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EXPLORING OPEN INNOVATION IN ENTREPRENEURIAL PRIVATE FAMILY FIRMS IN LOW- AND MEDIUM-TECHNOLOGY INDUSTRIES

Frank Lambrechts
Associate Professor, Hasselt University
Faculty of Business Economics | Research Center for Entrepreneurship and Family Firms
1 Agoralaan, Diepenbeek, 3590, Belgium
E-mail: frank.lambrechts@uhasselt.be
Corresponding author

Wim Voordeckers
Professor, Hasselt University
Faculty of Business Economics | Research Center for Entrepreneurship and Family Firms
1 Agoralaan, Diepenbeek, 3590, Belgium
E-mail: wim.voordeckers@uhasselt.be

Nadine Roijakkers
Associate Professor, Hasselt University
Faculty of Business Economics | Innovation Management
1 Agoralaan, Diepenbeek, 3590, Belgium
E-mail: nadine.roijakkers@uhasselt.be

Wim Vanhaverbeke
Professor, Hasselt University
Faculty of Business Economics | Innovation Management
1 Agoralaan, Diepenbeek, 3590, Belgium
E-mail: wim.vanhaverbeke@uhasselt.be

ABSTRACT

Four cases of open innovation in private family SMEs in low- and medium-technology industries are considered in order to examine the ways in which family firms can both foster their willingness and use their ability to engage in open innovation activities. Our cases illustrate how family SMEs can successfully engage in open innovation by handling multiple and conflicting goals within the family firm in particular ways and by taking up orchestration roles within their own open innovation networks to minimize concern for the loss of control.

Keywords: Family Firms, Family Dynamics, Open Innovation, Mechanisms, Relational Governance, Orchestration

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OPEN INNOVATION IN PRIVATE FAMILY FIRMS: ANOTHER STORY?

Most innovation nowadays requires extensive knowledge and resources to cope with issues that arise in the various stages of the innovation process. These are often lacking in private family small and medium-sized enterprises (SMEs). Such firms usually do not possess the required diversity of in-house resources and expertise, which makes it extremely difficult for them to rely solely on in-house innovation activities. Opening their boundaries and collaborating are, therefore, essential for innovation success. Open innovation (OI)—strategic collaboration with external partners to develop new technological innovations through sharing, using, and integrating knowledge—involves loosening control and allowing for a high degree of interdependence among the partners in the innovation process.

However, engaging in OI poses major challenges to family firms. Their willingness to engage in OI activities might be seriously hampered by a fear of control loss and/or by multiple and potentially conflicting goals within the family firm and family system. Some family firms successfully meet these challenges, others do not. Therefore, our main objective is to explore a diversity of OI processes in private family SMEs and to examine the ways in which family firms can rise to the challenges and succeed in innovating openly. In this respect, we recognize that OI processes are a specific type of strategic change that may involve various iterative cycles of internal change in which the firm may never reach a final state. The state of openness and the supporting internal characteristics need to be constantly scrutinized and maintained.

Following Chesbrough's original work, most OI research has addressed OI activities in large, R&D-intensive companies that use external technological knowledge to strengthen internal research processes (outside-in) and externalize internal technical know-how that does not support the current business model (inside-out) for generating additional funds. Only a few studies have begun to explore OI in smaller firms and non-R&D driven industries at an early stage. One of the main conclusions of these studies is that the well-established definition of OI, because it was developed for large, R&D-intensive companies, may not always capture the diverse and often creative approaches to OI in low- and medium-technology SMEs. The research on OI approaches in this group of companies has, however, remained sparse. Thus, there have recently been renewed calls for OI research in SMEs and sectors of industry that are classified as low- or medium-technology where the drivers for OI and the resulting dynamics may differ substantially from what we know on the basis of most current OI research. The present paper responds to these calls.

This article features the findings of a study of the OI processes followed by four Belgian private family firms in a wide variety of low- and medium-technology industries. Because little research on the topic has been published in either the family business or the OI literature, we conducted an exploratory, cross-case analysis with a focus on the question of "how private family SMEs successfully apply OI and what factors can account for their success." Our sample of firms was the outcome of a search process that started with the help of all of the Flemish Innovation Centers and local representatives of Flander's Chamber of Commerce and Industry. We purposefully selected privately held family SMEs that were recognized as OI champions by them, the press, OI experts, and academics. We then conducted in-depth interviews with the CEOs of the four firms and analyzed documents such as company websites, articles in newspapers, and professional journals. We used a semi-open interview protocol with questions about family dynamics, OI practices, and their interrelationships. With permission, we digitally recorded the interviews and made transcripts. Next, we looked for patterns and themes within and across the cases by taking advantage of pre-existing frameworks while allowing for new discoveries. The findings were shared with the study's participants to ensure the soundness and validity of our interpretations. Our cases illustrate how family SMEs operating in low- and medium-technology industries can successfully engage in OI by handling multiple and conflicting goals within the family firm in particular ways and by taking up orchestration roles within their own OI networks to minimize the concern for the loss of control. Table 1 gives an overview of the case companies Devan (textile chemicals), Curana (bicycle accessories), Dingens (precision barometers), and Boone (adaptable furniture).

***** INSERT TABLE 1 ABOUT HERE *****

FAMILY FIRMS AND OPEN INNOVATION: A MARRIAGE FULL OF CHALLENGES

For years, OI has been a hot topic in both academic publications and the popular literature. Despite this abundant attention, the OI literature has remained fairly sparse on issues that hamper or facilitate low- and medium-technology family SMEs' OI efforts to create new value. Only a few scholars (e.g., Kotlar, De Massis, Frattini, Bianchi, & Fang, 2013) have reached across disciplines and started to examine this innovation management topic from both an OI and a family firm perspective. Family-owned SMEs often have substantial resource constraints and less formalized R&D processes, which hamper their ability to turn internal R&D into a strategic asset. SMEs can, however, largely overcome these challenges by opening up their boundaries and using and integrating the necessary technological know-how from external collaboration partners. Therefore, investing in OI activities may be a beneficial strategy for family-owned SMEs.

However, choosing the road to open innovation is not self-evident in family-controlled SMEs. Private family firms are usually characterized by a powerful combination of family involvement in ownership, management, and governance, which gives the family owners the discretion to determine the goals and strategic options of the firm. As the boundaries between the family and the business are often blurred, the family firm's goal set may be a mixture of economic as well as non-economic family-oriented goals. Therefore, family owners are concerned not only about pecuniary benefits but also about their non-economic utility, which has been labelled in the family-business literature by Gómez-Mejía and colleagues as the family's "socioemotional wealth" (SEW). Research has found that strategic decision-making in family firms is driven by the preservation of the family's SEW as the primary frame of reference. Thus, non-financial objectives such as maintaining authority, control, and influence over the family firm or perpetuating the family dynasty seem to be critical reference points in strategic decision-making.

The salience of non-financial objectives in family firms often makes the engagement in an OI strategy difficult. OI may lead to obvious advantages like risk sharing and lower R&D expenditures for the individual firm, but it also enhances opportunity risk, unwanted spillover effects, uncertainty, knowledge appropriation, and concern for the loss of control. An OI strategy implies that the family firm loses control over aspects of the innovation process (e.g., knowledge appropriation concerns), which may hamper the family's SEW and consequently its willingness to engage in collaborative innovation practices. However, non-financial objectives have several dimensions, which may have different effects on innovation. For example, the objective of keeping "family control and influence" may hamper innovation activities whereas "dynastic succession intentions" imply a long-term orientation, continuity, and growth, which are more likely to be achieved by greater investment in innovation. Thus, although family firms generally may benefit from an OI strategy, it is clear that they have to overcome several challenges in safeguarding their SEW. How family firms handle these challenges is an open question. Figure 1 gives an overview of the key findings from our cross-case analysis in terms of the main drivers of OI, the most important challenges while engaging in OI, and the mechanisms for meeting these challenges.

