

# **Research on innovation capacity antecedents: distinguishing between family and non-family businesses**

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## INTRODUCTION

Innovation is considered to be essential for growth and survival of all firms (Schumpeter, 1934; Wolfe, 1994; Cefis & Marsili, 2006). The firm's ability to innovate is one of the key capabilities to be competitive in the 21<sup>st</sup> century. Innovation could be particularly important for family firms (Eddleston et al., 2008). Family firms are seen as one of the most complex forms of business (Neubauer & Lank, 1998) and innovation capacity is subject to unique influences in these firms (Corbetta & Salvato, 2004; Gudmundson et al., 2003). Nevertheless, there is only limited research investigating innovation in a family firm context (e.g. Aldrich & Cliff, 2003; Zahra et al., 2004; Kellermanns et al., 2008).

Innovation is a broad topic. In the innovation literature, innovation has been used as an umbrella term, to describe both the process to generate new products as well as the new or improved products themselves (Porter, 1990). The output of the innovation process can be defined as the adoption of a system, program, policy, product or service, that is new to the adopting organization (Damanpour & Evan, 1984). The innovation process starts with a firm's ability to innovate, referred to as innovation capacity by Hult et al. (2004). A firm's innovation capacity influences the innovation output or performance.

So far, the few papers investigating innovation in a family firm context do not lead to a consensus. Some researchers argue that family firms lack innovation capacity (Ward, 1987). Traditionally, they are often characterized as conservative (Sharma et al., 1997), resistant to change (Hall et al., 2001) and taking less risk (Naldi et al., 2007). Therefore, family firms tend to be less inclined to take decisions which involve innovation (Schulze et al., 2002). On the contrary, there are some studies that argue that family ownership is related to entrepreneurship (Rogoff et al., 2003; Aldrich & Cliff, 2003; Zahra et al., 2004) and, since innovativeness is a dimension of entrepreneurial activity (Zahra, 2005), invest in their innovation capacity. Also the long-term nature of the family firms' ownership allows them to dedicate the resources required for innovation (Zahra et al., 2004). This twofold asks for more examination regarding innovation within family businesses.

Family businesses possess a unique bundle of resources created by the interaction of the family and the business (Habbershon & Williams, 1999; Sirmon & Hitt, 2003). Chua et al. (1999) state that the uniqueness of a family business is caused by their pattern of ownership,

governance, management, and succession materially that influences the firm's goals, strategies, structure, and the manner in which each is formulated, designed, and implemented. The dual characteristics associated with the 'family-firm' dichotomy bring both advantages and disadvantages (Kets de Vries, 1993; James, 1999), and can affect the firm decisions regarding innovation. To summarize, because of their uniqueness, their dominant appearance, their influence in the economy, and the importance of innovation, it is important that family firms are able to innovate. As such, it is challenging and relevant to understand how the innovation capacity is affected by the unique characteristics related to family-owned businesses.

Despite the relevance of the subject, few studies exist that examine the relationship between family firms and innovation. For this paper the focus is put on human-related resources that affect a firm's innovation capacity, and this for two reasons. First, because we assume that people and organizational context are the main determinants of successful innovation (Cooper & Kleinschmidt, 1995; Zien & Buckler, 1997). Secondly, we expect that human-related resources are subject to unique influences in family firms. The aim of this paper is to examine the relationship between family firms' human-related factors and innovation capacity. Relying on the resource-based view, it proposes that human-related factors can be very important for family firms for promoting innovation capacity and can give them an important advantage over other business forms. This article proposes hypotheses about the relationship between human-related factors in family firms and innovation capacity. The study empirically test these relationships, also by comparing the influence of the human-related antecedents on innovation capacity in family and non-family firms.

In conclusion, this study contributes to the literature in two ways. First, it enhances the knowledge about the innovation process of the family firms. Given the importance of innovation and the important role family firms play in the economy, linking human-related factors to innovation capacity provides a better understanding about family firms and how their innovation capacity can create a possible competitive advantage over their rivals. Also, given the potential differences between family and non-family firms (Sharma et al., 1997), it is of significance to define which human-related antecedents are advantageous to family firms' innovation capacity.

This paper is organized as follows. We begin with a discussion of innovation capacity and its antecedents. We explain the proposed innovation capacity framework and the specific focus of this paper. Next, the four innovation antecedents are described and attention is paid to these antecedents in a family firm context. Next, the empirical part of this paper is introduced and the results are discussed.

## **INNOVATION CAPACITY AND ITS ANTECEDENTS**

Successful innovation in new product and processes is increasingly being regarded as the central issue in economic development (Porter, 1990). Innovation is found to stimulate firm growth and, importantly, this growth occurs almost regardless of the condition of larger economy (Craig & Moores, 2006).

