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Directive Deficiencies: How Resource Constraints Direct Opportunity Identification in SMEs

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Directive Deficiencies: How Resource Constraints Direct Opportunity Identification in SMEs

Author Biographies

Dr. Elco van Burg is an Assistant Professor of Entrepreneurship and Organization at the Faculty of Economics and Business Administration at VU University in Amsterdam. He received his Ph.D. from Eindhoven University of Technology in 2010. His research particularly concerns the cooperative behavior of (academic) entrepreneurs and the process of imagining entrepreneurial opportunities. He has published in among others in *Organization Science, Production and Operations Management* and the *Journal of Product Innovation Management.*

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Lien Beck is a doctoral researcher in the Centre of Entrepreneurship and Innovation (KIZOK) at Hasselt University. She is also a member of the team that coordinates 'Strategisch Innoveren', a large-scale project that encourages SMEs to participate in a strategic review process to (re)define their strategy and enhance their innovation capacity. Her research interests include market orientation, marketing capabilities and innovation. She has published in among others *Family Business Review*.

Dr. Tinne Lommelen is project manager at Hasselt University. She received her Ph.D. from Hasselt University in 2004, with a dissertation on the internationalization of service companies. Today, Tinne coordinates large-scale projects in which university, industry and government interact to enhance innovation in SMEs.

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Abstract

Previous studies show that resource constraints have mixed effects on innovation and opportunity identification by entrepreneurs. Sometimes, resource constraints lead to identifying more opportunities, whereas in other cases entrepreneurs rather see fewer opportunities. This study explores a new approach to reconcile this inconsistency. Using a sample of 219 small and medium-sized enterprises (SMEs), we explore relationships between supply and demand constraints and identifying supply and demand opportunities. The results show that supply constraints have a positive effect on identifying supply opportunities, but a negative effect on identifying demand opportunities. Similarly, demand constraints have a positive effect on identifying demand opportunities, but a negative effect on identifying supply opportunities. Thus, this study shows that resource constraints direct the entrepreneur's attention towards opportunities *inside* the constrained domain rather than *outside* the constrained domain. An important consequence for theory is that a complete explanation of the mixed effects should consider different types of resource constraints and different sources of opportunities simultaneously. For practicing entrepreneurs, being aware of this mechanism can prevent that they miss out on promising opportunities outside the constrained domains.

Introduction

Entrepreneurs act upon opportunities they envision. Therefore, one of the fundamental questions of entrepreneurship research is: when do entrepreneurs identify opportunities and which opportunities do they identify? Extant research has shown that prior knowledge and entrepreneurial experience channel opportunity identification (Shane 2000; Shepherd, Zacharakis, and Baron 2003). In addition, some studies have started to explore how the amount of resources at hand shapes opportunity identification (Baker and Nelson 2005; Garmaise 2008; Haynie, Shepherd and McMullen 2009).

The amount of available resources appears to have both negative and positive effects on opportunity identification by entrepreneurs. On the one hand, abundant resources enable experimentation, resulting in more new ideas and more innovation (Paladino 2007; Song et al. 2008; Voss, Sirdeshmukh, and Voss 2008). On the other hand, resource constraints can spur necessity-driven creativity and lead to identifying promising opportunities (Katila and Shane 2005; Ward 2004). To reconcile this inconsistency, it is proposed that the relationship between the availability of resources and opportunity identification follows an inverted U-shape (Renko, Reynolds, and Carsrud 2010) or is moderated by for instance the innovation team's cohesion and potency (Hoegl, Gibbert, and Mazursky 2008).

Following a new approach, this article explores how particular *types* of resource constraints direct identifying opportunities from different sources. We study the relationship between resource constraints and opportunity identification in small and medium-sized enterprises (SMEs), while controlling for the fact that team-level diversity might influence creativity of entrepreneurial teams (Song and Parry 1997). We distinguish between supply and demand constraints and relate those to the propensity to identify opportunities from related supply and

demand categories. As a particularly interesting demand opportunity, this study tests whether entrepreneurs identify sustainable opportunities: opportunities related to preventing degradation or improving the natural or social environment (Cohen and Winn 2007; Patzelt and Shepherd 2011; Zahra et al. 2009). Relating the specific constrained domain with the source of the identified opportunities, the results show that resource-constrained entrepreneurs do identify more opportunities *within* the constrained domain but fewer opportunities *outside* the constrained domain.