***** INSERT FIGURE 1 ABOUT HERE *****

In the next sections of the paper, we will explore and expand on the key findings of our study. Based on the lessons learned from the cases, we will explain how and why our exemplary case companies took the road of OI, achieved goal congruence between the family and the business system, overcame potential tensions within the family system itself, and orchestrated their OI activities to minimize perceived control losses, thus reconciling the seemingly conflicting objectives of the business and the family system. The lessons learned are of importance to both practitioners and academics as innovation is an essential driver of competitive advantage and firm performance.

ON THE ROAD TO OPEN INNOVATION: DECLINING PERFORMANCE AND LONG-TERM COMPETITIVE CHALLENGES

An important unsolved question is what drivers influence the choice of family SMEs to take the road of OI. Table 2 presents the internal and external drivers, collaboration structures, and outcomes of OI in each of the cases. As to the external OI drivers, the four cases faced harsh market conditions in terms of rapidly increasing commoditization, globalization, or unexpected and detrimental new government regulations that forced these family firms to find new ways to create value and even to protect themselves from financial distress and liquidation. We observed two different kinds of external OI triggers. In two cases (Curana and Dingens), the external factors (fierce price competition and a legal ban on the primary raw material) caused a *substantial short-term performance hazard* and had an imminent continuity-threatening effect. For the other two cases (Devan and Boone), *a long-term orientation and strong concern about the declining competitive position* of the firm during an intra-family succession or acquisition event initiated the search for new business models. Because the SMEs under study did not possess the necessary knowledge and/or technology in-house, they set up new business models to leverage commercial value from technologies and competencies of other organizations or that had been co-developed with partners. In what follows, we discuss, with case illustrations, how these two distinct triggers (substantial performance hazards and competitive challenges) interacted with the dynamics of the family subsystem in facilitating or hindering the road to OI.

***** INSERT TABLE 2 ABOUT HERE *****

Short-term performance hazards and preference reversals

When performance falls below aspirations, the long-term continuity of the family SME may become problematic and processes are initiated to protect the family's SEW. Research by Patel and Chrisman (2014) has found support for the premise that, under these endangering circumstances, the typical risk-aversion behavior of a family firm is *replaced* by risky innovation and new business model strategies. However, two cases (Dingens and Curana) not only show that the decision to turn to OI after performance hazards is a difficult one but also that it depends greatly on the quality of the relationships between the family members and the strength of the family bonds influencing the SME's capacity to cope with tensions in the family system.

Our first case, Dingens Barometers & Clocks (established in 1965), is a second-generation private family SME that produces high-precision barometers for the high-end market. At the outset, the firm produced only the frames and bought the instruments on the market. After 15 years, Dingens began to produce mercury barometers in their entirety. In 1990, Paul Dingens and his brother Yves took over the company from their parents, each coming to own 50% of the shares. The parents withdrew completely from the firm's management. Paul focused on R&D and sales while Yves took care of administration and finance. By broadening production and focusing on design, they were able to produce top segment barometers, which allowed Dingens to enter new markets. The firm realized strong growth in both revenue and personnel.

In 2000, however, significant sales were lost due to fierce competition from Asian producers that launched cheaper, easier-to-produce digital barometers. As a reaction, Dingens shifted its strategy and began to make clocks and frames as an original equipment manufacturer. Sales slowly went up when suddenly disaster struck in 2007: The European Commission prohibited the use of mercury in all consumer products. Sales decreased by 80%, which caused severe financial problems. As the value of liquidation was at that time greater than the value of the firm as a going concern, "economic logic" would dictate liquidation. This did not happen.

Paul and Yves reacted very differently to this event, which threatened their firm's continuity. Although Paul recognized that liquidation was probably the most rational choice—trying to get as much money as possible out of the company—he strongly believed that it was possible to save it by means of an OI strategy to develop a new type of high-precision mercury-free barometer with the help of external partners. For Paul, the most obvious choice was continuing the firm and safeguarding as many jobs as possible. Paul's choice for an OI strategy was motivated by the preservation of his "extended SEW," which refers to family benefits as well as benefits that extend to other stakeholders beyond the family. He perceived the family firm as an extension of himself and believed in the goodwill and willingness of his brother to take the leap with him.

Yves, however, had a very different view about the future of the family business. He did not believe in Paul's OI strategy and did not accept Paul's leadership on the matter. He substantiated his vision with an old report from the Flemish Governmental Agency for Innovation by Science & Technology IWT, which expressed strong doubts about the technical feasibility. While Paul was searching for solutions to save the firm, his brother prepared for its liquidation. A painful valuation and buyout scenario followed. Pruning the family ownership tree seemed to be the only feasible route to family firm continuity. This not only caused a deep rift between the two brothers but also slowed down Paul's ability to pursue his OI strategy to save the company. He had to let go nine of the thirteen employees to keep the firm alive. Soon after the buy-out, Dingens began to walk the path of OI successfully. With the help of a coach from the Innovation Centre Limburg, Paul filed and successfully defended an IWT subsidization project for the development of a mercury-free barometer, The Innovacelli. In 2009, Dingens developed The Innovacelli in close collaboration with Hasselt University and Sirris, the Belgian Collective Centre for and by the Technological Industry. Since then, Dingens' market has expanded and the firm has taken advantage of new business opportunities (e.g., the recycling of mercury barometers).

This case illustrates that the mixture of economic and non-economic goals poses challenges to family owners in the development of a shared vision about the strategic direction of the firm. Unresolved intra-family divergence about goals and strategic options may paralyze the family firm and its maintenance. Solving intra-family goal divergence by pruning the family tree through a buyout was the only feasible option that enabled this firm to pursue an OI strategy.

Our second case, Curana (established in 1946), is a third-generation private family firm that conceives, designs, and produces contemporary bicycle accessories. In 2014, the firm was a trendsetter and strategic R&D partner for large European bicycle manufacturers. In 1990, Dirk Vens and his brother Geert took over from their parents, each coming to own 50% of the shares. Both parents withdrew immediately from the firm's management. In 2012, Dirk became the sole owner after he bought out Geert (former COO) due to the latter's health problems. Dirk has two daughters. Although he hopes that they will become interested in the firm, it was not an issue in 2014. Curana started as a bicycle retailer producing its own frames and bicycle accessories. In the 1960s, the second generation continued this tradition by supplying mudguards and luggage carriers, surviving strong prize pressure from the bicycle manufacturers.

In 1999, Curana shifted its strategy radically as a reaction to rapidly declining demand in products due to fierce global competition on price and new materials (e.g., mudguards made from plastics instead of steel). It transformed itself from a production-driven manufacturer following customer demand to a trendsetting product-oriented company with a strong focus on design and innovation. The brothers decided to develop and market entirely new concepts, which allowed them to set their own prices. However, the family firm had no in-house expertise in product innovation, design, and plastic-integrated production of bicycle parts. Hence, under the strong impulse on the part of Dirk, it began to invest heavily in R&D through strategic partnerships with a diversity of partners (such as design firms, manufacturers, specialized knowledge centers, and universities).

From the beginning, Dirk took on the role of managing director with a focus on R&D, sales, and managing collaborations with external partners. Geert looked after the internal operations such as production, planning, finance, and personnel administration. The strategic turn-around towards OI emerged mainly from Dirk's vision and drive; his brother followed his lead without questioning him. From the start, Geert accepted Dirk as CEO and strategist of Curana. Emotional tensions between the brothers did not develop because they valued each other's strengths and mutually built on them. They trusted each other and valued their family bonds.