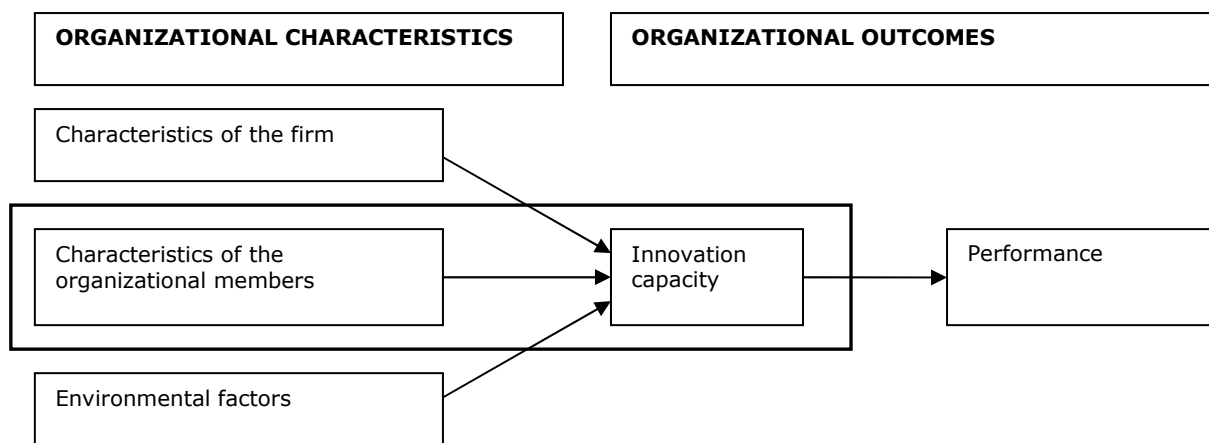
Consequently, innovation is a popular topic in the business and academic world. In the literature one can find that innovation is used to describe the process to generate new products as well as the new or improved products themselves (Porter, 1990). Concerning innovation output, the classic Schumpeterian definition of innovation distinguishes five different types of innovation: new products, new production methods, new markets, new sources of supply and new forms of organization (Schumpeter, 1934). Additionally, innovation can be defined as the adoption of an idea or behavior – being a system, a program, a policy, a device, a product or a service, that is new to the adopting organization (Daft, 1982; Damanpour & Evan, 1984). The process to generate new products starts with the firm's innovation capacity, which is the focus of this study. Innovation capacity or innovativeness relates to the firm's capacity to engage in innovation and can be defined as the capacity, the ability and the willpower of the organization to introduce new processes, products or ideas in the organization successfully (Damanpour, 1991; Hult et al., 2004).

Being innovative starts with having a well-oiled organization. The conditions for successful innovation and strategic change have been an important subject in the research literature since the pioneering days of Burns and Stalker (1961). There is an encouraging similarity regarding the importance of a number of basic success factors. These factors, related to cross-functional cooperation, commitment at the top and work floor, down-the-line leadership, effective processes, customer-involvement, expertise and skills, adaptive capacity, networking, R&D

expenditure, and culture, are seen as antecedents of innovation. The relevant antecedents of innovation capacity are all connected and create an ongoing process.

In our contribution, innovation is defined as a continuous process that is influenced by organizational characteristics that are depicted in Figure 1 as antecedents to the capacity to innovate and hence the innovation output and success. These organizational antecedents come from the enormous literature on the characteristics of innovative organizations (e.g. Damanpour, 1991; Wolfe, 1994; Hurley & Hult, 1998) and can be distinguished in three broad categories.

The first category, firm characteristics, are characteristics like size, age, as well as R&D expenditure, and can be seen as objective aspects of an organization that cannot be deduced from or reduced to properties of organizational members (Hurley & Hult, 1998). The second category, characteristics of the organizational members, also defined as cultural characteristics by Hurley & Hult (1998), refer to the behaviors of people in an organization. Examples of this category are teamwork, involvement of the employees and communication, hence human-related factors. The third category, environmental factors, are for instance, the intensity of competition and the extent of change in the environment as perceived by the people in the company. This model can be criticized, especially for its sequentially. The single direction of arrows is only used for a simplified presentation. It is expected that influence acts in both directions and there are feedback loops among the organizational characteristics.



Note: the empirical focus of this paper is put on the variables in the frame.