Theoretical Background

Resource Constraints and Creativity

The effects of resource constraints on creativity, opportunity identification and resulting innovative performance are mixed. A lack of financial resources can limit firms' innovative performance as they cannot afford to develop (multiple) technologies or to experiment with new ideas (Agarwal, Sarkar, and Echambadi 2002; De Carolis et al. 2009; Nohria and Gulati 1996; Voss, Sirdeshmukh, and Voss 2008). Missing specific capabilities, caused by a shortage of qualified managers and employees, also reduces innovativeness (Díaz-Díaz, Aguiar-Díaz, and De Saá-Pérez 2008). In particular small firms and young ventures experience that these resource constraints have far-reaching consequences. For instance, small firms with financial constraints are not able to hire the required employees, which reduces their innovativeness and viability (Eisenhardt and Schoonhoven 1996; Rao and Drazin 2002).

Yet, studies also confirm that necessity is the mother of innovation. The psychological mechanism of 'bounded creativity' predicts that the human mind will be more productive when restrictions apply, resulting in identifying not only more but also more diverse and creative

opportunities (Finke, Ward, and Smith 1992; Goldenberg, Lehmann, and Mazursky 2001; Moreau and Dahl 2005). Thus, resource constraints appear also to drive creativity and innovative behavior (Hoegl, Gibbert, and Mazursky 2008; Mosakowski 2002). Katila and Shane (2005) found that new ventures, although possessing fewer resources, are more innovative than their established peers in industries with high competition and in small markets. Resource-constrained entrepreneurs appear to be more resourceful to take profit from any emerging opportunity while employing their scarce resources (Baker and Nelson 2005; Renko, Reynolds and Carsrud 2010). While a venture's resource endowments may result in less efficient operations (Debruyne, Frambach, and Moenaert 2010; George 2005; Hvide and Møen 2010) and turn the firm's innovative strategy into core rigidities (Mosakowski 2002), resource-constrained firms are rather forced to break away from existing paths and to imagine new opportunities (Musso and Schiavo 2008; Stevenson and Jarillo 1990).

Researchers have proposed three different solutions for these mixed effects of resource constraints on creativity and innovative performance (Mellahi and Wilkinson 2010). Most studies have followed the *level-of-resources explanation*, which proposes that the relationship between resource availability and creativity is curvilinear (Bourgeois 1981). A significant lack of resources may hamper innovative activity, while entrepreneurs with too many resources become lazy, inefficient and lose their fit with the market (Bradley, Wiklund, and Shepherd 2011; Mellahi and Wilkinson 2010; Nohria and Gulati 1996).

The *contingency explanation* proposes that positive and negative effects of resource constraints are moderated by individual- and team-level characteristics such as the knowledge of the firm's employees and the composition and cohesion of the innovation team (Hoegl, Gibbert, and Mazursky 2008). Moreover, firm-level contingencies such as strategic choices (Mishina,

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Pollock, and Porac 2004) or management practices (Bradley, Wiklund, and Shepherd 2011) may explain the effect of resource availability.

The *type-of-resources explanation* is a third and rather new approach, which is further explored in this study. This approach argues that different types of resource constraints have different effects on identifying specific new ideas (Mellahi and Wilkinson 2010; Mishina, Pollock, and Porac 2004). For instance, the value of human resources is much more task- and context-dependent than is the value of financial resources (Mishina, Pollock, and Porac 2004). A lack of skilled employees may limit creativity and impact the ability to pursue alternative strategies (Voss, Sirdeshmukh, and Voss 2008), while the lack of adequate financing may rather stimulate resourcefulness (Baker and Nelson 2005) and creative bootstrapping strategies (Carter and Van Auken 2005).

To explore the effect of different types of resources on opportunity identification, two categories of constraints are distinguished. First, deficiencies in the internal processes in the firm create *supply constraints*, which include the lack of financial resources, such as cash, cash flow, inventory and accounts receivable (Bradley, Wiklund, and Shepherd 2011; George 2005). Moreover, the lack of skilled and well-performing employees (Mishina, Pollock, and Porac 2004) and deficiencies in the production processes, production equipment or products (Hoegl, Gibbert, and Mazursky 2008; Hoegl, Weiss, and Gibbert 2010) can cause difficulties to supply (new) products to the market. Second, *demand constraints* concern shortages of customer demand and difficult or insufficient relationships with clients (Sirdeshmukh, Singh, and Sabol 2002; Voss, Sirdeshmukh, and Voss 2008).

