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Family Ownership and R&D Intensity
in Small and Medium-Sized Firms

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Alfredo De Massis is Director of the Centre for Family Business at the Institute for Entrepreneurship and Enterprise Development at Lancaster University Management School (UK) and Professor in the area of Family Business at the University of Bergamo (Italy), where he co-founded the Center for Young and Family Enterprise (CYFE) that he ran as Deputy Director until October 2013. He also serves as Chair of the European Leadership Council and member of the Global Board of the Global Successful Transgenerational Entrepreneurship Practices (STEP) project. He has been TOFT Visiting Professor at Jonkoping International Business School (Sweden) and a visiting scholar at the Haskayne School of Business (Canada). His research interests include innovation management in family firms, organizational goal setting processes and technological and behavioral issues in enterprising families. On these

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Abstract

Research was largely consistent in predicting a negative relationship between family ownership and R&D intensity until Chrisman and Patel (2012), using a behavioral agency model (BAM), called this general assumption into question. They argued that publicly owned family firms typically invest less in R&D than non-family owned firms. This behavior may however be reversed if economic performance levels are below family aspirations or if family long-term goals, such as pursuing strong transgenerational family control, are highly valued. While most researchers, like Chrisman and Patel (2012), primarily focused on large listed firms, more research on the relationship between family ownership and R&D intensity in privately held small and medium sized enterprises (SMEs) is required. This is because firm size can play an important role in understanding the innovation management behavior of firms. Building on the BAM perspective, in the present article it is argued that Chrisman and Patel's (2012) results can be extended to the context of SMEs, albeit with one important specification: the relationship between family ownership and R&D intensity is likely to be contingent on the way the family has invested its wealth. Specifically, it is contended that in the context of SMEs, where goals are more fluid and mixed, and when there is a high overlap between family wealth and firm equity (i.e., most of the family's wealth is invested in the firm), the relationship between family ownership and R&D intensity is negative due to the family owners' greater desire to protect their socioemotional wealth (SEW). However, if the overlap between family's total wealth and single firm equity is low (i.e., family equity is just a small part of the total family wealth), the relationship between family ownership and R&D intensity is positive as the low overlap between family wealth and firm equity reduces the family's loss aversion propensity. In such a situation, family ownership is likely to foster R&D intensity due to the long-term orientation of family owners that increases the family firm's propensity to bear the risk of investing in R&D activities. The hypothesis is tested and confirmed in a study of 240 small and medium-sized firms based in Italy. The article contributes to the literature in several ways. First, adding to the literature on innovation management and R&D intensity, it increases the understanding of what drives or inhibits R&D investments in SMEs when a family is involved in the ownership of the firm. This is particularly important since research on innovation management, as well as research on R&D intensity in family firms, is primarily focused on large firms and much less on SMEs. Second, the study complements arguments from prior research on the correlates of R&D intensity in large listed firms, showing that the BAM and SEW perspective offer a theoretical framework that is also able to illustrate the complex nature of innovation management in the context of SMEs. Third, the study contributes to research on the effects of family ownership on the general functioning of a firm. In particular, it provides new insights into how family ownership may affect R&D intensity.

Keywords: R&D intensity, innovation, family ownership, small and medium enterprises, socioemotional wealth.

INTRODUCTION

Innovation management refers to an organization's efforts to discover and manage new product and/or service opportunities and to make improvements to existing processes and systems (Cooper and Kleinschmidt, 1987). Understanding whether innovation management is sustained or hampered by family ownership in small and medium enterprises (SMEs) is important since the vast majority of firms in the world economy are SMEs and family-owned (Miller et al., 2003). There are strong conceptual reasons to argue that family ownership affects innovation management (De Massis et al., 2013b). For instance, prior studies have shown that the ownership structure of a firm is likely to affect the organization's innovation management efforts (Hoskisson et al., 2002; Kochhar and David, 1996) according to ownership type, which may differ with respect to investment horizons, risk aversion, diversification plans and return aspirations (Thomsen and Pedersen, 2000).

This topic is also highly relevant from a practical perspective since a growing body of empirical evidence shows that family firms rely on innovation management to nurture their competitive advantage and to overcome economic and financial downturns (e.g., Gudmundson et al., 1999).

Research & Development (R&D), an important part of the innovation management process, includes activities that generate new knowledge to be turned into new products and services for the markets (Chiesa, 2001). Extant family business research is largely consistent in predicting a negative relationship between family ownership and R&D intensity (for a comprehensive review see De Massis et al., 2013a) due to their risk aversion (Morck et al., 2000; Block, 2012; Chen and Hsu, 2009; Munari et al., 2010; Munoz-Bullon and Sanchez-Bueno, 2011). However, Chrisman and Patel (2012), using a behavioral agency model (BAM) (Wiseman and Gomez-Mejia, 1998), called this general finding into question. They argue that publicly owned family firms (i.e., firms where the family owns a minimum 5% stake and at least one family member is involved in the management team) typically invest less in R&D than non-family owned firms. This behavior may however be reversed if economic performance levels are below family aspirations or if family long-term goals, such as pursuing strong transgenerational family control, are highly valued.

