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Elfi M. Lange, Karina Sopp

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Women's fault? Investigating the demand behaviour of founders and their access to venture capital

Elfi M. Lange* and Karina Sopp

TU Bergakademie Freiberg,
Schlossplatz 1, 09599 Freiberg, Germany
Email: Elfi.lange@bwl.tu-freiberg.de
Email: Karina.sopp@bwl.tu-freiberg.de
*Corresponding author

Abstract: Previous research has shown that venture capital is often not distributed equally among people of different genders. In addition to the supply side, however, the demand behaviour of founders must also be questioned. This study was conducted to investigate gender-specific demand behaviour related to venture capital distribution in the start-up seed phase and to examine the success rate of venture capital requests. The research is based on a quantitative survey of founders in Germany. Our results suggest that female founders approach even more venture capitalists than their male counterparts. It could not be proven that the success rate of venture capital requests depends on gender. Rather, entrepreneurial experience and the contact channel are decisive factors. The study results reveal positive developments in the women's venture capital demand behaviour. These results can be used as a basis for further political and economic measures to improve the ecosystem for female entrepreneurs.

Keywords: start-ups; gender differences; demand behaviour; entrepreneurship; female entrepreneurship; venture capital; requesting financing.

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Biographical notes: Elfi M. Lange is a PhD candidate at the Technical University Bergakademie Freiberg and focuses her research on the intersection of female entrepreneurship, finance, and entrepreneurship education. She has gained practical experience through employment in companies operating within the startup ecosystem.

Karina Sopp holds the Chair for Business Administration, especially entrepreneurship and business taxation at Technical University Bergakademie Freiberg. Furthermore, she is a Lecturer at the University of Vienna and the CEO of retria ESG reporting and analysis. Her research focus lies on taxation and reporting regulations, and she has published on these topics in numerous journals. She is a member of committees for the further development of taxation regulations and reporting regulations.

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1 Introduction

Research has already demonstrated the crucial role played by venture capital with respect to the growth and success of start-ups (Bertoni et al., 2011; Cavallo et al., 2019; Hellmann and Puri, 2000). Evidence exists that venture capital-backed companies perform better than non-venture capital-backed companies, especially in the early stages (Engel, 2002; Jeong et al., 2020). Various circumstances contribute to this aspect. On the one hand, start-ups receive substantial financial support through venture capital, which can be used for new investments and thus for growth. On the other hand, intangible assets (such as knowledge, networks) brought in by venture capitalists play an essential role as well (Hellmann and Puri, 2002; Sapienza, 1992). In this context, venture capital can also have a signal effect on third parties; therefore, it can generate trust. For example, this can have a positive impact on the acquisition of qualified employees (Bertoni et al., 2011; Engel, 2002) or create access to external networks (Bocken, 2015).

In the field of female entrepreneurship, studies have already demonstrated that female entrepreneurs face difficulties in accessing venture capital as compared to male founders (Greene et al., 2001; Kanze et al., 2018; Malmström et al., 2017). Some studies indicate that biased investors are the reason for the unequal gender[1] allocation of venture capital (Balachandra et al., 2017; Brooks et al., 2014; Malmström et al., 2017). In principle, this is not due to a conscious action by investors against female founders, but rather because of a hidden bias in which gender stereotypes and their perception have an effect (Balachandra et al., 2017; Malmström et al., 2017).

However, the question of whether gender per se makes access to venture capital more difficult remains controversial. Various scholars have indicated that this access is not necessarily the supply side – including access to capital from venture capital funds and business angels – but rather that the demand for venture capital is significantly lower among female entrepreneurs. Becker-Blease and Sohl (2007) investigated this issue regarding the angel investor market in the US and found that women were significantly less likely to approach angel investors than companies run by men. Kwapisz and Hechavarria (2018) pointed out that women in the US demanded less outside capital than male founders. Accordingly, one might conclude that women ask for less venture capital and thus they receive less, but this statement contradicts reports from female founders. Surveys conducted among founders revealed that female founders perceive challenges in accessing venture capital (Atomico, 2020; Hirschfeld et al., 2020). Based on this contradictory evidence from research previously carried out on female entrepreneurship, one may ask whether female founders in the early business stages are indeed less likely than male founders to ask for venture capital or whether access is indeed more difficult for female founders. Thereby, this study continues basic research on female demand behaviour, in which assumptions are often made that women do not ask for what they want and that, therefore, unequal treatment occurs (Babcock and Laschever, 2009).