Opportunity Identification

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In the domain of entrepreneurship, the identification and pursuit of opportunities is a key notion that researchers seek to understand (Shane and Venkataraman 2000; Short et al. 2010). An entrepreneurial opportunity is an idea or dream that is discovered or created by an entrepreneurial entity (Short et al. 2010). Entrepreneurial opportunities can originate from changes in supply and from changes in demand (Eckhardt and Shane 2003; Stevenson and Gumpert 1985). First, *supply opportunities* originate from changes in market supply, such as the withdrawal of competitors, emerging mismatches between supply and demand and new ways of organizing production processes (Eckhardt and Shane 2003; Schumpeter 1934; Stevenson and Gumpert 1985). Second, *demand opportunities* stem from changes in market demand, for instance as a result of demographic developments, regulatory changes and changing customer preferences (Christensen and Bower 1996; Drucker 1985). A specific type of demand opportunities, that is becoming more and more important for entrepreneurs, are sustainable opportunities. The growing desire of many individuals to prevent environmental degradation or even gradually improve the natural and social environment provides opportunities for entrepreneurial action to fulfill new demand (Cohen and Winn 2007; Patzelt and Shepherd 2011; Zahra et al. 2009).

Extant literature has shown that the identification of particular opportunities is influenced by the entrepreneur's prior knowledge (Gruber, MacMillan, and Thompson 2008; Shane 2000; Shepherd and DeTienne 2005), previous entrepreneurial experience (Baron 2004; Ucbasaran, Westhead, and Wright 2009), and engagement in experiential learning processes (Corbett 2005; Lumpkin and Lichtenstein 2005). These antecedents explain opportunity identification from behavior, experiences and knowledge that have accumulated during *past* activities. Other studies considered the influence of circumstances at the *moment* of opportunity identification, among

which the availability of resources. Available resources direct the entrepreneur's attention towards particular opportunities: entrepreneurs are attracted to opportunities that are in line with their existing resources (Haynie, Shepherd, and McMullen 2009; Sarasvathy 2001). In view of promising opportunities, however, resource-constrained entrepreneurs may also want to collect more resources (Baker 2007; Baker and Nelson 2005; Haynie, Shepherd and McMullen 2009). As such, the link between the creative identification of opportunities and resource constraints seems to be a key mechanism driving innovation in and performance of entrepreneurial ventures. Yet, the interaction between specific types of resource constraints and the identification of particular opportunities has not received much attention, while this may provide more insight in the effect of resource constraints and help understanding when particular opportunities are identified.

Relatedness of Constraints and Opportunities

To identify how experiencing different types of resource constraints directs attention towards identifying opportunities from different sources, we develop exploratory hypotheses. Relating the two different types of resource constraints (supply and demand constraints) to the two sources of opportunities (supply and demand opportunities) leads to Figure 1.

[INSERT FIGURE 1 AROUND HERE]

Matching resource constraints to opportunity sources raises the fundamental question whether constraints in a particular domain A lead to identifying more opportunities in the related opportunity domain A', or rather stimulate identifying more opportunities in an unrelated domain B. In other words, does the entrepreneur's creativity, unleashed by the perceived boundaries,

address the constrained domain or circumvent the constraints by identifying new, rather unrelated opportunities?

Gibbert and Scranton (2009) describe how during and after the Second World War German and French teams were developing aircraft turbofans. Both teams had to find a cooling solution for the turbofan. The French turbofan engineers avoided solving the problem within the given boundaries and did not identify their own solution for the cooling problem, but they circumvented the problem by copying and simplifying the design of the German team (Gibbert and Scranton 2009). Thus, entrepreneurs may seek new opportunities that navigate away from the constraints and come up with something entirely different (see Audia and Goncalo 2007).

In contrast, the German team did not have access to other solutions and to appropriate alloys, and thus could not replace the steel with more heat-resistant alloys. Because of this material constraint, they altered the design of the turbofan, resulting in a cooling solution. Thus, the opportunity was identified precisely because there was a cooling problem, and domain-relevant skills and knowledge were leveraged toward finding a solution within the problem domain (Hoegl, Gibbert, and Mazursky 2008). Similarly, Moreau and Dahl (2005) found that consumers design more creative solutions in the area where they experience input constraints – a phenomenon they later coined "thinking inside the box" as opposed to the "thinking outside the box" (Dahl and Moreau 2007). This seems to be the most common behavior of entrepreneurs, as they use the resources at hand – even if they experience a significant lack of those resources – to create new and innovative solutions (Baker 2007; Baker and Nelson 2005).

Thus, we expect that supply constraints increase the likelihood of identifying opportunities from the related source of supply opportunities, while entrepreneurs identify fewer opportunities from other, unrelated opportunity sources. This leads to the following hypotheses:

Hypothesis 1a: Experiencing supply constraints leads to identifying more supply opportunities.

Hypothesis 1b: Experiencing supply constraints leads to identifying fewer demand opportunities.