While authors such as Chrisman and Patel (2012) primarily focus on large listed firms, more research on the relationship between family ownership and R&D intensity in privately held SMEs is required. The organizational context, and specifically firm size, can play an important role in understanding the innovation management behavior of firms (Zahra, 2007). This is consistent with prior research showing that innovation management in SMEs is peculiar and differs from innovation management in large companies (e.g., Tan et al., 2009; Tether 1998).

Building on Chrisman and Patel's (2012) BAM approach, in the present article it is argued that their results can be extended to the context of SMEs, albeit with one important specification. It is posited that, in SMEs, the relationship between family ownership and R&D intensity is likely to be contingent on additional factors. Specifically, it is contended that in the context of SMEs, where goals are more fluid and mixed (Kotlar & De Massis, 2013; Gedajlovic et al., 2012), and when there is a high overlap between family wealth and firm equity (i.e., most of the family's wealth is invested in the firm), the relationship between family ownership and R&D intensity is negative due to the family owners' greater determination to protect their SEW (Gomez-Mejia, et al., 2007; Berrone et al., 2012). However, if the overlap between family's total wealth and single firm equity is low (i.e., family equity is just a small part of the total family wealth), the relationship between family ownership and R&D intensity is positive as the low overlap between family wealth and firm equity reduces the family's loss aversion propensity (Zellweger and Dehlen, 2012). In such a situation, family ownership is likely to foster R&D intensity due to the long-term orientation of family owners (Dyer, 2003; Zellweger,

2007). This long-term orientation increases the family firm's propensity to bear the risk of investing in R&D activities.

The hypothesis is tested and confirmed in a study of 240 Italian SMEs. The study is thus able to offer several contributions to the debate in this field. First, adding to the literature on innovation management and R&D intensity, it contextualizes the role of family ownership (Zahra, 2007). In particular, it increases the understanding of what drives or inhibits R&D investments in SMEs when a family is involved in the ownership of the firm. This is particularly important since research on innovation management is primarily focused on large firms and much less on SMEs (Verhees and Meulenberg 2004). Furthermore, prior research on the effect of family ownership on R&D investments has exclusively been conducted on large firms (De Massis et al., 2013a). Second, the study complements arguments from prior research on the correlates of R&D intensity in large listed firms, showing that the behavioral agency model (Wiseman and Gomez-Mejia, 1998) and SEW perspective (Gomez-Mejia et al., 2007; Zellweger and Dehlen, 2012) offer a theoretical framework that is also able to illustrate the complex nature of innovation management in the context of SMEs. Third, the study contributes to research on the effects of family ownership on the general functioning of a firm. In particular, it provides new insights into how family ownership may affect R&D intensity.

The article is structured as follows. First, the relevant literature is reviewed to form the theoretical framework of the research and develop the hypothesis. Then, the methodology is presented and thereafter results are reported and discussed. Finally, the article concludes with the contributions, implications and limitations.

THEORETICAL FRAMEWORK
Prior Research on Family Ownership and R&D Intensity

Innovation and family business scholars inspired by agency theory suggest that innovative behavior and risk preferences are embedded in the ownership and governance of the firm. Here, family owned firms are expected to take fewer risks since the unification of ownership and management leads to a situation where owners and managers have much of their wealth invested in the firm (Eisenhardt, 1989; Fama and Jensen, 1983). They thus bear the full financial burden of failed investments (Gedajlovic et al., 2004). Risky strategic decisions, such as committing resources to R&D, tend to be avoided due to concerns about the family's financial wealth (Schulze et al. 2002). Accordingly, Naldi et al. (2007) find support for their conceptual idea that family firms are less likely to take risks than non-family firms.

Recent empirical research rooted in agency theory shows family ownership as detrimental to R&D intensity. In their study on Canadian firms, Morck et al. (2000) find that established families controlling business groups are reluctant to undertake R&D investments. Similarly, in the context of listed Taiwanese firms, Chen and Hsu (2009) assert that family ownership negatively affects R&D intensity and this negative relationship is weaker when CEO duality is absent and when there is a greater number of independent directors on the board. Based on a dataset of 1,000 European firms, Munari et al. (2010) argue that higher family shareholding is negatively associated with R&D investments due to the risk-aversion of controlling families and their need for stability and cash flow protection. Block (2012), using panel data from S&P 500 firms, finds that while family ownership is negatively associated with R&D intensity level, lone founder firms show higher levels. He argues that family owners are less able to monitor managers due to family conflicts and may pursue private control-oriented benefits, i.e., dividends over firm growth. Based on results from large Canadian firms, Munoz-Bullon and Sanchez-Bueno (2011) hold that family controlled firms are characterized by lower R&D intensity not only for agency-based reasons but also due to limited resource availability.

