MANAGING NATURAL RESOURCES – ARE FAMILY FIRMS DIFFERENT FROM OTHER FIRMS

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Abstract

The main objective of this paper is to show differences in natural resource management between family-firms and other firms. Existing literature states that many family firms feature a strong rooting in the industrial sector and rely heavily on existing natural resources as basis of their success. As natural resources are limited, it must be suspected that family firms' economic success has a limited timespan if resources are not managed from a perspective of sustainability. This study shows that family firms view their natural resources both as more important and subjectively scarcer than non-family firms. This, however, is not reflected in resource management activities, as family firms show less such activities than other companies.

Keywords: Family Firms, Agency Theory, Contingency Theory, Sustainability, Triple Bottom Line, Corporate Governance

1. INTRODUCTION

A high percentage of global companies can be regarded as family firms. This is especially the case for Germany (Klein, 2000). Existing literature states that family firms possess unique and possibly advantageous strategic resources such as creativity, flexibility, personnel or the family as such (Habbershon and Williams, 1999). The potential relevance of the family as a resource is also characterized by applying the term familiness (Pearson et al., 2008). However, not only family firms, but also companies in general must both appropriate resources and retain property rights over those strategically important resources as well as successfully manage them to develop and maintain competitive advantages (Barney, 1991; Grant 1991; Ndofor et al. 2011; Sirmon et al. 2010). This view has been incorporated into the resource-based view (RBV) of company strategy (Wernerfelt; 1984; Prahalad and Hamel, 1990; Barney, 1991). Starting with the study of Sirmon and Hitt (1993), the resource management of family firms has also been gaining increased awareness in theory and company practice. The cited authors state that family business uses a three-pronged approach towards the management of company resources that consists of resource inventory, resource building, and resource leveraging and which addresses all strategically important company resources.

Over the last five to ten years, at least two additional trends have been affecting the way family firms and other enterprises are conducting business. First, rising environmental and company complexity lead companies to adapt more formalized management and control systems, which also affect resource management and control activities (Simons, 2013). This development is further linked to company size, as contingency theory explains that bigger companies progressively rely on formalized management and control systems due to greater complexity and need for coordination (e.g. Bruns and Waterhouse, 1975). However, as both Chenhall (2003) and Lavia Lopez and Hiebl (2014) point out, there is generally a lack of evidence regarding the effect of firm size on management accounting and control systems, especially concerning small and medium-sized enterprises (SME), which are to large parts also family firms.

Second, there is an ongoing trend towards company sustainability (Benn et al., 2014) from the economic, ecological and social viewpoints, this being commonly regarded as the triple bottom line of company sustainability (Elkington, 1999). The trend towards sustainability has resulted in different approaches towards sustainable strategy, management, and management control (Aragón-Correa et al., 2008). Some – such as Porter and Kramer (2011) – argue that a more sustainable view of doing business can create not only shareholder value, but also shared value in a broader sense. In

strategic management, recent research has seen a rise of the so called natural resource based view of the firm (Hart, 1995; Hart and Dowell, 2010; Hart and Dowell, 2011). Here, natural resources and management activities regarding strategically relevant resources are crucial in the explanation of company success and company performance. This trend was also addressed by a recent special issue of MAR on sustainable development, management and accounting (Bebbington and Thompson, 2013).

The existing literature focuses either on the role of contingency factors such as company size and industry on resource management and control activities (e.g. Darnall et al. 2010; Guest, 2011) or on the peculiarities of family firms for management and management accounting in general (Salvato and Moores, 2010; Giovannoni et al., 2011; Chu, 2011; Speckbacher and Wentges, 2012; Miller et al., 2013; Hiebl 2013; Hiebl et al., 2013; Lavia Lopez and Hiebl, 2014) , while for most parts of research and practice, family involvement remains a "missing variable in organizational research" (Dyer, 2003).

For our study, we choose an integrative approach towards both family involvement and resource management acitivities. We limit our analysis of firm resources and resource management and control on natural resources, namely raw materials and energy, for two reasons: First, energy and natural resources are important aspects in the productive process, especially with incumbent firms. Second, it is not possible to analyze all company resources in one specific research paper due to the specifics of each company resource.

Thus, the following paper aims at answering the ensuing research question: *Is there a difference in natural resource management between family firms and non-family firms?*

In this paper, as already proposed by Siebels and Knyphausen (2012), we look beyond the traditional separation of strategic management, management accounting, and management control literature on the one hand and family business literature on the other hand to present an integrative approach. According to our line of argumentation, family firms are more aware of resource shortages than non-family firms due to their specific and more sustainable relationship to company stakeholders (Rodrigue et al., 2013) and the rest of the company environment. However, regarding formalized resource management and control activities, we hypothesize that, in general, family firms view those activities as more important than non-family firms (Sharma and Sharma, 2011), but that family firm characteristics such as skepticism towards formal rules result in lower degrees of formalized management and control activities and instrument usage. This effect may also be enhanced by informal means of management and control employed in family firms – such as trust or direct personal control. Additionally, industry and company size may severely affect the principal need for resource management and control in those enterprises.

Thus, we argue that family firms may openly express the need for formalized resource management and control, yet not act on it. To manage and control firm resources, companies might use a specific set of resource management and control instruments such as lifecycle costing (LCC) (Riggs, 1982; Norris, 2000; Kicherer et al., 2007) or total cost of ownership (TCO) (Ellram, 1993) that enable companies to both enhance transparency and manageability of resource availability and resource scarcity (e.g. Bell et al. 2012; Barbier 2013; Harris and Roach 2013). Hence, we argue that family firms may rely more on standardized management and control instruments (Stewart and Hitt, 2012) than on these specific instruments.

Our study uses a sample of 142 German firms to test our research hypotheses. We explicitly distinguish two different levels of family involvement to better understand possible interactions. Thus, we are able to determine whether differences in resource management and control can be traced to the ownership dimension of family firms or whether the involvement of family members in company management severely affects resource management and control activities. In fact, our paper shows that family ownership alone does not significantly alter resource management and control perception or activities. We conclude, however, that family involvement in company management leads to lower levels of activity and formalization in resource management and control.

