., maintaining and continually improving current capabilities and strategies) (Matz Carnes & Ireland, 2013; Sirmon, Hitt, & Ireland, 2007) and take higher risks, which results in higher levels of enriching activities, namely, extending or elaborating a current capability. The higher the perceived level of knowing, controlling, and investing one's self in the family firm, the more likely the CEO will try to extend current capabilities in order to satisfy (future) customer needs (e.g., Jansen, Veram, & Crossan, 2009; Sirmon & Hitt, 2003). The multi-dimensional ownership model that we propose also holds promise for the overall management field. We assume high levels of psychological ownership of CEOs in non-family firms to also influence innovation outcomes. Thus, the psychological

dimension of ownership influences strategically relevant behavior in both family and non-family firms. This supports the call of Westphal and Zajac (2013) for a behavioral theory of corporate governance.

Whether or not family firms, especially those of the third and later generation, engage in pioneering activities depends largely on the socialization of the family CEO. Imprinting her/his family's legacy, which focuses on entrepreneurial successes or resilience in the past, is the basis of observing, learning, experiencing, and, finally, executing entrepreneurial activities (Jaskiewicz et al., 2015). Thus overriding "...the increased value of stability and commitment to past strategies based on a family's shared history" (Gomez-Mejia, Haynes, Nuñez-Nickel, Jacobson, & Moyano-Fuentes, 2007) [which] "is at odds with the process of acquiring and transforming current resources into new and currently unknown capabilities" (Matz Carnes & Ireland, 2013: 1410). The relationship between family ownership and innovation is a blend of individual factors such as self-efficacy, imprinted entrepreneurial legacy and subsequent entrepreneurial behavior, psychological ownership and the motivation resulting from it, and legal ownership rights and the power to take decisions stemming from it.

6.2. Limitations and future research directions

Our research limitations open future research opportunities. In order to develop a finer grained ownership model, we concentrated on the integration of on psychological ownership. Similar concepts, such as commitment, identification, and loyalty, might add to our understanding of a multi-dimensional concept of ownership (for an overview of difference and commonalities with psychological ownership, see Brown et al., 2014). Furthermore, we focused on a highly developed country. Welter (2011) makes a strong argument to contextualize entrepreneurship research. In the case of innovation in family firms, examining less developed economies might generate different outcomes and add to our understanding of how context factors such as institutional settings affects the relevance of different ownership dimensions.

Our research was not longitudinal. A longitudinal (at best, panel) data set would help to disentangle time-related influences as well as better explaining causation effects. Furthermore, future research might control for individual level factors such as openness, agreeableness, or locus-of-control and differentiate more regarding the innovation output (product and/or process, incremental and/or radical). Moreover, we are aware of the limitations of using of self-reported measures of innovation. However, unfortunately, we have no access to reliable actual innovation data; e.g. from databases such as Orbis or Amadeus collected by Bureau Van Dijk. Thus, we encourage future research to use other innovation indicators in more detail.

Apart from future research opportunities that result from overcoming the limitations inherent in our research, there are further future research opportunities. First, with our study we were able to show that explanation for the findings of Duran et al. (2016) could be psychological ownership. We argue that high psychological ownership in later generation family businesses results in high level of innovation. With our study, we only were able to develop theoretically an idea how psychological ownership is built and transferred in family businesses. Future research should address the development of those ownership feelings in family businesses, especially regarding (potential) successors. Furthermore, we concentrated on individual level psychological ownership. Incoming research might as well take collective psychological ownership into consideration. The key idea is that next to the individual-level a group-level phenomenon exists in which a shift in personal references from the self to the group and the inclusion of others takes place and, consequently, creates a collective notion of the target of ownership (Pierce & Jussila, 2010; Rantanen & Jussila, 2011).

Following the call of Jaskiewicz and Dyer (2017), insights from family science could offer opportunities for a better understanding of the heterogeneity of family businesses. From our point of view, family science, with its foundation in psychology and sociology, can be used as

a fundament for future research to better understand psychological ownership in family businesses. For example, what role do non-active family members, grand-parents, children and spouses play in supporting or harming psychological ownership of the actual CEO, but also of the incoming successor? Moreover, the family communication pattern theory focusses on how family members interact with each other and how individuals develop their own identity and internal family behavior from this socialization (Koerner & Fitzpatrick, 2006). It may be fruitful to analyze how these patterns influence the development of psychological ownership. Drawing on developmental psychology, future research may ask if psychological ownership development is different concerning sibling order and/or gender, if conflicts harm or even strengthen psychological ownership and if this is dependent upon the type of conflict and/or the protagonists of these conflicts. These and other research questions can focus on the family itself as antecedent for building psychological ownership of a family business, which could be a crucial success factor for long term performance.