Figure 1: The innovation process. Source: Adapted from Hadjimanolis (2000), Hurley & Hult (1998)

There is an abundant literature that proves the influence of the organizational characteristics on innovation capacity (e.g. Hurley & Hult, 1998; Damanpour, 1991; Deshpandé et al., 1993; Siguaw et al., 2006). According to Prajogo & Ahmed (2006), two major streams of research emerge in the numerous studies on innovation. Each stream focuses on a different set of antecedents of innovation. The first stream focuses upon technological aspects that influence innovation, such as R&D (e.g. Napolitano, 1991; Leblanc et al., 1997). The second stream examines innovation in terms of human aspects. This latter research stream presupposes that people and organizational context are the main determinants of successful innovation (e.g. Cooper & Kleinschmidt, 1995; Zien & Buckler, 1997). This paper follows this second stream and focuses on innovation antecedents in terms of human-related aspects, referred to as the characteristics of organizational members in Figure 1. As such, the key question in this paper is whether human-related antecedents have a significant influence on innovation capacity within family firms and if they provide possible advantages over their non-family counterparts.

## **INNOVATION CAPACITY IN FAMILY FIRMS**

The resource-based view is a popular approach to analyse the performance of family firms (Habbershon & Williams, 1999). The theory suggest that a firm's resources can generate a competitive advantage when these resources are valuable, rare, nonsubstitutable and inimitable (Barney, 1991). Moreover, according to this resource-based perspective (Barney, 1991), also a firm's human resources are believed to have implications for firm performance. More specifically, it helps an organization to become more effective and achieve competitive advantage that is difficult to replicate (Becker & Huselid, 1998; Bowen & Ostroff, 2004). In the resource-based view, human resources contribute to firm performance by leveraging human capital, discretionary effort, and desired attitudes and behaviors (Becker & Gerhart, 1996). Human-related aspects are subject to influences of the organizational culture since a firm's culture can be seen as a key determinant of the firm's behavior (Zahra et al., 2004). Because of the ambiguity of their cultures origins and the culture's embeddedness in the family history and dynamics (Gersick et al., 1997), family firm cultures are difficult to imitate (Dierickx & Cool, 1989). Also the interconnectedness of family firms' intangible and tangible assets inhibits the imitation of their cultures (Zahra et al., 2004). According the previous, it is

reasonable to examine the innovation process in a family firm context focusing on human-related aspects of the firm.

There are a number of important categories to distinguish within the field of human resources (Beer et al., 1984). This study examines four categories that are expected to be related with innovation capacity in family firms: human capital, involvement of the employees, top-down coordination, and cooperation.

**Human capital.** Human capital can be seen as an enabling factor in profitable innovation (Leiponen, 2005). This term represents the knowledge, skills, and capabilities of persons that allows for unique and novel actions (Coleman, 1988). Numerous authors recognize knowledge and skills of the employees and the owner/manager as significant determinants of innovation (Mahemba & De Bruijn, 2003; Clancy, 2001; Romijn & Albaladejo, 2002; Mohnen & Röller, 2005). Romijn & Albaladejo (2002) argue that one of the most important factors that contribute to the enhancement of innovation capacity is the knowledge and skills of the workforce. Also Birdthistle & Fleming (2007) state that, within firms, the success of innovation depends significantly on the ability, skills and intellectual capacity of individuals to absorb change and interpret the rapidly changing environment. In a study of Mohnen & Röller (2005), lack of skills was the most important obstacle for innovation.

In terms of human capital, one can find in the literature that there may be a difference between family-owned businesses and other businesses. In family firms, human capital stands for the knowledge and skills of all employees, as such both family and non-family employees. Concerning human capital, Schulze et al. (2001) argue that family firms are more likely to hire family members, even if there are more qualified outsiders. According to Dunn (1995) favoring family members over non-family candidates, can lead to a lower qualified workforce. Kets De Vries (1993) concluded that nepotism allows inept family members to become and remain managers, and makes attracting professional managers difficult. Also particularistic criteria are often used by family businesses and this can have a negative influence on innovation capacity. Perrow (1972) summarizes particularism as follows: “Particularism means that irrelevant criteria like e.g. only relatives of the boss have a chance at top positions, in contrast to universalistic criteria like e.g. competences is all that counts, are employed in choosing employees ... The particularistic criteria are likely to be negatively related to performance ...” (Perrow, 1972, p.8-10). The reason behind the employment or

promotion of relatives in family-owned business is likely caused by a lack of trust in the capabilities of others and a desire to maintain family power and control (Stoy Hayward, 1992). This reluctance to use or employ outside expertise can cause family firms to become introverted, inflexible and uncompetitive (Leach, 1994). Finally, it has been argued that family businesses have difficulties attracting and retaining qualified managers due to the limited promotion possibilities, exclusive succession, and lack of perceived professionalism (Schulze et al., 2003).

