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Radical innovation in (multi)family owned firms

Francesco Chirico^{a,b,*}, R. Duane Ireland^c, Daniel Pittino^{d,f},
Valeriano Sanchez-Famoso^e

^a Macquarie Business School - Macquarie University, Department of Management, 4 Eastern Road, NSW 2109, Sydney, Australia

^b Jönköping International Business School, Center for Family Entrepreneurship and Ownership (CeFEO), PO Box 1026, SE-551 11 Jönköping, Sweden

^c Mays Business School, Office of the Dean, Texas A&M University, 4113 TAMU, College Station, TX 77843-4113, United States

^d Jönköping International Business School, PO Box 1026, SE-551 11 Jönköping, Sweden

^e University of the Basque Country UPV/EHU, Department of Financial Economics I, Faculty of Economics and Business, Avda. Lehendakari Agirre, 83, E48015 Bilbao, Spain

^f Università degli Studi di Udine, Dipartimento di Scienze Economiche e Statistiche, Via Tomadini 30/a, 33100, Udine, Italy

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ABSTRACT

By integrating organizational learning theory with the family firm literature, we seek to enhance our understanding of radical innovation in (multi)family-owned firms. We theorize that the goal diversity and path dependency that multifamily ownership creates negatively affects the positive relationship between knowledge integration and radical innovation. However, this is not the case for multifamily-owned firms in which family members embrace a commitment to change. We contend that commitment to change mitigates the negative moderating effect of multifamily ownership by ensuring the effective translation of integrated knowledge into radical innovation within the firm. Overall, our results highlight the complexity of radical innovation in (multi)family-owned firms as a product of the joint effect of knowledge integration, the number of unrelated owning families, and a commitment to change.

1. Introduction

The ability to produce products with a high degree of novelty (Subramaniam and Youndt, 2005) is a key aspect to maintaining family firms' competitiveness and preserving their role as a driving economic force on a global scale (Diaz-Moriana et al., 2018; Hu and Hughes, 2020; La Porta et al., 1999; Zahra, 2012). However, debate remains regarding the degree to which family firms focus less on the 'novelty' of their products because of a conservative orientation relative to the degree to which at least some of these firms successfully pursue radical innovation. This issue is critical in that although radical innovation carries significant risk and uncertainties (Zhou and Li, 2012), evidence suggests that it affects family-firm continuity in the long run (Diaz-Moriana et al., 2018; Duran et al., 2016; Konig et al., 2013). For example, Hu and Hughes (2020: 1201, 1225) explain that "[w]ithout radical innovation, family firms are in jeopardy to competitors and failure in the long term." As such, "for a family business to develop innovations that are truly legacy-building," a long-term time perspective is needed "with more radical approaches to innovation" (Diaz-Moriana et al., 2018: 281).

* Corresponding author at: Macquarie Business School - Macquarie University, Department of Management, 4 Eastern Road, NSW 2109, Sydney, Australia.

E-mail addresses: francesco.chirico@mq.edu.au (F. Chirico), direland@mays.tamu.edu (R. Duane Ireland), daniel.pittino@ju.se (D. Pittino), valeriano.sanchezfamoso@ehu.eus (V. Sanchez-Famoso).

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Interestingly, while practical evidence shows that some family firms recognize and explore *new* opportunities to produce radical innovation as a foundation for competing successfully against rivals (Boston Consulting Group, 2021; Duran et al., 2016; Forbes, 2018; Zahra, 2005), the literature generally suggests that family firms are a conservative form of organization with a greater focus on incremental innovation. Incremental innovation requires the reinforcement of prevailing knowledge; in contrast, radical innovation requires the transformation of prevailing knowledge (Asaba and Wada, 2019; Calabrò et al., 2019; Diaz-Moriana et al., 2018; Hu and Hughes, 2020; Nieto et al., 2015).

Examining *within*-family firm heterogeneity is thus critical to efforts to advance this debate and to challenge existing assumptions about family firms' risk aversion regarding radical innovation, largely because of the perceived high degree of conservatism that may characterize this form of organization. Scholars suggest that there are multiple indicators of family firm heterogeneity (Chua et al., 2012) including how they pursue goals, their attitude toward risk, and how they engage in change activities (Hoskisson et al., 2017). In particular, the number of unrelated families owning a single business is a key dimension along which family firms vary (Chua et al., 1999). Although "[w]e know little about these businesses" (Pieper et al., 2015: 1313; see also Chrisman et al., 2021), increasing our knowledge about unrelated families that own a single business has the potential to inform the complex picture of radical innovation in family firms (Brinkerink et al., 2020; Pongelli et al., 2016). For example, Brinkerink et al. (2020: 10) observe that how a multifamily-owned firm manages the innovative response to radical technological shifts "is an issue of both theoretical and practical interest." A multifamily-owned firm is a single firm owned by multiple families that are not related by blood or marriage (Duran and Ortiz, 2019; Kudlats et al., 2019; Pieper et al., 2015). Such a context is relevant given that it combines the favorable aspects of the family business social setting (Arregle et al., 2007; Sirmon and Hitt, 2003) with the potentially negative effects of goal diversity and path-dependent behaviors that may emerge from the presence of unrelated owning families (Brigham and Payne, 2015; Chrisman et al., 2021; Pagliarussi and Rapozo, 2011; Pieper et al., 2015). Moreover, multifamily-owned firms are particularly important in connection with radical innovation in that these firms are often a product of heterogeneous teams of unrelated founders who, with the support of their families, decide to organize as a single entity (Kudlats et al., 2019).

We examine (multi)family-owned family firms as a means of gaining deeper theoretical insights regarding radical innovation in family firms. To this end, we integrate organizational learning theory with the family firm literature. Exploratory learning is the foundation of radical innovation (Crossan et al., 1999; Subramaniam and Youndt, 2005; Zhou and Li, 2012), where "[e]xploration occurs as the firm integrates diverse [breadth of] knowledge with existing knowledge stocks" (Ireland and Webb, 2007: 52). Indeed, the prior research identifies knowledge integration as a source of organizational learning (Crossan et al., 1999; Grant, 1996a, b; Zahra et al., 2020) and as an important foundation for radical innovation efforts (Carnabucci and Operti, 2013; Rothaermel and Hess, 2007; Subramaniam and Youndt, 2005; Zhou and Li, 2012). However, integrating different strands of knowledge within a firm is challenging given that specialized and valuable knowledge resides within individuals who often possess different goals. Additionally, learning can create its own traps that in turn may encourage an excessive reliance on well-established routines and proven knowledge combinations (Ahuja and Lampert, 2001; Der Foo et al., 2005; Ireland and Webb, 2009; Tsai et al., 2015).

Following this logic, we propose that although an increased number of unrelated owning families has the potential to create broader searches, because of the heterogeneous yet complementary knowledge of the family members belonging to different owning families, goal divergence and path dependency are likely to be promoted and offset the potential advantages of diverse multifamily knowledge (Brigham and Payne, 2015; Pagliarussi and Rapozo, 2011; Pieper et al., 2015); that is, the presence of an increased number of unrelated owning families constrains the translation of integrated knowledge into radical innovation. Furthermore, in line with the organizational learning literature (Argote, 2011; Crossan et al., 1999), we argue that to realize the potential benefits of knowledge integration, commitment to change (Herscovitch and Meyer, 2002) provides a common logic among multifamily members to use knowledge integration as a means of engaging in exploratory learning to produce radical innovation. That is, with the presence of both multifamily ownership and commitment to change, we expect that the positive effects of integrating heterogeneous yet complementary sources of knowledge among family members belonging to different owning families will surface. In these instances, firms also experience a reduction in the negative effects resulting from goal diversity and path dependencies. This argument leads us to examine how (multi)family ownership and a commitment to change jointly affect the translation of knowledge integration into radical innovation.

Our results lead to several contributions. First, we contribute to the understanding of the link between knowledge integration, as a key element of organizational learning, and radical innovation. We accomplish this by identifying and studying an important yet underresearched characteristic of family firms; namely, the number of unrelated families owning a family firm. This shareholder ownership structure *either* positively or negatively affects the effective translation of integrated knowledge into a platform for producing radical innovation. Our theory suggests that in a family firm context, potential learning rigidities are a function of the number of unrelated families that own the business. As such, we add important knowledge to the sparse literature concerning the intersection among organizational learning, radical innovation, and family firms (Calabrò et al., 2019; Diaz-Moriana et al., 2018; Zahra, 2012). Second, we add to the emerging knowledge stock about multifamily-owned firms to investigate radical innovation. To the best of our knowledge, this is the first study to examine the role of multifamily ownership on radical innovation within a family-owned firm. Our theory-based arguments suggest that coupling multifamily ownership with family members' commitment to change maximizes the potential for knowledge integration to lead to radical innovation. Recently, scholars have called for family firm research "into types of innovation, particularly the *conditions* for truly novel [radical] innovations" (Hu and Hughes, 2020: 1200). Our study represents an important effort in this direction. Third, we highlight that family firms are heterogeneous; in turn, this heterogeneity finds such firms pursuing different strategic actions (Calabrò et al., 2019). The shareholding structure coupled with the family members' commitment to change are important differences characterizing family firms. In turn, these differences affect the ability of such firms to translate ideas into shared actions that are oriented toward producing radical innovation. Thus, our research shows why some family firms are more

effective than others in realizing radical innovation (e.g., [Chrisman et al., 2015](#); [De Massis et al., 2015b](#)). In doing so, our theory and results shed light on the theoretical tension existing in the family firm-innovation literature ([Calabrò et al., 2019](#); [Diaz-Moriana et al., 2018](#); [Hu and Hughes, 2020](#)). Importantly, our theory and results challenge the widely held assumption that family firms are risk averse ([Hoskisson et al., 2017](#)) and that, as a result, they are reluctant to pursue radical innovation, although some practical evidence suggests otherwise.