The major contribution by Chrisman and Patel (2012) draws on the BAM and the SEW perspective to argue that since R&D entails a great deal of risk-taking, the preference of family

owners to protect their SEW endowment will generally lead them to invest less in R&D. However, they also hold that economic performance levels below the family's aspirations as well as long-term orientation may transform the family ownership effect into a positive effect on R&D investments. Confirming their hypotheses on a dataset of 964 listed firms extracted from the S&P 1500, Chrisman and Patel (2012) subsequently reconciled these agency-based arguments with the position of many family business scholars who depict the family business as a favorable innovation setting (e.g., Rogoff and Heck, 2003). For instance, according to Salvato (2004) and Zahra et al., (2004: 363), the long-term nature of family firm ownership "allows them to dedicate the resources required for innovation and risk taking". Firms characterized by an external, decentralized and long-term (Zahra et al., 2004) or open (Hall et al., 2001) culture tend towards higher levels of innovation.

The next section builds on Chrisman and Patel's (2012) contribution and describes the BAM and SEW in greater detail.

Behavioral Agency and Socioemotional Wealth Perspective
The behavioral agency model (BAM) relaxes the agency theory assumption that decision-makers have consistent risk preferences and utility maximizing behaviors (Wiseman and Gomez-Mejia, 1998). By integrating agency theory with prospect theory (Kahneman and Tversky, 1979), BAM suggests that decision-makers vary their risk preferences and behaviors according to the context of the decision being faced (Gomez-Mejia et al., 2007; Wiseman and Gomez-Mejia, 1998). Therefore, decision-maker preferences change with the framing of problems, which are either positive or negative depending on the reference point used to compare anticipated outcomes from available options. According to BAM, the risk-bearing attitude depends on each situation or decision (Wiseman and Gomez-Mejia, 1998), implying that owners are loss adverse rather than risk adverse and that the firm-level governance structure that innovation behavior takes place in influences their risk choices (Wiseman and Gomez-Mejia, 1998).

The SEW perspective has its roots in the BAM. According to this perspective, family owners consider their endowment of socioemotional wealth, namely, the "non-financial aspects of the firm that meet the family's affective needs, such as identity, ability to exercise family influence, and perpetuation of the family dynasty" (Gomez-Mejia et al., 2007: 106) worth protecting for nonfinancial reasons (Berrone et al., 2012). In other words, the preservation of the family's SEW is the real reference point for family owner decisions and behaviors in an organizational context. This means that family owners tend to act after evaluating how decisions will affect their SEW endowment (Berrone et al., 2010; Gomez-Mejia et al. 2007; Zellweger et al., 2012). Thus, in line with BAM, family owners are loss averse and seek to protect the non-financial benefits they derive from owning a firm. Specifically, when they face losing family control and the nonfinancial benefits deriving therefrom, they will accept greater performance hazard (Berrone et al., 2010).

Recently, Zellweger and Dehlen (2012) extended the SEW perspective by introducing the affect infusion model in order to better understand how SEW considerations relate to the affective needs of family owners. Importantly, these authors suggest that the degree to which family owners feel affection and emotional attachment to a particular firm depends on how relevant this firm is within the family owner's total wealth (Miller et al., 2010). This observation indicates that family owners are not homogeneous in terms of their affective and emotional connection to the firms they own. As such, the heterogeneity of attitudes and subjective value perceptions among family owners in relation to their firms must be considered (Zellweger and Dehlen, 2012). Depending on the degree of overlap between family and firm, family owners can feel more or less affection and emotional attachment to a firm and are

consequently more or less inclined to seek non-financial utilities such as the preservation of SEW.

Family Ownership and R&D Intensity in Small and Medium-Sized Firms
Small and medium family owned firms are characterized by fewer formal planning and control systems (Naldi et al, 2007); meaning that in these firms it is more difficult to set clear goals, control performance and compare this to aspirations. Thus, the moderator of the relationship between family ownership and R&D investments that is relevant in large firms, i.e., the gap between goals or aspirations and performance (Chrisman and Patel, 2012), is less likely to play a role in the context of family-owned SMEs.