Moreover, it could be interesting to see what impact psychological ownership can have on other outcome measures at both business and family levels. Also, future research could go deeper into what happens if the psychological ownership for the family business differs extremely between two generations. For example, if the second generation has a very high level of psychological ownership and the third generation a very low level, is this obvious and noticeable for employees, suppliers and customers, and if so, with what results? Does it lead to procrastination of succession? The insights gained from these and other studies would support the further advancement of research on business succession and family business at large.

In addition, as we could show, the interplay of legal ownership rights, allowing influencing decisions, and of psychological ownership, motivating to influence decisions, is pivotal for innovation. Future research can look for equifinality in terms of several optimal combinations of the two dimensions leading to equally desirable outcomes. In other words, is there only one optimal combination of the two or, most likely, more than one? Apart from equifinality, the question of the dark side of different ownership types offers interesting avenues for future research. For example, a minority shareholder with a relatively low level of psychological ownership might hinder the family firm to capitalize on family business specific strength such as long-term orientation or patient capital. Likewise, a majority shareholder with a low level of psychological ownership can even pose a potential threat, especially when she/he passes the legal ownership onto an heir who does not at all understand the business' culture. On the other hand, a highly engaged minority shareholder can be both, a great support, but also an equally great threat to the business. Looking more in-depth into the boundary conditions under which these ownership types are detrimental or helpful for a firm's long-term success offers interesting future research opportunities. Last, but not least, it is especially interesting for policy makers to better understand under which boundary conditions active, powerful owners (highly engaged majority shareholders) will develop an equally strong next generation and under which they will cash-out or will try to maintain the wealth of the family but not the innovativeness of the company (Carney et al., 2014).

Finally, looking outside the family firm, does the ownership type predict, or at least explain, relationships of the firm with other organizations such as customers, suppliers, lenders, or network or alliance partners? Does ownership type help to understand whether a joint venture with the respective family firm will work out? Does ownership type, integrating the psychological and the legal side, help us to understand different modes of going international? We propose that any of these and other questions where ownership plays an important role as either an independent or moderating variable can be looked at from a more complete point of view when integrating the psychological dimension of ownership. Overall, the two-dimensional ownership model and the behavioral theory of innovation in family firms proposed in this article offer multiple interesting and challenging avenues for future research.

Acknowledgements

We would like to thank Jim Combs, Peter Jaskiewicz, Luis Gomez-Mejia and Shaker Zahra for their comments on earlier versions of this manuscript. Furthermore, we are grateful for the support of ifm (Institut für Mittelstandsforschung, Bonn) and Creditreform e.V.