2. Theoretical frameworks

2.1. Radical innovation

Radical innovation consists of innovations that transform existing goods and services in a significant way ([Subramaniam and Youndt, 2005](#)). This type of innovation represents a risky departure from existing practice and can be disruptive or discontinuous within firms. Consumers often experience such transformations in the form of a novel good or service that likely provides a valuable new functionality for the user ([Garcia and Calantone, 2002](#); [Zhou and Li, 2012](#)). A firm's capacity to produce radical innovations is especially important given that, with increasing frequency, the success factors of product development have a relationship with efforts to prevent product obsolescence, a product's degree of novelty, and its long-term competitiveness and success ([Delgado-Verde et al., 2016](#); [Evanschitzky et al., 2012](#)). Knowledge is critical to achieve radical innovation (e.g., [Carnabucci and Operti, 2013](#); [Galunic and Rodan, 1998](#); [Zhou and Li, 2012](#); [Zhou and Wu, 2010](#)). In fact, the capabilities required to produce radical innovations come from integrated knowledge that is transformational, leading to innovations that make prevailing technologies obsolete ([Subramaniam and Youndt, 2005](#)).

Extending this logic is the argument and the related findings that radical innovation is more likely to occur in firms that are capable of integrating a broad variety of heterogeneous yet complementary new and pre-existing knowledge ([Garcia and Calantone, 2002](#); [Makri et al., 2010](#); [Slater et al., 2014](#); [Zhou and Li, 2012](#)). This process involves interactions and knowledge exchanges among organizational actors from different areas of expertise ([Kanter, 1988](#); [Schulz, 2001](#)). The research also suggests that shared understanding among organizational actors is key to efforts undertaken to translate breakthrough ideas into radically innovative products with commercialization potential ([Helfat et al., 2007](#); [Subramaniam and Youndt, 2005](#); [Zahra and George, 2002](#)). In fact, the level of trust, reciprocity, and proximity of interactions that characterize the portfolio of ties among participants ([Tiwana, 2008](#)) affects communication effectiveness ([Dyer and Singh, 1998](#)), reciprocal assistance ([Hansen, 1999](#)), and knowledge disclosure ([Yli-Renko et al., 2001](#)) and, as such, “can help connect...diverse ideas and thoughts...to make unforeseen and unusual combinations for radical breakthroughs” ([Subramaniam and Youndt, 2005](#): 454; see also [Fiol, 1994](#); [Michie et al., 2006](#)). Insights regarding actions needed to effectively integrate resources as a means of producing radical innovation appear in the organizational learning literature (e.g., [Crossan et al., 1999](#); [Ireland and Webb, 2007](#); [Zahra et al., 2020](#)).

2.2. Knowledge integration and organizational learning

Knowledge integration is “an organizational capability for creating novel combinations of different strands of knowledge...which derive from individual and group contributions” ([Zahra et al., 2020](#): 11). Although difficult to achieve ([Zahra, 2008](#)), integrated knowledge can in turn generate combinative knowledge ([Kogut and Zander, 1992](#)); that is, through knowledge integration, team members are able to share and codify their specialized knowledge and facilitate more rapid diffusion of newly gained knowledge within an organization. Knowledge integration involves team members building concrete experiences with others to create a common experience base and language that facilitates their efforts to reach common frames of reference and gains in efficiency in terms of allocating and using resources within an organization ([Atuahene-Gima, 2005](#); [Tsai et al., 2015](#)). Integrating knowledge—or the specific expertise possessed by individuals in a given domain ([Grant, 1996a](#))—involves connecting knowledge held by individual members, leading to “a single coherent, integrated structure...that incorporates both new and existing knowledge” ([Zahra et al., 2020](#): 166). Integrated knowledge affects various organizational outcomes including innovation ([Kogut and Zander, 1992](#)). Organizations are indeed composed of coalitions of individuals ([Cyert and March, 1963](#); [Hoskisson et al., 2017](#)) who collectively “influence each element of the learning system” ([Vera and Crossan, 2004](#): 222).

Scholars recognize the knowledge integration that occurs among organizational members ([Crossan et al., 1999](#); [Zahra et al., 2020](#)) as a source of organizational learning ([Majchrzak et al., 2012](#); [Nonaka and Takeuchi, 1995](#); [Vera and Crossan, 2004](#); [Zahra et al., 2020](#)); that is, as individuals integrate different strands of knowledge, they gain rich insights and learn new things, which forms the foundation for organizational learning and knowledge creation ([Grant, 1996a, b](#); [Zahra et al., 2020](#)). For example, as product development teams integrate different pieces of knowledge, they create new knowledge that may become the source of radical innovation and subsequently the foundation for developing novel products to introduce into a marketplace. In summary, given that knowledge resides in individuals, and because there is variance across what people “know,” knowledge integration is a fundamental element of organizational learning ([Grant, 1996b](#)).

Formally, organizational learning is “conceived of as a principal means of achieving the strategic renewal of an enterprise” ([Crossan et al., 1999](#): 522) through a process aimed at exploring and learning new ways while exploiting what has been learned ([March, 1991](#)). Learning applied to the domain of radical innovation focuses on the exploration aspect of the exploration-exploitation tension identified by March ([Crossan et al., 1999](#); [Subramaniam and Youndt, 2005](#); [Zhou and Li, 2012](#)). This tension occurs as team members integrate different breadths of knowledge with existing knowledge stocks ([Ireland and Webb, 2007, 2009](#)). However, organizational learning theorists also explain that learning creates its own traps that favor specialization and inhibit experimentation ([Ahuja and](#)

Lampert, 2001; Tsai et al., 2015). As such, team members must respond positively and commit to change as a path to integrating different knowledge stocks to produce radically new products (Ahuja and Lampert, 2001; Crossan et al., 1999; Ireland and Webb, 2009; Wang et al., 2009).

An effective ownership structure that “direct[s] firm actions” is also key when firms seek to recombine individuals’ specialized knowledge stocks as a foundation for producing novel innovations (Connelly et al., 2010: 1561; Ortega-Argiles et al., 2005). For instance, Dixon and Seddi’s (1996) and Galende and de la Fuente’s (2003) studies yield results that are consistent with the expectation that concentrated ownership and shareholder monitoring are effective in exploiting knowledge while mitigating the high agency and contracting costs associated with innovation (see also Baysinger et al., 1991). Additionally, Love et al. (1996) find that foreign ownership facilitates innovation through network relationships. De Clercq and Dimov (2008) suggest that some venture capitalist owners specialize in internal knowledge recombination (e.g., industry), whereas others specialize in external knowledge recombination. These different specializations influence firm outcomes, including innovation, differently (see also Kochhar and David, 1996).

Among companies worldwide, family ownership is a common ownership structure (Neckebrouck et al., 2018) that can either facilitate or constrain the translation of knowledge integration actions toward novel innovations (Calabrò et al., 2019; Chirico and Salvato, 2016; Duran et al., 2016). We explain these possibilities in the next sections.

2.3. Family firms

A family firm is a “business held by a dominant coalition controlled by members of the same family [single-family-owned firm] or a small number of [unrelated] families [multifamily-owned firm]” (Chua et al., 1999: 25). Family firms tend to share characteristics such as a long-term strategic orientation, a strong collective identity, strong family values, a unique social context, and an extraordinary emotional commitment to firm survival (Arregle et al., 2007; Sirmon and Hitt, 2003; Zellweger and Sieger, 2012). These characteristics indicate that family firms value not only financial but also nonfinancial goals (Chrisman et al., 2012) or socioemotional wealth, that is, the “nonfinancial aspects of the firm that meet the family’s affective needs” (Gómez-Mejía et al., 2007: 106).

However, despite sharing common characteristics, family firms are not homogeneous, including with respect to their ownership structure. Some family firms possess an ownership structure comprising stakes owned by at least two unrelated owning families that share ownership of the firm (Brigham and Payne, 2015; Duran and Ortiz, 2019; Fattoum-Guedri et al., 2018; Holderness, 2017; Russino et al., 2019). Despite scant attention by researchers, multifamily-owned firms—that is, firms owned by two or more families that are related neither by blood nor marriage (Duran and Ortiz, 2019; Kudrats et al., 2019; Pieper et al., 2015)—comprise a meaningful fraction of firms worldwide (Brigham and Payne, 2015; Chrisman et al., 2021; Kudrats et al., 2019; Lim, 2017, 2018). For example, in Lim’s (2017, 2018) sample, 38% of the largest listed US family businesses are multifamily-owned firms. Similarly, Duran and Ortiz (2019) reported that 26.25% of the family firms from Latin America (Chile) included in their sample were multifamily owned. Additionally, in Europe, among the Spanish family firms in the IBEX 35—the benchmark stock market index of the ‘Bolsa de Madrid’, Spain’s principal stock exchange—33% are owned by two or more families (Bolsa de Madrid, 2021; Pérez-Rodríguez et al., 2005).