Instead, based on recent developments in SEW literature (Zellweger and Dehlen, 2012),, a meaningful moderator of the relationship between family ownership and R&D intensity, in the context of SMEs, is the degree of overlap between family wealth and firm equity. The relationship between family ownership and R&D intensity is expected to be negative when the majority of the family's financial wealth is invested in the firm, namely, in presence of a high overlap between family wealth and firm equity. When the owning family has the majority of its wealth invested in one firm, the probability increases that family owners will be more cautious in taking firm decisions. From a SEW perspective, family owners tend to prioritize non-financial utilities such as family legacy, status and reputation, rather than pure financial utilities (Gomez-Mejia et al., 2007; Zellweger and Astrachan, 2008) when they perceive their SEW as threatened (Cennamo et al., 2013). In other words, a strong overlap between family wealth and firm equity is likely to lead to a higher degree of personalism (Carney, 2005) and greater concerns about protecting the family's SEW endowment (Berrone, et al., 2012). Thus, affection and emotional attachment will be stronger when the personal relevance of the firm is higher among family owners (Zellweger and Dehlen, 2012).

Prior family business research has shown that family owners are concerned about the safety of their family's SEW, which influences their decision on whether to pursue innovation opportunities or not (e.g. Block, 2012). When a family's wealth is closely related to its investments in one firm, the family's identity - and often also its name - is closely associated with the company. Intense R&D spending may thus jeopardize not only the family's financial wealth but also its reputation and status in the community, which typically entails the sacrifices and hard work of several generations (Bartholomeusz and Tanewski, 2006). This is in line with Gomez-Mejia et al.'s (2011: 674) observation that SEW preservation is a key explanation of why family-owned firms generally tend to invest less in R&D. Moreover, investing in R&D typically entails ceding shares to outside parties such as venture capitalists or institutional investors (Kotlar et al., 2013), thus implying a restriction of family control and a threat to the family's SEW.

The above reasoning suggests that when most of the family's wealth is invested in the firm, the owning family will seek to avoid investing in costly R&D projects that may jeopardize the family's SEW endowment (Gomez-Mejia et al., 2007). Thus, it is contended that as the share of a family's total wealth invested in one firm increases, family owners become more conservative and cautious since the reference point for making business decisions is the preservation of SEW (Gomez-Mejia et al., 2007; 2011).

In sum, it is expected that when the family's total wealth is closely tied to a firm's future strategic development, the family's willingness to make investments in risky innovative activities is likely to reduce and the desire to preserve SEW is likely to increase. When a family has most of its wealth invested in the firm, family members bear both the financial and the socioemotional burden of failed innovation projects. They are consequently expected to be less inclined to spend on R&D.

On the other hand, this relationship is expected to change if the family wealth does not significantly overlap with firm equity. Owners are less averse to taking risks in terms of a particular investment if this is only part of the total portfolio of investments (Jensen and Meckling, 1976; Fama and Jensen, 1983). When family owners do not have a considerable portion of their wealth invested in a single firm, the potential loss in case of unsuccessful R&D investments reduces (Gedajlovic et al., 2004), and hence risky decisions to invest in innovation and R&D are not necessarily avoided or postponed.

Moreover, when the overlap between family wealth and firm equity is high, family owners tend to look beyond the financial aspect of investments due to concerns about the family's name, status and reputation that have often been built over several generations (Gomez-Mejia et al., 2007; Gomez-Mejia et al., 2010). When the overlap between family wealth and firm equity is low, personal affection and emotional attachment to a particular firm is expected to be less intense since the firm's relevance to the family is lower (Zellweger and Dehlen, 2012). Thus, in case of low overlap between family wealth and firm equity, family owners are expected to be less loss averse and thus less inclined to limit costly and uncertain R&D projects in order to protect the family's SEW endowment. Under these circumstances, i.e., when the owning family's loss aversion is low, family ownership is likely to promote R&D intensity due to the long-term orientation of family owners (Dyer, 2003; Zellweger, 2007). Such orientation evidently increases the propensity of family firms to invest in long-term R&D activities, which are inherently risky in nature. Thus, the following general hypothesis is proposed:

The relationship between family ownership and R&D intensity in small and medium-sized firms is contingent on the overlap between family wealth and firm equity such that it is negative when a large amount of the total family wealth is invested in the firm and positive when a small amount of the total family wealth is invested in the firm.

METHODOLOGY

Data Collection

Data collection was carried out in two steps. In the first, independent variables were collected from incorporated Italian firms. A sample of 15,517 firms was randomly extracted from the register of the Italian Chamber of Commerce, representative of the Italian population of firms in terms of economic activity and size. The CEOs of these firms were sent a postal questionnaire in October 2000 and compiled it in the subsequent 4 months. 620 CEOs sent the completed questionnaire back, a response rate equal to 4%. Although this may seem a low response rate, leaders of Italian SMEs are reluctant to devote their limited time to compiling academic questionnaires, especially when samples are randomly extracted. Fortunately, respondents and non-respondents showed no significant differences in terms of size and economic activity.