However, there are several reasons put forward concerning why family firms may have unique human capital. Hence, the positive attributions of the family characteristic to the family firms' human capital, include potential deep firm-specific knowledge (Sirmon & Hitt, 2003). First of all, the protective characteristic of family businesses may create unique skills and knowledge because they are protected and kept in the family for generations (Uhlander et al., 2007). Moreover, the early involvement of family members active in the firm can produce deeper level of firm-specific tacit knowledge (Sirmon & Hitt, 2003). Through direct exposure and experience, this, difficult to codify, tacit knowledge is transferred (Lane & Lubatkin, 1998), and this allows family firms to have the potential to have deeper level of firm-specific knowledge (Sirmon & Hitt, 2003). Furthermore, the staff turnover rate in family firms is suggested to be lower compared to non-family firms (Miller & Le Breton-Miller, 2003), which implies that skills and knowledge is preserves within the business for a longer period of time.

In conclusion, the former implies that there are different opinions on the value of human capital of family-owned businesses. However, following the resource-based view, former research suggests that family firm human capital is better developed than human capital of non-family firms (Habbershon & Williams, 1999) Since human capital is seen as one of the main determinants of innovation capacity, we propose the following:

*Hypothesis 1: Human capital is positively related with innovation capacity in family firms.*

The second and third antecedents of innovation capacity can be linked with the firm's belief regarding coordination and control. These beliefs makes the firm's decision making authority decentralized or centralized (Zahra et al., 2004). At centralization, power is in the hands of a



select people which may limit the exchange of ideas (Zahra et al., 2004), and this may stifle innovation. Also Damanpour (1991) finds evidence for the negative association of centralization with innovation. On the contrary, decentralization will enhance flexibility and promote the involvement of the employees (Kanter, 1983). Put differently, centralized and formalized organizations might be more efficient but less innovative (Pelhan & Wilson, 1995). The two practices or antecedents that are related with (de)centralization and we consider in this paper are employee involvement and top-down relationship.

**Employee involvement.** Prajogo & Ahmed (2006) suggest that there are several specific key practices aimed at building the innovative behavior of a firm, and among these are empowerment and involvement. Top-management need to challenge and involve employees in the innovation process when they want to improve the climate for innovation (Prather & Turrell, 2002). Ultimately, this will also contribute to the firm's capacity to innovate. Several authors report that when a firm has the intention to be innovative they need to encourage employee interaction and demonstrate that the employees' ideas are valued (Siguaw et al., 2006; Prather & Turrell, 2002). In addition, Siguaw et al. (2006) argue that innovation is promoted in organizations that enhance employee autonomy and permit free expression. Furthermore, Tang (1999) suggests that leadership that creates an open employee environment can significantly affect innovation.

Some authors argue that family-owned firms can be positively linked to innovation capacity regarding employee involvement. First, because these firms are typically found to rely less on the use of formal internal control systems (Uhlander et al, 2007; Westhead, 1997). The use of informal management systems may increase the capacity to innovate since it is more easier for the employees to give ideas and to be involved in the innovation process. Secondly, the employees' personal commitment and involvement to the company often present in family businesses (Daily and Dollinger, 1993) and mainly caused by the inside orientation of the family firm may be positive for the employees' involvement and participation in the innovation process. Additionally, Gersick et al. (1997) state that the intimate knowledge among family members facilitate the decision-making process. One can expect that this can also enhance the employee involvement. On the contrary, there are also some arguments that contribute to the expectation that family ownership may result in lesser employee involvement. Namely, family firms are often closely held, with power and decision-making concentrated in the owner/manager (Dyer & Handler, 1994). The influence of the founder in

family firms on strategic decisions is generally greater in family firms in comparison with their non-family counterparts (Denison et al., 2004). Additionally, family firms owners are found to commonly reject the advice and ideas of others and are reluctant to delegate decision-making, which leads to reduce innovativeness (Dyer & Handler, 1994).

In conclusion, the previous suggests that there is no consensus concerning the extent of employee involvement in family-owned businesses. Nevertheless, one can expect that when family firms have a high employee involvement, this will be positive for their innovation capacity.

*Hypothesis 2: Employee involvement is positively related with innovation capacity in family firms.*

**Top-down relationship.** Another antecedent that is related with the centralization or decentralization of a firm is the coordination between the top and the work floor. Siguaw et al. (2006) state the following about this relationship: “The way a firm views, interacts with, and enables its employees through knowledge dissemination, clarity of direction, and commonly shared understanding either facilitates or inhibits their capacity to invent” (p.565). Rothwell (1992) as well notes the importance of horizontal management style, with increased decision making at lower levels, as a critical success factor for innovation. Beer & Eisenstat (2004) argue that most failures of innovation initiatives in organizations start when top management implement change without finding out what other parts of the organization think about it. They state that strategic conversations have to be ‘public’. By that they mean that managers need to keep everyone below them informed about what has been learned, as well as what changes are planned (Beer & Eisenstat, 2004). Additionally, Beer et al. (2007) argue that managers/owners have to facilitate an open and honest conversation to effectively manage their organization. One can argue that an effective top-down coordination is facilitated by an open top-down communication and by given the employees clear information about possible change and what is expected of them.