2. THEORY DEVELOPMENT AND HYPOTHESES

Contingency-based research on management and control systems has shown several firm characteristics to be important – namely firm size, industry, type of strategy, organizational structure and culture (e.g. Khandwalla, 1974; Chenhall, 2003). However, there is only scarce evidence regarding – on the one hand – resource management and control in family firms in general and – on the other hand – the usage of specific instruments in this particular context. In our paper, we will try to concentrate first on the strategic importance of firm-specific resources in family firms. Ideally, a perceived higher importance of resources will lead not only to higher degrees of resource awareness, but c.p. also to a heightened strategic importance of topics related to firm resources. In addition, modern companies tend to formalize resource strategies by either integrating them into the general business strategy or by formulating individual sustainability strategies (Stead and Stead, 1995). Moreover, resources can be managed and controlled formally, first by adhering to a management and control cycle, second by utilizing specific resource management and control instruments such as TCO or LCC.

Regarding the analysis of resources in companies, we refer to contingency theory, stakeholder theory and the resource-based view of strategy to explain the reasoning of family firms. Most of the literature on family firms focuses on the family as such, the relations to company stakeholders and communication processes between the family and those stakeholders (Cromie et al., 1995; Carney, 2005; Chrisman et al., 2005; Habbershon and Williams, 1999; Sirmon and Hitt, 2003). In addition, some literature addresses the strategic importance of financial (Chua et al., 2011; Anderson et al., 2012; Hiebl, 2012) and human resources (Miller et al., 2013) in family firms.

From the perspective of resource dependence theory and stakeholder theory (Donaldson and Davis, 1991), family firms face a specific network of stakeholders that include their employees, representatives of the region where the company is situated and representatives of local government

and other institutions. For family firms, it is essential to establish a link between the company environment and the company itself to guarantee good corporate performance. Pfeffer and Salancik (1978: 145) point out that by doing this, firms can obtain useful information, additional channels for information, commitment of company stakeholders and legitimacy concerning society in general. This creates a unique corporate culture and business policy in family firms (Vallejo, 2011).

2.1. Importance and scarcity of energy and natural resources in family firms

Regarding the subjective view towards company resources, family firms generally show business models that adhere more to the resource-based view of strategy than to a more market-oriented, positioning approach (Upton et al., 2001). Thus, family firm executives should view resources c.p. as very important for their company. An additional perspective can be added by referring to the importance of company resources for business models. Business models – as defined by Amit and Zott (2001) – describe a system of interdependent activities that transcends the focal firm and spans its boundaries. The activity system enables the firm, in concert with its partners, to create value and also to appropriate a share of that value (Zott and Amit, 2010). Here, Sirmon and Hitt (2003) have shown the critical importance of integrating opportunity and advantage-seeking with regards to company resources. In addition, Chrisman et al. (2003) argue that family firms possess unique capabilities in combining the existing resources in order to achieve market success. Taking this into consideration, we argue that decision makers in family firms will focus more on internal resources that form part of their productive process and less on market acceptance, rendering these resources subjectively more important. Family firms will view energy as subjectively important because it is the foundation of the production process. Similarly, natural resources such as iron ore and zinc will be subjectively more important because of their strategic value for the product and business model, respectively.

In the same context, we must also address the problem of resource scarcity. In economic and ecological research, there may be absolute or relative resource scarcity (Baumgärtner et al., 2006). The concept of absolute resource scarcity goes back to Malthus and Ricardo (Hall and Hall, 1984). This type of resource scarcity might not be overcome by technological change. Relative resource scarcity might, however, be addressed by coping strategies such as business model innovation or secondary business models. In company strategy, absolute and relative resource scarcities are not always applicable due to business model and resource configuration between companies and sectors.

Concentrating on the subjective experience of resource scarcity could be a more fruitful approach at this point (Schneider, 1999). Whenever a person or institution sees a gap between current and necessary company resources both in the quantitative and qualitative dimensions, we speak of subjective (or felt) resource scarcity. Results of subjective resource scarcity and absolute or relative (objective) resource scarcity might not differ at all. Prediger et al. (2013) argue that subjective resource scarcity may have different behavioural outcomes: subjects (in this case family firms) may overestimate the value of the individual resource for the company, may hamper the willingness to engage in otherwise fruitful cooperation projects and create antisocial or unethical behaviour such as fraud.

In the field of energy, we argue that family involvement in the company leads to energy being subjectively more important than in non-family firms. Family-firm executives tend to view energy less than a commodity and more than an important basis of their business model. In addition, family involvement leads to energy being subjectively scarcer. This might lead to family firms wanting to become energetically relatively independent, which could have achieved by building and maintaining independent power plants or engaging in sustainable energy production.

In the field of natural resources, we argue that family firms tend to view the natural resources – namely abiotic resources – that form the basis of their products as more important than non-family firms. In addition, natural resources will be seen as subjectively scarce. This might lead to changes in company strategy and procurement behaviour, such as a tendency to buy in stock and not to rely on just in time or just in sequence deliveries. In addition, family firms might tend to monitor their suppliers' behaviour more critically than non-family firms. Thus, we argue for the involvement of family members in the top management team (TMT) as follows:

H1a. Family involvement in the TMT is associated with energy being subjectively more important and subjectively scarcer at the same time.

H1b. Family involvement in the TMT is associated with natural resources being subjectively more important and subjectively scarcer at the same time.

2.2. Importance of resources for the strategic management of family firms

Many researchers have focused on differences in business strategy between family and non-family firms (Harris et al., 1994; Sharma et al., 1997; Chua et al. 1999; Astrachan, 2010; Chirico et al., 2011; Miller et al., 2013; Wulf and Brands, 2013). In general, it is said that family firms often substitute formal company strategy by informal means such as anecdotal descriptions of corporate behavior. Hence, the family as such is often depicted a being either a strength of or a constraint for strategic management in family firms (Habershon et al., 2003).

Regarding the planning perspective of strategic management, family firms in general plan to lesser extents than non-family firms (Ward, 1988). This is problematic, as family firms need to simultaneously plan the business and ownership arenas (Carlock and Ward, 2001). In addition, linking strategic decision-making and firm strategy is especially important for family firms due to the overlapping of the family and company spheres (Basco, 2013).

Relating to the formulation process of company strategy (Miller and Friesen, 1978), we argue that family involvement in the TMT leads to an enhanced subjective importance of technology and products

and c.p. a subjective less important role of basic company resources. This might mean that family firms concentrate too much on solving current customer needs via current technologies, but that they lack the necessary long-term perspective regarding the importance of resource inventory, resource building, and resource leveraging. As Sirmon and Hitt (2003) have pointed out, family firms show certain characteristics that enable them to use and enrich existing resources. However, these family firm peculiarities also produce a rather informal approach towards planning and company strategy that fails to point out the exact interdependencies between the causes (resources) and effects (company performance).