References

- Acs, Z. J., & Audretsch, D. B. (1990). *Innovation and small firms*. Cambridge: MIT Press.
- Adler, P. S., & Kwon, S. W. (2002). Social capital: Prospects for a new concept. *Academy of Management Review*, 27(1), 17–40.
- Ahlstrom, D. (2010). Innovation and growth: How business contributes to society. *Academy of Management Perspectives*, 24(3), 11–24.
- Ahuja, G. (2000). Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly*, 45(3), 425–455.
- Ahuja, G., Lampert, C. M., & Tandon, V. (2008). Moving beyond Schumpeter: Management research on the determinants of technological innovation. *The Academy of Management Annals*, 2(1), 1–98.
- Aldrich, H. E., & Ruf, M. (2006). *Organizations evolving* (2nd ed.). London: SAGE.
- Anderson, R. C., & Reeb, D. M. (2003). Founding-family ownership and firm performance: Evidence from the S&P 500. *Journal of Finance*, 58(3), 1301–1328.
- Arregle, J. L., Hitt, M. A., Sirmon, D. G., & Very, P. (2007). The development of organizational social capital: Attributes of family firms. *Journal of Management Studies*, 44(1), 73–95.
- Astrachan, J. H., Klein, S. B., & Smyrnios, K. X. (2002). The F-PEC scale of family influence: A proposal for solving the family business definition problem. *Family Business Review*, 15(1), 45–58.
- Avey, J. B., Avolio, B. J., Crossley, C. D., & Luthans, F. (2009). Psychological ownership: Theoretical extensions, measurement and relation to work outcomes. *Journal of Organizational Behavior*, 30(2), 173–191.
- Avey, J. B., Wernsing, T. S., & Palanski, M. E. (2012). Exploring the process of ethical leadership: The mediating role of employee voice and psychological ownership. *Journal of Business Ethics*, 107(1), 21–34.
- Backes-Gellner, U., & Werner, A. (2007). Entrepreneurial signaling via education: A success factor in innovative start-ups. *Small Business Economics*, 29(1–2), 173–190.
- Bandura, A. (1986). *Social foundations of thought and action*. Eaglewood Cliffs, N.Y.: Prentice-Hall.
- Barkema, H., Baum, J. A. C., & Mannix, E. (2002). Management challenges in a new time. *The Academy of Management Journal*, 45(5), 916–930.
- Baum, C. F. (2006). *An introduction to modern economics using stata*. Texas: Stata Press.
- Baumol, W. J. (2004). Entrepreneurial enterprises, large established firms and other components of the free-market growth machine. *Small Business Economics*, 23(1), 9–21.
- Beck, L., Janssens, W., Debruyne, M., & Lommelen, T. (2011). A study of the relationship between generation, market orientation, and innovation in family firms. *Family Business Review*, 24(3), 252–272.
- Bernhard, F., & O'Driscoll, M. P. (2011). Psychological ownership in small family-owned businesses: Leadership style and nonfamily-employees' work attitudes and behaviors. *Group & Organization Management*, 36(3), 345–384.
- Bhardwaj, V., & Fairhurst, A. (2010). Fast fashion: Response to changes in the fashion industry. *The International Review of Retail, Distribution and Consumer Research*, 20(1), 165–173.
- Block, J. (2012). R&D investments in family and founder firms: An agency perspective. *Journal of Business Venturing*, 27(2), 248–265.
- Brown, G., Pierce, J. L., & Crossley, C. (2014). Toward an understanding of the development of ownership feelings: Understanding the development of ownership. *Journal of Organizational Behavior*, 35(3), 318–338.
- Burkart, M., Panunzi, F., & Shleifer, A. (2003). Family firms. *Journal of Finance*, 58(5), 2167–2202.
- Burns, T., & Stalker, G. M. (1994). *The management of innovation* (rev. ed.). New York: Oxford University Press.
- Cameron, A. C., & Trivedi, P. K. (2009). *Microeconometrics using stata*. Texas: Stata Press.
- Camisón-Zornoza, C., Lapiedra-Alcamí, R., Segarra-Ciprés, M., & Boronat-Navarro, M. (2004). A meta-analysis of innovation and organizational size. *Organization Studies*, 25(3), 331–361.
- Carney, M. (2005). Corporate governance and competitive advantage in family-controlled firms. *Entrepreneurship, Theory and Practice*, 29(3), 249–265.
- Carney, M., Gedajlovic, E., & Strike, V. M. (2014). Dead money: inheritance law and the longevity of family firms. *Entrepreneurship Theory and Practice*, 38(6), 1261–1283.
- Carney, M., van Essen, M., Gedajlovic, E. R., & Heugens, P. P. (2015). What do we know about private family firms? A meta-analytical review. *Entrepreneurship, Theory and Practice*, 39(3), 513–544.
- Choi, S. B., Lee, S. H., & Williams, C. (2011). Ownership and firm innovation in a transition economy: Evidence from China. *Research Policy*, 40(3), 441–452.
- Chrisman, J. J., & Patel, P. C. (2012). Variations in R&D investment of family and non-family firm: Behavioral agency and myopic loss aversion perspectives. *Academy of Management Journal*, 55(4), 976–997.
- Chrisman, J. J., Chua, J. H., & Litz, R. H. (2004). Comparing the agency costs of family and non-family firms: Conceptual issues and exploratory evidence. *Entrepreneurship, Theory and Practice*, 28(4), 335–354.
- Chua, J. H., Chrisman, J. J., & Sharma, P. (1999). Defining the family business by behavior. *Entrepreneurship, Theory and Practice*, 23(4), 19–39.
- Chua, J. H., Chrisman, J. J., Steier, L. P., & Rau, S. B. (2012). Sources of heterogeneity in family firms: An introduction. *Entrepreneurship, Theory and Practice*, 36(6), 1103–1113.
- Classen, N., Van Gils, A., Bammens, Y., & Carree, M. (2012). Accessing resources from innovation partners: The search breadth of family SMEs. *Journal of Small Business Management*, 50(2), 191–215.