The family nature of Curana played an important role in enabling the OI strategy. Constructive family bonds coupled with strong feelings of responsibility for the family legacy, the desire to continue the family firm over the long run, and the presence of internal social capital patiently built over generations enabled more venturing risk and greater flexibility in times of both financial success and hardship. In contrast to Dingens, intra-family discussions about ongoing innovation projects could be labeled as positive cognitive conflicts where the brothers shared ideas and opinions with the intention of moving forward together. For Dirk, long-term continuity was an obligation he owed to the family and his personnel. His brother had always shared this vision. Although the ownership tree has been pruned in 2012 (Dirk's brother stepped out because of health reasons), it was not a condition necessary for OI.

Curana avoided intra-family goal divergence by investing in open dialogue and reciprocal communication between family owners, which are main elements of a process referred to by Poppo and Zenger (2002) as "relational governance," governance that "emerges from the values and agreed-upon processes found in social relationships" and in which promises, obligations, and expectations between parties are put into effect by "social processes that promote norms of flexibility, solidarity, and information exchange." The discussion of the Curana case above provides several examples of these aspects of relational governance. Poppo and Zenger refer to "flexibility" as facilitating adaptation to unforeseeable events while "solidarity" refers to "a bilateral approach to problem solving, creating a commitment to joint action through mutual adjustment." "Information sharing" among parties facilitates problem solving and adaptation. The fact that Geert accepted Dirk as CEO and strategist of Curana is an example of "agreed-upon processes found in social relationships." The cognitive conflicts and the sharing of ideas and opinions among the brothers with the intention of moving forward together are examples of information sharing and solidarity. In general, relational governance promotes open dialogue, transparency, and trust as building blocks of a cohesive family and a shared vision regarding the strategic direction of the family SME. Prior research shows that relational governance practices play a pivotal role in reinforcing family unity and harmony through optimizing the social interactions and team formation of the family owners. Therefore, fostering an OI strategy will be easier in family firms that invest in relational governance practices such as family meetings in which members of the owning family regularly discuss issues at the business and family system crossroads and resolve family-related conflicts. Table 3 shows representative informants' quotes concerning OI and internal family firm characteristics of Dingens and Curana.

***** INSERT TABLE 3 ABOUT HERE *****

Competitive challenges and strategic renewal: Investing in the well-being of the extended family as a key resource for open innovation

The first two cases show that short-term performance hazards may be important triggers for OI activities in family SMEs. Our next two cases demonstrate that long-term competitive challenges may represent overlooked, but equally important, triggers for an OI strategy in family firms.

Our third case, Devan, was a second-generation family firm. The firm was established in 1977 by two families, Vandendaele and Dekeyzer. Up until 1991, Devan operated as a wholesaler of textile chemicals, employing seven employees with an annual turnover of €2 million. In 1991, Patrice Vandendaele became the CEO and R&D director. Rudy Dekeyzer had already joined the firm in 1980 and focused on sales. As second-generation owners, Patrice and Rudy owned 50% of Devan. Once Patrice and Rudy took over, their parents withdrew entirely from the management of the firm.

With Patrice succeeding his father, the company refocused its strategy from a "closed" stance towards a company based on an OI strategy. He built trust via high transparency with respect to all of the stakeholders (personnel, banks, collaboration partners, customers). Market demand for new textile-chemical applications increased, but the firm's strong dependency on suppliers hindered it in its efforts to develop its own new products, to grow, and to go global. Under the leadership of Patrice, Devan then focused on the development and production of highly specialized textile chemicals (e.g., antimicrobial and flame-retardant applications). The company began to invest heavily in R&D and collaboration with external knowledge partners and customers. Over the years, it acquired a number of firms that held interesting patents. It also received financial support from the Flemish Governmental Agency for Innovation by Science &

Technology IWT. Devan was able to maintain its focus on innovation over time and so to provide a continual stream of new products.

As family owners, Patrice and Rudy developed close relationships with their personnel and felt highly responsible for them and their families' well-being. They were seen as part of an extended family. Growing and taking care of the employees were the most important reasons for Devan's owners to reinvest their yearly profits into the firm instead of going for immediate personal gains by means of dividends or above-the-market salaries. A concrete example of this long-term orientation occurred in 2008 when Devan lost its biggest customer in the midst of the global financial crisis. To safeguard jobs and the timely development of new products, Patrice and Rudy decreased their own salaries by 20% and paid no dividends. This gesture generated high employee engagement and trust, which in turn was an important resource to nurture OI activities.

From the outset, Patrice and Rudy shared the same ambition and complemented each other. The two constantly invested in a mutual understanding and built trust through open, reciprocal communication. In 1991, they agreed that their children were free to pursue their own careers outside Devan and that, after they had seen to the growth of the firm, all options were open for discussion. In 2000, when it was clear that their children were not interested in Devan, Patrice and Rudy began to plan their exit. They strengthened the management of key positions (such as R&D and sales) in the hope that the firm could then continue without them. In 2010, the everyday management was delegated to a non-family CEO. Three years later, Patrice and Rudy decided to sell the firm to two of their company managers and an investment fund. This sale went smoothly as both families quickly agreed on the price. With the sale of the company in August 2013, a short-term return on investment logic came to dominate. The autonomy of the R&D director, who had been trained by Patrice, was immediately restricted by the new owners. In the words of Patrice: “The new management immediately limited the autonomy of the R&D manager I had hired and trained. Enough with what they called ‘wild thinking’.” According to Patrice, the successful long-term OI strategy that was built up so patiently by the former family owners is now endangered.

Our fourth case is Boone. In 2014, Boone was the third largest furniture supplier to hospitals and retirement homes in Belgium. CEO-owner Jan Van Hecke had bought the existing family furniture maker after failure in 1985. As a first-generation owner, Jan holds a majority stake in the firm with 66% of the shares while a silent partner holds 34%. Jan has two sons and a daughter. The latter is not interested in the firm. One of the sons joined the firm in 2011 and is (in 2014) responsible for a commercial division. Both sons are members of the board of directors (together with Jan) and the advisory board (together with eight external advisors). In 2014, with the help of an external advisor, Jan was preparing for the transfer of Boone if his children (his first preference) or other parties would be interested in taking over the firm.

After the acquisition in 1985, Jan realized that he had to tap into new markets and diversify in order to stay competitive as a furniture maker. With society's increasing demand for healthcare solutions, he felt that producing innovative furniture for the health-facilities market (such as hospitals and nursing homes) was a huge business opportunity. However, this was a restricted contract market and Jan felt that major product innovations failed to materialize because various supply chain partners delivering to the healthcare sector did not collaborate. To overcome these obstacles, Jan took the lead in setting up PRoF (acronym for “Patient Room of the Future”), a multi-stakeholder OI platform of manufacturers, architects, patient associations, healthcare personnel, user groups, research institutes, and universities. The overall goal of the platform was to conceive and develop patient-centered innovations, jointly delivering at least one feasible new concept per year. Since its inception in 2009, the platform has achieved that goal and has become exemplary in the industry. Under Jan's leadership, PRoF had over 240 members in 2014, including the Flemish government and European partners, and was in 2014 the largest OI platform in the healthcare sector in Europe. The consortium built a prototype of the patient room, the personalized residence, and the patient-recovery room of the future. These prototypes and ideas are not patented. Although competitors might copy ideas, the collaboration and innovations that emerge in the consortium are unique and always give the members a head start, a point Jan emphasized.

The platform, however, had a shaky start. In October 2009, only seven of the 50 invitees for the first PRoF brainstorming session showed up, one of them being Televic, a market leader in healthcare communication systems. However, four months later, the multinational Philips approached Jan with a request to join as a member. The Philips board was very enthusiastic about Jan's initiative. The board openly recognized that Philips, as a large public multinational, was not agile enough to set up and manage a collaborative initiative such as the PRoF consortium, which the family firm Boone could do. However, Philips wanted to collaborate, equipping the patient rooms with a TV incorporating a fully integrated care-service system, and has been supporting the platform in many ways. Philips' membership gave a boost to the platform without itself taking the lead. Table 4 displays representative informants' quotes concerning OI and internal family firm characteristics of Devan and Boone.