From the point of view of formalized resource management, we thus argue that while family firms possess unique advantages in combining existing resources for greater economic success, they also fail to link these resources to company strategy. One might say that strategic management in family firms excels in utilizing the existing resources, but that these resources remain rather underdeveloped. Family firms focus on a strategic management approach that is centred more on innovating by a trial-and-error starting with the existing products than on disruptive innovations in completely new areas (Sosna et al., 2010). Yu and Hang (2010) argue that structured routines significantly deteriorate a firm's disruptive innovation capability. Combining this with the argumentation of De Massis et al. (2012), who state that family firms invest less in R&D than non-family firms, it is argued that family-firms will focus their strategy more on products and markets than on the underlying company resources.

In addition to business strategy in general, company resources might also be addressed by specific resource strategies and also a sustainability strategy (Stead and Stead, 1995; Epstein and Roy 2001; Baumgartner and Ebner, 2010). Regarding the existence of the business itself, the overlapping of family and business is often seen as a positive effect on company sustainability (Olson et al., 2003). Thus, the familiness is seen as the biggest advantage of family firms (Cabrera-Suárez et al., 2001). In this paper, however, we focus not on company sustainability but on the existence of a specific sustainability strategy. This type of strategy might have several performance effects, e.g. direct effects on resource performance and also direct or indirect effects on social performance due to higher levels of stakeholder and society legitimacy. Here, we argue that due to the lower importance of strategic management in family firms, there is also a lower probability for the existence of specific and individual resource and sustainability strategies.

H2. Family involvement in the TMT is associated with resources in general being less important for company strategy and lower probabilities for the existence of individual resource and sustainability strategies.

2.3. Resource management and control in family firms

As proposed by Simons (1994), managers might use different means (or levers) of control to ensure the implementation of company strategy. The underlying assumption is that companies might use different approaches towards management and control, with formalization one of the important variables. In both business strategy and managerial accounting, formalization refers to the amount of formalized management structures and processes, i.e. if information is written down and established in formal structures. As initially proposed by Hall et al. (1967), there is a strong link between organizational size, complexity and formalization of management activities.

The link between family influence and formalization of management is, however, less evident. Family conflicts have been described as drivers of company complexity, yet family firms mostly rely on informal means of management and leadership. In addition, formalization of the family firm involves immediate financial and psychic cost, as it professionalizes practices that were once informal and social (Lubatkin et al., 2005). Recent studies suggest that family firms show lever levels of formalization in management control (Speckbacher and Wentges, 2012) and financial management (Becker et al., 2014). Here, family influence via control and governance might be pivotal in substituting for formal management activities (Villalonga and Amit, 2006).

Daily and Dollinger (1992) point out that family firms possess efficient informal decision-making channels, less organizational structure, and lower monitoring and control costs than non-family firms. In addition, Speckbacher and Wentges (2012) pointed out that when family owners also serve as executives, a firm seems less likely to have explicit formulated goals and strategies. Such owner managers may be reluctant to bear the costs of making their entrepreneurial insights known to outsiders. They may also consider it an advantage to be able to transfer such insights and visions directly and personally into the TMT without having to write everything down to ensure decision speed and flexibility. Mintzberg and Waters (1982) argue that in owner-managed firms' new strategies tend to emerge in the entrepreneurs' minds and can be implemented informally by the importance of the entrepreneur or entrepreneurs for the company. This might, however, endanger company survival in later stages of company existence.

H3a. Family involvement in the TMT is associated with less formalized energy management activities.

H3b. Family involvement in the TMT is associated with less formalized natural resource management activities.

2.4. Specific instruments for resource management in family firms

In a deeper analysis of resource management and control, specific instruments are proposed from the perspective of managerial accounting. First, according to Ellram (1995), TCO can be used to help understand all relevant supply chain related costs of doing business with a particular supplier for a particular good/service. From a resource-based view, TCO could increase transparency within the supply chain and enhance company performance. Second, lifecycle costing or product lifecycle costing (LCC) is proposed as an alternative method of calculation and cost configuration that encompasses all phases

of product (and resource) existence. Third, lifecycle assessment (LCA) is mentioned as a technical, data-based and holistic approach to define and subsequently reduce the environmental burdens associated with a product, process, or activity by identifying and quantifying energy and material usage (Curran, 1994). Principles and rules for the implementation of LCA have been internationally defined in the ISO standards 14040:2006 and 14044:2006 and transferred to the German Standardisation DIN EN ISO 14040 and DIN EN ISO 14044. Fourth, production and logistics have long been proposing the use of material flow analysis (Hawkins et al., 2007).

There is, in general, a lack of information of the influence of family involvement in the TMT on the usage of management and control instruments. Management Accounting research in general has shown that these instruments are rather heavily used (e.g. Cinquini and Tenucci, 2010). Some recent studies show that family firms use strategic management accounting practices to a lesser extent than non-family firms (García Pérez de Lema and Duréndez, 2007; Becker et al., 2011). Posch and Speckbacher (2012) show that family firms show a lower usage of formalized decision-making and control instruments, for instance management accounting practices.

Family executives in family firms show long management tenures and high levels of implicit knowledge. Hence, they should rely less on management accounting instruments than family managers (Moores and Yuen, 2001). In contrast, family firms might be dominated by the family's views and not so open to innovations from outside the company (Kraus et al., 2012). This means that there is a combined effect of lower perceived importance of formal management and control and lower levels of knowledge of modern management accounting instruments in family firms. As resource management and control is a rather young field of management accounting interest, we argue that this effect also obtains for specific resource management and control instruments.

H4a. Family involvement in the TMT is associated with lower usage of TCO.

H4b. Family involvement in the TMT is associated with lower usage of LCC.

H4c. Family involvement in the TMT is associated with lower usage of LCA.

H4d. Family involvement in the TMT is associated with lower usage of material flow analysis.

3. DATA AND VARIABLES

3.1. Sample

To test our hypotheses, we carried out a structured written survey of enterprises in Germany, as family firms play a prominent role for both the German economy and society (e.g. Kraus et al., 2011). Our research was based on the Nexis (formerly LexisNexis) database of German enterprises. To create a feasible number of companies for research, the search criteria were adjusted to include companies beginning with a firm size of 50 employees and for legal forms GmbH, GmbH & Co. KG and AG, as the questionnaire and the topic itself included some structure-related questions not easily interpretable for legal forms such as the e.K. or OHG, where every shareholder must be part of the board. The size minimum of 50 employees was introduced because the literature suggest that very small German enterprises rely on very informal management and control mechanisms (Rautenstrauch and Müller, 2005) that are hardly researchable by using a written questionnaire.