Like already mentioned, family firms make more use of informal systems. This makes it also easier to communicate between the different parts of the firm, a primary antecedent of innovation (Burns & Stalker, 1961). Additionally, the communication within family firms will be facilitated caused by the close bonds among family members (Gersick et al., 1997).

Additionally, Daily & Dollinger (1992) state that altruism, which is often present in family-owned businesses, increase communication within the family firm, thereby reducing information asymmetries and increase their use of informal agreements. It may be expected that this is positive for the firm's innovation capacity, since this encourage an efficient top-down coordination.

To conclude, the previous suggests that family firms can enjoy the benefits of an efficient top-down coordination with an open top-down relationship and an accessible management. Therefore, we propose the following:

*Hypothesis 3: Top-down coordination is positively related with innovation capacity in family firms.*

**Cooperation.** A final human-related antecedent of innovation capacity concerns the cooperation between different functions in a firm. The importance of teamwork is increasingly emphasized in the innovation context (Song et al., 1997). Siguaw et al. (2006) state that innovation is promoted in organizations who devise inter-functional cooperation. According to Love & Roper (2009) cross-functional teams play a potentially important part in the innovation process enabling knowledge sharing, the development of trust and overcoming spatial and organizational barriers. Also Burgelman (1983) state that cooperation and collaboration results in trust and sharing sensitive data and innovative ideas across functional boundaries. And hence encourages entrepreneurship and innovation. Additionally, cross-functional teamwork is important because it is one of the most effective channels of communication, a primary antecedent of innovation (Burns & Stalker, 1961). McGourty et al. (1996) state that dealing with multifunctional teaming is important to modify an organization's culture to encourage innovative behavior.

Within family businesses, relationships between group members are often both personal and professional (Dyer, 2003). Sirmon & Hitt (2003) as well state that "family members simultaneously participate in both business and family relationships in their [...] professional lives" (p.341). The duality of these relationships increases the complexity of family businesses and creates a unique context, both positive and negative, compared to non-family businesses (Sirmon & Hitt, 2003). Family relationships may encourage nepotism or interpersonal conflicts (Dyer, 1986). This is not only detrimental to firm performance, but

also to the efficiency of working in team. Although, it can be stated that conflicts may create creativity and discussion, what is positive for a firm's innovativeness (Kellermans et al., 2008). Moreover, Zahra et al. (2004) state that the family business culture is group oriented, which indicates that employees in family firms will more easily share knowledge and collaborate. Additionally, the relationships are mostly based on kinship and trust (Zahra et al., 2004), which positively influences effective collaboration and cooperation between different functions. Which in turn is positive for a firm's innovation capacity.

The previous suggest that family firms have an organizational culture that is group oriented which automatically promotes cooperation and teamwork. Hence, this has a positive influence on innovation capacity. Therefore, we propose:

*Hypothesis 4: Cooperation is positively related with innovation capacity in family firms.*

#### **INNOVATION CAPACITY IN FAMILY VS. NON-FAMILY FIRMS**

Family firms are often unique compared to non-family firms with regard to their resources and capabilities. These unique bundle of characteristics are created by the interactions of the family and the business, referred to by Habbershon & Williams (1999) as the 'familiness' of the firm. This variable can differentiate the family firm, resulting in a competitive advantage, as suggested by the resource-based view (Zahra et al., 2004). So argue Chrisman et al. (2002) that there is less concern over opportunistic behavior by agents. This leads to an increased salience of organizational culture for influencing the behavior of organizational members (Zahra et al., 2004). Since human-related factors are dimensions of the organizational culture, it can be expected that the effect on innovation capacity is different in family firms than in non-family firms. Additionally, according to recent resource-based view research, human aspects that are a product of complex social structures built over time, are the most valuable and most difficult to imitate (Hatch & Dyer, 2004). Recent research of Zahra et al. (2004) on entrepreneurship in family firms found that the effect of certain cultural characteristics, like individualism, decentralization, and strategic control on entrepreneurial orientation were all stronger in family firms than in non-family firms. This suggests that when these characteristics are present, family firms are more likely to engage in entrepreneurship than

non-family firms with similar characteristics. Since innovation is seen as a dimension of entrepreneurial behavior (Zahra, 2005), one can expect to find a similar pattern in the effect of the human-related antecedents and innovation capacity. Therefore, we propose the following:

*Hypothesis 5 : The relationship between the four human-related antecedents and innovation capacity will differ between family firms and non-family firms.*

## RESEARCH METHODOLOGY

**Sample.** The data for this study are collected in the context of a large-scale policy program named ‘Strategic Innovation’ in the period 2002-2007. Companies from various sectors and of different sizes participated in this project. In this study we took a random sample of 210 companies, located in Belgium and The Netherlands to perform the analysis for this paper. The sample contains 111 private family firms and 99 non-family firms. The selected firms have at least 10 employees and have a profit motive. Sample characteristics are given in Table 1.