***** INSERT TABLE 4 ABOUT HERE *****

In conclusion, maintaining the business for future family generations is often the dream of the founder/family owner and an important driver for family business behavior. Indeed, as an essential aspect of the family's SEW, the intention of handing over the business to the next generation encourages strategic decision-making with a long-term competitive view in mind. The declining competitive position of Devan and Boone in a mature industry, albeit without an imminent short-term performance hazard (as in the Dingens and Curana cases), created a potential long-term threat to the survivability of the firm and accordingly the family's socioemotional endowment. Pursuing an OI strategy was the logical result of a search for reconciliation of the economic and non-economic objectives of the family owners. However, engaging in an OI strategy did not follow naturally. For example, in the Devan case, the concern of the next generation about the declining competitive position of the family firm led them to initiate a strategic renewal process by reframing the competitive challenge as a strong new opportunity leading ultimately to an OI strategy. Indeed, the strategic renewal processes of our cases were facilitated by family adaptability and the absence of the "shadow of the founder effect" (i.e., previous generations that hinder change processes initiated by successors), which are both positively related to innovation according to the research of Hauck and Prügl (2015). A striking finding is that in most of our cases (Devan, Boone, Curana), the socioemotional strategic reference points of the family owners included motives that directly benefited stakeholders beyond the family. For example, the concern for the long-term wellbeing of the employees as a motive for an OI strategy engendered a strong commitment of the employee base that ultimately benefited the financial figures of the family firm.

MINIMIZING CONTROL LOSS CONCERNS BY TAKING UP THE ORCHESTRATION ROLE IN THE OI NETWORK

Typically, keeping control and influence over the family SME is a primary goal for most family owners. At first sight, this objective contrasts greatly with engaging in OI activities that typically involve surrendering part of this control and risk opportunistic behavior on the part of OI partners. Our cases, however, show how family firms can reconcile this apparent contradiction by becoming orchestrators and taking a leading role in their OI initiatives on the basis of their innovative power and OI management capabilities. An OI orchestrator is typically capable of binding a group of partners together for prolonged periods of time by means of an inviting and facilitating way of leading without exercising formal control or hierarchical power over the joint innovation initiative. To be able to do this, the orchestrator needs to go beyond merely coordinating OI network activities to creating sustained value for the network partners that they would be unable to create on their own. They create (technological) visions with each partner playing a distinctive role over the long run, market the network to outside parties by generating a resource network around the collaboration from which partners can draw, set interaction rules to foster an atmosphere of information sharing, trust, reciprocity, and effective communication, set up partner selection mechanisms to ensure that like-minded partners join the network, and so on. By initiating collaborative innovations and taking up the orchestrator role, the leading family owners in several of our cases invested heavily in building long-term relationships based on trust and openness with stakeholders and partners. In other words, as lead firms, they stayed in the driver's seat of building and nurturing their respective OI networks of partners of their choice thereby minimizing perceived control losses. Devan and Curana mostly collaborated with like-minded partners (often other family firms) within the value chain (vertical partners); Boone orchestrated a very large network of large/small, for profit/non-profit complementary partners. While Dingens is the core firm of the innovative network that developed The Innovacelli, its orchestration role was not very pro-active in terms of developing a vision, marketing the network, building trust or selecting partners. Therefore, Dingens will not be discussed here. We take a closer look at the other three cases, starting with Devan.

Patrice and Rudy always regarded Devan as a big family going for the long run. They built a company culture featuring curiosity, transparency, a focus on collaboration and an openness to all stakeholders. This family culture made it easier for Devan to set up OI networks with its vertical value-chain partners as the value-chain orchestrator coordinating their activities to reach a win-win goal. According to Patrice, one of the biggest success factors of Devan's OI strategy was its collaboration with public knowledge centers and other family firms with whom they felt an immediate connection based on mutual respect and understanding, which led to the rapid establishment of trust. Devan always initiated its OI projects and actively selected partners with similar values and attitudes towards trust, openness, and sharing (never competitors). They took the lead in building their OI networks. They set up conversations to clarify their mutual expectations and roles, always searching for a win-win situation, and they terminated the collaboration if they felt that transparent knowledge sharing was missing.

Regarding Curana, Dirk always attracted employees that shared his entrepreneurial drive, perseverance, long-term orientation, open-mindedness, and willingness to experiment and learn. When searching for OI partners, he ensured that there was an equally strong fit with these characteristics and actively selected like-minded partners. He found these features more in family firms than in non-family firms because of the entrepreneurial drive of the CEO-owner, his/her long-term orientation, and his/her ability to build close relationships with personnel. Curana's family character rapidly enhanced trust on the part of collaboration partners, which made it easier to initiate and build OI partnerships as the lead firm. As a value-chain orchestrator leading its OI network on the basis of an innovative vision, Curana set up vertical collaborations with upstream or complementary partners (e.g., Pilipili, the family firm Anziplast), customers (e.g., Batavus, Sparta) or with research centers (e.g., VKC-Centexbel, the technological research and service center for the plastics-processing industry). Horizontal collaboration with competitors does not occur. With the help of VKC-Centexbel and in close collaboration with the neighboring design firm Pilipili and the local injection-molding family business Anziplast, Curana initiated the development of the B"Lite, a lightweight mudguard with a high-tech appearance that combines plastic and conductive aluminum, which eliminated the use of wires for the built-in taillight.

Batavus and Sparta, two Dutch bicycle makers, held an exclusivity contract for two years. Since its launch in 2002, Curana's turnover quadrupled in the six subsequent years and Anziplast grew faster. Curana built on this success formula and expanded its product portfolio significantly.

With respect to Boone, Jan orchestrated, on the basis of a strong vision of differentiation and growth, a very broad customer-oriented network of large and small, non-profit and for profit complementary partners. Jan actively coordinated and built the network based on explicit, albeit informal, ground rules concerning partner selection and collaboration. To keep the focus on patient-centered innovations, 90% of the PRoF members had to be non-profit healthcare actors, which meant that only 10% could be commercially-oriented manufacturers and architects. Moreover, commercial members needed to demonstrate different but complementary core expertise to avoid destructive competitive logic creeping in that might hinder open knowledge sharing. Jan retained a decisive voice regarding who could join the platform and played a mediating role when difficulties arose between partners. He chaired the PRoF meetings, set timelines, and marketed the network to outside parties by hosting annual PR events and looking after the PRoF showroom at Boone. High trust, an orientation to long-term learning, mutual feedback, reciprocity, and discipline characterized the interactions between the PRoF members. As coordinator, Jan cultivated the combined strengths of diversity, complementarity, equivalence, and trust in partners as building blocks for OI. Moreover, to keep the platform's autonomy, it was self-funded by its members and subsidies were not sought.

Even though the type of partners/networks may differ across our cases, we do see a common thread: Owner-entrepreneurs who demonstrate clear leadership in their family firm typically orchestrate their OI networks. They were the first to come up with innovative ideas that stimulated the formation/maintenance of the network, took the lead in creating an innovative vision and realizing innovation, represented their OI networks to the outside world, and carefully selected collaboration partners whom they could trust and with whom they could openly share information. Indeed, most of the case companies chose their collaboration partners vertically so as to minimize the loss of control over the family firm. Horizontal collaboration (with competitors) never happened. Table 5 shows representative informants' quotes from our four cases concerning OI and collaborative relationships with external partners.