Multifamily firms can come into existence at different stages of an organization’s lifecycle. Different families might come together when heterogeneous teams of unrelated founders rely on the support of their family members. This can happen at the founding stage, which commonly occurs in high technology sectors (Kudrats et al., 2019). However, we also observe this event occurring at the time of ownership and management succession (Pieper et al., 2015). Within an existing business, a partnership among multiple, not blood-related, owning families can result from either a proactive strategy to create new synergies or under conditions of uncertainty and threats to a firm’s survival (e.g., in the form of an acquisition, merger or with one business family entering the equity structure of another family-owned firm—Brigham and Payne, 2015). For instance, Chirico et al. (2011b) refer to dyadic relationships and partnerships that might be a product of unrelated owning families’ decision to join forces to take advantage of their shared ‘familiness’ (Habbershon and Williams, 1999). However, although these firms may benefit from multifamily members’ heterogeneous yet complementary assets and knowledge within the family business social setting (Arregle et al., 2007), an outcome that may contribute positively to organizational learning efforts (Zahra, 2012), goal diversity and path dependency may also surface as a function of the presence of unrelated owning families (Brigham and Payne, 2015; Pagliarussi and Rapozo, 2011; Pieper et al., 2015).

3. Hypothesis development

3.1. (Multi)family-owned firms

In building our hypotheses, we rely on the notion that the trajectories and outcomes of organizational learning critically depend on the social context in which learning occurs (Argote, 2011; Bunderson and Reagans, 2011; Crossan et al., 1999; Levitt and March, 1988). Specifically, we expect that an increased number of multiple, unrelated families owning a firm creates a particular social setting that affects the trajectories of organizational learning and the translation of integrated knowledge into radical innovation. As the number of unrelated owning families increases, knowledge is potentially more heterogeneous and richer (Brigham and Payne, 2015). In turn, this means that the propensity to perform a broad knowledge search in different areas and fields is likely to be greater (e.g., Brinkerink, 2018; Zahra, 2012). The literature on exploration suggests that radical innovation occurs by bridging previously separated knowledge bases (e.g., Ireland and Webb, 2007). Nevertheless, obtaining this outcome is conditional on members’ shared understandings and common goals (Subramaniam and Youndt, 2005; Tiwana, 2008). We argue that family members belonging to different owning families possess different bases of knowledge; however, as knowledge integration intensifies, the need to manage an increased number of relationships and varying goals across multiple owning families is likely to offset the potential advantages of the

diverse multifamily knowledge and thwart the translation of knowledge integration into radical innovation. As [Chrisman et al. \(2021: 906, 924\)](#) theorize, “divergent family-centered noneconomic [and financial] goals between the owning families create complex inter-family...problems that are intensified by evolving family dynamics.” Because of this, “partnering families are not able to...reap the potential advantages that the multi-family form of organization offers.” Indeed, the unrelated owning families’ goals and priorities are likely to require continuous negotiations ([Chrisman et al., 2012](#); [Duran and Ortiz, 2019](#); [Kotlar et al., 2014](#); [Pagliarussi and Rapozo, 2011](#)); that is, as efforts intensify to integrate knowledge in ways with the potential to contribute to radical innovation ([Brinkerink, 2018](#); [Zahra, 2012](#)), the potential lack of agreement among the unrelated owning families is likely to impede efforts to convert the multifamily members’ knowledge base into commercially valuable and radically innovative outputs. Different goal systems that unrelated owning families may hold are a key reason for this, which may lead to an increase in “the potential for harmful conflict” ([Pieper et al., 2015: 1314](#)).

Indeed, owning families have the pursuit of both financial and nonfinancial goals in common ([Chrisman et al., 2012](#); [Gómez-Mejía et al., 2007](#)); however, the relative importance each family assigns to each goal may differ substantially ([Bertrand et al., 2008](#); [Chrisman et al., 2021](#); [Zellweger and Kammerlander, 2015](#)). For example, for some owning families, preserving the family’s current socioemotional wealth may be the most important goal. This goal may contribute to a desire to commit knowledge resources to pursue more cautious/incremental product innovations. In contrast, other owning families may desire to prioritize the family’s future financial wealth even though pursuing radical innovation may place short-term socioemotional wealth at risk ([Chrisman et al., 2012](#); [Chrisman et al., 2021](#); [Gomez-Mejia et al., 2018](#); [Pongelli et al., 2016](#)). As [Chrisman et al. \(2021\)](#) explain, different owning families may even prioritize specific nonfinancial goals, e.g., family control and dynastic succession—which may require more cautious strategic investments—over other nonfinancial goals, e.g., enhancing the firm’s reputation—which may require actions that are more oriented to produce radical forms of innovation.

Examples of such conflicting goals and potential conflicts characterize many instances of multifamily ownership. For instance, the media company RCS Mediagroup S.p.A. (formerly Rizzoli-Corriere della Sera), which is an Italy-based holding company that is active in publishing leading national daily newspapers, magazines and books as well as radio and television broadcasting and digital news production, has been owned for a long time by a coalition of shareholders comprising major Italian business families (Agnelli, Romiti, Della Valle and Benetton families). Each family had a different entrepreneurial mindset and views with regard to how to develop the business ([Piluso, 2012](#)). They also had different agendas and motivations for controlling RCS and different goals in terms of power and influence. These differences were primarily associated with the sectors where each family had its main interests (e.g., automotive, real estate, infrastructure and transportation, fashion, and food and catering). Overall, the Agnelli and Romiti families had a stronger orientation toward acting in ways that would conserve the firm’s relationships and ties in the local industrial and financial community across generations; in contrast, the Della Valle and Benetton families had a stronger orientation toward developing new strategies and partnerships as a foundation for being innovative in marketplace competitions (e.g., [Piluso, 2012](#)). Different goals generated disagreements and conflicts ([Sylvers, 2004](#)), which hampered RCS’s innovation capacity, especially relative to the radical changes occurring in the industry in the 21st century. RCS struggled to cope with digital disruption; moreover, the inability of the owning families to find a common ground toward radical renewal paved the way for a hostile takeover by the media entrepreneur Urbano Cairo—a former top manager and employee of the entrepreneur and former prime minister Silvio Berlusconi. As the firm’s sole owner, Cairo initiated a strategy of renewal and turnaround to cope with industry-related disruptive transformations ([Sanderson, 2016](#)).

Thus, we expect that the coexistence of diverse sets of conflicting goals of an increased number of unrelated owning families will have a detrimental effect on the relationship between knowledge integration and radical innovation. To avoid conflicts and disagreements, as illustrated by the RCS mediagroup S.p.A. case, a company’s ownership structure may change. However, a reasonable strategic alternative is to limit risk and follow a course of action that does not require debate and provides familiarity for decision makers ([Chirico et al., 2011a](#)). In such an instance, increased knowledge integration activities will lead to the reinforcement and replication of existing knowledge bundles rather than to the creation of new knowledge by challenging existing processes, routines, and solutions ([Levinthal and March, 1993](#); [Tsai et al., 2015](#)), thereby weakening the knowledge integration-radical innovation relationship. As such, the presence of multiple and unrelated owning families may determine a logic toward path dependency that causes family members to search for paths to follow in the realm of existing solutions that “limit[s] the openness to information and to alternative ways of doing things” ([Nahapiet and Ghoshal, 1998: 245](#)).

Myopic, path-dependent behaviors have the potential to provide familiarity and let multifamily members perceive past solutions as less risky than attempting a de novo solution. An illustrative example is related to the three owning families, De Spoelbech, De Mevius and Van Damme, who combined their expertise to establish the brewing company Interbrew in Belgium, which later evolved in the AB-InBev. As owners of previously independent and strong competitors in the Belgian beer market (De Spoelberch and De Mevius in Artois from Leuven and Van Damme in Piedbouef from Liege), the three families’ initial views and strategic goals differed in terms of how to develop the multifamily-owned business ([Bertrams et al., 2019](#)). To avoid conflicts regarding the firm’s development, the families formed an agreement with a foundation on strong and explicit adherence to developing the business without engaging in radical novel changes in the core business’s methods of operating and in its resulting products. As one of the members of the founding families observed, “[t]his is a pure vision that has been cultivated among the entrepreneurial families...the [multi]family shareholders redefined the business...and limits itself to that one core [intact and traditional] business” and product ([Lievens, 2003](#)). The company’s strategy did not focus on breakthrough innovations with respect to production methods or end products; rather, the company relied on existing routines while integrating its knowledge, acquiring leading national and regional brands, and investing heavily in production and promotion to increase the sales of beer products. As a result, despite the company’s performance, the owning families missed the opportunity to translate their rich and diverse knowledge into radical product innovations ([Interbrew, 2021](#)).

In summary, we expect that with an increased number of unrelated owning families, the outcome of knowledge integration shifts

from the development of radically new products to the replication of existing ones, thus constraining the translation of integrated knowledge into radical innovation. That is, the number of unrelated owning families negatively moderates the relationship between knowledge integration and radical innovation in family firms. Formally, we posit the following:

Hypothesis 1. An increased number of unrelated owning families in a business interacts with knowledge integration such that there is a negative effect on radical innovation in family firms. That is, the increasing number of unrelated owning families negatively moderates the relationship between knowledge integration and radical innovation.

3.2. Commitment to change

Some family firms led by unrelated owning families achieve novel firm outcomes (Duran and Ortiz, 2019). With care, these firms mitigate goal divergence and path dependency and unlock the positive potential that multifamily ownership yields in terms of heterogeneous yet complementary multifamily member knowledge (search breadth; Zahra, 2012) as a foundation for producing radical innovation. Indeed, with an increased number of unrelated owning families, the multifamily members' knowledge is likely to be more heterogeneous and thus richer while being based on a common understanding of the complementarity of the family, the business systems, and their interactions (Makri et al., 2010; Sirmon and Hitt, 2003; Zahra, 2012).