To investigate this issue, a deliberate decision was made to confine the study to the seed phase of the companies. The seed phase describes ‘the state of a company when it has just been incorporated and its founders are developing their product or service’ (National Venture Capital Association, 2020). This decision was made because, at this stage, few financial figures are usually available that can influence the investment decision. Accordingly, investment decisions are more likely to be made based on other company or founding team characteristics (Bachher and Guild, 1996; Molnár and Jáki, 2020; Sudek, 2006). In the present study, we point out different investment criteria of

venture capitalists and discuss their relevance, which is considered as a controversial topic in academia.

By carrying out a survey of 90 start-ups, which include 241 founders, we attempted to determine whether female founders show different demand behaviour for venture capital than male founders in the seed phase of their company. We examined the success rate and the ratio of approached venture capitalists to funding commitments received in order to assess whether gender has an influence on the investment decision, or other previously discussed investment criteria provide the basis for a rejection or commitment. This enabled us to investigate the gender-specific demand behaviour with respect to venture capital, as well as the influence of this behaviour and other variables on investment commitments. The study findings provide us with a better understanding of the obstacles that female founders can face and their behaviour. These results can be used as a basis to specifically address challenges faced by female founders and to advance the currently stagnating development of the female start-up scene (Hirschfeld et al., 2019).

2 Literature review and development of hypotheses

2.1 Liberal and social feminist theory

In the literature, several theoretical explanations have been proposed to explain differences between challenges faced by female and male entrepreneurs. The liberal feminist theory assumes that all humans are equal; therefore, they have the same mental capacity and the same ability to think rationally (Fischer et al., 1993; Lowe and Bentson, 1984). This theory implies that women cannot realise their full potential because they experience overt discrimination or due to differences in systematic factors, such as their education or prior business experience (Fischer et al., 1993; Jaggar, 1983).

Social feminist theory argues that gender differences exist as a result of the different socialisation processes experienced by women and men (Fischer et al., 1993; Johnsen and McMahon, 2005). Thereby, men are expected to be highly assertive, independent, and self-confident (Eagly and Wood, 1991; Huq et al.; 2019). Women, on the other hand, are supposed to have more communal qualities, such as tenderness, selflessness, and interpersonal sensitivity (Eagly and Wood, 1991; Johnsen and McMahon, 2005). These differences lead them, for example, to take different approaches to running a business, which can then result in different outputs (Watson and Robinson, 2003). However, the theory assumes that they have equivalent self-perceptions, motivations, and belief structures (Fischer et al., 1993; Watson and Robinson, 2003).

Both theories can be applied to determine why women and men have different access to venture capital financing in the early start-up stages. Therefore, both theories function as the basis for the hypothesis development.

In this paper, we examine two aspects of venture capital financing: First, the rate at which female and male founders apply for venture capital and, second, the success rate on a gender-specific basis.

2.2 Demand behaviour of female entrepreneurs

If the demand behaviour of women in different disciplines is analysed and compared to that of men, no definite pattern can be discerned. In the context of this study, demand

behaviour is considered to describe the probability or frequency with which women and men request different aspects of the corporate environment (e.g., financing). Babcock and Laschever (2009) showed that women negotiate significantly less frequently than men and even that women are disadvantaged as compared to men when they initiate negotiations (Bowles et al., 2007). Some authors have attributed this behaviour to the socialisation of girls in our society and have argued that they are discouraged from putting their own interests first (Babcock and Laschever, 2009). In contrast, other authors have suggested that positive developments are taking place. Artz et al. (2018) described a positive development that contradicts the assumption that women demand less than men. In their research on pay raise, the authors found no significant difference between the likelihoods that women and men would ask for a pay raise. Leibbrandt and List (2015) supported this opinion, reporting no difference in wage negotiation behaviour when the participants are explicitly told that wage negotiations are permitted. These new findings challenge the basic assertion that women principally demand less than men.