Similarly, experiencing supply constraints will trigger thinking about solutions for the supply problems. Thus, entrepreneurs experiencing supply constraints are likely to identify more supply opportunities, while identifying fewer opportunities from unrelated sources. Thus we predict:

Hypothesis 2a: Experiencing demand constraints leads to identifying more demand opportunities.

Hypothesis 2b: Experiencing demand constraints leads to identifying fewer supply opportunities.

Method

Sample

The data originate from the project 'Strategic Innovation' in Belgium and The Netherlands, which started in 2008 and finished in 2011. This government-funded project stimulated companies to participate in a strategic review process. The project's main objective was to help companies rethink their strategy. The only selection criterion for companies to participate in the project was that the company qualified as a small and medium-sized enterprise (SME). Following the European Commission's definition of SMEs (European Commission 2003), SMEs are defined as companies with no more than 250 employees, an annual maximum turnover of 50 million Euro or a balance sheet total of no more than 43 million Euro. The SMEs were invited to the project through mailings, SME fairs and existing networks of project partners, consultants and employers' organizations.

The project's protocol included three steps to collect data from the SME and to create an in-depth discussion within the SME's management. This data collection was performed by

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interviewers who were first trained in the research and intervention methodology of the project. The first step was an interview of approximately two hours with the firm's CEO. In this interview, information was collected about the company in general, its customers and products, and the strategic changes that took place in the company over the past 10 years. Second, a questionnaire was filled out by the CEO. This questionnaire contained financial and sales questions. The information collected through the interview and the questionnaire was used in the third step, where strategic conversation sessions were performed. In these sessions the firm's management team discussed the internal and external environment in which the company operated. This discussion was finished by composing a ranking of five firm-specific strengths, weaknesses, opportunities and threats.

This study employs data from these three protocol steps. The average time between the data collection steps was two weeks. Both qualitative and quantitative data are included from the interview, the questionnaire and the coded strategic sessions. Since different sources of data are used and there is time separation between data collection moments, the concerns for potential common method variance are limited (Podsakoff et al. 2003; Podsakoff and Organ 1986). The total study included 237 Dutch and Belgian SMEs. Due to missing values, the final study sample includes 219 SMEs. The detailed statistics of the sample can be found in Table 1.

[INSERT TABLE 1 AROUND HERE]

The fact that the entrepreneurs had to volunteer themselves for the project could introduce a self-selection bias. Therefore, we compared our sample's characteristics with a large-scale (1250 firms) study, with a similar focus on innovation in SMEs in the same region, in terms of size, age, and industry (De Jong and Vermeulen 2006). This revealed that our sample has a similar age distribution. However, the firms in our sample tended to be smaller and more active in the

manufacturing sector. Since the analysis controls for size and industry, this is not a significant concern for this study. Additionally, the companies that did participate in the project could have a different profile than those that did not participate. Therefore, a control group was created, containing 109 companies. These companies decided not to participate in the full project, but did complete the questionnaire, which is the second step of the protocol. No significant differences are found between the companies included in the full project and the control group. Thus, selection bias in this study appears to be limited.

Dependent Variables

For the dependent variables, the sources of opportunities, this study relies on data collected in the strategic conversation sessions. In these sessions, the opportunities as perceived by the SME's management team were discussed and finally the team listed at maximum five opportunities. Entrepreneurship literature emphasizes that entrepreneurial opportunities are perceived by people, rather than objectively existing in the outside world. Thus, our measure for opportunities as perceived and reported by the entrepreneurial team fits with existing entrepreneurship theory (see Shane 2003; Short et al. 2010). In order to obtain insights into the different sources of opportunities, the opportunities reported by each company's management team were coded by two raters. These coders used standardized coding instructions, which were developed by exploratory coding a number of interviews and by interaction with existing innovation literature (see Locke 2001; Miles and Huberman 1994). These coding instructions differentiated between sources of opportunities stemming from supply and demand sources, where demand is in particular related to demand concerning environment-related products and services. QSR NVivo software was used to build the coding database. The simple inter-rater agreement between the

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two raters was 86% while Cohen's κ was 0.71, confirming that the coding was reliable (Fleiss 1981). Remaining differences in coding were subsequently resolved by discussions between the coders, involving the other authors as independent coders, until consensus was reached. Table 2 gives an overview of all the variables and the corresponding data sources. Table 3 illustrates the coding process, by providing code definitions and exemplary quotes for each of the codes.

[INSERT TABLE 2 AND 3 AROUND HERE]

Independent Variables

For the independent variables used in this study, we rely on data from three different sources: the CEO interview, the questionnaire completed by the CEO, and the strategic conversation sessions. The fact that these constraints were reported by the entrepreneurs themselves enabled us to measure resource constraints as perceived constraints. This is an important advantage, as the effect of the availability of resources depends on the perceived value to the beholder rather than the actual amount of resources at hand (Baker and Nelson 2005; Hoegl, Weiss and Gibbert 2010; Penrose 1959).