Table 1: Sample characteristics (N=210)

	Family firms (N=111)	%	Non-family firms (N=99)	%
<b>Size</b>				
Small (10-50 employees)	74	66,7	58	58,6
Medium (51-250 employees)	35	31,5	37	37,4
Large (more than 250 employees)	2	1,8	4	4
<b>Turnover</b>				
Less than 2 million	21	18,9	27	27,3
2-10 million	52	46,8	27	27,3
10-50 million	30	27	33	33,3
More than 50 million	2	1,8	9	9,1
Unknown	6	5,4	3	3
<b>Activity</b>				
Industry	57	51.4	36	36.4
Services	35	31.5	41	41.4
Retail	10	9	11	11.1
Other	9	8.1	11	11.1

**Measures.** The firm-specific data are obtained with a questionnaire that assesses the antecedents that impact the innovation capacity of the firm. In order to measure the organizational antecedents a five-point Likert-type scale was used, which ranges from strongly agree (5) to strongly disagree (1). The owner/manager of the participated firms were asked to indicate to what extent the particular items typify their firm.

All antecedents are measured using multiple items. Human capital and top-down coordination of the employees are measured using four items. For measuring employee involvement, three items were used. The fourth antecedent teamwork is measured using five items. The dependent variable, innovation capacity is measured using four items. Factor analysis was applied for each antecedent in order to find possible different dimensions. None of the human-related antecedents were reduced to multiple factors after factor analysis.

To assure internal consistency, Cronbach's coefficient alpha was conducted for each factor. Since an alpha value of 60% is considered adequate for internal consistency (Hair et al., 1998), internal consistency was assured for all factors. Cronbach's Alphas for the measures were as follows: human capital ( $\alpha=.77$ ), employee involvement ( $\alpha=.78$ ), top-down coordination ( $\alpha=.65$ ), cooperation ( $\alpha=.80$ ), and innovation capacity ( $\alpha=.73$ ).

## ANALYSIS

Differences in size are found to affect the relationships under study (e.g. Chrisman et al., 2004; Schulze et al., 2003). Therefore, we used the logarithm of number of employees and the logarithm of annual turnover to control for size. Table 2 presents the means, standard deviations, and correlations among the variables. The correlations do not indicate multicollinearity, since all correlations are below .60 (Janssens et al., 2008). We tested the hypotheses using multiple regression. The analyses were done separately for family and non-family firms. In the first step, we entered the control variables for size. In the second step, we added the four independent variables.

Table 2: Descriptive statistics and correlations (N=210)

	Mean	SD	Human capital	Employee involvement	Top-down coordination	Cooperation
1. Employees	3.74	0.98				
2. Annual turnover	15.68	1.33				
3. Human capital	3.32	0.68				
4. Employee Involvement	3.36	0.76	0.37**			
5. Top-down coordination	3.71	0.63	0.19**	0.57**		
6. Cooperation	3.03	0.68	0.40**	0.55**	0.48**	
7. Innovation capacity	3.45	0.74	0.45**	0.54**	0.37**	0.47**

\*\* Significant at the 0.01 level

Note: Employees and annual turnover are logarithmized

**Results.** The results of the linear regression are shown in Table 3. The results for the family firms appear in the columns 1A en 1B. In regression 1A, innovation capacity is regressed on the two control variables, however, number of employees and annual turnover are not significantly related with innovation capacity. The adding of the independent variables (regression 1B) explains 41 percent of the variance in innovation capacity ( $p < 0.001$ ). The predicted positive relationship between human capital and innovation capacity was supported ( $p < 0.001$ ), consistent with hypothesis 1. The predicted positive relationships between respectively employee involvement and top-down coordination and innovation capacity, concerning hypothesis 2 and 3, are not supported. Consistent with hypothesis 4, the relationship between interfunctional cooperation and innovation capacity is positive ( $p < 0.1$ ).

The results for non-family firms are shown in columns 2A and 2B of Table 3. Regression 2A, with innovation capacity regressed on the two control variables of size number of employees and annual turnover, explains only 2 percent and is not significant. The result for regression 2B is significant ( $p < 0.001$ ), explaining 33 percent of innovation capacity. Only employee involvement is positively associated with innovation capacity ( $p < 0.001$ ).