If we examine the demand behaviour of women in the field of entrepreneurship, the current literature supports the hypothesis that women demand less financing than men. Many studies have already investigated the demand for bank loans to finance businesses, showing that women generally demand fewer bank loans than men and finance themselves more often by asking for personal loans from family and friends (Carrington, 2006; Coleman, 2000; Zimmermann Treichel and Scott, 2006). Sena et al. (2012) revealed that women perceive greater financial barriers, which may account for their reluctance to demand financial support. In a German survey conducted among founders, female founders also reported barriers to accessing start-up capital (Hirschfeld et al., 2020). However, a review of the literature on founders' demand behaviour, and specifically on behaviour related to the demand for start-up venture capital, shows that few studies have analysed this specific issue to date (Becker-Blease and Sohl, 2007; Kwapisz and Hechavarria, 2018).

In their study of angel portals in the U.S., as already mentioned, Becker-Blease and Sohl (2007) found that women submitted significantly fewer applications than male founders. Out of 6,263 applications, only 8.86% were from women-owned businesses.[2] However, the success rate ('ratio of the number of deals funded to the number of proposals […]') (Becker-Blease and Sohl, 2007) of applications submitted by men-owned and women-owned ventures are not significantly different. Therefore, the study by Becker-Blease and Sohl (2007) first has interesting implications, but only examined the business angel market and ignored venture capital funds, which nevertheless also play a significant role in financing the early stages of start-ups (Mayer et al., 2005).

Kwapisz and Hechavarría (2018) asked the question "Have financial institutions or other people been asked for funds for this new business?" to evaluate whether the demand behaviour of women differed from that of men. The results show that women asked less frequently for outside financing than male founders (taking into account the respective gender distribution in the sample). However, outside financing does not necessarily have to be linked to a specific request for venture capital; this study, therefore, did not provide precise information about our targeted research gap. If we examine the new developments in women's demand behaviour beyond the corporate finance area and ask whether the obstacles reported by female founders to finding funding really exist, we can hypothesise that women seek venture capital funding in the

same way as men. Therefore, we developed the following hypothesis to test this assumption:

Hypothesis 1a The demand behaviour of female and male founders for venture capital in the seed phase is similar.

The research in the field of entrepreneurship and, specifically, on financing a business, indicates that the success rate of female founders is worse than that of male founders (Amatucci and Sohl, 2004; Buttner and Rosen, 1988; Kanze et al., 2018; Malmström et al., 2017). Investor bias is often cited as the reason for this. Bias is a factor that can significantly influence the valuation of a start-up in the investment decision process; it is based on cognitive factors such as beliefs or overconfidence (Fama, 1998). Studies reveal that the bias factor strongly affects the investment and decision-making processes (Forrester, 2014). Therefore, the same information may be evaluated differently by various venture capitalists, who may then make different investment decisions (Sharma, 2015).

Buttner and Rosen (1988) have already shown that women are at a disadvantage as compared to male founders regarding financing their businesses, as the investors are often sceptical about their ability to run a business. Amatucci and Sohl (2004) conducted in-depth interviews, finding that female entrepreneurs have less access to informal venture capital (business angel) in the U.S. and identifying prejudices, e.g., about women's management skills. A Swedish study of 126 ventures that applied for government venture capital exposed how stereotypical biases influence venture capitalists' decisions (Malmström et al., 2017). Characteristics such as caution, risk aversion, reluctance to grow their own business, and lack of access that would enable them to engage in high growth were attributed to female founders, but none of these attributions could be confirmed by empirical data from the founded companies in the sample. These findings are even more surprising considering the fact that Swedish government venture capitalists now have to comply with the national and European equality regulations when making investment decisions (Malmström et al., 2017). Ahl and Malow (2012) indicated that the prejudices about female founders are generated by prominent male founders who serve as role models. Kanze et al. (2018) observed interactions among 140 venture capitalists and 189 founders in New York and found that the investors asked female and male founders different questions. While men were asked questions about the profit potentials of their company, women were more likely to be asked about their risk of loss.

Therefore, the literature shows that investors seem to display gender bias toward founders, even if venture capitalists do not consciously act on this, and that such bias can influence investment decisions. Therefore, we developed a second hypothesis:

Hypothesis 1b There is a negative relationship between the share of women in the team and the success rate in raising venture capital.

We could also hypothesise that gender is not a decisive factor that influences decisions made for or against an investment commitment. For example, the literature shows that the founders' experience (e.g., both industry and start-up experience) can have an influence (Franke et al., 2008; Hoenig and Henkel, 2015; Hsu, 2007; Macmillan et al., 1985; Tybejee and Bruno, 1984; Zhang, 2009).