From the CEO survey the perceived sales decreases in percentage points relative to 100% in year zero are used, where the year zero is a firm-specific reference year. The reference year is identified by the respondent, and thus functions as a reference point in the perception of the entrepreneur (Kahneman 1992; Kahneman and Tversky 1979). Customer relational constraints and demand constraints in general were coded in the reports of the intake interview and the strategic conversation sessions by two independent raters, using a detailed coding protocol similar to the one employed for coding the sources of opportunities. The reliability of the coding was confirmed by the inter-rater agreement of 84%, which corresponds to a Cohen's κ of 0.74.

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Control Variables

The following control variables are included. Studies show that domain expertise has a key role in the opportunity identification process (Gruber, MacMillan, and Thompson 2008; Shane 2000) and that team diversity influences creativity (Song and Parry 1997). Therefore, we control for team diversity by counting the number of different functions (e.g., finance, marketing and sales, production, human resource management) that were represented during the strategic conversation session. Finally, age and size of the firm are included as control variables. To control for the industry of the firm, a dummy variable was used, indicating whether a firm was active in the manufacturing sector or not.

Results

Analysis

The correlations between all constraint types and opportunity sources are reported in Table 4. The dependent variables measure the number of identified opportunities representing an integer count without normal distributions and with restricted ranges (a maximum of five opportunities). Ordinary least squares regression becomes inappropriate since it relies on the assumption of normality of the residuals (Hair et al. 1998). Consequently, negative binomial regressions were used to test the predicted relationships more accurately (Gardner, Mulvey, and Shaw 1995; Gruber, MacMillan, and Thompson 2008). The overview of the negative binomial regression results can be found in Table 5 and 6.

The significance of the model's improvement after adding the new variables was assessed by the Chi-square statistic. The Chi-square statistic was calculated on the basis of two times the difference between the log likelihood of the two models, with degrees of freedom equal to the

number of added variables (cf. Gruber, MacMillan, and Thompson 2008). Model 1 to 2 and

model 4 to 5 in Tables 5 and model 2 to 3, 4 to 5 and 5 to 6 in Table 6 provide indeed a

significant overall model improvement when adding a significant constraint.

<center>[INSERT TABLE 4, 5 AND 6 AROUND HERE]</center>

Hypotheses Tests

Hypothesis 1a predicts that entrepreneurs who experience supply constraints will identify an

increased number of opportunities at the supply side. The results do clearly support this

hypothesis, as a very significant positive relationship ($p<0.001$) is found for the relationship

between financial constraints and the identification of supply opportunities. In addition, supply

constraints, in the form of product and service constraints, reduce the tendency to identify

demand opportunities, thus supporting Hypothesis 1b.

Hypothesis 2a argues that demand constraints lead to identifying fewer opportunities from

supply sources. This hypothesis is supported: entrepreneurs experiencing customer relational

constraints appear to identify less supply opportunities. Its counterpart, hypothesis 2b is also

supported, as demand constraints and sales decreases show a positive relationship with demand

opportunities.

Among the controls, the results confirm that team diversity sometimes has a positive effect

on opportunity identification, namely on identifying demand opportunities (Hoegl, Gibbert, and

Mazursky 2008; Song and Parry 1997). The age of the firm may be interpreted as a proxy for the

entrepreneurial experience of the founder-owner – which is quite typical for SMEs. In contrast to

earlier studies that found a positive relationship between previous entrepreneurial experience and

the identification of opportunities (Baron 2004; Ucbasaran, Westhead, and Wright 2009), the

results do not show a relationship between age and the identification of opportunities from the

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two opportunity sources. In addition, the size of the company appears to have a positive effect of opportunity identification by entrepreneurs. The manufacturing context seems to increase the likelihood of identifying demand opportunities, but has no effect on identifying supply opportunities.

Discussion and Conclusion

This study joins recent efforts to explore more fine-grained explanations of the effect of resource constraints (Hoegl, Gibbert, and Mazursky 2008; Mellahi and Wilkinson 2010), and therefore related different types of constraints to different sources of opportunities. The results show that the entrepreneur's creativity, unleashed by the perceived constraints, addresses the constrained domain itself, rather than circumventing the constraints by focusing on opportunities outside the constrained domain.