All in all, a sample of 1,920 companies was created from the database by restricting the analysis to the three German provinces Bavaria, Baden-Wuerttemberg and Saxony, which are located in Southern Germany and relatively homogeneous from the economic perspective. The three provinces were also chosen because they show a relatively balanced proportion between family firms and non-family firms. Our pre-test revealed that completion of our questionnaire should take 25–30 min. 148 of the 1,920 questionnaires sent out were completed and returned. Six of these had to be disqualified for reasons of low data quality, leaving an acceptable response rate of approximately 7.7% which is positioned on the lower rims of response rates in similar surveys (e.g. Flacke 2007: 90). It may well be that the response rate was negatively affected by the strategically delicate topic of company resources. However, some incomplete responses meant that fewer cases were available for some of the conducted individual analyses. To control for non-response bias, we conducted a comparison between early respondents and late respondents following Armstrong and Overton (1977). The results suggested that non-response bias was not present in the data.

The questionnaires were completed in 74% of cases by a "Member of the top management team", in 9% by an "Assistant to a member of the top management team", in 9% by a "member of the second hierarchical level" and in 8% by a "member of the Management Accounting department". Thus, the quality of data can be assessed as rather good, while the hierarchical position of respondents had no effect on the conducted regression analyses. The industry sectors of the responding companies were heterogeneous: 32% manufacturing, with other industrial sectors being evenly matched along the remaining 68%.

As already pointed out by other researchers, it is arguably harder to obtain reliable data from family firms than from non-family firms (e.g. Handler, 1989; Wortman, 1994; Speckbacher and Wentges, 2012), as the latter are more accustomed to disclosure of crucial data. Family firms still show a certain amount of secretiveness regarding both strategic and financial information (e.g. Hutton 2007; Tong 2007). In addition to transparency problems, it seems harder to use multi-item scales in questionnaires with the focus group of family firms, as many of these companies show a tendency not to respond to overly complex and supposedly theoretical questionnaires. Thus, weighing the advantages and disadvantages of multi-item and single-item scales (Spector, 1992; Dillman et al., 1993; Nunally and Bernstein, 1994; Wanous et al., 1997; Loo, 2002; Bergkvist and Rossiter, 2007; Schjoedt et al., 2014), we opted for the single-item approach. Unfortunately, these adjustments did not result in a high, but only a moderate response rate. It may well be that the subjective importance – and consequently the tendency of respondents not to

risk exposure – outweighed the practical advantages of a single-item-approach.

3.2. Variable measures

3.2.1. Dependent variables

The binary variable "importance and scarcity of resources for the company" (IMPSCAR&RES) is constructed as follows: IMPSCAR&RES equals "1" if the company has both high values for the importance of a specific resource and the believed (and thus) subjective scarcity of that particular resource. To create this variable, two questions from the questionnaire were combined, one asking for the importance of a specific resource on a scale from "1" (not important) to "5" (very important) and the other asking the subjective scarcity of named resource from "1" (not scarce at all) to "5" (very scarce). These questions were asked both for energy and for natural resources. As our pre-tests showed that probands tended to interprete these five stages as increasing intensity levels and thus viewed the "3" more as a medium-high than a "neither nor" category, two binary variables were created where answers from 1 to 3 were coded as "0" and answers from 4 to 5 were coded as "1", the combination of these two variables being the basis for the construction of IMPSCAR&RES.

The variable "strategic importance of resources and sustainability" STRATIMP&SUST is also a binary variable constructed out of multiple questionnaire parts: STRATIMP&SUST equals "1" if the firm views resources both as strategically important and has an individual resource and sustainability strategy with specific measures and deduced actions to be executed. The construction of the variable is based on two questions in the questionnaire: First, the strategic importance of resources and resource management was measured on a five-point Likert scale from "1" (not important) to "5" (very important). Then, a binary variable was created where answers from 1 to 3 were coded as "0" and answers from 4 to 5 were coded as "1". The second part of the construct is existence of an extra and specific resource and sustainability strategy with specific aims, measures and actions. This was measured as a binary 0/1 variable. Subsequently, STRATIMP&SUST equals "1" when there is high strategic importance and when there is a specific resource and sustainability strategy, and "0" if only one or none of the given prerequisites is fulfilled.

The variable "formalization of resource management" FORMRESMAN is a binary variable, too. FORMRESMAN equals "1" when a company has a high or very high formalization of resource management activities. The level of formalization as depicted in our survey contained several aspects, one being the measurement of formalization based on a scale from "1" (not existent) to "5" (high level of formalization). Probands were asked to estimate the formalization of their resource management acitivities for both energy and natural resources using this scale. As a second step, a dummy variable was constructed with levels from 1 to 3 being interpreted as a "0" & levels from 4 to 5 being coded as "1". Thus, the two variables FORMRESMAN_EN and FORMRESMAN_RAW were construct for energy and natural resource management, respectively.

The variable "usage of resource-specific instruments" USRES&INSTR is a binary variable. Four different binary variables were constructed for the four operationalized instruments LCC, TCO, LCA and MFA. Usage of these instruments was measured on a scale from "0" (not in use) to "5" (very high usage"). As a second step, a dummy variable was constructed with levels from 1 to 3 being interpreted as a "0" and levels from 4 to 5 being coded as "1". USRES&LCC equals "1" when a company showed high or very high levels of LCC usage. Subsequently, USRES&TCO equals "1" when a company showed high or very high levels of TCO usage, USRES&LCA equals "1" when a company showed high or very high levels of LCA usage, and USRES&MFA equals "1" when a company showed high or very high levels of MFA usage.

3.2.2. Independent variables

There are already a vast number of different definitions to distinguish family firms from non-family firms (Westhead and Cowling, 1998; Dyer, 2003; Chrisman et al., 2005; Speckbacher and Wentges, 2012). Because the definition has shown itself to be applicable in the management accounting context, we refer to the categories operationalized by Speckbacher and Wentges (2012) as basis of our own analysis. Thus, in our study, we also used the above mentioned authors' differentiation between the two dimensions "ownership" and "representation in the TMT". The respondents were asked to indicate whether their company was "predominantly", "less than 50%" or "not" family-owned and whether "all", "some" or "none" of the members of the TMT were members pertaining to the founding family. These two individual attributes were used to form the dichotomous variable FAMILY FIRM, with a value of "1" if the company is predominantly family-owned and all or some of the members of the TMT are family members (in our case, 93 companies were classified as family firms and 49 as non-family-firms). This means that there exist different governance structures in the sample. Companies with family ownership, but without family members in the TMT were interpreted to share specific principal-agent-problems between owners and managers with "traditional", anonymous companies. Thus, we opted to regards these companies as non-family companies, as we think that the specifics of family firms only arise when family members are present in both the ownership and management dimensions. The same is to be expected for companies where the family owns less than 50% of the shares, where there might be problems between majority and minority shareholders, but typically less governance problems between family members.