- Classen, N., Carree, M., Van Gils, A., & Peters, B. (2014). Innovation in family and non-family SMEs: An exploratory analysis. *Small Business Economics*, 42(3), 595–609.
- Crossan, M. M., & Apaydin, M. (2010). A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of Management Studies*, 47(6), 1154–1191.
- Cruz, C., & Nordqvist, M. (2012). Entrepreneurial orientation in family firms: A generational perspective. *Small Business Economics*, 38(1), 33–49.
- Cucculelli, M., Le Breton-Miller, I., & Miller, D. (2016). Product innovation, firm renewal and family governance. *Journal of Family Business Strategy*, 7(2), 90–104.
- Czarnitzki, D., & Kraft, K. (2009). Capital control, debt financing and innovative activity. *Journal of Economic Behavior & Organization*, 71(2), 372–383.
- Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of Management Journal*, 34(3), 555–590.
- Davis, P. S., & Harveston, P. D. (1999). In the founder's shadow: Conflict in the family firm. *Family Business Review*, 12(4), 311–323.
- Davis, P. S., & Harveston, P. D. (2001). The phenomenon of substantive conflict in the family firm: A cross-generational study. *Journal of Small Business Management*, 39(1), 14–30.
- Dawkins, S., Tian, A. W., Newman, A., & Martin, A. (2017). Psychological ownership: A review and research agenda. *Journal of Organizational Behavior*, 38(2), 163–183.
- De Massis, A., Frattini, F., & Lichtenthaler, U. (2013). Research on technological innovation in family firms: Present debates and future directions. *Family Business Review*, 26(1), 10–31.
- De Massis, A., Audretsch, D., Uhlaner, L., & Kammerlander, N. (2018). Innovation with limited resources: Management lessons from the german mittelstand. *Journal of Product Innovation Management*, 38(1), 125–146.
- Dougherty, D., & Hardy, C. (1996). Sustained product innovation in large, mature organizations: Overcoming innovation-to-organization problems. *Academy of Management Journal*, 39(5), 1120–1153.
- Duran, P., Kammerlander, N., Van Essen, M., & Zellweger, T. (2016). Doing more with less: Innovation input and output in family firms. *Academy of Management Journal*, 59(4), 1224–1264.
- Eddleston, K. A., & Kellermans, F. W. (2007). Destructive and productive family relationships: A stewardship theory perspective. *Journal of Business Venturing*, 22(4), 545–565.
- Eddleston, K. A., Kellermans, F. W., & Zellweger, T. M. (2012). Exploring the entrepreneurial behavior of family firms: does the stewardship perspective explain differences? *Entrepreneurship Theory and Practice*, 36(2), 347–367.
- European Commission (2009). *Overview of family-business-relevant issues: Research, networks, policy measures and existing studies*. Retrieved from: <https://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0ahUKewje2Myv45XAhULExoKHQM1BYOQFghCMA&url=http%3A%2F%2Fec.europa.eu%2FDocsRoom%2Fdocuments%2F10389%2Fattachments%2F1%2Ftranslations%2Fen%2Frenditions%2Fpdf&usq=AovVawOXWg1T9mYqfAhQDuXJ082a>. Accessed November 2017.
- Fagerberg, J., Fosaasa, M., & Sappasert, K. (2012). Innovation: Exploring the knowledge base. *Research Policy*, 41(7), 1132–1153.
- Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *Journal of Law and Economics*, 26(2), 301–325.
- Felin, T., & Hesterly, W. S. (2007). The knowledge-based view, nested heterogeneity, and new value creation: Philosophical considerations on the locus of knowledge. *Academy of Management Review*, 32(1), 195–218.
- Feranita, F., Kotlar, J., & De Massis, A. (2017). Collaborative innovation in family firms: Past research, current debates and agenda for future research. *Journal of Family Business Strategy*, 8(3), 137–156.
- Fiss, P. C., & Zajac, E. J. (2004). The diffusion of ideas over contested terrain: The (non) adoption of a shareholder value orientation among German firms. *Administrative Science Quarterly*, 49(4), 501–534.
- Franks, J., Mayer, C., Volpin, P., & Wagner, H. F. (2012). The life cycle of family ownership: International evidence. *Review of Financial Studies*, 25(6), 1675–1712.
- Garud, R., Tuertscher, P., & van de Veen, A. H. (2013). Perspectives on innovation processes. *Academy of Management Annals*, 7(1), 775–819.
- Gomez-Mejia, L. R., Haynes, K., Nuñez-Nickel, M., Jacobson, K., & Moyano-Fuentes, F. (2007). Socioemotional wealth and business risks in family controlled firms. *Administrative Science Quarterly*, 52(1), 106–137.
- Greve, H. R. (2003). A behavioral theory of R&D expenditures and innovations: Evidence from shipbuilding. *Academy of Management Journal*, 46(6), 685–702.
- Greve, H. R. (2009). Bigger and safer: The diffusion of competitive advantage. *Strategic Management Journal*, 30(1), 1–23.
- Gudmundson, D., Tower, C., & Hartman, E. (2003). Innovation in small business: Culture and ownership structure do matter. *Journal of Developmental Entrepreneurship*, 8(1), 1–17.
- Hair, H. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (2010). *Multivariate data analysis*. Upper Saddle River, NJ: Prentice Hall.
- Hambrick, D. C., Cho, T. S., & Chen, M. J. (1996). The influence of top management team heterogeneity on firms' competitive moves. *Administrative Science Quarterly*, 41(4), 659–684.
- Henssen, B., Voordeckers, W., Lambrechts, F., & Koironen, M. (2014). The CEO autonomy-stewardship behavior relationship in family firms: The mediating role of psychological ownership. *Journal of Family Business Strategy*, 5(3), 312–322.