In the second step, 6 years later, financial data were collected to measure the dependent variable (i.e., R&D intensity). Financial data were available for 294 firms. A chi-square test revealed no differences in age, size and economic activity between respondent firms and cases with available financial data. The hypothesis was tested only on SMEs, identified according to the definition provided by the European Commission (2006), i.e. firms employing fewer than 250 workers and with revenues below 50 million euro. This selection led to a dataset of 240 cases.

Variables Treatment

The hypothesis was tested by running regression analyses. The dependent variable, i.e., R&D intensity, was measured using R&D investments as the percentage of sales registered between 2000 and 2006 (7 years). This choice derived from the need to rely on objective data after the collection of the independent variable in order to obtain a lagged dataset and consequently reduce reverse causality problems. Although 7 years may seem a long period of time between measuring the dependent and independent variables, this time range was adopted to measure R&D intensity as an expression of enduring willingness to introduce innovation inputs. With a shorter time range, isolated innovation initiatives could have been captured rather than a well-established tendency towards investing in innovation.

The independent variables are family ownership and the overlap between family wealth and firm equity. Family ownership was measured with the percentage of firm equity held by the owning family in 2000 (Astrachan and Kolenko, 1994; Litz, 1995; Sharma et al., 1996). The average value of family ownership in the sample is 77.8%. The overlap between family wealth and firm equity was measured with the percentage of the family's wealth invested in that firm. An ordinal measure was adopted along a 4-point Likert scale: less than 25%, between 26% and 50%, between 51% and 75%, over 75%.

Seven variables considered as influencing the relation between the dependent and independent variables were used as control variables: company age, size, industry, firm efficiency, leverage, liquidity and generational involvement. *Company age* was measured by the number of years the firm had been in existence. Older firms may not be inclined to devote resources to innovation activities because of their strategic conservatism. They are often unwilling to innovate and implement changes (Zahra, 2005; Zahra et al., 2007). The average company age in the sample is around 35 years, with a standard deviation of around 28. *Company size* was measured using the log of full-time employees. Company size may affect family firm R&D intensity; larger firms tend to have more slack resources to engage in R&D (Zahra and Nielsen, 2002; Kellermanns and Eddleston, 2006). The average number of employees is around 100, with a standard deviation of around 319. The third control variable was *industry,* since this may determine the abundance of innovation opportunities (Zahra and Nielsen, 2002). Abundant innovation opportunities in a particular industry may encourage companies to invest in new products, services or processes. Industry control was done by using the following dummy variables: agriculture, manufacturing, services, constructions, mining, transport, distribution, retail and other. *Firm efficiency* was measured with the return on assets achieved in 2000 and was included as a control variable since R&D investments are more likely in efficient companies (Chrisman and Patel, 2012). Following Munari et al. (2010), and in view of the well-known negative association between firm debt level and R&D investments or patents, a *Leverage* variable was included in the model, which was calculated as the conventional debt-to-equity ratio. R&D spending requires *Liquidity* (Munoz-Bullon and Sanchez-Bueno, 2011), therefore the model included this control variable measured by the ratio between current assets and total assets. *Generational involvement* was measured with the number of family generations thus far involved in the company. This may negatively affect the R&D intensity of the firm since founders are acknowledged to be more prone to innovate than their heirs (Miller et al., 2007).

RESULTS AND DISCUSSION

Results

The descriptive statistics and the correlations of the variables are presented in Table 1. An examination of the variance inflation factors (VIFs) and tolerance coefficients showed that multicollinearity was not a concern. All VIFs were lower than 5 and all tolerance coefficients were close to 1 (Hamilton, 2006).

Regression analysis was used to test the hypothesis. The results are presented in Table 2.

Several models were developed. As shown in Table 2, Model 1 includes only the control variables. In Model 2, R&D intensity was also regressed on family ownership, revealing a negative and significant coefficient. Thereafter, R&D intensity was regressed on family wealth and firm equity overlap (Model 3), which revealed a negative but non-significant beta coefficient. However, these 3 preliminary models were characterized by low and non-significant adjusted R squared coefficients. Model 4 is the final model including the control variables, family ownership, overlap between family wealth and firm equity and the moderating term. This model showed a high and significant R square coefficient. The regression coefficients of family ownership, family wealth and firm equity overlap, and the moderating term (family ownership x family wealth and firm equity overlap) are statistically significant: family ownership coefficient = -.240 (p<.01), family wealth and firm equity overlap coefficient = 1.035 (p<.001), family ownership x family wealth and firm equity overlap coefficient = -1.165 (p<.001).