To permit an even deeper analysis of the influence of family executives on business activity, we also explicitly concentrated on the predominantly founding family-owned firms where all members of the TMT were members of the founding family. This resulted in the dichotomous variable OWNER LED with a value of "1" if the firm is predominantly family-owned and all the members of the TMT are members of the founding family. A total number of 37 companies could be identified as such companies where family ownership and family management totally or almost converged, with an additional 56 companies fulfilling the broader definition of a

family firm as operationalized in the variable FAMILY FIRM.

3.2.3. Control variables

Size. The vast majority of already existing studies on management and control use company size as a contingency variable (Chenhall, 2003). In our study, we used an open approach where respondents were able to insert their individual employee numbers. The results were then categorized, using four size categories according to Speckbacher and Wentges (2012). These size categories, first used by other authors in similar studies (e.g. Fröhlich and Pichler, 1988; Loan-Clarke et al., 1999; Kotey, 2005), were then used as binary dummy variables in the regression analysis, while the smallest size category – firms with less than 100 employees, N = 25) served as reference class:

- SIZE 100–249: "1", if the firm has 100–249 employees (N = 32).
- SIZE 250–499: "1", if the firm has 250–499 employees (N = 27).
- SIZE >499: "1", if the firm has more than 499 employees (N = 58).

For some deeper analyses, we also used the dummy variable SIZE >99 ("1", if the firm has more than 99 employees, N = 117).

Interestingly, there seemed to be only a weak link between company size and family influence. Even among the small firms (less than 100 employees) 28.0% were non-family firms according to the above mentioned classification, while 72.0% were family firms. 53.1% of the firms with 100–249 employees and 66.7% of those with 250–499 employees were family firms. 69.0% of the large firms (500 or more employees) were also family firms.

Industry. Since we included data from companies pertaining to every industry sector, we also included "industry" as a control variable in our analysis. With regards to the specific situation in Germany, where manufacturing companies form a very important part of the economy (Couch et al., 2011; Giovannetti et al., 2012), and to the very different ways in which those companies use raw materials and energy in comparison with other companies pertaining to trade or services, we opted for a binary analysis. Thus, a dummy variable MANUFACTURING (N=46) was created and included in the regression analysis (thus, firms belonging to the remaining sectors trade and services served as the reference class, N=96).

Strategy type. There may exist a link between the company strategy and the need for resource management and control as such, we opted to control for strategy type. As a basis, we used the typology proposed by Miles et al. (1978). In this typology, defenders, analyzers, prospectors and reactors are distinguished with regards to different approaches towards corporate strategy, strategic planning, and strategic foresight. For our analysis, we created a dummy variable STRATEGY (N=72) with a value of "1" if the firm either belonged to the analyzer or prospector category (hence, the reactor and defender categories served as reference group, N=70) by using the traditional questions and scale Miles et al. (1978) established. This was deemed operational because analyzers and prospectors are believed to rely more heavily on formalized strategic planning than defenders and reactors, rendering the differentiation between those two groups practicable for our analysis.

4. RESULTS

Various regression models were estimated to test our hypotheses regarding the impact of family control on resource management and control activities and their level of formalization. For all seven independent variables, we constructed three regression models, which results in a total of 27 regression models presented in tables 1 to 9. In addition, each first regression model presents the results of control variables. In the second model, we included the broader operationalization of family influence, while in the respective third models, we opted to analyze the effect of the narrower operationalization of owner-led companies.

We opted to standardize independent and dependent variables in order to utilize the same regression type. Thus, all models are based on logistic regressions.

Models 1-3 (see Table 1) analyze the influence of founding family involvement in the TMT on the subjective importance and scarcity of energy for the company. Model 1 hereby contains all control variables. It is interesting to see that there are no size effects. However, manufacturing companies conceive energy to be more important and scarcer at the same time. Consistent with Hypothesis 1a, firms which are predominantly family-owned and where all or some of the members of the TMT are family members (FAMILY FIRM) (Model 2). and firms adhering to a more restrictive definition of family firms, i.e. firms that are predominantly family-owned and where all the members of the TMT are members of the founding family (OWNER LED) (Model 3) were analyzed. As can be seen in Table 1, only the narrower definition OWNER LED shows the supposed effect. Owner-led firms perceive energy to be more important and scarcer at the same time. The effect, however, cannot be observed in Model 2 with the broader definition. Thus, our data support Hypotheses 1 only for the narrow definition of family firms. Hence, we are of the opinion that the interaction of family ownership and family management is the important variable in this situation.

Models 4-6 (see Table 2) analyze the influence of family involvement in the TMT on the perceived importance and scarcity of natural resources. Model 4 only contains the control variables and shows no significant effects. As with Models 1-3, company size is not important when considering the subjective importance and scarcity of resources. As Models 5 and 6 show, the supposed effect of family influence on the importance and scarcity of natural resources only holds for the broader operationalization of family firms (FAMILY FIRM). In Model 6 with the operationalization OWNER LED, manufacturing companies show higher levels of perceived importance and scarcity of natural resources. Thus, our data support Hypothesis 1b only for the broader approach towards the operationalization of family firms.

Table 1. Binary logistic regression models to explain the importance and scarcity of energy (H1a)

	Model 1		***Model 2***		***Model 3***	
Dependents	***IMPSCAR&RES_EN***		***IMPSCAR&RES_EN***		***IMPSCAR&RES_EN***	
Independents	ß-Coeff.	Sig.	ß-Coeff.	Sig.	ß-Coeff.	Sig.
SIZE_100_249	-0,614	0,266	-0,526	0,349	-0,435	0,442
SIZE_250_499	0,127	0,827	0,143	0,808	0,245	0,679
SIZE_>499	0,092	0,854	0,100	0,843	0,231	0,654
MANUFACTURING	0,796	0,043**	0,776	0,049*	0,929	0,021**
STRATEGY_TYPE	-0,273	0,438	-0,409	0,265	-0,388	0,284
FAMILY_FIRM			0,604	0,117		
OWNER_LED					0,897	0,040**
Constant	0,321	0,496	0,023	0,965	-0,004	0,993
Model fit						
-2LL	184,237		181,770		179,781	
Cox and Snell R²	0,058		0,075		0,081	
Nagelkerkes R²	0,079		0,100		0,118	
ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic.						
* Significance at the 10% level (Wald test).						
** Significance at the 5% level (Wald test).						
*** Significance at the 1% level (Wald test).						