- Hernandez, M. (2012). Toward an understanding of the psychology of stewardship. *Academy of Management Review*, 37(2), 172–193.
- Higgins, E. T. (1998). Promotion and prevention: Regulatory focus as a motivational principle. *Advances in Experimental Social Psychology*, 30, 1–46.
- Hilbe, J. (2009). *Logistic regression models*. New York: CRC Press.
- Hsu, L. C., & Chang, H. C. (2011). The role of behavioral strategic controls in family firm innovation. *Industry & Innovation*, 18(7), 709–727.
- Hsu, P.-H., Huang, S., Massa, M., & Zhang, H. (2014). *The new lyrics of the old folks: The role of family ownership in corporate innovation. Working paper 2014/51/FIN, INSEAD, France*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2572423. Accessed November 2017.
- Jansen, J. J., Vera, D., & Crossan, M. (2009). Strategic leadership for exploration and exploitation: The moderating role of environmental dynamism. *Leadership Quarterly*, 20(1), 5–18.
- Jaskiewicz, P., & Dyer, W. G. (2017). Addressing the elephant in the room: Disentangling family heterogeneity to advance family business research. *Family Business Review*, 30(2), 111–118.
- Jaskiewicz, P., Uhlenbruck, K., Balkin, D. B., & Reay, T. (2013). Is nepotism good or bad? Types of nepotism and implications for knowledge management. *Family Business Review*, 26(2), 121–139.
- Jaskiewicz, P., Combs, J. G., & Rau, S. B. (2015). Entrepreneurial legacy: Toward a theory of how some family firms nurture transgenerational entrepreneurship. *Journal of Business Venturing*, 30(1), 29–49.
- König, A., Kammerlander, N., & Enders, A. (2013). The family innovator's dilemma: How family influence affects the adoption of discontinuous technologies by incumbent firms. *Academy of Management Review*, 38(3), 418–441.
- Kammerlander, N., & Ganter, M. (2015). An attention-based view of family firm adaptation to discontinuous technological change: Exploring the role of family CEOs' noneconomic goals. *Journal of Product Innovation Management*, 32(3), 361–383.
- Kammerlander, N., Burger, D., Fust, A., & Fueglistaller, U. (2015a). Exploration and exploitation in established small and medium-sized enterprises: The effect of CEOs' regulatory focus. *Journal of Business Venturing*, 30(4), 582–602.
- Kammerlander, N., Dessi, C., Bird, M., Floris, M., & Murru, A. (2015b). The impact of shared stories on family firm innovation: A multicase study. *Family Business Review*, 28(4), 332–354.
- Kaye, K. (1996). When the family business is a sickness. *Family Business Review*, 9(4), 347–368.
- Kellermanns, F. W., & Eddleston, K. A. (2006). Corporate entrepreneurship in family firms: A family perspective. *Entrepreneurship, Theory and Practice*, 30(6), 809–830.
- Kellermanns, F. W., Eddleston, K. A., Sarathi, R., & Murphy, F. (2012). Innovativeness in family firms: A family influence perspective. *Small Business Economics*, 38(1), 85–101.
- Klein, S. B. (2000). Family businesses in Germany: Structure and significance. *Family Business Review*, 13(3), 157–181.
- Klein, K. J., & Knight, A. P. (2005). Innovation implementation—Overcoming the challenge. *Current Directions in Psychological Science*, 14(5), 243–246.
- Koberg, C. S., Uhlenbruck, N., & Sarason, Y. (1996). Facilitators of organizational innovation: The role of life-cycle stage. *Journal of Business Venturing*, 11(2), 133–149.
- Koerner, A. F., & Fitzpatrick, M. A. (2006). Family communication patterns theory: A social cognitive approach. In D. O. Braithwaite, & L. A. Baxter (Eds.). *Engaging theories in family communication: Multiple perspectives* (pp. 50–65). Thousand Oaks: Sage Publication, Inc.
- Kracicz, N. D., Hack, A., & Kellermanns, F. W. (2014). New product portfolio performance in family firms. *Journal of Business Research*, 67(6), 1065–1073.
- Kracicz, N. D., Hack, A., & Kellermanns, F. W. (2015). What makes a family firm innovative? CEO risk-taking propensity and the organizational context of family firms. *Journal of Product Innovation Management*, 32(3), 334–348.