Table 3: Multi Regression analysis; dependent variable: innovation capacity

	1. Family Firms		2. Non-family firms	
	A β (t-value)	B β (t-value)	A β (t-value)	B β (t-value)
<b>Explanatory Variables</b>				
<i>Controls</i>				
Employees	-0.055 (-0.51)	-0.006 (-0.07)	-0.169 (-1.69)	-0.043 (-0.51)
Annual turnover	0.052 (0.56)	-0.014 (0.59)	0.127 (1.86)	0.054 (0.92)
<i>Independent variables</i>				
Human capital		0.452 (4.68)**		0.079 (0.72)
Employee involvement		0.133 (1.30)		0.532 (4.54)**
Top-down coordination		0.096 (0.84)		-0.074 (-0.55)
Cooperation		0.188 (1.77)*		0.191 (1.57)
R <sup>2</sup>	<b>0.01</b>	<b>0.45</b>	<b>0.04</b>	<b>0.38</b>
Adjusted R <sup>2</sup>	<b>0.00</b>	<b>0.41</b>	<b>0.02</b>	<b>0.33</b>
F-statistic	<b>0.90</b>	<b>13.14**</b>	<b>1.86</b>	<b>8.89**</b>
Change in R <sup>2</sup>		<b>0.41**</b>		<b>0.31**</b>

\* Significant at the 0.1 level; \*\* Significant at the 0.001 level

Note: β-value refer to the unstandardized coefficients of the explanatory variables

In order to test hypothesis 5, the Chow test was used to determine the significance of the differences across the two subgroups in the effect of the independent variables on innovation capacity. The regression coefficients for the regressions 1B and 2B are compared. The results shows that the regressions of the two subgroups differ significantly and hence it is justified to deal with these two groups separately. The effect of human capital on innovation capacity is significantly stronger in family firms than in non-family firms ( $p < 0.05$ ). Employee involvement on the contrary has a weaker effect in family firms than in non-family firms ( $p < 0.01$ ). There are no significant differences between family and non-family firms in the positive effect of teamwork on innovation capacity. Also top-down coordination does not differ between the two groups. Overall, the results partially support hypothesis 5. An overview of the results are given in Table 4 below.

Table 4: Overview results

<b>Hypothesis 1</b>	Supported	Human capital has a positive influence on innovation capacity in family firms.
<b>Hypothesis 2</b>	Not supported	There is no evidence that employee involvement has a positive influence on innovation capacity in family firms.
<b>Hypothesis 3</b>	Not supported	There is no evidence that top-down coordination has a positive influence on innovation capacity in family firms.
<b>Hypothesis 4</b>	Supported	Cooperation has a positive influence on innovation capacity in family firms.
<b>Hypothesis 5</b>	Partially supported	It is recommended to run separate regressions for family firms and non-family firms. The effect of human capital on innovation capacity is stronger in family firms than in non-family firms. The effect of employee involvement on innovation capacity is stronger in non-family firms.



## DISCUSSION OF THE RESULTS

The research on which this paper is based is twofold. First, we proposed that a family firm's innovation capacity is influenced by human-related antecedents. Secondly, we suggested that the relationship between the human-related antecedents and innovation capacity differ between family firms and non-family firms. The results show that human capital has a positive relationship with innovation capacity in family firms, as predicted in *hypothesis 1*. Family firms with strong human capital have a greater innovation capacity. As such, the knowledge, skills and capabilities of the workforce are factors that enhance innovation capacity in family firms. In the family business literature, there are arguments that can be positive and negative for a family firm's human capital. The result confirms that the uniqueness of the family firm's human capital, created by the internal and protected nature of family firms, dominate. Hence, for family firms it is important to continuously invest in their workforce. *Hypothesis 2*, which stated that employee involvement is positively related with innovation capacity is not supported by the results. There is no evidence that involving employees has a positive influence on the innovation capacity in family firms. Although it is positive for innovation capacity to create an open work environment where employees are motivated and encouraged to give ideas, this study's results do not provide statistically significance evidence to support this. It may be expected that the concentrated power and decision-making in the owner/manager has lead to this result. *Hypothesis 3*, which is related with the previous hypothesis is also not supported. This hypothesis assumed a positive relationship between top-down coordination and innovation capacity in family firms. The result does not provide evidence that the use of informal management systems has a positive influence on family firm's innovation capacity. The positive relationship between cooperation and innovation capacity in family firms, as predicted in *hypothesis 4*, is supported by the results. The group oriented culture and the duality of relationships that often characterize family firms influence the cooperation between different functions, and is positive for the family firm's innovation capacity. Finally, the results provide support that family and non-family firms need to be treated separately concerning innovation. In two of the four examined antecedents, the two groups differ significantly in the influence of these antecedents on innovation capacity. As such, *hypothesis 5* is partially supported. The result indicates that the concept of familiness is important, especially in dealing with innovation capacity. The first antecedent for which the two groups differ significantly is human capital. Result shows that the influence of human capital on innovation capacity is stronger for family firms. The

interaction between the family and the business can generate the family firm with a competitive advantage by the influence of human capital on innovation capacity. Employee involvement is the second antecedent for which family firms and non-family firms significantly differ. Contrary to human capital, the influence of this human-related antecedent on innovation capacity is stronger for non-family firms.