The effects of family ownership and family wealth and firm equity overlap on R&D intensity were plotted in Figure 1 in order to interpret results and verify if they are in line with predictions. The two lines respectively show a negative relationship between family ownership and R&D intensity when family wealth is mostly invested in the company and a positive relationship between family ownership and R&D intensity when the overlap between family wealth and firm equity is lower. A t-test for a single slope was also performed (Aiken and West, 1991). Family wealth and firm equity overlap took the value of one standard deviation below ("Low") and above ("High") the mean. At lower levels of family wealth and firm equity overlap, the effect of family ownership on R&D intensity is positive and significant (β=.475; p<.010), whereas at a higher level of overlap between family wealth and firm equity the effect of family ownership on R&D intensity is negative and significant (β=-.954; p<.001). It can be consequently concluded that the hypothesis is fully confirmed.

Discussion

SMEs constitute a large part of economies around the world and innovation is considered one of the most critical determinants of sustained competitive advantage for this category of firms (Cefis and Marsili, 2006; Hausman, 2005). Furthermore, research has indicated that family ownership of business organizations is ubiquitous (Gedajlovic et al., 2012; La Porta et al.,1999; Villalonga and Amit, 2009) and its influence on economic growth is significant (e.g., Anderson and Reeb, 2003; Astrachan and Shanker, 2003). Research on innovation in family SMEs is therefore very important. In this article, it is posited that the relationship between family ownership and R&D intensity in SMEs is contingent on the degree of overlap between family wealth and firm equity. The argument is that this overlap strongly influences the innovative behavior of the owning family in the context of SMEs since it largely determines the extent of their eagerness to preserve the family's SEW endowment.

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The hypothesis was confirmed. The statistical analysis shows that the degree of family ownership negatively affects R&D intensity when the amount of family wealth invested in the SME is high, whereas family ownership positively affects R&D intensity when the amount of family wealth invested in the SME is low. This suggests the complex role of family owners in decisions relating to R&D investments in small and medium-sized firms.

On the one hand, the study shows that family ownership is a negative correlate of R&D intensity when family wealth and firm equity overlap is high, implying that the more a family controls firm ownership, the less the SME is inclined to invest in R&D. It can be argued that when the family owners' wealth is mostly invested in the firm, a cautious approach ensues to protect the financial and social wellbeing of current and future generations, as well as family reputation, status and identity. Thus, consistent with BAM arguments and the SEW perspective, owning families tend to avoid R&D spending, preferring to play safe and protect the family's financial and socioemotional wealth that has typically been built over several generations (Chrisman and Patel, 2012; Gomez-Mejia et al., 2011).

On the other hand, if the portion of family wealth invested in the firm is low, there are reasons to expect that cautious and protective behavior is replaced by a more innovative attitude that results in higher R&D expenditure. This is because R&D investments that do not lead to successful innovations have fewer consequences on the family's SEW and are thus less risky for family owners concerned about preserving their SEW endowment (Zellweger and Dehlen, 2012). In these circumstances, i.e., when the family is less averse to potential losses because the family wealth invested in the firm is low, family ownership is likely to promote R&D intensity as a result of the long-term orientation of family owners (Dyer, 2003; Zellweger, 2007). Thus, investments in risky R&D projects, which may take years or even decades to produce tangible returns, are more likely to be perceived as opportunities for long-term survival than a threat to the family's financial safety. Consequently, long-term orientation evidently increases the propensity of family firms to make R&D investments characterized by a long-term horizon and a certain degree of risk. Family owners are consequently expected to support R&D investments if this is conducive to creating a stronger and more competitive organization that is more likely to survive and create employment opportunities and community development (Corbetta and Salvato, 2004; Zahra, et al., 2004).

Figure 1 shows the effects of family ownership on R&D intensity and can be interpreted by distinguishing those situations where the overlap between family wealth and firm equity is low from those where such an overlap is high. The latter are always characterized by higher levels of R&D intensity, with the exception of the case where family ownership is total. This means that when there is a low overlap between family wealth and firm equity, R&D intensity is more effectively increased by increasing this overlap. When the level of overlap is instead high, opening the equity to non-family capital to be invested in R&D is more effective.

CONCLUSIONS

Contributions and Implications

The article offers relevant contributions that stand at the interface of innovation and SME and family business study domains. First, the present research enriches existing knowledge on the correlates of R&D intensity in small and medium-sized firms. Given the results obtained, scholars may want to include variables such as family ownership and family wealth and firm equity overlap in their models to assess the variance in the level of innovation inputs among different types of SMEs.