Table 2. Binary logistic regression models to explain the importance and scarcity of natural resources (H1b)

	Model 4		***Model 5***		***Model 6***	
Dependents	***IMPSCAR&RES_RAW***		***IMPSCAR&RES_RAW***		***IMPSCAR&RES_RAW***	
Independents	ß-Coeff.	Sig.	ß-Coeff.	Sig.	ß-Coeff.	Sig.
SIZE_100_249	-0,608	0,281	-0,507	0,377	-0,489	0,393
SIZE_250_499	-0,561	0,339	-0,554	0,348	-0,493	0,404
SIZE_>499	-0,335	0,515	-0,332	0,523	-0,254	0,626
MANUFACTURING	0,603	0,120	0,585	0,134	0,682	0,083*
STRATEGY_TYPE	-0,405	0,248	-0,555	0,131	-0,488	0,173
FAMILY_FIRM			0,646	0,093*		
OWNER_LED					0,594	0,161
Constant	0,808	0,099	0,448	0,402	0,603	0,241
Model fit						
-2LL	185,925		183,071		183,901	
Cox and Snell R²	0,037		0,056		0,051	
Nagelkerkes R²	0,050		0,076		0,069	
ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic.						
* Significance at the 10% level (Wald test).						
** Significance at the 5% level (Wald test).						
*** Significance at the 1% level (Wald test).						

Table 3. Binary logistic regression models to explain the strategic importance of resources and the existence of individual resource and sustainability strategies (H2)

	Model 7		***Model 8***		***Model 9***	
Dependents	***STRATIMP&SUST***		***STRATIMP&SUST***		***STRATIMP&SUST***	
Independents	ß-Coeff.	Sig.	ß-Coeff.	Sig.	ß-Coeff.	Sig.
SIZE_100_249	0,317	0,660	0,099	0,893	0,163	0,824
SIZE_250_499	0,986	0,154	0,969	0,171	0,905	0,197
SIZE_>499	0,748	0,231	0,751	0,240	0,673	0,288
MANUFACTURING	0,748	0,069*	0,843	0,052*	0,662	0,112
STRATEGY_TYPE	-0,283	0,477	0,025	0,953	-0,141	0,730
FAMILY_FIRM			-1,235	0,005***		
OWNER_LED					-0,884	0,107
Constant	-1,785	0,004	-1,172	0,070	-1,552	0,015
Model fit						
-2LL	152,509		144,418		149,623	
Cox and Snell R²	0,049		0,103		0,069	
Nagelkerkes R²	0,073		0,151		0,101	
ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic.						
* Significance at the 10% level (Wald test).						
** Significance at the 5% level (Wald test).						
*** Significance at the 1% level (Wald test).						

[1] ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic.
* Significance at the 10% level (Wald test). ** Significance at the 5% level (Wald test). *** Signifi cance at the 1% level (Wald test).
[2] ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic.
* Significance at the 10% level (Wald test). ** Significance at the 5% level (Wald test). *** Signifi cance at the 1% level (Wald test).
[3] ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic.
* Significance at the 10% level (Wald test). ** Significance at the 5% level (Wald test). *** Signifi cance at the 1% level (Wald test).

Table 4. Binary logistic regression models to explain the formalization of energy management (H3a)

	Model 10		***Model 11***		***Model 12***	
Dependents	***FORMRESMAN_EN***		***FORMRESMAN_EN***		***FORMRESMAN_EN***	
Independents	ß-Coeff.	Sig.	ß-Coeff.	Sig.	ß-Coeff.	Sig.
SIZE_100_249	0,025	0,966	-0,030	0,959	0,079	0,893
SIZE_250_499	0,064	0,915	0,049	0,935	0,098	0,871
SIZE_>499	0,425	0,406	0,418	0,414	0,459	0,373
MANUFACTURING	0,659	0,078*	0,674	0,073*	0,695	0,067
STRATEGY_TYPE	-0,177	0,618	-0,105	0,775	-0,214	0,554
FAMILY_FIRM			-0,326	0,399		
OWNER_LED					0,245	0,559
Constant	-0,882	0,074	-0,694	0,198	-0,973	0,061
Model fit						
-2LL	181,446		180,737		181,106	
Cox and Snell R^2	0,035		0,040		0,038	
Nagelkerkes R^2	0,048		0,055		0,052	
ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic.						
* Significance at the 10% level (Wald test).						
** Significance at the 5% level (Wald test).						
*** Significance at the 1% level (Wald test).						

Table 5. Binary logistic regression models to explain the formalization of natural resource management (H3b)

	Model 13		***Model 14***		***Model 15***	
Dependents	***FORMRESMAN_RAW***		***FORMRESMAN_RAW***		***FORMRESMAN_RAW***	
Independents	ß-Coeff.	Sig.	ß-Coeff.	Sig.	ß-Coeff.	Sig.
SIZE_100_249	0,060	0,915	0,115	0,838	0,204	0,721
SIZE_250_499	-0,147	0,802	-0,135	0,819	-0,056	0,924
SIZE_>499	0,189	0,704	0,196	0,695	0,281	0,580
MANUFACTURING	0,193	0,606	0,184	0,624	0,287	0,453
STRATEGY_TYPE	-0,412	0,239	-0,486	0,178	-0,512	0,155
FAMILY_FIRM			0,333	0,388		
OWNER_LED					0,626	0,129
Constant	-0,413	0,383	-0,611	0,248	-0,651	0,196
Model fit						
-2LL	186,419		185,662		184,105	
Cox and Snell R^2	0,015		0,021		0,031	
Nagelkerkes R^2	0,021		0,028		0,043	
ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic.						
* Significance at the 10% level (Wald test).						
** Significance at the 5% level (Wald test).						
*** Significance at the 1% level (Wald test).						