Building on insights from the organizational learning literature (Argote, 2011; Crossan et al., 1999), we argue that commitment to change among family members is vital to unlocking the potential value offered by multifamily ownership. More specifically, we expect that high commitment to change leads to a positive interaction effect of knowledge integration and the number of unrelated owning families on radical innovation in family firms. Commitment to change is a force (a mindset) that binds a group to a shared action deemed necessary to successfully implement a change initiative (Herscovitch and Meyer, 2002). Once in place, this commitment mitigates the possibility of core rigidities surfacing while also having a positive effect on the novelty of any resulting knowledge integration-based radical innovation. For instance, Crossan et al. (1999: 533) note that "for novel ideas, shared understanding may not evolve unless shared action or experimentation [toward change] is attempted"; that is, organizational members need to anchor their behavior to a common logic that transforms prevailing knowledge and that favors radical forms of innovation (Argote, 2011; Bunderson and Reagans, 2011; Edmondson, 1999). Commitment to change provides that common logic with the potential to overcome the multifamily ownership limitations discussed above.

Commitment to change "is viewed as a conveyor of opportunities" (Ireland et al., 2003: 970) and "is reflected in organizational members' beliefs, attitudes, and intentions regarding the extent to which changes are needed and the organization's capacity to successfully make those changes" (Armenakis et al., 1993: 681). A commitment to change surfaces when individuals realize that change is foundational to a firm's efforts to learn and enhance its outcomes (Ireland and Webb, 2009). As such, it has a positive effect on efforts to explore new opportunities and develop creative approaches to exploit them (Ireland and Webb, 2009). Commitment to change provides the logic for a change initiative and helps exploit the resources supporting that logic. For instance, the research suggests that the desire to support change strengthens the positive relationship between knowledge sharing (e.g., Randall et al., 1990) and opportunity exploration and innovation (e.g., Bloodgood and Morrow, 2003; Klein and Sorra, 1996). Additionally, evidence indicates that commitment to change has a negative relationship with goal diversity and myopic, path-dependent behaviors (e.g., Wanberg and Banas, 2000). As such, an increased commitment to change shifts a firm's response behaviors toward efforts to identify creative ways to deploy knowledge resources toward innovation as an outcome of a firm's activities (Bloodgood and Morrow, 2003; Conner, 1992; Conner and Patterson, 1982).

In this study, we contend that (multi)family ownership affects the relationship between knowledge integration and radical innovation across different levels of family members' commitment to change. We expect that commitment to change is an important factor to distinguish (multi)family-owned firms that produce radical innovation from those that do not; that is, commitment to change mitigates the potentially divergent goals and path dependencies that accompany the increased presence of multiple owning families (Konig et al., 2013; Miller et al., 2003). It also ensures a commitment on the part of the families to develop novel products by deploying their unique heterogeneous yet complementary knowledge in value-creating ways (Chirico and Salvato, 2016; Kellermanns and Eddleston, 2006; Mazzelli et al., 2018). In this respect, Klein and Sorra (1996), Miller et al. (1994), and Wanberg and Banas (2000) argue that openness to change can promote goal clarity, deter change resistance behaviors, and facilitate innovation. Thus, commitment to change can facilitate multifamily members' efforts to adapt their behavior to be consistent with the spirit of change while investing significant efforts to effectively use integrated knowledge to create radical innovation. Conversely, in the absence of a commitment to change, in their effort to translate the integrated knowledge into novel products, multifamily members may be more likely to fall into familiarity traps that constrain radical forms of innovation.

An interesting illustration is offered by the Boero Group, a company based in Genoa and the leader in the European market of premium and highly innovative coatings, paints, and protection cycles (Boero, 2021a). Established in 1831, Boero has a long tradition and expertise in the industry thanks to the knowledge accumulated over decades by the ownership coalition comprising the Boero, Teso, and Ghisleri families. Different strategic goals and perspectives distinguish the three families. The Boero and Ghisleri families have a stronger desire to grow the firm's domestic market presence while leveraging and building on their historical business networks and preserving family control. In contrast, the Teso family has a stronger focus on expanding the business internationally and enhancing its reputation. Over time, these different foci have led to disagreements among the families (Genco and Penco, 2013). However, the strong orientation toward change characterizing the three families has helped mitigate their divergent goals and priorities while enabling them to translate their diverse knowledge and experiences into radical forms of innovation. A spirit of change and the families' "commitment to pioneering the future of painting products" have indeed created a strong and enduring legacy of

radical innovations at the Boero Group (Boero, 2021b), as demonstrated through a dedicated state-of-the-art research and development center. Overall, “research, innovation and excellence have enabled the company to achieve leadership in the [market of paint products for the] architectural and deco, yachting and marine sectors” (Boero, 2021a). In 2017, the company chose to delist itself from the Italian stock exchange to support its commitment to increase investments in R&D with the objective of producing radically new products as solutions to customers’ problems (MediTelegraph, 2017).

In summary, we expect that commitment to change is vital to unlocking the potential value of multifamily ownership in exploiting family members’ heterogeneous yet complementary knowledge resources to produce radical innovation. Commitment to change allows multifamily members to explore new opportunities and ensures the most effective vetting of those opportunities while reducing the likelihood of goal divergence and path dependency surfacing in a firm. Accordingly, we contend that when commitment to change is high, multifamily members are more likely to effectively exploit their knowledge resources to produce radical innovation. In contrast, when commitment to change is low, multifamily members may tend to take actions that focus on maintaining the firm’s current competitive advantage. Focusing on maintaining a current competitive advantage often hampers a firm’s efforts to translate integrated knowledge in ways that lead to radical innovation. In support of this argument, Kellermanns and Eddleston (2006) find that family firm innovativeness increases when family members’ willingness to change is high. Thus, our arguments suggest that a three-way interaction among knowledge integration, the number of unrelated owning families, and commitment to change has a positive effect on radical innovation. More specifically, when commitment to change is high, the number of unrelated owning families positively moderates the relationship between knowledge integration and radical innovation. Formally, we posit the following:

Hypothesis 2. The three-way interaction among knowledge integration, the number of unrelated owning families, and commitment to change has a positive effect on radical innovation in family firms. That is, when commitment to change is high, the increasing number of unrelated owning families positively moderates the relationship between knowledge integration and radical innovation.

4. Methods

To form our sample, we identified companies included in the Spanish database, the SABI (the Iberian Balance Sheet Analysis System). Given the cultural importance placed on family relationships and the prevalence of family firms in Spain (Poza, 1995; Steier, 2009), it is not surprising that according to estimations from the Spanish Family Enterprise Institute (2015), family ownership is a common governance structure among Spanish companies. Following the prior research (Arzubiaga et al., 2018; Deephouse and Jaskiewicz, 2013; Gómez-Mejía et al., 2001; Miller et al., 2013; Pérez-González, 2006), we identified family firms as those in which two or more shareholders have the same family name. Additionally, we excluded companies affected by insolvency, winding-up, liquidation or zero activity, as well as listed companies. Finally, we removed firms with incongruent data or missing contact information.

Following the prior research (Arzubiaga et al., 2018; Kellermanns et al., 2008; Simon and Shrader, 2012), we address the difficulty of accessing primary data in private firms by opting for a single respondent survey directed to key informants. Specifically, we adopted a key informant design targeting the companies’ family CEOs or family senior executives who are the most critical decision makers and oversee all major operations (Gedajlovic et al., 2012; Wiklund and Shepherd, 2003). To increase the participation rate, we made the respondents aware of the study in advance by means of a letter stating the purpose and importance of the research. We protected the respondents’ anonymity by indicating in the cover letter that participants’ information would remain confidential. The first survey question aimed to corroborate that the respondents recognized the firm as a family firm (Chua et al., 1999). Starting from the final sample of 1312 nonlisted Spanish family firms, we received responses from 236 family firms (17.99% response rate) in which a family or a group of families owned the majority of the firm’s equity compared to other shareholders (Andres, 2008; Bennedsen et al., 2007; Chirico and Salvato, 2016). We compared the means of the respondents and nonrespondents with respect to age, size, and industry. We used a *t*-test and a chi-square test to determine if the group of respondents was representative of the initial population. We found no significant differences in conducting these tests. Moreover, there were no differences in answers between early and late respondents.

Next, we addressed the issue of common methods bias (CMB) in several ways. First, we performed Harman’s one-factor test on the items included in our regression model. The results of the unrotated factor analysis showed that no single factor was dominant. The results showed 12 factors with eigenvalues greater than one; these factors accounted for 72.32% of the variance. The first factor explained 16.46% of the variance; the remaining factors accounted for 55.86% of the variance. These results suggested that the factor structure was not an artifact of the measurement process (Podsakoff and Organ, 1986). Second, we followed Podsakoff et al.’s (2003) suggestion to use the unmeasured latent factor method approach to analyze the data. This approach allows all self-reported items to load both on their theoretical constructs and on an uncorrelated method factor. We compared the results of this model (CFI: 0.584; IFI: 0.587; TLI: 0.562 and RMSEA: 0.20; Normed χ^2 (77 d.f.): 802.07) with our four-factor measurement model (radical innovation, knowledge integration, number of unrelated owning families, and commitment to change) without the latent method factor (CFI: 0.966; IFI: 0.966; TLI: 0.956 and RMSEA: 0.06; Normed χ^2 (71 d.f.): 130.31). The results from this effort show that the addition of the latent factor did not significantly improve the fit of the measurement model. Additionally, all factor loadings of the measurement model remained statistically significant at $p < 0.001$. These results further suggested that common method bias was unlikely to have influenced our study’s results. Third, we followed Lindell and Whitney’s (2001) method, employing a marker construct. To conduct the marker construct test (Podsakoff et al., 2003), we used the multi-item scale on “satisfaction with the work-life balance” from Valcour (2007) (Alpha = 0.96; Composite Reliability = 0.97; Average Variance Extracted (AVE) = 0.86). This marker construct assesses common method bias by determining the correlation between the marker construct and the latent variables. If the correlation between any latent variables and the marker variable is greater than 0.30, then common method bias is an issue (Cohen, 1992; Gkorezis et al.,

2016; Tehseen et al., 2017). The correlations between all latent variables and the marker variable (satisfaction with the work-life balance) were always lower than 0.30, indicating no evidence of common method bias in this study (correlation with the number of owning families: -0.06 , ns; correlation with radical innovation: 0.10 , ns; correlation with knowledge integration: 0.29 , ns; correlation with commitment to change: 0.22 ; ns). Finally, we used objective secondary data for the control variables of age, size, and industry.