The key contribution of this study to the literature on resource constraints is that resource constraints direct the attention of entrepreneurs toward opportunities related to the constraints they are experiencing. This effect could only be identified by relating different types of constraints to different sources of opportunities. As a consequence, a type-of-resources explanation (Mellahi and Wilkinson 2010) does not offer a complete explanation of the effect of resource constraints on opportunity identification. Instead, we find that one type of resource constraints can have both negative and positive effects on opportunity identification (see the rows in Table 5 and 6). The positive relationships between constraints and the number of identified opportunities are in line with earlier studies that observed that constraints can spur creativity (Goldenberg, Lehmann, and Mazursky 2001; Moreau and Dahl 2005) and that entrepreneurs see new opportunities when they experience resource constraints (Baker and

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Nelson 2005; Bradley, Wiklund and Shepherd 2011). However, as multiple studies already showed (e.g., Nohria and Gulati 1996; Voss, Sirdeshmukh, and Voss 2008), this study also demonstrates that constraints can have negative effects on identifying opportunities. For instance, in our results, customer relational constraints have a negative effect on identifying opportunities.

Similarly, the results show that only distinguishing between different sources of opportunities does not provide a complete explanation for the effect of resource constraints on opportunity identification. The results show that within one particular source of opportunities, constraints both increase and decrease the likelihood of identifying opportunities (see the columns in Table 5 and 6). Thus, only the combination of particular resource types with different opportunity sources gives a complete picture of the relationship between resource constraints and identified opportunities.

The effect of the relatedness of resource types and opportunities sources opens a new area of research on the effects of resource constraints. Existing studies have argued that entrepreneurs are attracted to opportunities that are in line with their available resources (Haynie, Shepherd, and McMullen 2009; Sarasvathy 2001; see also Audia and Goncalo 2007; March 1991). Our study presents an important additional insight: entrepreneurs are not only attracted to opportunities that are in line with their *available* resources, but also to opportunities that are in line with their resource *deficiencies*. Entrepreneurs appear to identify opportunities in a particular domain precisely because they perceive constraints in that domain (see Dahl and Moreau 2007; Gibbert and Scranton 2009; Moreau and Dahl 2005). This is an interesting specification of the bounded creativity approach (see Hoegl, Gibbert, and Mazursky 2008): the more constrained the entrepreneurs were, the more they tended to stay inside the 'problem box'. In our results, the

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relatedness argument explains all relationships between resource constraints and the number of identified opportunities, indicating that this explanation is indeed a powerful one. Thus, the relatedness argument may also explain many mixed findings regarding the relationship between resource constraints and innovation.

The demand opportunities in this study were related to opportunities which appear currently very interesting for entrepreneurs, namely sustainable opportunities. Societal concerns regarding climate change and degrading biodiversity create opportunities in the market that can be pursued by entrepreneurs (Patzelt and Shepherd 2011; Shepherd and Patzelt 2011). Moreover, entrepreneurs seem to become more interested in reducing environmental problems and making a positive contribution to the community (Dean and McMullen 2007; Marcus and Fremeth 2009). Recently, theoretical explanations for sustainable entrepreneurship have been proposed, but empirical work in this area is still scarce. This study contributes to this domain by showing how the resource constraints of entrepreneurs might impact their propensity to identify demand opportunities related to environmental sustainability concerns.

Implications for Practice

For practicing entrepreneurs, these results imply that constraints can have a positive role in small and medium-sized enterprises. Awareness of the fact that perceived difficulties spur creativity can help to create positive energy to overcome the existing constraints by identifying new opportunities. Proverbially, entrepreneurs should 'never waste a good crisis' to move away from mental 'paths of least resistance' (Moreau and Dahl 2005), stimulating them to identify innovative new products and services. This study observes that entrepreneurs have the tendency to identify opportunities that are related to the constrained domains. Awareness of this

mechanism can prevent that they miss out on promising opportunities that are unrelated to the perceived constraints.

Limitations and Future Research Directions

This study is not without limitations. First, the study design did not allow for controlling the entrepreneurs' engagement in experiential learning processes (Corbett 2005; Lumpkin and Lichtenstein 2005). As these learning processes are quite essential, more in-depth studies of the opportunity identification process under the condition of different constraints could rule out the effect of this antecedent as well. Second, part of the data on constraints was derived from the same data source (namely strategic sessions) as the dependent variables, meaning that the results may be subject to common method bias. We aimed to reduce this potential bias by using constraints that were derived from different data sources, such as the intake interview with the SME's CEO prior to the strategic session and the CEO survey. Thus, as a remedy for common method bias, temporal separation was applied and multiple data sources were used for the independent variables (Podsakoff et al. 2003; Podsakoff and Organ 1986). Moreover, a potential common method bias in the data would lead to more significant relationships between constraints and opportunities from the same data source. Since this is clearly not the case, we can conclude that common method variance is not substantial in our dataset.