## CONCLUSION

This study had the purpose to investigate the influence of human-related antecedents on innovation capacity in family firms. Furthermore, we examined if the relationship differs for family and non-family firms and may provide a possible advantage for family firms.

The capacity to innovate is important for family businesses to create value. This study shows that human capital and cooperation are of great significance for family businesses, because of their influence on innovation capacity. Hence, family firms need to manage these factors accurate and with caution. When comparing the relationship of the four human-related factors on innovation capacity between family firms and their counterparts, result shows that the influence of human capital on innovation capacity is larger for family firms. As such, human capital can provide the family firm with a potential competitive advantage. The result also provide evidence that it is accurate to treat family firms and non family firms as separate groups when it concerns innovation capacity.

**Limitations & further research.** There can be several limitations and opportunities for additional research identified from this study. This paper examined the relationship between four human-related antecedents and innovation capacity. It is obvious that there are more human-related factors that may have an influence on innovation capacity, besides the ones we examined. Furthermore, we did not make any distinction in the family business group. Recent studies, however, acknowledge the heterogeneity within the group of family businesses (e.g. Sharma, 2004; Chrisman et al., 2005; Dyer, 2006; Westhead & Howorth, 2007). For example, family firms in different generational phases have different characteristics. As such, it can be expected that family firms in different generational phases differ in the influence of human-related factors on innovation capacity.

In terms of further research, there are some recommendations. First of all, it may be recommended to make a distinction in family businesses. Like we already mentioned, family firms in a different generational phase have different characteristics. Hence, generation is a possible variable to divide the family businesses, because it can be expected that family businesses in different generational phases differ in human-related antecedents. A second suggestion for further research is to examine the effect of more human-related factors on innovation capacity, like for instance training and learning orientation in the business. Thirdly, there may be also some factors that can affect the relationship between human-related antecedents and innovation capacity. For example, the founder or other family members can have enormous influence on the working of the family business and this may affect the influence of the human-related factors on innovation capacity. Also the number of family members or the number of generations active in the business may influence the strength, direction, and significance of the relationships (Winter et al., 1998). A fourth suggestion is to link the relationship with performance. Does family and non-family firms also differ in the performance? Finally, the differences found between family and non-family firms concerning the relationship between the human-related antecedents and innovation capacity needs further research. A possible suggestion is to examine if and how the antecedents develop over time for the two types of firms.

**Contributions & implications.** A first contribution lies in examining innovation in a family firm context. Despite the popularity of family businesses and innovation in the literature, there is limited research investigating both topics in combination. Secondly, this study's results provides some evidence on the difference between family and non-family firms, regarding innovation capacity. Finally, human resources are often unique for family businesses and have an influence on innovation capacity. This study offers preliminary results that family firms can use their human resources in enhancing their innovation capacity, and that this can lead to a possible competitive advantage.

This study indicates that innovation in family firms deserves more interest. Family firms have unique characteristics caused by the interaction between the family and the business. And this interaction has an effect on the relationship between innovation antecedents and innovation capacity. This study also gives an indication that family firms can have possible advantages over non-family firms concerning their innovation capacity. Hence, it is necessary to examine the innovation capacity of family firms separately.

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### Appendix 1: Description of variables

Name of the variable	Items
Human capital	<p>We have sufficient expertise (knowledge and experience) to develop new products/services or internal processes.</p> <p>Our company has the right technical competences and expertise to realize innovation.</p> <p>Our company has sufficient managerial know how to run our innovations effectively</p> <p>Our company has sufficient skills and expertise to effectively introduce new developments.</p>
Employee involvement	<p>Our employees are motivated to be involved in the innovation process.</p> <p>The involvement of our employees with our company is large.</p> <p>Our employees are actively involved in the innovation process.</p>
Top-down coordination	<p>The hierarchy in our company is no roadblock for effective communication.</p> <p>Problems can be openly discussed between management and employees in our company.</p> <p>Company management clearly communicates what is expected from employees.</p> <p>Employees are rather coached instead of ordered.</p>
Cooperation	<p>People with different expertise work well together in our company.</p> <p>The cooperation among teams and departments is effective in our company.</p> <p>We are effective in managing the innovation process.</p> <p>We are familiar with working in multi-disciplinary teams.</p> <p>Our project management is one of our strengths.</p>
Innovation capacity	<p>Top-management in our company is very committed to innovation.</p> <p>Our company is a frontrunner in the renewal of product/services/processes.</p> <p>We are successful in responding to developments in the market.</p> <p>In our company, we are conscious about the necessity of innovation.</p>