Second, the article contributes more specifically to previous research by complementing the arguments and results on innovation and R&D intensity in large listed family firms. This study shows that the behavioral agency model and the SEW perspective offer a theoretical framework that is able to illustrate the complex nature of innovation management also in the

context of SMEs. As such, it also contribute to the emerging SEW theoretical perspective on family firms, offering an examination of its relative predictive power in the context of small and medium-sized firm R&D investment decisions (Chrisman and Patel, 2012; Gomez-Mejia et al., 2011). In particular, this study shows that the owning family's concern for SEW protection differs according to how important they consider their investment in the firm in relation to their other holdings (Zellweger and Dehlen, 2012).

Third, and more broadly, the present research contributes to the literature on the effects of the family on SME business processes. The sign of the effect of family ownership on profitability is yet to be defined (e.g., Villalonga and Amit, 2006), especially in the context of SMEs (De Massis et al., forthcoming a; Sciascia and Mazzola, 2008). This study generates new insights into how family ownership may affect a specific business process, i.e., innovation investment. Thus, it can be used as a point of reference to study other business processes in the specific context of SMEs.

The arguments and ideas presented in this study also offer suggestions to small and medium-sized business owners, managers and advisors. Assuming that innovation is essential for SMEs in the current competitive environment, business families need to recognize that the firms' orientation towards investing in innovation is not so much hampered by the extent of family involvement in ownership or by the overlap between family wealth and firm equity, but by their combination. Two recommendations can be made to SME owners and managers when R&D intensity appears to be low: (1) if the overlap between family wealth and firm equity is not high or if family ownership is low, family owners are advised to invest more in the firm to increase the benefits of family ownership, (2) if, instead, the overlap between family wealth and firm equity is high or family ownership is high, then a viable solution for family owners to increase their R&D intensity would be to open equity to other owners (e.g., angel investors or private equity) in order to minimize the drawbacks of family ownership.

The article suggests to practitioners advising family SMEs that they should adapt the best practices reported in innovation management handbooks to meet the idiosyncratic characteristics of their firms. The degree of family ownership and the overlap between family wealth and firm equity are two important conditions that should be considered when making recommendations on R&D investments to family SMEs.

Finally, R&D investments are acknowledged to be an important antecedent of the creation and generation of economic growth (e.g., Audretsch, 2007; Audretsch et al., 2006; Wennekers and Thurik, 1999), which is among the top priorities of many governments worldwide. This study therefore also has policy-making implications. Indicating the underlying logic that links R&D intensity, family ownership and the overlap between family wealth and firm equity is a first step towards helping policy-makers develop a system of supporting R&D investment initiatives that fit the idiosyncratic characteristics of SMEs, a very ubiquitous and relevant form of business organization.

Limitations and Future Research
This study has some limitations that provide future research opportunities. First, the study is based on the assumption that the family has the discretion to pursue family-oriented particularistic goals such as the preservation of SEW. Indeed, the study assumes that if family owners are determined to protect their SEW, they are able to pursue such goals. Although this assumption does not always hold - family control is a necessary but insufficient condition for the family to have the discretion to produce the family-oriented particularistic behavior (De Massis et al., forthcoming b; Zellweger et al., 2012) - the relationship between family involvement and pursuing family-oriented particularistic goals is likely to be more pronounced and more relevant in influencing behaviors in SMEs than in larger firms where teams of professional managers, wider ownership dispersion and independent boards of directors may

dilute the relationships of interest (Chrisman et al., 2012). Put differently, the concentration of ownership and management that characterizes small and medium family firms should increase the family's discretion to impose its determination on the firm, thus implying that this potential limitation of the study is at least partially overcome. Second, the external validity of the analysis is limited by the cross-sectional nature of the study. A longitudinal research design, controlling for the stability of the independent variables, could provide further evidence on the causal relationships among the variables included. Third, the possibility of generalizing the present findings to countries beyond Italy is limited by the fact that data were collected exclusively there. The relationships explored may change across countries since the innovation management process may be bound to cultural contingencies (Hayton et al., 2002). Fourth, the overlap between family wealth and firm equity was measured as an ordinal variable, while an interval variable would have added more accuracy to results. Last, there was no possibility to control for economic performance levels below family aspirations and family long-term goals (i.e., the two moderators introduced by Chrisman and Patel, 2012).

There are several lines of further research on this topic. Future investigations should be conducted in countries other than Italy to increase the external validity of the results. A longitudinal research design would be suitable for such a study to increase the reliability of causality directions. Moreover, the study could be enriched by exploring the role of family involvement in management (e.g., proportion of family members in the TMT, presence of family CEO) and in firm governance (e.g., proportion of family members on the board of directors). Prior studies (e.g., De Massis et al., forthcoming a) have shown that other dimensions of family involvement beyond ownership may play a different role in business processes and firm performance, which may also influence the firm's investment decisions in innovation. Lastly, future research should also test the proposed relationships in the context of larger firms.