***** INSERT TABLE 5 ABOUT HERE *****

CONCLUSIONS AND PRACTICAL IMPLICATIONS

Prior to this study, we had very little understanding of how private family SMEs can successfully pursue OI and what factors can explain their success. Our cases have revealed a number of mechanisms family entrepreneurs can use to rise up to the challenges of multiple and potentially conflicting goals in the family firm and family system, the lack of diversity of in-house resources and expertise, and the fear of losing family control.

The first mechanism entails achieving goal congruence and a shared vision concerning OI within the business-owning family by investing in relational governance. Family firms that invest in constructive family bonds and high-quality relationships among the family owners characterized by reciprocity, consideration of one another, and directness find it easier to pursue an OI strategy. Under these circumstances, family relationships become generative, that is, they become family firm unique resources that contribute to succeeding in OI. By contrast, dysfunctional family relationships can make family firms uniquely vulnerable, causing unwanted spill-over effects (e.g., discouraging employees and external partners) and negatively affecting the way OI can be enacted in the family business. In this respect, when goal congruence cannot be achieved because the family owners are not able to deal constructively with intra-family divergence about goals and strategic options, pruning the family ownership tree through a buyout can be a second mechanism for pursuing an effective OI strategy and thus ensure family firm continuity (e.g., the Dingens case). The third mechanism involves taking the lead in orchestrating outside knowledge partners, thereby minimizing the family owners' fear of losing control over their goal set and strategic trajectory. Maintaining family control over the business has been said to shape family firm behavior as it contributes to the preservation of the family's socioemotional wealth (SEW). Several of our cases have shown that control-loss concerns can be effectively reduced by taking up orchestration roles and becoming strategic centers of OI networks and communities. The orchestrators knew how to broaden and build constructive relationships within the family to include their employee base and external partners thereby creating high engagement and trust in the firm and OI network. Similarly, the family owner-entrepreneurs demonstrated strong and inspiring leadership that enabled them to instill entrepreneurial drive and long-term opportunity thinking (vs. short-term profit maximizing) both company-wide and in their respective OI networks, which in turn became sources of competitive advantage.

These findings contribute to the nascent knowledge about OI network orchestration in family SMEs. The literature has found that the orchestration role is essential in an OI network for the creation and extraction of value. Orchestrating, conceived as managing knowledge mobility, seeing to an equitable distribution of value among network partners, and maintaining network stability, is said to require network management dedicated to fostering reciprocity, trust, mutual learning, and conflict resolution. Family firms typically have the resources for this kind of network management, such as a long-term orientation and a superior ability to develop more personalized, trusting, and enduring relationships with both internal and external stakeholders. However, these assets are not always recognized and/or effectively used to create value. Our cases, moreover, suggest that family SMEs are more likely to engage in network orchestration and thus to use their social capital assets when they perceive this action as a means to minimize control loss concerns. The existing literature has suggested that in non-family firms, transaction costs, intellectual property considerations, and management challenges are important costs and risks associated with an OI approach. Our study of OI in family SMEs reveals and adds the importance of the preservation of the family's SEW (and the wellbeing of the "extended" family)—a unique defining feature of family firms—as a pivotal reference point of family owners when making the decision to take the road of OI, shaping the way OI networks are organized by them.

A common thread throughout our case findings is that the leadership and traits of the family owner-entrepreneur had a pervasive effect on successfully engaging in OI practices and orchestrating OI networks. Family entrepreneurs, which orchestrated their networks, strongly embodied a passion and drive for preserving the family firm's values and mission. They were very present in their family firm's business (the firm is essentially a mirror of the entrepreneur), which enabled them to attract and develop like-minded employees that could be strongly motivated to pursue the firm's mission (as exemplified by the training of the R&D manager by the owner of Devan). Likewise, this entrepreneurial drive also carried over into connections with external collaboration partners, which made finding compatible partners that shared the same drive and building enduring relationships with them easier. Furthermore, these family entrepreneurs engaged in long-term thinking, embraced being open, and persisted, which fitted well with pursuing their OI strategy. This long-term orientation, which is found frequently in outcompeting family firms according to Le Bretton-Miller and Miller (2006), seems to originate from the mere possibility of intra-family succession and/or a strong moral obligation to build on the family legacy, to preserve the family's SEW, and to take care of the loyal employee and partner base. These characteristics are not generally found in large non-family firms. It thus is no surprise that researchers in OI, while turning their attention to SMEs after predominantly studying OI practices in large non-family firms, have discovered that OI lessons from these large firms cannot be easily transferred to the family SME context.

Moreover, research on entrepreneurship and family businesses has found that entrepreneurs have a much stronger influence on strategic decisions and the commitment of employees than managers in large non-family firms. The survival and prosperity of the business *and* the family's SEW may be directly and significantly influenced by the leader's decision-making, carrying with it a significant responsibility, inducing the family entrepreneur to be more controlling when it comes to making decisions. Concerning OI, one can assume that family firm entrepreneurs may thus be more inclined to seek control of their OI activities than any other type of manager. As engaging in OI equals partly giving up control to partners, whose behavior will subsequently not only influence the family firm's performance but also the business-owning family's SEW, it seems logical that the entrepreneur tries to maneuver his/her firm into an orchestration position where as much influence as possible can be exerted on the behavior and outcomes of the OI network.

In sum, OI can be a valuable strategy for family SMEs. Our cases show that OI in family SMEs is not the result of a grand, formalized action plan (as is found in many studies of OI activities in large, R&D-intensive non-family firms) but rather a continual process of discovery together with external collaboration partners, combining expertise and strengths along the way. Value is created in many different ways and, given the heterogeneity of family firms, there is no "one-size-fits-all" OI strategy for family SMEs. In view of the findings of the present study, the intricacies and nuances of OI processes in family SMEs and the role of the entrepreneur and the family system herein obviously deserve further investigation. Studying, in-depth, why some family businesses succeed in innovating openly while others fail therefore remains an important research trajectory of which the outcomes will enrich both the OI literature and research streams on entrepreneurship and family businesses.

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TABLE 1. Overview of the cases

	Devan	Curana	Dingens	Boone
Year founded	1977 (by 2 families: Dekeyzer & Vandendaele)	1946	1965	1985
Family business	Yes (till August 2013: Two company managers & investment fund buy the firm)	Yes	Yes	Yes
Industry	Textile chemicals	Bicycle accessories	Precision barometers	Adaptable furniture
Latest generation in ownership	2^{nd}	3^{th}	2^{nd}	1^{st}
No. of employees	50 (2014)	25 (2014)	13 (2007), 4 (2014); loss of employment due to the 2007 EU decision to ban mercury in consumer products	37 (2014)
Change in ownership (year, protagonists, distribution of shares)	- 1980: Rudy Dekeyzer takes over from his father; - 1991: Patrice Vandendaele takes over from his father; Rudy & Patrice each come to own 50% of the shares - August 2013: Devan is sold to two company managers & investment fund	- 1965: Founder's daughter takes over with her husband - 1990: Two brothers, Dirk & Geert Vens, take over from their parents, they each come to own 50% of the shares - 2012: Dirk buys out his brother Geert	- 1990: Two brothers, Paul & Yves Dingens, take over from their parents, each coming to own 50% of the shares - 2008: Paul buys out his brother Yves	1985: Jan Van Hecke buys existing family firm Boone after the firm's failure
Family ownership	100% in the hands of 2 families (50/50; till August 2013)	100% in the hands of a sole family owner (after 2012 buyout Geert)	80% in the hands of a sole family owner (after 2008 buyout Yves), external investor owns 20%	66% in the hands of a sole family owner, silent non-family partner owns 34%
Family CEO	Yes: Patrice (until August 2013)	Yes: Dirk	Yes: Paul	Yes: Jan
Family members working in management	Patrice & Rudy (until August 2013)	Till 2012: Dirk & Geert, then: Dirk	Till 2008: Paul & Yves, then: Paul	Jan & one of his sons
Desire of family CEO-owner to pass on the firm to the next generation (time of study)	Yes, but children are free to decide; children are not interested	Yes, but children are free to decide; they did not decide yet	No. Paul does not want his children to take over the firm	Yes, transfer of Boone to the children (Jan's preference) or other parties is being prepared
Key information about Open Innovation projects	Proactive orchestration role in vertically oriented OI network based on strong internal R&D and management capabilities, openness, and trust-building, resulting in new technologies, products, and growth	Proactive orchestration role in vertically oriented OI network based on strong internal production and management capabilities, openness, and trust, resulting in innovative leadership, new products, and growth	Core player in public-private OI network based on design, development, and production capabilities, resulting in a new environmentally friendly version of the former product	Proactive orchestration role in vertically oriented OI network based on strong capabilities in design, manufacturing as well as management skills, openness, and trust, resulting in strong market presence
Turnover (2013)	€20 million	€3.7 million	€400.000	€4.5 million