In sum, this study explores relationships between particular types of resource constrains and the identification of entrepreneurial opportunities from different sources. The results show that this way of approaching the relationship between constraints and opportunity identification is promising, as this study highlights that resource constraints direct the entrepreneur's attention in

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identifying opportunities. Rather than circumventing the constraints, entrepreneurs appear to see new opportunities within the constrained area.

Acknowledgements

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Figure 1
Mapping Constraint Types to Opportunity Sources

Source of Opportunities

		Supply	*Demand*
Type of Constraints	*Supply*	Related: Identifying more opportunities (H1a)	Unrelated: Identifying fewer opportunities (H1b)
	Demand	Unrelated: Identifying fewer opportunities (H2a)	Related: Identifying more opportunities (H2b)

<div align="center">**Table 1. Sample Distribution across Size, Age and Industry**</div>

Characteristic	Number of Firms
Size (full-time equivalent employees)	
Micro companies (1-10 employees)	90 (41.1%)
Small companies (11-50 employees)	100 (45.7%)
Medium-sized companies (51-250 employees)	29 (13.2%)
Age (number of years)	
≤ 5 years	41 (18.7%)
6-10 years	29 (13.2%)
11-20 years	52 (23.7%)
≥ 21 years	97 (44.3%)
Industry	
Service industry	82 (37.5%)
Manufacturing	85 (38.8%)
Other industries	52 (23.7%)
Total	219 (100%)

<div align="center">**Table 2. Data Sources**</div>

Variables	Data Sources
Dependent variables	
Demand opportunities	Strategic conversation session with the venture's top management team.
Supply opportunities	
Independent variables	
Financial constraints, demand constraints and product or service constraints	Strategic conversation session with the venture's top management team.
Customer relational constraints	CEO interview
Sales decreases	CEO survey
Control variables	
Size, age and manufacturing dummy	CEO survey
Team diversity	Strategic conversation session with the venture's top management team.

Table 3. Coding of Opportunity Sources and Constraint Types

	Definition	Exemplary Quotes
Supply opportunities	Opportunities arising from changes in the value chain and the cooperation with other parties (Schumpeter 1934).	"There is a scarcity of suppliers which makes backward integration possible." "Cooperation with some other good performing regional companies can boost our reputation."
Demand opportunities	Opportunities arising from changes in the market demand caused by changing customer preferences related to preventing degradation of the natural and/or communal environment and help sustain this environment (Dean and McMullen 2007; Patzelt and Shepherd 2011).	"Corporate social responsibility is becoming increasingly important in the current economy, and we can anticipate this by using sustainable wood for our products." "The society is becoming more and more conscious about the environment. As such, using environmental friendly products for treating and washing clothes is an opportunity for our company."
Supply Constraints		
Financial constraints	Constraints related to the SME's finances, such as financial capacity, liquid assets and cash flow (Hoegl, Gibbert, and Mazursky 2008).	"[We have] a lack of finance because of a large debt caused by wrong investment choices." "The management of outgoing and ingoing payments is not optimal, which has consequences for our cash flow."
Product or service constraints	Constraints related to the SME's end product or service, such as product/service quality and product/service knowledge.	"We have insufficient knowledge about the product." "Our product does not completely fit the customer's needs."
Demand Constraints		
Demand constraints in general	Constraints related to abrupt changes in market demand (as a consequence of economic downturn), shrinking markets and reduced turnover.	"The economic downturn has hit the construction sector, in which we are operating, quite hard. As a result, our turnover is lowered." "We have lost a lot of demand as a result of the economic crisis. Our sales volume has decreased with 15%."
Customer relational constraints	Constraints related to relationships with clients, which are perceived as difficult or insufficient (Voss, Sirdeshmukh, and Voss 2008).	"The parents of the children observed that [the founder] was no longer providing the training, and they got disappointed. … This resulted in a substantial loss of customers." "At this moment, all efforts are directed towards keeping existing clients."

Table 4. Descriptive Statistics

	Mean	St. Dev.	1	2	3	4	5	6	7	8	9	10
1. Supply opportunities	0.62	0.67										
2. Demand opportunities	0.24	0.46	-0.07									
3. Financial constraints	0.12	0.33	0.19**	-0.09								
4. Product/service constraints	0.15	0.36	-0.01	-0.14*	-0.05							
5. Customer relational constraints	0.08	0.28	-0.10	-0.03	0.12	-0.04						
6. Demand constraints	0.13	0.33	-0.09	0.13*	0.13*	-0.02	0.07					
7. Sales decreases	-8.57	19.40	-0.03	0.14*	0.03	-0.15*	-0.10	0.03				
8. Firm age	25.77	25.11	0.08	0.14*	-0.05	-0.04	-0.11	0.04	0.18**			
9. Firm size	1.84	0.68	0.11	0.17**	-0.08	-0.08	-0.08	0.04	0.18**	0.40**		
10. Manufacturing dummy	0.38	0.49	0.02	0.24**	0.05	0.01	-0.05	0.07	0.09	0.23**	0.19**	
11. Team diversity	3.17	1.16	-0.03	0.16*	-0.12	0.08	-0.07	0.02	0.04	0.25**	0.21**	0.14*