Table 6. Binary logistic regression models to explain the usage of TCO (H4a)

	Model 16		***Model 17***		***Model 18***	
Dependents	***USRES&TCO***		***USRES&TCO***		***USRES&TCO***	
Independents	ß-Coeff.	Sig.	ß-Coeff.	Sig.	ß-Coeff.	Sig.
SIZE_100_249	-0,075	0,906	-0,152	0,814	-0,365	0,584
SIZE_250_499	0,138	0,831	0,121	0,851	-0,003	0,996
SIZE_>499	-0,085	0,881	-0,104	0,856	-0,285	0,631
MANUFACTURING	0,232	0,583	0,256	0,547	0,092	0,833
STRATEGY_TYPE	0,358	0,373	0,462	0,270	0,579	0,168
FAMILY_FIRM			-0,427	0,325		
OWNER_LED					-1,677	0,011**
Constant	-1,440	0,009	-1,203	0,043	-1,025	0,081
Model fit						
-2LL	152,684		151,721		143,969	
Cox and Snell R^2	0,009		0,016		0,068	
Nagelkerkes R^2	0,014		0,024		0,103	
ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic.						
* Significance at the 10% level (Wald test).						
** Significance at the 5% level (Wald test).						
*** Significance at the 1% level (Wald test).						

[4] ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic.
* Significance at the 10% level (Wald test). ** Significance at the 5% level (Wald test). *** Signifi cance at the 1% level (Wald test).
[5] ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic.
* Significance at the 10% level (Wald test). ** Significance at the 5% level (Wald test). *** Signifi cance at the 1% level (Wald test).
[6] ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic.
* Significance at the 10% level (Wald test). ** Significance at the 5% level (Wald test). *** Signifi cance at the 1% level (Wald test).

Table 7. Binary logistic regression models to explain the usage of LCC (H4b)

	Model 19		***Model 20***		***Model 21***	
Dependents	***USRES&LCC***		***USRES&LCC***		***USRES&LCC***	
Independents	***ß-Coeff.***	***Sig.***	***ß-Coeff.***	***Sig.***	***ß-Coeff.***	***Sig.***
SIZE_100_249	0,493	0,589	0,499	0,586	0,373	0,685
SIZE_250_499	0,960	0,280	0,961	0,280	0,892	0,319
SIZE_>499	1,203	0,134	1,204	0,134	1,128	0,162
MANUFACTURING	-0,036	0,941	-0,035	0,942	-0,099	0,839
STRATEGY_TYPE	-0,005	0,990	-0,012	0,979	0,076	0,868
FAMILY_FIRM			0,034	0,945		
OWNER_LED					-0,641	0,288
Constant	-2,428	0,002	-2,449	0,004	-2,235	0,006
Model fit						
-2LL	125,644		125,639		124,412	
Cox and Snell R^2	0,024		0,024		0,032	
Nagelkerkes R^2	0,039		0,039		0,054	
ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic						
* Significance at the 10% level (Wald test)						
** Significance at the 5% level (Wald test)						
*** Significance at the 1% level (Wald test)						

Table 8. Binary logistic regression models to explain the usage of LCA (H4c)

	Model 22		***Model 23***		***Model 24***	
Dependents	***USRES&LCA***		***USRES&LCA***		***USRES&LCA***	
Independents	***ß-Coeff.***	***Sig.***	***ß-Coeff.***	***Sig.***	***ß-Coeff.***	***Sig.***
SIZE_100_249	0,426	0,642	0,482	0,602	0,432	0,643
SIZE_250_499	-0,137	0,895	-0,132	0,900	-0,133	0,899
SIZE_>499	0,620	0,459	0,611	0,465	0,623	0,459
MANUFACTURING	-0,447	0,471	-0,446	0,471	-0,443	0,481
STRATEGY_TYPE	-0,601	0,274	-0,662	0,237	-0,603	0,276
FAMILY_FIRM			0,339	0,568		
OWNER_LED					0,024	0,970
Constant	-2,022	0,011	-2,231	0,011	-2,032	0,015
Model fit						
-2LL	97,056		96,722		97,055	
Cox and Snell R^2	0,020		0,023		0,020	
Nagelkerkes R^2	0,040		0,045		0,040	
ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic						
* Significance at the 10% level (Wald test)						
** Significance at the 5% level (Wald test)						
*** Significance at the 1% level (Wald test)						

Table 9. Binary logistic regression models to explain the usage of MFA (H4d)

	Model 25		***Model 26***		***Model 27***	
Dependents	***USRES&MFA***		***USRES&MFA***		***USRES&MFA***	
Independents	***ß-Coeff.***	***Sig.***	***ß-Coeff.***	***Sig.***	***ß-Coeff.***	***Sig.***
SIZE_100_249	-0,446	0,518	-0,467	0,499	-0,458	0,511
SIZE_250_499	0,128	0,846	0,119	0,856	0,121	0,855
SIZE_>499	0,113	0,842	0,106	0,852	0,107	0,851
MANUFACTURING	0,955	0,020*	0,960	0,020*	0,947	0,023*
STRATEGY_TYPE	-0,054	0,894	-0,019	0,964	-0,045	0,914
FAMILY_FIRM			-0,145	0,744		
OWNER_LED					-0,055	0,910
Constant	-1,478	0,008	-1,393	0,022	-1,459	0,012
Model fit						
-2LL	149,136		149,03		149,124	
Cox and Snell R^2	0,049		0,050		0,049	
Nagelkerkes R^2	0,074		0,075		0,074	
ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic						
* Significance at the 10% level (Wald test)						
** Significance at the 5% level (Wald test)						
*** Significance at the 1% level (Wald test)						

[7] ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic.
* Significance at the 10% level (Wald test). ** Significance at the 5% level (Wald test). *** Signifi cance at the 1% level (Wald test).
[8] ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic.
* Significance at the 10% level (Wald test). ** Significance at the 5% level (Wald test). *** Signifi cance at the 1% level (Wald test).
[9] ß-Coeff. denotes the logistic regression coefficient, and Sig. gives the probability of the Wald statistic. * Significance at the 10% level (Wald test). ** Significance at the 5% level (Wald test). *** Signifi cance at the 1% level (Wald test).

The influence of family involvement in the TMT on the strategic importance of resources and the existence of a sustainability strategy is analyzed in Models 7-9. In Model 7, containing only the control variables, it is shown that manufacturing companies see higher levels of strategic importance and existence of independent sustainability strategies. In Model 8, a similar effect for industrial companies is obtained. In addition, family firms in the operationalization FAMLY FIRM show significantly lower levels of strategic importance of resources and existence of independent sustainability strategies. This effect, however, does not obtain in Model 9 with the operationalization OWNER LED. As with Hypothesis 1b, our data only support Hypothesis 2 for the broader definition of family firms.