4.1. Measurement and validation of constructs

We developed the survey through a series of steps, including the use of existing and validated scales from the literature. English was the language for developing the questionnaire initially. We then translated the questionnaire into Spanish through a translation and back-translation procedure completed by two university academics who are fluent in both languages. Following this step, we pilot tested the questionnaire with three executives and five academics whose expertise focuses on research methodology and family firms. We then incorporated feedback from these individuals about the survey instrument's content, item wording, terminology, and clarity into a revised instrument. In this refinement process, we paid close attention to ensure that we interpreted items unambiguously and that the items displayed high content validity. Before making the final revisions, we again piloted the refined items on a sample of 20 Spanish family firms. These revision efforts created an instrument with high reliability (Cronbach's α ranging from 0.77 to 0.92). Below we report the study's key constructs and items measured on a five-point scale (strongly disagree/strongly agree; much weaker/much stronger than competitors).

We used exploratory and confirmatory factor analyses to assess the construct validity of all items pertaining to our main constructs. Exploratory factor analysis of all items (radical innovation, knowledge integration, number of unrelated owning families, and commitment to change) clearly replicated the intended four-factor structure. Each item loaded clearly on its intended factor, and all factor loadings were above 0.60 (Bagozzi and Yi, 1988). An integrated confirmatory factor analysis on all items (with each item constrained to load only on the factor for which it was the proposed indicator) yielded a model that fits the data well (CFI: 0.966; IFI: 0.966; TLI: 0.956 and RMSEA: 0.06; Normed χ^2 (71 d.f): 130.31). Moreover, all item loadings were as proposed and significant, while composite reliabilities (radical innovation: 0.88; knowledge integration: 0.91; commitment to change: 0.93) were all above the recommended threshold of 0.70 (radical innovation: 0.88; knowledge integration: 0.91; commitment to change: 0.93). The AVEs were also well above the recommended cutoff of 0.50, providing support for convergent validity (radical innovation: 0.71; knowledge integration: 0.73; commitment to change: 0.71) (Anderson and Gerbing, 1988; Fornell and Larcker, 1981).

We then compared the fit of our primary, four-factor model against alternative models of two and three factors.¹ The results of the confirmatory factor analysis suggested that our four-factor model fit the data significantly better than alternative models. Additionally, we evaluated discriminant validity (Fornell and Larcker, 1981), that is, the extent to which each latent variable is distinct from other constructs in the model (Hair et al., 2017). We did this by examining the square root of the AVE for each construct that needs to be greater than all the correlations of the other constructs associated with the model (Fornell-Larcker criterion; Fornell and Larcker, 1981; Hair et al., 2017). The heterotrait-monotrait (HTMT) ratio is an additional and generally considered superior criterion compared to more traditional assessment methods to assess discriminant validity (Henseler et al., 2015). An HTMT value above 0.85 suggests a lack of discriminant validity (Hair et al., 2017). Table 1 shows evidence of discriminant validity with both the Fornell-Larcker criterion and the HTMT criterion.

4.2. Dependent and independent variables

To measure *radical innovation*, we adopted Subramaniam and Youndt's (2005) three-item scale to assess the family firm's capability to generate radical innovation in the form of products introduced into a marketplace. The items were "Innovations that make your prevailing good/service lines obsolete," "Innovations that fundamentally change your prevailing goods/services," and "Innovations that make your existing expertise in prevailing goods/services obsolete" (Alpha = 0.78). We assessed *knowledge integration* through a four-item scale from Tiwana (2008) and Tiwana and Mclean (2005) to measure family members' ability to integrate their knowledge. We used the following items: "Family members competently blend new project-related knowledge with what they already know," "Family members span several areas of expertise to develop shared project concepts," "Family members synthesize and integrate their individual expertise at the project level," and "Family members can see clearly how different pieces of a project fit together" (Alpha =

¹ The first three-factor model combined knowledge integration and commitment to change into a single composite measure (CFI: 0.715; IFI: 0.718; TLI: 0.650 and RMSEA: 0.17; Normed χ^2 (74 d.f): 570.23). The second three-factor model included commitment to change and radical innovation to form one composite measure (CFI: 0.830; IFI: 0.831; TLI: 0.791 and RMSEA: 0.13; Normed χ^2 (74 d.f): 370.39). The third three-factor model combined knowledge integration and radical innovation into one composite measure (CFI: 0.840; IFI: 0.842; TLI: 0.804 and RMSEA: 0.12; Normed χ^2 (74 d.f): 351.78). The two-factor model combined knowledge integration, commitment to change and product innovation into one composite measure (CFI: 0.583; IFI: 0.587; TLI: 0.501 and RMSEA: 0.20; Normed χ^2 (76 d.f): 802.07).

Table 1Discriminant validity (Fornell-Larcker criterion and HTMT₈₅ criterion).

	Number of unrelated Owing Families	Radical Innovation	Knowledge Integration	Commitment to Change
Number of unrelated Owing Families	<i>1.000</i>	0.114	0.077	0.042
Radical Innovation	−0.098	<i>0.839</i>	0.255	0.145
Knowledge Integration	−0.069	0.218	<i>0.853</i>	0.298
Commitment to Change	−0.037	0.120	0.282	<i>0.840</i>

Note: The diagonal represents the square root of AVEs in italic. The Fornell-Larcker criterion appears below the diagonal and the HTMT85 criterion appears above the diagonal.

0.87). The number of unrelated owning families was captured by asking the respondents “How many unrelated families own the business”?² (Duran and Ortiz, 2019; Pieper et al., 2015). We measured *commitment to change* by adopting a six-item scale from Herscovitch and Meyer (2002) to assess family members’ commitment to follow a shared action deemed necessary to successfully implement a change initiative. The items were “Family members believe in the value of change,” “Change is a good strategy for the business,” “It would be a mistake not to introduce changes,” “Change serves an important purpose,” “Things would be worse without change,” and “Change is necessary for the business” (Alpha = 0.91).

4.3. Control variables

We also controlled for several variables (company age, company size, company performance, sales growth, R&D investments, product development, organizational capital, family members’ working experience within and outside the firm, family ownership, family management, and industry³). First, we measured *company age* as the number of years that the firm had been in existence. Older companies may not be apt to implement radical forms of innovation because conservatism may prevail (Leonard-Barton, 1992). Second, we identified *company size* using the number of full-time employees. Larger companies may have more access to external slack resources (Zahra and Nielsen, 2002) and more opportunities for alliance formation (Harrison et al., 2001), which may affect their innovation capacity. Third, evidence suggests that a *company’s performance* can increase its slack resources, some of which can support investments in knowledge, such as employee training, and in turn innovation (Zahra and Nielsen, 2002). Following Wiklund and Shepherd (2003), we assessed performance through four financial measures—net profit, sales growth, cash flow, and growth of net worth—in relation to those of competitors (Alpha = 0.86). Fourth, we controlled for *R&D investments*, which reflect a company’s ability to acquire external knowledge for innovation purposes (Cohen and Levinthal, 1990; Sciascia et al., 2015). We did this by using a four-item scale: “R&D spending is high,” “R&D investments are taken into strong consideration in our company,” “R&D investments are vital for our company’s success,” and “We invest resources in R&D” (Alpha = 0.92) (Sciascia et al., 2013). Fifth, a firm’s *product development* capability may also affect its innovative capacity, especially when seeking to produce radical innovation (Subramaniam and Youndt, 2005). As such, we controlled for it through the following items: “Ability in conducting applied R&D,” “Ability to transform R&D results into goods/services,” “Ability to build new goods/services,” “Ability to modify existing goods/services,” “Speed of new goods/service development,” and “Overall ability to modify or build goods/services” (Alpha = 0.77) (Chirico and Salvato, 2016).

Sixth, the organizational members’ *working experience within and outside the organization*, which forms most of the organization’s human capital and social capital, together with firm *organizational capital*, are critical to efforts to develop radical innovation (Subramaniam and Youndt, 2005). Thus, we controlled for all family members’ full-time work experience within and outside the family firm in terms of the number of years. Based on the scale developed by Subramaniam and Youndt (2005), we also controlled for organizational capital. We did this by using the following items: “Our business uses multiple means (manuals, stories) as a way to store knowledge;” “Much of our business’s knowledge is contained in manuals, databases, etc.,” “Our business’s culture (stories, rituals) contains valuable ideas, ways of doing business, etc.,” and “Our business embeds much of its knowledge and information in structures, systems, and processes” (Alpha = 0.86). The research suggests that the *percentage of family ownership* and the *percentage of family members in the management team* affect the family firm’s radical innovation (Calabrò et al., 2019; Duran et al., 2016); accordingly, we controlled for this expectation. Finally, *industry type* can potentially affect radical innovation (Subramaniam and Youndt, 2005). With the agriculture industry as the comparison, dummy variables differentiate different industries including minerals, construction,

² We clearly specified to the respondents that the question refers to a situation in which family members within each family have a family relationship while family members across families do not (Brigham and Payne, 2015; Duran and Ortiz, 2019; Pieper et al., 2015). In our sample, 31% of the family firms are multifamily owned. We also calculated the percentage of all multifamily-owned firms present in the SABI database. The results show that multifamily-owned firms are 34% of the total number of Spanish family firms in the SABI database—which provides further support of the representativeness of our sample.