TABLE 2. Open innovation in each of the four family-owned businesses

	Devan	Curana	Dingens	Boone
External OI drivers	Reduce dependence on suppliers/remedy restrictions in terms of product range and geographical spread (i.e., Benelux)	Move away from price competition through global sourcing/consolidation/ competition from producers using other raw materials	Deal with ban on use of mercury in consumer products/competition from Asian producers	Stay competitive
Internal OI facilitators	Vital R&D function; strong marketing/sales capacity; OI management capabilities (e.g., create win-win situations); top management autonomy and commitment	Strong production capabilities; OI management capabilities (e.g., select and motivate partners, establish close relations); top management autonomy, commitment, and perseverance	Strong capabilities in design, development, and production; top management autonomy, commitment, new business development capacities, and perseverance	Strong capabilities in design and manufacturing; top management commitment; OI management capabilities (e.g., create trust and an OI culture within the network)
OI direction (inside-out/outside-in)	Outside-in	Outside-in	Outside-in	Outside-in
OI modes (equity/contractual/informal)	Equity acquisitions; contractual partnerships	Contractual partnerships	Contractual partnerships	Contractual partnerships
OI level (dyad/formal network or informal community)	Dyad-level, one-on-one relations between Devan and its partners	Dyad-level relations between Curana and partners	Network-level, formal partnerships between Dingens, Hasselt University, and Sirris where these partners collaborate closely among each other	Network-level, formal partnerships between Boone and its partners where all partners collaborate among each other
Types of OI partners (horizontal/vertical/public-private)	Vertical relations with customers (short-term, applied research); public-private relations with universities (long-term, fundamental research, e.g., Ghent University, Ensait, DWI)	Vertical relations with upstream partners (e.g., Pilipili, Anziplast) and customers (e.g., Batavus); public-private partnerships with research centres (e.g., VKC)	Public-private relationships with universities and research centres (e.g., Hasselt University and Sirris)	Vertical relations with complementary manufacturers (e.g., Televic, Philips), architects, customers, and other value chain partners; public-private partnerships with universities (e.g., KU Leuven)
OI orchestration role (value chain/network or community)	Value chain orchestrator: With limited production capacity Devan manages the final mix of products; Devan creates favourable conditions for its (predominantly vertical) partners (e.g., helping partners develop unique value propositions, granting exclusivity, market/funding access, etc.)	Value chain orchestrator: By designing, developing, and manufacturing radically innovative concepts using new materials in collaboration with value chain partners Curana creates value for a specific set of bike manufacturers	Dingens is the core of the innovative network that developed The Innovacelli but its role is not very pro-active (in terms of selecting partners, for example)	Network orchestrator: Boone actively coordinates the PRoF network by setting up meetings, managing timelines, etc.
OI funding (internal/external)	External (IWT and EU)	Internal	External (Chinese investor, IWT, Vinnof)	Internal
OI outcomes	Expanded (environmentally friendly) technology and product portfolio (e.g., Eco-flam™, Purissimo™, Insecta™, Aegis™), growth through new product development, geographical expansion (e.g., presence in the UK, Portugal, and the US), independence, strong market presence	Proactive, leading innovator/designer/manufacturer/brand in the industry rather than a reactive, anonymous producer of parts, products new to the industry (e.g., B"lite, C-lite, and D-vide), expanded product portfolio, growth, strong financial position, strong market position based on differentiation and price-setting	Innovative, environmentally friendly, new product (i.e., The Innovacelli), new business opportunities, geographical expansion, survival and growth	Third largest furniture supplier to hospitals and retirement homes in Belgium, diversification

TABLE 3. Cross-case analysis of Dingens and Curana: Quotes regarding open innovation and internal family firm characteristics

Internal family firm characteristics	Dingens	Curana
Leadership family entrepreneur	• "I felt like I could not take the lead in our OI project." • "Many employees left during/following the dispute with my brother. They saw that the company was lacking leadership." • "My brother was planning a liquidation while I was searching for a solution. I did not see this coming and so I did not handle it very well." • "My brother and I had a clear role division on the basis of competencies. He was the administrative talent and I was more technology-oriented. Initially, this worked well. Problems started arising when we both got involved in sales and were more or less competing with each other." • "We had a 50/50 division with regards to decision-making; we both took decisions for different areas of the business." • "My brother did not share my vision of growth."	• "With regards to OI my brother did not have the vision or the drive; it originated predominantly with me." • "My brother and I had a clear role division; he was in charge of production, administration, personnel, etc. while I was leading our OI approach, contacts with external partners, customers, etc. There were no formal agreements about this role division. It grew organically on the basis of capabilities. Growth through OI has been my internal drive." • "My brother has never resisted my approach to growth/innovation." • "As a leader I am open minded. That attitude determines the heart and soul of Curana. Curana's performance and actions are linked to my leadership." • "As a leader I am headstrong; we do not do what others do." • "My external advisory board supports my views but they also regularly act as the devil's advocate, which is very helpful."
Relationships within the family (family bonds)	• "My brother did not believe there was a way of dealing with the ban on mercury; I did believe in a solution. This dispute seriously harmed the company and forced me to do a buy-out, severely weakening Dingens. It cost us a year." • "I had invested private funds in the family business while my brother had financial problems. This occurred on the basis of trust. He took advantage of this situation to get a higher price for his shares at the buy-out. External mediation did not help." • "Our mother (my parents got divorced) tried to mediate in our dispute but this did not work. She did not have the necessary authority." • "My brother is seven years older than I am so he told me that I should work harder than him." • "In my view, our family relations and the (negative) attitude of my family members hampered me in changing the direction of the family business. After my brother left the firm, I was able to make the OI story a successful one."	• "We always tried to respect each other as much as possible." • "I took the lead and my brother accepted that." • "My brother could not handle the implications of our growth strategy. Particularly when our internal production regained momentum he was unable to handle the larger number of customers, employees, specifications, etc." • "At a certain point my brother and I got involved in a conflict. A 50/50 division of shares implies equal rewards; yet the number of hours put into the business by my brother and I did not match. With the help of an external person, who is on our advisory board and could take the interests of both of us into account, we decided to apply different wages as this is common business in most other companies; if you put in more hours, if your tasks involve more risk-taking, you earn a higher pay." • "We never put any agreements on paper because the complexity of the family business was very low." • "My parents played a mediating role in a dispute between my brother and I regarding the value/transfer of the shares. The family bond is important then."
Relationships with employees (internal community)	• "It was not a very wise business decision to take over the family business but rather an emotional one. There were people that had been working for us for already 30 years. These emotional ties led me to ensure that the firm would survive." • "There was an internal division between believers and non-believers."	• "It is difficult to find people that share my views on OI. I am looking for good people who can take over my daily management tasks so I can once again focus on strategy and (open) innovation." • "The employees that worked for my father supported us in our approach when we took over."
Innovativeness	• "As a result of an immediate ban on the use of mercury in barometer, we were forced to innovate and come up with a new product. There was not much time; there was no transition period. The product we have now is a better one than we had before." • "With our Chinese business partner we hope to develop new product lines, new markets."	• "We had no choice but to search for innovation about 14/15 years ago when there was a decreasing demand for our products." • "We realized that we had to be innovative to survive but as an SME that is not something you can do on your own." • "Growth, innovation, change have been internal drivers for me. I will not wait to become obsolete in my sector." • "We are leading the industry in terms of innovation; we are trend-setting."
Openness	• "At first, following the ban, there was an internal division between believers and non-believers with regards to the new product concept. But once the new product concept was launched, their enthusiasm emerged."	• "The people working for Curana, and those that are performing well, are all very open-minded, open to renewal, open to change. And they understand that sometimes you try something and it does not work out. That it is part of pushing the boundaries."