In Models 10-12, the influence of family involvement in the TMT on the formalization of energy management activities was analyzed. In Model 10, containing all control variables, manufacturing companies show higher levels of formalization of energy management activities. A similar effect can be obtained in Model 11, containing the family influence in the operationalization FAMILY FIRM. In Model 12 with the operationalization OWNER LED, no significant effects were obtained. Thus, our data could not support Hypothesis 3a.

In Models 19-21, the influence of family involvement in the TMT on the usage of lifecycle costing (LCC) was analyzed. Neither model showed any significant effects. Hence, we cannot find evidence supporting Hypothesis 4b.

In Models 13-15, the influence of family involvement in the TMT on the formalization of natural resource management activities was analyzed. Neither model contains statistically significant effects. Thus, we could not find data that approve Hypothesis 3b.

In Models 16-18, the influence of family involvement in the TMT on the usage of total cost of ownership (TCO) was analyzed. In Model 16, containing only the control variables, no significant effects could be observed. In Models 17 and 18, the family involvement was gradually introduced via FAMILY FIRM and OWNER LED. While there were no significant effects of FAMILY FIRM, Model 18 shows that family firms in the operationalization OWNER LED show significantly lower levels of TCO usage. Thus, we find supportive data for Hypothesis 4a.

In Models 22-24, the influence of family involvement in the TMT on the usage of lifecycle assessment (LCA) was analyzed. Neither model showed any significant effects. Hence, we cannot find evidence supporting Hypothesis 4c.

In Models 25-27, the influence of family involvement in the TMT on the usage of material flow analysis (MFA) was analyzed. It is shown that in all models, manufacturing companies use MFA to higher degrees than other companies. There was, however, no significant effect of family involvement in the TMT.

5. DISCUSSION

Our research provides empirical evidence on the role of founding family involvement for resource management and control activities concerning energy and natural resources. Throughout our study, it is shown that firms attribute perceives those resources to be scarce and important, yet there is no corresponding response concerning companies' action. We could not, however, single out family involvement as the sole influence factor for resource management and control. However, we detected evidence supporting the view that firms where family members have a majority role in the management board differ from firms where there is a separation between ownership and control and family members are restricted to the ownership dimension.

Interestingly, we could not detect any size (and thus complexity-based) effects on resource management and control activities. This clearly contradicts existing, contingency-based literature regarding management and control activities in general. Here, bigger and more complex organizational bodies are reported to feel the need to establish formalized management and control procedures, processes and instruments in order to be able to cope with higher company complexity. This effect cannot be observed for our study. A closer look at the data reveals possible explanations for this situation. As levels of resource management and control are relatively low even for bigger and more complex companies, we can extract the information that resource management and control activities show a much earlier stage of development in comparison to other management and control activities (such as managerial or cost accounting in general). Thus, it could be argued that many companies address financial and human resources, but that energy, natural and other important resources have until now been almost neglected when talking about formalized management and control activities. Hence, there are no size effects due to the sample's homogeneity regarding low levels of management formalization.

The lack of formalized management control becomes increasingly interesting regarding the importance of company resources for business models and business model innovation. We did not address this topic in the questionnaire, but it remains doubtful whether companies can successfully reinvent resources and business models without formal management and control activities. However, the yet unexplainable element of family entrepreneurship could explain why previous studies could not find any performance differences between companies with and without formalization of management and control (e.g. Posch and Speckbacher, 2012).

The observation of low levels of usage can also be obtained for the four analyzed resource management and control instruments TCO, LCC, LCA, and material flow analysis. Neither company size nor family influence seem to be important contingency factors for the levels of usage of these instruments. As usage levels of these four specific instruments are low among all respondents, some possible interpretations can be given that, however, cannot be solely derived from our survey data. First, it is possible that family and non-family firms alike use other instruments – e.g. standardized instruments from managerial and cost accounting – to manage and control energy and natural resources. Here, family firms might use informal means of management and control as substitutes or complements. However, we cannot solve this problem as we did not address this question in our

questionnaire. Second, there might also be the problem of operationalization. As former studies have shown, management accounting practices can be "used" in different types and ways, for example as diagnostic or interactive as proposed by Simons (1994). The single dimension of usage intensity employed in our study might therefore not address all relevant dimension of instrument usage.

Our results further help to close existent gaps between family firm literature, resource management literature, and management accounting and control literature. In our theoretical section, we argue that family firms might rely less on formal resource management and control activities. Especially from the perspective of the resource-based view, firms might use informal means of resource management and control and thus attain tacit and implicit knowledge that can serve as competitive advantage in comparison with similar non-family firms. While our empirical data clearly show that family firms perceive energy and natural resources to be more important than non-family firms, we could not detect the supposed lower levels of formalization of energy and natural resource management and control. However, our study (and our questionnaire) did not address levels of informal management and control, so we cannot definitely guarantee whether family firms show lower or higher levels of resource management in the long run. In addition, we did not include performance effects of resource management and control activities, so we cannot deduce normative information on whether it is better or worse to make use of formalized resource management and control activities.

Obviously, this is one of the major limitations of our study. A deeper and more comprehensive analysis and understanding of informal means and activities of resource management and control must be left for further scientists and studies. In addition, we used statistical data from the geographic region Germany that might be reproducible, but, due to the high importance of manufacturing companies for the German industry, not so easily adaptable to other situational contexts. For further studies, it would be interesting to use the cited model containing resource inventory, resource building, and resource leveraging for a deeper analysis of company resources and possible contingency effects.

APPENDIX

Table A10. Correlations

	<100	100-249	250-499	>499	FAMILY	OWNER	MANUFACT	STRATEGY
SIZE_<100	1				0,063	0,147	-0,004	0,049
SIZE_100-249		1			-0,140	-0,090	-0,121	-0,008
SIZE250_499			1		0,012	-0,001	-0,029	-0,025
SIZE_>499				1	0,061	-0,036	0,129	-0,012
FAMILY_FIRM					1		0,059	**0,232****
OWNER_LED						1	-0,137	**0,168***
MANUFACTURING							1	0,020
STRATEGY_TYPE								1

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[10] * Correlation is significant at the 0,05-level (two-tailed). ** Corelation is significant at the 0,01-level (two-tailed).

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