³ Additionally, given that a firm’s radical innovation might differ according to the generation of the family in control of the business (Calabrò et al., 2019; Duran et al., 2016), as a robustness check, we also ran the analyses controlling for the generation in control. This variable was not statistically significant, and its inclusion did not change the other results. However, as expected, we did find a high correlation between the generation in control and firm age (0.50; $p < 0.001$). As an additional check, we again ran the analysis excluding firm age while retaining the generation in control. Again, the generation in control was not statistically significant and its inclusion did not change the results. Therefore, we did not include the family generation in control as a control variable in the analyses we report.

manufacturing, transportation and communication, wholesale and retail trade, the food sector, finance, and services.

4.4. Controlling for endogeneity

It is possible that radical innovation is endogenous to the unique features of having an increased number of unrelated families owning the business. Stated differently, the factors that might influence the need for radical innovation could also influence the desirability of maintaining the firm as a one-family or as a multiple-family entity. To control for potential endogeneity, we employed a two-stage residual inclusion (2SRI) model (see [Patel et al., 2018](#); [Terza et al., 2008](#)). The 2SRI estimator is similar to the linear two-stage least squares estimator except that in the second-stage regression, the first-stage predictors do not replace the endogenous variables; instead, the first-stage residuals are included as additional regressors.

In our study, for instrumental variables that can potentially correct for endogeneity, we relied on the emphasis the firm places on resource divestment as demonstrated by laying people off, selling equipment/facilities, and divesting resources. Theoretically, these instrumental variables are unlikely to have a direct influence on radical forms of innovation in family firms ([Calabrò et al., 2019](#)); however, they can potentially affect the existence of a business owned by one or multiple families. The literature concerned with divestiture suggests that families are reluctant to divest resources, especially when ownership is concentrated within a single family ([Chirico et al., 2020](#); [Feldman et al., 2016](#); [Filser et al., 2018](#)). Similarly, given that the factors that may influence radical innovation could also influence the levels of knowledge integration and commitment to change, we also address the potential related endogeneity through multiple instruments measuring the family's satisfaction with work-life balance (the division of time between work and family life, the fit between work and family life, the ability to balance job and family needs, and the ability to perform the job well and yet be able to adequately perform home-related duties; see [Valcour, 2007](#)). Family satisfaction with the work-life balance is likely to influence knowledge integration and commitment to change ([Beauregard and Henry, 2009](#); [Erdogan et al., 2012](#); [Mari and De Vita, 2016](#)) but unlikely to affect radical innovation directly ([Calabrò et al., 2019](#); [Fletcher, 2010](#)). In the first stage, we used the instrumental variables to compute the estimated values of the problematic predictor(s); we then used those computed values in the second stage as predictors of our dependent variable ([Kennedy, 2008](#); [Wooldridge, 2002](#)). Thus, we controlled for the endogeneity score in all analyses⁴ (see [Table 3](#); [Chrisman and Patel, 2012](#)).

5. Results

We used regression analysis to test the hypotheses. We present the study's descriptive statistics and correlations of variables in [Table 2](#). First, an inspection of the variance inflation factors (VIFs) reveals that multicollinearity is not a concern in that all VIF coefficients are less than 5. Second, to test for heteroscedasticity, we screened the data with the help of the White test (Cameron and Trivedi's decomposition of the IM-test) and the Breusch-Pagan/Cook-Weisberg test. Both tests (White test: $\text{Chi}^2 = 236.00$; $p = 0.47$; Breusch-Pagan/Cook-Weisberg test: $\text{Chi}^2(1) = 3.72$; $\text{prob.} > \text{chi}^2 = 0.06$) indicate that heteroscedasticity is not a concern ([Hamilton, 2006](#); [Kennedy, 2008](#); [Wooldridge, 2002](#)). [Table 3](#) presents the results for Hypotheses 1 and 2. As expected, Model 2 shows that knowledge integration positively affects radical innovation. As a robustness test, we also checked whether a nonlinear relationship exists between knowledge integration and radical innovation ([Tsai et al., 2015](#)). The results were not significant (knowledge integration = 0.14; $p < 0.05$; knowledge integration squared = 0.08; $p > 0.10$).

[Hypothesis 1](#) predicts that an increased number of unrelated owning families interacts with knowledge integration to negatively affect radical innovation in family firms. Model 3's interaction term (number of unrelated owning families * knowledge integration) is negative and significant, thus supporting [Hypothesis 1](#). Model 3 also exhibits a significant increase in R^2 ($F = 4.063$; $p < 0.05$). Moreover, the results appearing in Model 4 corroborate this finding. This model includes all the independent variables and the two-way interactions required to test the three-way interaction hypothesis. Even with the addition of these other interaction terms, the effect of knowledge integration by the number of unrelated owning families remains of the same magnitude, negative, and statistically significant (although marginally so at $p = 0.052$). To qualify our findings in greater depth, we graphed the interactions between knowledge integration and the number of unrelated owning families on radical innovation (see [Fig. 1](#)). The plot shown in this graph is consistent with our expectation. The slope difference test further supports [Hypothesis 1](#), showing a t-statistic value of 2.787 ($p < 0.01$).

[Hypothesis 2](#) states that the three-way interaction among knowledge integration, the number of unrelated owning families, and a commitment to change positively affects radical innovation. Model 5 shows that the three-way interaction is positive and statistically significant. Furthermore, Model 5 also exhibits a significant increase in R^2 ($F = 4.372$; $p < 0.05$). The plot of the interaction in [Fig. 2](#) confirms that when commitment to change and knowledge integration are high, an increased number of unrelated owning families leads to higher levels of radical innovation. We also conducted *slope difference tests* to determine whether individual slopes were significantly different from each other ([Dawson, 2014](#); [Dawson and Richter, 2006](#)). As shown in [Table 4](#), all the slopes differ significantly from one another.

6. Discussion

Given the dominance of (multi)family-owned firms in many economies ([Chrisman et al., 2021](#); [Neckebrouck et al., 2018](#)) and the

⁴ To mitigate the high correlation among the three endogeneity scores, we calculated a composite endogeneity score by adding the standardized values of each measure ([Finkelstein, 1992](#)).

Table 2
Descriptive statistics and correlations.

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Radical innovation	3.12	0.59	1														
2 Knowledge integration	3.84	0.69	0.22	1													
3 # of unrelated owning families	1.66	1.26	-0.1	-0.06	1												
4 Commitment to change	4.11	0.67	0.12	0.26	-0.03	1											
5 Firm age	43.73	28.93	-0.06	0.03	0.01	0.04	1										
6 Number of employees	103.67	97.93	0.03	0.16	0.04	0.04	0.15	1									
7 Performance	3.64	0.74	0.34	0.21	-0.09	0.06	-0.01	0.19	1								
8 Sales growth	9.99	10.24	0.06	0.06	-0.09	0.09	0.04	0.18	0.12	1							
9 R&D investments	3.15	1.06	0.13	0.28	-0.1	0.16	0.05	0.13	0.1	0.17	1						
10 Product development	3.96	0.57	-0.1	0.03	0.05	0.07	-0.03	-0.02	-0.02	0.09	0.02	1					
11 Organizational capital	3.75	0.72	0.19	0.33	0.02	0.15	-0.1	0.02	0.16	0.09	0.31	0.05	1				
12 Working experience within	34.2	27.33	-0.08	0.01	0.03	0.1	0.08	0.15	-0.04	-0.03	-0.03	-0.09	-0.03	1			
13 Working experience outside	9.5	14.6	0.05	0.01	-0.02	0.15	-0.08	-0.09	-0.03	0.02	0.04	0.03	0.13	0.13	1		
14 Family ownership	89.74	18.37	-0.01	0.04	-0.21	0.01	-0.12	-0.01	0.02	0.08	0.11	-0.01	0.01	0.1	-0.05	1	
15 Family management	65.27	32.59	-0.06	0.02	-0.04	-0.12	-0.11	-0.18	-0.07	-0.11	-0.15	-0.06	-0.05	0.05	-0.12	0.07	1

Correlations with values of 0.131 or greater are significant at $p < 0.05$.