Resources	• "We had to sell our company building to ensure enough resources." • "I invested private funds in the family business." • "The Chinese business partner is financially strong."	• "As we did not have all the necessary competencies internally to come up with innovations, we started working with external partners." • "We hardly ever pay dividends to family shareholders; we save the money, keep it within the business to help us survive difficult times."
Preserving family control of the firm	• "We recently attracted an external partner to invest in our business and thus ensure continuity. This is a Chinese partner. It is my intention to leave the family business in the hands of this partner in due time. We still have to agree on the exact terms. Our interaction so far is based on trust."	• "When my brother and I took over, my father continued to work in production for another five years." • "When my brother left I took over his shares. I made a conscious decision not to have him become a silent partner who is more interested in the value of his shares than the direction of the company." • "In OI, you become dependent on your partners, on their well-being."
Long-term view (perseverance)/ Family patient capital	• "The family factor did not play a role in my decision to take over the firm." • "I am ambitious. I want our firm to grow. My brother did not share this vision." • "The new product we have now offers opportunities for export. And it has opened up new markets. For example, we received requests from hospitals for a specific thermometer. Technically, we succeeded in developing this product for hospitals but sales did not take off. I invested resources in these projects for a while but then I decided to withdraw. I chose to focus on projects that would generate more direct, short-term returns." • "By double-crossing me, my brother put the continuity of our family business at risk." • "In contrast to my brother, I was very enthusiastic about the family firm and invested private funds in our business."	• "We have followed a clear growth strategy." • "OI requires a long-term view. Sometimes you invest and there are no or negative returns or returns take a long time to materialize. If you are a shareholder to the family business, you accept this as part of the game. You incur the costs." • "The risk of following an OI strategy is that it is discontinued when business is rough; OI requires a long-term view." • "My parents never intervened but they did intervene in the dispute my brother and I had regarding the transition of the shares. They would not let us destroy three generations' worth of work."
Desire to pass on the firm to later generations	• "I forbid my children to ever play a role in the family firm. I now have an external partner that owns 20% of the shares. This partner will continue the firm." • "Originally, my parents and my two brothers were involved in the family business. My oldest brother left the firm because his life took a different turn and he also had a deviating vision. We then started negotiations with an external party to take over the firm but this did not work out. The only option that was left was for my brother and I to take over."	• "There was a traditional sense of succession; my brother and I were to take over the family business. I was eager, my brother not so much but we both did." • "I understand how my parents handled the succession but nowadays there is a more professional approach to it. It is not a must anymore that children take over the family business. In my case this will most likely not be the case. And I am fine with that."
Resume	**Weak leadership, weak family bonds, medium-strong employee community, forced to be innovative, not very open, weak financial position, low desire to preserve family control, medium-term view, no desire to pass the firm on to later generations**	**Strong leadership, medium-strong family ties, medium-strong employee community, innovative (although initially forced to change), open, strong financial position, strong desire to preserve control, long-term view, low desire to pass the business on to later generations**

TABLE 4. Cross-case analysis of Devan and Boone: Quotes regarding open innovation and internal family firm characteristics

Internal family firm characteristics	Devan	Boone
Leadership family entrepreneur	• "I communicated openly about the management buy-out decision with my children but the ultimate decision was up to me." • "Our company values are clearly communicated; they were portrayed on the walls of the meeting room. Our people know what we stand for." • "I clearly communicate my demands, my expectations. I do not wait until things go wrong to express what I want." • "Once my father retired I became the leader. He let me develop the strategy. But I always communicate what I want and why." • "There was not much to criticize when it comes to our OI approach but I always listen to (financial) people's advice." • "Our board of directors mainly has had an advisory role."	• "I was not knowledgeable with respect to the furniture industry when I took over Boone. I realized quickly that I needed to find a niche market to survive and establish a position for my company in this mature industry. I decided I needed a completely new furniture concept. And I started working towards this goal." • "On the basis of my personal, financial investments in the company, I can quickly take decisions; very, very fast." • "I do not want to be dependent on, for example, subsidies. I want to be independent, and supporting myself financially ensures this authority." • "The healthcare sector is very regulated and our innovations were therefore difficult to implement. Instead of trying to convince the regulator, I quite stubbornly decided to gather other innovators around Boone and start with PROF. We just started and we made a lot of noise. Then the regulator came to us and is now even part of the consortium." • "I have external advisors that are involved in decision-making."
Relationships within the family (family bonds)	• "The two families agreed that we would have an equal say in the company; we divided everything up in two." • "There were no formal agreements regarding succession or division of shares within the families; both families have always interacted with each other on the basis of trust." • "Both families were in agreement regarding the management buy-out." • "Family members completely trusted us; we never had any need for written agreements." • "Family members always knew what was going on, such as an acquisition of another firm, but never asked for details." • "Our growth strategy has benefitted both families."	• "As a non-family member I took over the Boone family business in 1985 after the company governance system had failed (it was not a bankruptcy; the company was sold through a public sale where the family was legally forbidden to take any more decisions and the personnel/future of the company was protected). I obtained 2/3 of the shares. 1/3 of the shares are held by a silent partner. The Boone family is not involved anymore in the company." • "Both my sons are part of the board of directors." • "We do not have a family charter currently but in the case of me leaving Boone in the hands of my children/family we intend to draw up an agreement."
Relationships with employees (internal community)	• "Another agreement within the family was to be open with external partners, banks, and employees." • "It is not fair with respect to our employees who have always performed well that I would become the manager just because I am the son of the owner." • "We have very low turn-over."	• "I select employees based on a personal connection."
Innovativeness	• "In 1999 the company was still a distributor of chemicals for the textile industry; then we decided to develop our own products." • "An SME should not only buy from external parties but should collaborate and bring new ideas, products, projects onto the market. That is very important."	• "During my first weeks at Boone I decided to start developing a completely new furniture concept."
Openness	• "Our OI strategy is tightly linked to our openness with respect to employees, suppliers, banks, etc." • "Our R&D strategy has always been based on collaboration with others." • "When we jointly develop something, we share the benefits with our partner." • "Our family firm values regarding openness have helped us in our OI approach because external parties have come to know us as open, not afraid to let people know what we are working on."	• "PROF is all about openness."