- La Porta, R., Lopez-De-Silanes, F., & Shleifer, A. (1999). Corporate ownership around the world. *Journal of Finance*, 54(2), 471–518.
- Long, S. J., & Freese, J. (2001). *Regression models for categorical dependent variables using Stata*. College Station, TX: Stata Press.
- Lumpkin, G. T., Steier, L., & Wright, M. (2011). Strategic entrepreneurship in family business. *Strategic Entrepreneurship Journal*, 5(4), 285–306.
- Martins, E., Pundt, A., Horsman, C. S., & Nerdinger, F. W. (2008). Organizational culture of participation: Development and validation of a measure. *German Journal of Human Resource Research*, 22(2), 195–215.
- Matz Carnes, C., & Ireland, R. D. (2013). Familiness and innovation: Resource bundling as the missing link. *Entrepreneurship, Theory and Practice*, 37(6), 1379–1419.
- Matzler, K., Veider, V., Hautz, J., & Stadler, C. (2015). The impact of family ownership, management, and governance on innovation. *Journal of Product Innovation Management*, 32(3), 319–333.
- Mihalache, O. R., Jansen, J. J. P., van den Bosch, F. A. J., & Volberda, H. W. (2012). Offshoring and firm innovation: The moderating role of top management team attributes? *Strategic Management Journal*, 33(13), 1480–1498.
- Miller, D., Le Breton-Miller, I., Lester, R. H., & Cannella, A. A., Jr. (2007). Are family firms really superior performers? *Journal of Corporate Finance*, 13(5), 829–858.
- Mitchel, M. N., & Chen, X. (2005). Visualizing main effects and interactions for binary logit models. *Stata Journal*, 5(1), 64–82.
- Munari, F., Oriani, R., & Sobrero, M. (2010). The effects of owner identity and external governance systems on R&D investments: A study of Western European firms. *Research Policy*, 39(8), 1093–1104.
- Pérez-Luño, A., Wiklund, J., & Valle Cabrera, R. (2011). The dual nature of innovative activity: How entrepreneurial orientation influences innovation generation and adoption. *Journal of Business Venturing*, 26(5), 555–571.
- Patel, P. C., & Cooper, D. (2014). Structural power equality between family and non-family TMT members and the performance of family firms. *Academy of Management Journal*, 57(6), 1624–1649.
- Peng, M. W., & Jiang, Y. (2010). Institutions behind family ownership and control in large firms. *Journal of Management Studies*, 47(2), 253–273.
- Pieper, T. M. (2007). *Mechanisms to assure long-term family business survival? A study of the dynamics of cohesion in multigenerational family business families*. Frankfurt: Verlag Peter Lang Dissertation European Business School, Oestrich-Winkel, 2007.
- Pieper, T. M., & Klein, S. B. (2007). The bulleye: A systems approach to modeling family firms. *Family Business Review*, 20(4), 301–319.
- Pierce, J. L., & Jussila, I. (2010). Collective psychological ownership within the work and organizational context: Construct introduction and elaboration. *Journal of Organizational Behavior*, 31(6), 810–834.
- Pierce, J. L., Rubenfeld, S. A., & Morgan, S. (1991). Employee ownership: A conceptual model of process and effects. *Academy of Management Review*, 16(1), 121–144.
- Pierce, J. L., Kostova, T., & Dirks, K. T. (2001). Toward a theory of psychological ownership in organizations. *Academy of Management Review*, 26(2), 298–310.
- Pierce, J. L., O'Driscoll, M. P., & Coghlan, A. M. (2004). Work environment structure and psychological ownership: The mediating effects of control. *The Journal of Social Psychology*, 144(5), 507–534.
- Pittino, D., & Visintin, F. (2009). Innovation and strategic types of family SMEs. A test and extension of Miles and Snow's configurational model. *Journal of Enterprising Culture*, 17(3), 257–295.
- Pittino, D., Martínez, A. B., Chirico, F., & Galván, R. S. (2018). Psychological ownership, knowledge sharing and entrepreneurial orientation in family firms: The moderating role of governance heterogeneity. *Journal of Business Research*, 84, 312–326.
- Podsakoff, P. M., MacKenzie, S. B., & Lee, J.-Y. (2003). Common method bias in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903.