Table 3
Results of regressions.**

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Firm age	0.000	-0.000	-0.000	-0.000	0.000
Number of employees	-0.000	-0.000	-0.000	-0.000	-0.000
Performance	0.259***	0.241***	0.227***	0.226***	0.233***
Sales growth	-0.001	-0.000	-0.001	-0.001	-0.001
R&D investments	0.029	0.017	0.016	0.013	0.012
Product development	-0.123 ⁺	-0.129*	-0.134*	-0.137*	-0.128*
Organizational capital	0.103 ⁺	0.073	0.074	0.073	0.066
Working experience within	-0.002	-0.002	-0.002	-0.002	-0.002
Working experience outside	0.002	0.002	0.002	0.002	0.002
Family ownership	-0.000	-0.000	-0.000	-0.000	-0.000
Family management	-0.001	-0.001	-0.001	-0.001	-0.001
Industry dummies	Yes	Yes	Yes	Yes	Yes
Knowledge integration (KI)		0.123*	0.112 ⁺	0.110 ⁺	0.096
Number of unrelated owning families (families)			-0.032	-0.031	-0.050
Commitment to change (CtoC)			0.051	0.058	0.086
Families*KI			-0.090*	-0.089 ⁺	-0.070
Families*CtoC				-0.004	-0.020
KI*CtoC				-0.047	-0.068
Families*KI*CtoC					0.143*
Endogeneity score	0.000	0.006	0.010	0.009	0.006
R ²	0.20	0.22	0.24	0.24	0.26
Adjusted R ²	0.12	0.13	0.14	0.13	0.15
F-statistics for R ² change		1.864	4.063*	0.176	4.372*

⁺ $p < 0.1$.
^{*} $p < 0.05$.
^{**} $p < 0.01$.
^{***} $p < 0.001$.

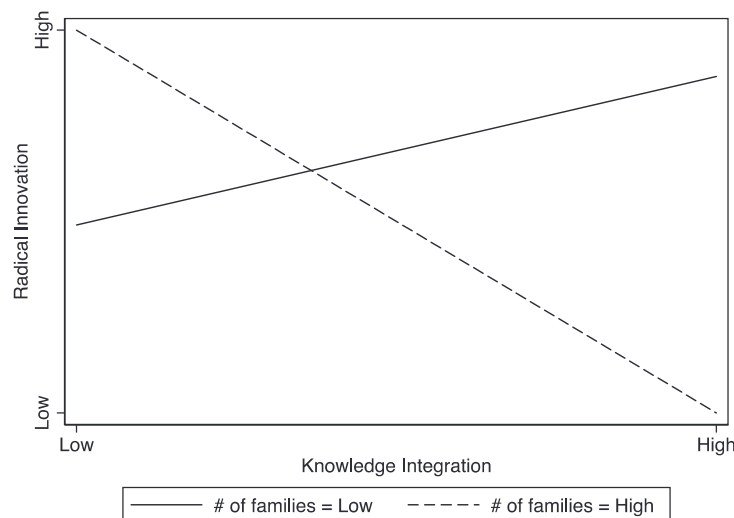


Fig. 1. Two-way interaction effect between knowledge integration and the number of unrelated owning families on radical innovation.

benefits that may accrue to these firms by producing radical innovation (Subramaniam and Youndt, 2005), an important objective of this study is to increase our understanding of the factors that have a positive influence on (multi)family-owned firms’ ability to produce radical innovations. Gaining additional insights regarding these issues is critical in that radical innovation has a strong influence on the continuity of a family firm across time and events (Diaz-Moriana et al., 2018; Duran et al., 2016; Konig et al., 2013). However, the portrayal of family firms is often that they are a conservative form of organization (Calabrò et al., 2019; Diaz-Moriana et al., 2018) with a focus on incremental rather than radical innovation. This general and widely held assumption has received some empirical support (see, e.g., Asaba and Wada, 2019; Hu and Hughes, 2020; Nieto et al., 2015). On the other hand, a recent ranking by *Forbes* identifying the most innovative companies in Europe that invest largely to produce radical innovations shows that, paradoxically, owning families control more than half of these companies (Forbes, 2018; see also De Massis et al., 2015a; Duran et al., 2016). On the same note, over the years, the historical ranking compiled by the Boston Consulting Group with the 50 most innovative companies at the global level reflects a consistent and significant presence of family companies (Boston Consulting Group, 2021).

With respect to this study’s foundation, we find it intriguing that there is little research examining the advantages or disadvantages

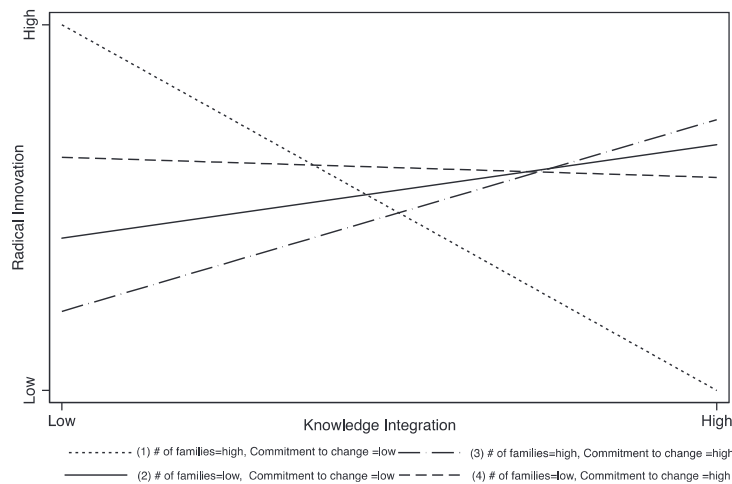


Fig. 2. Three-way interaction effect among knowledge integration, the number of unrelated owning families and commitment to change on radical innovation.

Table 4
Slope difference tests (three-way interaction).

Pair of slopes	t-value for slope difference	p-value for slope difference
(1) and (2)	1.971	0.049
(1) and (3)	-2.721	0.007
(1) and (4)	-2.574	0.011
(2) and (3)	-2.334	0.021
(2) and (4)	-2.391	0.018
(3) and (4)	-2.234	0.027

of having an increased number of unrelated families as owners of a business with respect to the ability to produce radical innovation (Brigham and Payne, 2015; Chrisman et al., 2021; Duran and Ortiz, 2019; Pieper et al., 2015). Accordingly, we seek herein to advance the debate about these issues and to challenge existing assumptions about family firms' orientation to an innovation type. We contend that owning families affect family members' conduct and actions and, in turn, efforts within family firms to engage in radical innovation (Chirico and Salvato, 2016; Minola et al., 2021).

We believe that several significant contributions flow from our study. First, our study sheds new light on the organizational learning and knowledge integration literatures. Organizational learning theorists argue that learning creates its own traps (Ahuja and Lampert, 2001; Ireland and Webb, 2007, 2009). For instance, Tsai et al. (2015) theorize that radical innovation is related to knowledge integration in an inverted U-shaped relationship. In fact, knowledge integration can be either beneficial or detrimental for radical innovation because, on the one hand, it may facilitate the successful anchoring of new ideas in an organization's knowledge base (e.g., Zahra et al., 2000; Zhou and Li, 2012). On the other hand, increasing levels of knowledge integration could encourage excessive reliance on familiar, perhaps "comfortable," knowledge rather than stimulate exploration for new knowledge. When this happens, the adoption of alternate directions of development is less likely (e.g., March, 1991; Levinthal and March, 1993; Tsai et al., 2015). Instead, our results and the related robustness test show a *linear* and *positive* relationship between knowledge integration and radical innovation. Nonetheless, importantly, in a family firm context, learning rigidities that favor the refinement of familiar knowledge over the exploration for novel knowledge are a function of the number of unrelated families owning the business. In multifamily-owned firms, our theory suggests that learning rigidities stem from the owning families' goal diversity and path dependency. Our theory and empirical results contribute to our understanding of knowledge integration, organizational learning, and radical innovation in that we identify a unique ownership mechanism (number of unrelated owning families) that affects the novelty of any resulting radical innovation. More generally, from the perspectives of organizational learning, our results suggest that innovation research focusing on the balance between *reinforcing* and *transforming* prevailing knowledge (Subramaniam and Youndt, 2005) should not ignore the contingency role of firm ownership as a form of corporate governance (see Connolly et al., 2010).

Second, what we believe is a key contribution to the entrepreneurship research results from our focus on firms owned by unrelated families as a context within which to study radical innovation. The multifamily firm setting is a unique one in which, with support from their families, two or more founders come together to establish a new enterprise (Pieper et al., 2015). However, to date, the "research has overlooked family firms that are [multifamily] owned" or failed to acknowledge the presence of multifamily-owned firms in their sample (Chrisman et al., 2021: 907). In fact, to the best of our knowledge, our study is the first to shed light on radical innovation in firms where single and multiple unrelated families own the firm. While multifamily ownership is detrimental for radical innovation because of the goal divergence and path dependency it may create, we demonstrate how a commitment to change can provide a common logic that enables family members to deploy their integrated knowledge in ways that yield outcomes that are favorable to

producing radical innovations. Overall, our theory suggests that higher levels of radical innovation occur when firms effectively manage the intersections among knowledge integration, multifamily ownership, and commitment to change. This finding also allows us to shed new light on the limited extant literature regarding the intersection between radical innovation and family firms (Calabrò et al., 2019; Hu and Hughes, 2020). Surprisingly, despite some practical evidence supporting family firms as champions of radical innovation (Boston Consulting Group, 2021; Forbes, 2018), the family firm literature (Asaba and Wada, 2019; Calabrò et al., 2019; Nieto et al., 2015) consistently suggests that family firms are risk averse (Hoskisson et al., 2017), which causes them to focus less on the novelty of their products. Our work challenges this widely held assumption (cf. “consensus shifting;” Grant and Pollock, 2011; Holtenbeck, 2008) and the related theoretical tension in the family firm-innovation literature (Calabrò et al., 2019; Diaz-Moriana et al., 2018; Hu and Hughes, 2020). We do so by considering how radical innovation within multifamily-owned firms can vary substantially for different levels of commitment to change. Relatedly, the implications of our theory and findings for single family firms – which may resemble multifamily constellations because a large, extended family is likely to gradually develop into multiple, smaller “sub” families – are also important. In fact, while family members in a single-multigenerational family firm are blood-related, the issues they face likely resemble those encountered by family firms that are owned by multiple unrelated owning families.