Table 5. Overview of the Negative Binomial Regression Results (N=219) for Supply Opportunities

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Supply Constraints							
Financial constraints		0.612 (0.184)**	0.613 (0.184)**	0.658 (0.179)***	0.709 (0.193)***	0.667 (0.178)***	0.715 (0.195)***
Product/service constr.			0.011 (0.224)				-0.056 (0.221)
Demand Constraints							
Customer relational constr.				-0.557 (0.317)†	-0.559 (0.310)†	-0.603 (.300)*	-0.615 (0.292)*
Demand constraints					-0.255 (0.240)		-0.265 (0.239)
Sales decreases						-0.005 (0.003)	-0.005 (0.004)
Controls							
Firm age	-0.658 (0.252)	0.003 (0.003)	0.003 (0.003)	0.002 (0.003)	0.002 (0.003)	0.003 (0.003)	0.003 (0.003)
Firm size	0.002 (0.003)	0.193 (0.103)†	0.193 (0.103)†	0.195 (0.102)†	0.199 (0.102)†	0.213 (0.103)*	0.217 (0.104)*
Manufacturing dummy	0.164 (0.106)	-0.070 (0.150)	-0.071 (0.150)	-0.084 (0.149)	-0.072 (0.148)	-0.081 (0.149)	-0.065 (0.149)
Team diversity	-0.002 (0.152)	-0.034 (0.064)	-0.035 (0.064)	-0.040 (0.063)	-0.038 (0.063)	-0.044 (0.064)	-0.040 (0.064)
Constant	-0.658 (0.252)**	-0.875 (0.258)**	-0.876 (0.259)**	-0.811 (0.257)**	-0.808 (0.257)**	-0.882 (0.267)**	-0.880 (0.269)**
Likelihood Ratio Chi-square /df	4.319/4	13.986/5*	13.932/6*	17.925/6**	19.057/7**	19.419/7**	20.574/9*
Log Likelihood	-235.335	-233.345	-233.345	-232.520	-232.269	-232.204	-231.920

The coefficients are exponentiated betas. Standard errors are in parentheses.

† $p \leq 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 6. Overview of the Negative Binomial Regression Results (N=219) for Demand Opportunities

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Supply Constraints							
Financial constraints		-0.443 (0.524)					-0.620 (0.474)
Product/service constr.			-1.259 (0.477)**	-1.257 (0.477)**	-1.260 (0.492)*	-1.201 (0.489)*	-1.194 (0.482)*
Demand Constraints							
Customer relational constr.				0.070 (0.472)			0.068 (0.468)
Demand constraints					0.434 (0.257)†	0.454 (0.251)†	0.533 (0.250)*
Sales decreases						0.012 (0.007)†	0.013 (0.006)*
Controls							
Firm age	0.001 (0.005)	0.001 (0.005)	0.001 (0.005)	0.001 (0.005)	0.001 (0.005)	0.000 (0.005)	-0.000 (0.005)
Firm size	0.432 (0.201)*	0.421 (0.208)*	0.415 (0.197)*	0.417 (0.198)*	0.399 (0.196)*	0.378 (0.196)†	0.361 (0.205)†
Manufacturing dummy	0.899 (0.254)***	0.910 (0.255)***	0.944 (0.246)***	0.947 (0.245)***	0.946 (0.244)***	0.935 (0.245)***	0.943 (0.245)***
Team diversity	0.174 (0.109)	0.157 (0.108)	0.218 (0.105)	0.219 (0.106)	0.216 (0.104)	0.219 (0.106)*	0.194 (0.105)†
Constant	-3.335 (0.542)***	-3.219 (0.551)***	-3.345 (0.550)***	-3.361 (0.570)***	-3.371 (0.554)***	-3.246 (0.555)***	-3.082 (.572)***
Likelihood Ratio Chi-square /df	25.537/4***	26.133/5***	35.326/5***	35.182/6***	36.122/6***	38.083/7***	40.238/9***
Log Likelihood	-125.692	-125.375	-123.234	-123.227	-122.737	-121.962	-121.364

The coefficients are exponentiated betas. Standard errors are in parentheses.

† $p \leq 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$