In conclusion, this article offers theoretical arguments and empirical support for the contention that the degree of family ownership affects R&D intensity in small and medium-sized firms as described hereinafter. When the overlap between family wealth and firm equity is high, family ownership reduces R&D intensity because family owners derive the majority of both their financial and socioemotional benefits from the firm and could potentially lose everything if engaging and committing excessive resources to risky projects where the outcome is uncertain, such as in R&D projects. When the overlap between family wealth and firm equity is low, family ownership increases R&D intensity because having only a minor portion of the family wealth invested in the firm reduces the loss aversion of family owners to invest in risky innovation projects and induces family owners – due to their typical long-term orientation – to make longer term and riskier R&D investments. In other words, better understanding of the relationship between family ownership and R&D investments in small and medium-sized firms can be obtained by distinguishing the degree of firm equity held by the owning family from the percentage of the family's wealth invested in the firm.

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Table 1
Descriptive Statistics and Correlations

		Mean	St. Dev.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Age (log)	1.409	0.302																	
2	Size (log)	1.346	0.497	.349**																
3	Agriculture	0.017	0.128	0.037	-0.112															
4	Manufacturing	0.371	0.484	0.114	.269**	-0.1														
5	Services	0.163	0.370	-0.057	0.127	-0.057	-.338**													
6	Construction	0.054	0.227	-0.103	-0.081	-0.031	-.184**	-0.105												
7	Extraction & Min.	0.004	0.065	.183**	.131*	-0.008	-0.05	-0.028	-0.015											
8	Transport	0.038	0.190	0.071	0.055	-0.026	-.152*	-0.087	-0.047	-0.013										
9	Retail	0.200	0.401	-0.08	-.303**	-0.065	-.384**	-.220**	-0.12	-0.032	-0.099									
10	Commerce	0.075	0.264	-0.09	-.171**	-0.037	-.219**	-0.125	-0.068	-0.018	-0.056	-.142*								
11	Other	0.075	0.264	0.048	-0.009	-0.037	-.219**	-0.125	-0.068	-0.018	-0.056	-.142*	-0.081							
12	Firm efficiency	9.599	0.992	-.235**	-.179*	-0.053	-0.032	0.156	0.064	-0.136	-.167*	0.028	0.005	-0.008						
13	Leverage	2.984	68.937	-0.043	0.026	0.002	-.150*	0.08	0.014	0	0.018	0.044	0.025	0.047	0.058					
14	Liquidity	0.106	0.160	0.073	0.031	0.025	-0.033	0.109	-0.024	-0.025	0.021	-0.039	-0.034	-0.004	0.147	0.02				
15	Generations	2.137	0.853	.509**	.260**	0.046	0.037	-0.025	-0.098	-0.012	0.053	0.034	-0.072	0.023	-0.18	-0.002	0.036			
16	Family ownership	78.578	35.143	.210**	-0.066	0.005	0.024	-0.08	0.018	-0.044	-0.092	0.025	0.093	0.032	0.119	-0.033	-0.038	0.053		
17	Overlap	2.477	1.045	0.076	.210**	0.054	0.086	-.173*	0.018	-0.035	0.065	0.032	-0.046	-0.006	0.08	0.014	0.029	-0.024	0.13	
18	R&D intensity	0.002	0.012	.133*	.182**	-0.017	0.126	-0.044	-0.032	-0.01	-0.013	-0.082	-0.047	0.05	-0.043	0.018	-0.065	0.017	-0.023	0.059

N= 240; * p<.05; ** p<.01.

Table 2
Results of Regression on R&D intensity

	Model 1	Model 2	Model 3	Model 4
Age (log)	.132	.092	.093	.118
Size (log)	.227+	.160	.163	.028
Agriculture	-.033	-.027	-.028	-.038
Services	.001	-.079	-.079	-.080
Construction	-.042	-.036	-.036	-.032
Extraction & Mining	-.118	-.207+	-.208+	-.036
Transport	-.032	-.028	-.028	-.026
Retail	-.034	-.080	-.079	-.120
Commerce	-.047	-.043	-.043	-.071
Other	.115	.107	.106	.125
Firm efficiency	-.046	-.030	-.030	-.008
Leverage	.038	.034	.034	.042
Liquidity	-.086	-.117	-.118	-.030
Generations	-.195	-.142	-.143	-.101
Family ownership (FO)		-.368**	-.367**	-.240**
Overlap between Family Wealth and Firm Equity (FWFE)			-.007	1.035***
FOxFWFE				-1.165***
Models				
Adj. R2	0.041	0.079	0.068	0.441
F	0.727	1.558	1.444	5.547***

N= 240; Standardized regression weights; + p<.1; * p<.05; ** p<.01; *** p<.001

Figure 1
R&D Intensity, Family Ownership and the Overlap between Family Wealth and Firm Equity

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