- Porter, M. E. (1992). Capital disadvantage—America's failing capital-investment system. *Harvard Business Review*, 70, 65–82.
- Ramos, H. M., Man, T. W. Y., Mustafa, M., & Ng, Z. Z. (2014). Psychological ownership in small family firms: Family and non-family employees' work attitudes and behaviors. *Journal of Family Business Strategy*, 5(3), 300–311.
- Rantanen, N., & Jussila, I. (2011). F-CPO: A collective psychological ownership approach to capturing realized family influence on business. *Journal of Family Business Strategy*, 2(3), 139–150.
- Rauch, A., & Frese, M. (2007). Let's put the person back into entrepreneurship research: A meta-analysis on the relationship between business owners' personality and business creation and success. *European Journal of Work and Organizational Psychology*, 16(4), 353–385.
- Reay, T. (2009). Family-business meta-identity, institutional pressures, and ability to respond to entrepreneurial opportunities. *Entrepreneurship, Theory and Practice*, 33(6), 1265–1270.
- Roccas, S., Sagiv, L., Schwartz, S. H., & Knafo, A. (2002). The big five personality factors and personal values. *Personality and Social Psychology Bulletin*, 28(6), 789–801.
- Röd, I. (2016). Disentangling the family firm's innovation process: A systematic review. *Journal of Family Business Strategy*, 7(3), 185–201.
- Rondi, E., De Massis, A., & Kotlar, J. (2018). Unlocking innovation potential: A typology of family business innovation postures and the critical role of the family system. *Journal of Family Business Strategy*. <http://dx.doi.org/10.1016/j.jfbs.2017.12.001> online first.
- Rosenbusch, N., Brinckmann, J., & Bausch, A. (2011). Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs. *Journal of Business Venturing*, 26(4), 441–457.
- Schumpeter, J. (1912/1913). *The theory of economic development*. Harvard University Press Cambridge.
- Schumpeter, J. A. (1942). *Capitalism, socialism and democracy*. New York: Harper & Brothers.
- Sieger, P., Bernhard, F., & Frey, U. (2011). Affective commitment and job satisfaction among non-family employees: Investigating the roles of justice perceptions and psychological ownership. *Journal of Family Business Strategy*, 2(2), 78–89.
- Sieger, P., Zellweger, T., & Aquino, K. (2013). Turning agents into psychological principals: Aligning interests of non-owners through psychological ownership. *Journal of Management Studies*, 50(3), 361–388.
- Simon, H. (1992). Lessons from Germany's midsize giants: An inside look at how smaller German companies have come to dominate their markets worldwide. *Harvard Business Review*, 70, 115–123.
- Sirmon, D. G., & Hitt, M. A. (2003). Managing resources: Linking unique resources, management and wealth creation in family firms. *Entrepreneurship, Theory and Practice*, 27(4), 339–358.
- Sirmon, D. G., Hitt, M. A., & Ireland, R. D. (2007). Managing firm resources in dynamic environments to create value: Looking inside the black box. *Academy of Management Review*, 32(1), 273–292.
- Smith, W. K., & Tushman, M. L. (2005). Managing strategic contradictions: A top management model for managing innovation streams. *Organization Science*, 16(5), 522–536.
- Stewart, A., & Hitt, M. A. (2012). Why can't a family business be more like a nonfamily business? Modes of professionalization in family firms. *Family Business Review*, 25(1), 58–86.
- Sydow, J., Schreyögg, G., & Koch, J. (2009). Organizational path dependence: Opening the black box. *Academy of Management Review*, 34(4), 689–709.
- Thompson, J. D. (1965). Bureaucracy and innovation. *Administrative Science Quarterly*, 10(1), 1–20.
- Tripsas, M. (2009). Technology, identity, and inertia through the lens of the digital photography company. *Organization Science*, 20(2), 441–460.
- Tripsas, M., & Gavetti, G. (2000). Capabilities, cognition, and inertia: Evidence from digital imaging. *Strategic Management Journal*, 21(10), 1147–1161.
- Tsai, W. P. (2002). Social structure of cooperation within a multiunit organization:

- Coordination, competition, and intraorganizational knowledge sharing. *Organization Science*, 13(2), 179–190.
- Vandewalle, D., Van Dyne, L., & Kostova, T. (1995). Psychological ownership: An empirical examination of its consequences. *Group & Organization Management*, 20(2), 210–226.
- Villalonga, B., & Amit, R. (2006). How do family ownership, control and management affect firm value? *Journal of Financial Economics*, 80(2), 385–417.
- Welter, F. (2011). Contextualizing entrepreneurship—Conceptual challenges and ways forward. *Entrepreneurship, Theory and Practice*, 35(1), 165–184.
- Werner, A., Schröder, C., & Chlosta, S. (2018). Driving factors of innovation in family and non-family SMEs. *Small Business Economics*, 50(1), 201–218.
- Westhead, P., & Cowling, M. (1998). Family firm research: The need for a methodological rethink. *Entrepreneurship, Theory and Practice*, 23(1), 31–56.
- Westhead, P. (1997). R&D 'inputs' and 'outputs' of technology-based firms located on and off Science Parks. *R&D Management*, 27(1), 45–62.
- Westphal, J. D., & Zajac, E. J. (2013). A behavioral theory of corporate governance: Explicating the mechanisms of socially situated and socially constituted agency. *Academy of Management Annals*, 7(1), 607–661.
- Wiklund, J., Baker, T., & Shepherd, D. (2010). The age-effect of financial indicators as buffers against the liability of newness. *Journal of Business Venturing*, 25(4), 423–437.
- Wu, S. B., Levitas, E., & Priem, R. L. (2005). CEO tenure and company invention under differing levels of technological dynamism. *Academy of Management Journal*, 48(5), 859–873.
- Zahra, S. A. (1996). Governance, ownership, and corporate entrepreneurship: The moderating impact of industry technological opportunities. *Academy of Management Journal*, 39(6), 1713–1735.
- Zahra, S. A. (2005). Entrepreneurial risk taking in family firms. *Family Business Review*, 18(1), 23–40.
- Zahra, S. A. (2012). Organizational learning and entrepreneurship in family firms: Exploring the moderating effect of ownership and cohesion. *Small Business Economics*, 38(1), 51–65.
- Zellweger, T. M., Kellermanns, F. W., Chrisman, J. J., & Chua, J. H. (2012). Family control and family firm valuation by family CEOs: The importance of intentions for trans-generational control. *Organization Science*, 23(3), 851–868.
- Zhao, H., & Seibert, S. E. (2006). The big five personality dimensions and entrepreneurial status: A meta-analytical review. *Journal of Applied Psychology*, 91(2), 259–271.