Resources	• "In R&D we are too small to do everything ourselves. There is a wealth of knowledge in universities and other small firms that we can collaborate with." • "When the financial situation is good we do not pay dividends to family members; we re-invest for the benefit of growth."	• "I am highly committed to making our business a success. I have invested a lot of personal funds in our company."
Preserving family control of the firm	• "The majority of the stocks are held by family members." • "I currently act as an advisor to the company, six days a month." • "We always try to be leading in our OI projects."	• "I see our company as a family business. I have private funds invested in Boone. This gives me a lot flexibility and the power to make decisions. Not in the least with respect to our OI efforts. I can make decisions and back them up financially. This is one of the success factors in PROF." • Both my sons are part of the board of directors. We do not have external people governing Boone. We do have external people that advise us." • "I see myself in the board of directors of Boone even after my retirement. I also see myself continuing to play a role in PROF."
Long-term view (perseverance)/ Family patient capital	• "Based on our own product development our revenues grew from 2 to 20 million Euro." • "When it became clear that our children were not willing to take over the family business, we started working towards continuity of the company without our leadership." • "Our family has always had a long-term view and an OI strategy fits well with that vision; to follow a growth strategy." • "Our long-term view has been crucial in the success of our OI approach."	• "Because I am personally highly invested in the company, also financially, I am highly committed to maintaining a lasting, successful business." • "Thanks to our OI project PROF we have grown 15% on a yearly basis in the past years. OI has contributed to our desired survival and growth strategy." • "I have a long-term view but the most important concern is survival. There has to be balance." • "At the initiation meeting of PROF I had invited 50 people of which seven showed up. That should have been a sign to give up but I pushed through." • "The OI initiative is my way of making a contribution to society. PROF ensures the long-term well-being of Boone."
Desire to pass on the firm to later generations	• "Our children were given the choice of whether or not they wanted to work within Devan. For me, it is not a problem if they decide to pursue a career outside Devan; in fact, I think it is valuable. Had my daughter expressed the wish to work within Devan, I would have advised her to first gain experience elsewhere and she would have had to start at the bottom." • "The company was ultimately sold through a management buy-out. This occurred while communicating openly with the children. They did not have the intention to be involved in the family business."	• "I am thinking about succession. One of my sons joined Boone three years ago. It was not my intention to have him stay for so long. It triggers a lot of questions in employees. But now I owe it to him to think about succession. It could be that succession will be family-based but it could equally well be the case that an external party will be involved. But my children will always have an opportunity to make an offer." • "Both my sons are part of the board of directors. It is a way for me to provide them with information on a structural basis. To let them feel responsibility. And a way of ensuring that Boone can continue to function should something happen to me."
Resume	**Strong leadership, strong family ties, strong employee community, innovative, open, strong financial position, strong desire to preserve control, long-term view, strong desire to pass the business on to later generations (even though this did not work out in the end)**	**Very strong entrepreneurial leadership, medium-strong family bonds and employee community although not very influential, innovative, open, strong financial position, strong desire to preserve control, short to medium-term view, medium-strong desire to pass the firm on to later generations**

TABLE 5. Cross-case analysis of the four cases: Quotes regarding open innovation and collaborative relationships with external partners

Features collaborative relationships with external partners	**Devan**	**Curana**	**Dingens**	**Boone**
Initiation and orchestration	• "In our OI projects we have always been the driving force and have been able to convince others of the benefits of OI. We have always been believers and have been able to spread the word." • "In most of our OI projects we were the facilitators/initiators." • "Our leading role in OI projects was not based on knowledge of the approach. I have not read any books on OI. The approach grew spontaneously within our firm." • "We always try to be leading in our OI projects and we avoid projects that do not fit within our strategy."	• "We have developed a high level of experience in OI over the past years." • "We lead our OI projects because we initiate the novelty." • "Curana does not want to do what others are doing. Many times, we thus explore and end up with partners who we ask to do something that they never did before. We then rely on their willingness to just go for it and we lead because we come up with the idea."	• "We followed an innovation trajectory with our partners that was completed within the time frame that was set by the funding agency." • "I should have been more on top of things in our OI project. To make sure the collaboration would have worked out as planned. The lack of orchestration on my side was due to inexperience and my being impressed by the reputation of one of the partners. I felt like I was not in a position to take the lead. But I should have."	• "We initiated and set up the PROF consortium." • "We take a leading role in PROF. We invest large amounts of money. PROF projects are realized physically at the Boone site." • "I let the PROF consortium grow. We are now also present in Germany. If these partners are complementary I let them be part of PROF." • "The PROF members probably think that I do well as the coordinator." • "I select partners based on a personal connection. You cannot make these kinds of decisions as a group." • "I make sure that opportunistic behaviour at the expense of PROF as a whole does not occur."
Partner selection (complementarity, other family firms, fitting entrepreneurial mindsets & values)	• "We prefer collaboration with knowledge institutions and other SMEs. We collaborated with multinationals a few times but we have had bad experiences." • "Our most successful collaborations have been with other family firms where there was an immediate sense of connection, mutual respect, trust, and understanding of each other's desired directions." • "Partner selection is very important. Creating a win-win situation for every party involved and avoiding situations where competitors have to work together."	• "The partners that we work with have the same open mindset that we do. Innovating with open-minded partners works best. They are usually also family firms, experiencing similar kinds of dynamics, being of the same size. We select each other because of these similarities. Our partners are extensions of Curana." • "The drive to innovate, the long-term view, the flexibility, the willingness to invest in a project that may fail or may not generate benefits right away…these can be typical characteristics of family firms vis-à-vis public firms that we find highly valuable and explicitly select in our collaborative relations. The attitude of the leader reflects the soul of the partner firm. This needs to match mine/ours." • "We choose partners that are	• "Through external governmental (funding) agencies we got into contact with our partners." • "One of the partners was logistically the right choice and we had some experience working with them. The other partner was suggested to us by the external agency and turned out not to have the right knowledge." • "With hindsight, I feel like we had better selected different partners with more basic knowledge; the project would have probably turned out better."	• "We explicitly select complementary partners. If partners are sufficiently different from each other they do not keep secrets. We have 250 complementary partners. We select mostly partners who are active in healthcare and research institutes (90%) and barely 10% of partners are producers such as Boone. The latter group predominantly ensures financing and realization of joint projects within a year. The former group has the knowledge and the ideas." • "We search for complementary partners that are not competing with each other. Partners that can offer us solutions to problems we are faced with. We do not necessarily search for small companies or family firms. Philips, for example, is also part of PROF."

		complementary to us/have complementary goals. I prefer working with family entrepreneurs rather than managers.”		
Governance (trust versus control, formality versus informality)	• “The old way of management based on control of information in combination with OI…I find that wrong.” • “We communicate openly what our expectations are.”	• “Our partners are usually also family firms. We have the same dynamics, personal drives that lead us to understand each other and work in the same way.” • “Usually family firms are driven by personal values such as ambitions and entrepreneurship rather than performance. We understand each other.”	• “We knew what to expect from the partner we already had experience with and vice versa.” • “I work on the basis of trust. People know they can rely on me.”	• “Members trust that what we come up with will be realized within a year. That basis of trust is one of the reasons why we continue to exist.” • “We do not have a formal structure; we are no legal entity. We function on the basis of informal agreements. People stick to these agreements. I have three people around me with different backgrounds who give me advice.”
Resume	**Strong orchestrating role in OI, partners that are similar, informal/trustful partnering**	**Strong orchestrating role in OI, partners that are similar, informal/trustful partnering**	**No orchestrating role with respect to the OI project/partner selection, collaboration based on trust/informality**	**Very strong orchestrating role in OI, complementary partners, informal/trustful collaboration**

FIGURE 1. Overview of the key findings from the cases

Family SMEs & Open Innovation

Main drivers of OI in family SMEs	Main family SME challenges of OI	Mechanisms for meeting the challenges
Substantial short-term performance hazard with an imminent threat to firm continuity	Multiple & conflicting goals within the family	Pruning the family tree through buyout
Strong concern about the long-term future of the firm (remaining competitive) and wellbeing of extended family	Lack of diversity in-house resources and expertise	Investing in relational governance by building shared vision & trust via mutually open & direct communication; valuing strong family bonds
	Loss of family control	Taking the lead in orchestrating outside knowledge partners