Third, with increasing frequency, scholars are calling for additional investigations of behavioral differences in innovation among multiple types of family firms, especially in relation to radical innovation (Calabrò et al., 2019; De Massis et al., 2015a; Diaz-Moriana et al., 2018). Recently, Hu and Hughes (2020: 1201) identified the research gap with respect to radical innovation and the *conditions* to achieve radical innovation in family firms as being of “paramount importance” given that an absence of radical innovation can compromise the family firm’s long-term viability. In our study, we show how the diversity in family firms with respect to their shareholding structure and commitment to change are differentiators that explain why some, but not all, family firms are effective in producing radical innovation. We contribute to the debate on whether and under what circumstances the family firm context is conducive to efforts to produce radical innovation (e.g., Chrisman et al., 2015; De Massis et al., 2015b; Erdogan et al., 2020). Fig. 1 shows that multifamily ownership constrains the translation of knowledge integration into radical innovation; according to our theory, this finding is a product of goal divergence and path dependency. This finding allows us to contribute to the extant literature on financial and nonfinancial (socioemotional) goals. Generally, this literature assumes that family firms have similar goals that are distributed equally among family members and that these goals differ from those held by members of nonfamily firms (see, e.g., Chirico et al., 2020; Chrisman et al., 2012; Gómez-Mejía et al., 2007; Hoskisson et al., 2017). In contrast, our theory suggests that such goals may vary among the family members of different families holding joint ownership of a family firm.

Fig. 2 offers a keen understanding regarding the joint effects of knowledge integration, the number of unrelated owning families, and a commitment to change. When knowledge integration is high, the combination of multifamily ownership and a high commitment to change leads to the maximization of radical innovation; that is, commitment to change mitigates goal divergence and path dependency. The result is that multifamily-owned firms are then able to convert integrated knowledge into highly innovative products. However, when knowledge integration is weak, multifamily-owned firms innovate best when family members’ commitment to change is low. A plausible explanation for this perhaps surprising result is that in multifamily-owned firms with weak knowledge integration and, thus, weak social relationships among family members, there is a tendency for goal divergence and path dependency to become stronger. The outcome of this is that a family member group’s high commitment to change cannot drive efforts to implement innovation outcomes. Instead, under these conditions, radical innovation is most likely best driven by a single or few dominant family member(s) acting as ‘product champions’ through “a strategy of simple rules” (Pieper et al., 2015: 1315; see also Salvato et al., 2010). Additionally, the slope difference tests shown in Table 4 enabled us to differentiate statistically among the four individual slopes. For instance, when the number of unrelated owning families is high, the relationship between knowledge integration and radical innovation is positive only when commitment to change is high—significant slope difference at $p < 0.05$ between (1) and (3). Additionally, when knowledge integration is high, radical innovation is maximized with a high number of unrelated owning families and high commitment to change compared to all the other combinations represented in Fig. 2—significant slope differences at $p < 0.01$ and $p < 0.05$ between (1) and (3), (2) and (3), and (3) and (4).

Fourth, our work extends the findings reported by scholars studying similar types of issues. For example, Subramaniam and Youndt’s (2005) arguments and related results suggest that the more organizational members interact, exchange ideas, and learn from one another, the stronger their knowledge’s influence will be in developing radical innovative capabilities as a path to producing radical innovation. Our study shows that radical innovation is not simply a function of the characteristics of a group (Burt, 1992; Granovetter, 1973), the possession of knowledge (Rodan and Galunic, 2004), or the ability to articulate that knowledge (Tiwana, 2008). Rather, our results suggest that a firm’s ownership structure and its members’ commitment to change also play key roles in producing radical innovation. This finding implies that merely possessing a variety of relevant knowledge is necessary but not sufficient for radical innovation to materialize. Indeed, multiple owning families can possess unique and different knowledge bases yet can fail to stimulate radical innovation when family members lack commitment to change. Additionally, our study contrasts with the recent arguments put forward by Duran and Ortiz (2019) suggesting that the advantage of multifamily ownership improves with an increase in the number of unrelated owning families controlling the firm until a certain point after which any further increase in the number of unrelated families leads to a deterioration in competitive advantage (inverted U-shaped relationship). Our work shows that this result does not apply in a situation where a strong commitment to change drives multifamily members’ actions.

Last, a final contribution associated with our study concerns the possibility that our theory and related arguments may facilitate efforts to enhance our understanding of radical innovation within other organizational arrangements. Examples of such arrangements are those of new ventures and ownership constellations such as founding teams, alliances, mergers, and acquisitions (Chirico et al., 2020; King et al., 2022). In these settings, too, multiple nonrelated owners and team members may face goal divergence and path dependency that constrain radical forms of innovation unless a shared action toward change is agreed upon and pursued. Similarly, our

theory and results may have implications for single-family-owned firms with widespread ownership and multiple branches with diluted family ties (Chrisman et al., 2021).

6.1. Limitations and future research

Several limitations associated with our work suggest areas for future research. First, in this study, we do not address the different ways to integrate tacit and explicit knowledge. Most importantly, our design does not consider the different roles played by family members belonging to different owning families or even the role of nonfamily members in the knowledge integration process. Future studies could consider these issues. For example, researchers might choose to extend our model by taking into consideration additional factors (e.g., prior education and experience) affecting the stock of knowledge available in a family firm for integration. Additionally, future studies could adopt a more specific focus. One way to do this is to measure the relationship between existing knowledge and new knowledge as well as how owning families combine these different knowledge sources without becoming subject to core rigidities or other barriers to change (Leonard-Barton, 1992; Mazzelli et al., 2018). Second, future work on family firm heterogeneity and a “further exploration into the multi-family business” (Brigham and Payne, 2015: 1344) may help address conflicting predictions of agency, stewardship, and socioemotional perspectives regarding family firm outcomes. For instance, differences in producing radical innovations may exist not only *between* single-family firms and multifamily firms but also *within* single-family firms and *within* multifamily firms. In particular, the arguments we advance about goal diversity and path dependency may apply not only in relation to multiple and unrelated families but also among members of the same family, especially when multiple family generations are involved (see Chirico et al., 2011a). Moreover, as we highlight in our theoretical section, multifamily firms can form differently from one another. Therefore, future research should differentiate the behaviors and outcomes between multifamily firms that originated in this form from those that are a product of partnerships between established family businesses that surfaced in response to environmental opportunities and/or threats.

Third, we do not measure goals or path dependency directly in the family firms in our sample; instead, we argue that these potential conditions result from multifamily ownership. Future research could benefit by using more fine-grained measures (see, e.g., Bateman et al., 2002) and could pay more attention to the (different) roles of both family owners and family managers. However, often in family firms, “decision management and decision control are combined in the same owner-managers” (Chrisman et al., 2021: 910). Fourth, we depict commitment to change as a crucial differentiator among (multi)family firms in terms of their ability to produce radical innovation. However, it may be that there is a direct relationship between the number of unrelated owning families in a business and commitment to change or even an optimal level of commitment to change beyond or below which knowledge integration and product innovation diminish. Exploring these possibilities in future research has the potential to create valuable insights.

Fifth, we collected our data in Spain, thereby limiting the possibility of generalizing our findings to other countries. The relationships explored in our study may change across regions and countries as well as across culturally embedded family-firm dynamics. Thus, context may affect our results. For instance, commitment to change may have a specific link with cultural contingencies. Additionally, given that in our sample there are no failed multifamily firms, there may be a survivor-bias issue. Drawing from sources of large secondary data, future studies should explore the conditions under which an increased number of unrelated owning families is likely to lead to continuation versus different types of exit strategies—or failure altogether (Chirico et al., 2020). Sixth, despite being common in survey research, we based our measures on respondents’ perceptions, resulting in some degree of subjectivity in our analyses. Seventh, our R-squared ranges from 0.20 to 0.26 (adjusted R-squared from 0.12 to 0.15). However, our analyses of the slope difference tests show the significance of our results. Finally, determining the degree to which the hypotheses presented herein apply to studies involving other forms of organization is an appropriate and potentially interesting avenue for future research. Relatedly, future studies may also investigate radical innovation outcomes between nonfamily-owned firms and family-owned firms with one or multiple families involved. Interesting results may emerge from comparing the behavior and resulting outcome of these organizations. For instance, as the literature shows (Asaba and Wada, 2019; Calabrò et al., 2019; Nieto et al., 2015), we may expect that in an overall sense, family firms focus less on radical innovation than nonfamily firms. However, under certain conditions (e.g., when commitment to change is high), multifamily-owned firms might be the ones achieving the highest novelty in their products due to the heterogeneous (different bases) yet complementary (family-related) knowledge its members likely bring to the family organization.

In general, we hope that this study will serve as a stimulus of efforts to enhance our understanding of radical innovation in (multi) family-owned firms by informing, extending, and encouraging additional work regarding this important yet understudied research topic. Understanding how and under what circumstances multifamily ownership can be a source of competitive advantage is one positive outcome that could result from this type of research.

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CRedit authorship contribution statement

Francesco Chirico: Conceptualization, Writing – original draft, Writing – review & editing, Supervision, Project administration. **R. Duane Ireland:** Conceptualization, Writing – original draft, Writing – review & editing, Methodology, Software, Validation, Formal analysis, Investigation, Data curation, Supervision, Project administration. **Daniel Pittino:** Conceptualization, Writing – original draft, Writing – review & editing, Methodology, Software, Validation, Formal analysis, Data curation. **Valeriano Sancez-Famoso:**

Investigation, Validation, Formal analysis.

Declaration of competing interest

None.

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