2.3 Industry experience

The success rate was examined to determine the variable industry experience and to analyse whether this variable can place the influence of gender into perspective. A well-known quote in the venture capital sector is that 'Venture capitalists would rather invest in a grade A team with a grade B idea than in a grade B team with a grade A idea' (Bygrave, 1997). This quote indicates the founding team's relevance, as well as how their experience and characteristics influence the investors' investment decisions. However, various study authors have come to different conclusions regarding the relevance of this factor with respect to venture capital access. Hall and Hofer (1993) showed that the founding team characteristics do not play a significant role in the proposal screening and proposal assessment stage of the venture capitalists' decision-making process. Only the extremes of these characteristics influenced decisions. Zacharakis and Meyer (1998) supported this finding with their research and concluded that venture capitalists do not identify such team characteristics (including industry experience) as highly important, although this depends on how much information the investors have. The more information they have, the stronger the focus placed on the market rather than the team. However, recent research by Kim and Lee (2022) indicates that although venture capitalists take the industry experience into account, its relevance does not vary with increasing uncertainty (e.g., if the product is not complete yet, or it's a new market). Other studies found as well that venture capitalists consider the team's level of experience as highly relevant for and believe that it significantly influences access (Franke et al., 2008; Hoenig and Henkel, 2015; Macmillan et al., 1985; Tybejee and Bruno, 1984). Interestingly, Franke et al. (2008) found that venture capitalists do not assess the team as a whole based on its industry experience, but consider it as partly sufficient if only some team members possess this experience. Nonetheless, these studies did not conduct gender-specific analyses.

For the purpose of this research, we assumed that industry experience is a factor that significantly influences the search for venture capital, as the founders can demonstrate that they already are familiar with the market in which their company operates. Valuable contacts with employees, suppliers and customers may also already exist, and this could be interpreted as a positive signal for investors. We then developed a third hypothesis for our sample:

Hypothesis 2a There is a positive relationship between existing industry experience of the founders and the success rate in raising venture capital.

Various studies have been conducted to determine whether a gender-specific difference exists regarding this aspect. These studies show that women tend to have less industry experience in the sector in which their company operates than men when they start their companies (Robichaud et al., 2019; Fischer et al., 1993; Fairlie and Robb, 2009; Gottschalk and Niefert, 2013). Therefore, we also make these assumptions and developed a fourth hypothesis:

Hypothesis 2b There is a negative relationship between female founders and industry experience in the sector in which their company operates.

2.4 Entrepreneurial experience

A similar result is seen if the variable 'entrepreneurial experience' is analysed. Various studies have examined the influence of this variable on access to venture capital, if one or more team members have previously founded a company (Gompers et al., 2010; Hsu, 2007; Chambers et al., 1988; Zhang, 2009; Shane and Cable, 2002; Zaleski, 2011). Again, the findings are contradictory. Chambers et al. (1988) concluded that prior founding experience has no influence on access. Hsu (2007) and Zhang (2009), however, were able to prove that entrepreneurial experience increases the probability of receiving venture capital, although Zhang (2009) also pointed out that founders who have and have not previously founded a venture capital-backed start-up differ from one another. If a founder did not finance his or her previous company with venture capital, no quick access to venture capital – as well as no financially larger first round – could be proven. The observed advantage resulted from the already-existing connections to venture capital investors. This advantage was especially obvious for companies in the early stages. This study showed that entrepreneurs also learn from their experiences and can use the experience to finance their next venture. Shane and Cable (2002) provided evidence that social ties influence seed-stage financing decisions, concluding that these ties can give serial entrepreneurs an advantage over first-time founders. However, a differentiated analysis of differences or similarities based on the gender of the founders was also lacking.

In this study, we tested the assumption that entrepreneurial experience influences access to venture capital by developing a fifth hypothesis:

Hypothesis 3a There is a positive relationship between success rate in raising venture capital and the characteristic that founders have entrepreneurial experience.

A survey of 3,747 founders in Germany (Hirschfeld et al., 2019) revealed that significantly fewer serial founders are women than are men. Because of their low levels of entrepreneurial experience, women might lack important contacts and networks, as well as valuable experience. Similarly, the gender gap in entrepreneurship rates may mean that women are less likely to have entrepreneurship experience when seeking venture capital (Bruin et al., 2007; Shane, 2008). Similarly, Kuppuswamy and Mollick (2016) found that after experiencing a business failure, men are more likely to make a second attempt to build a business than women. This fact may also explain the different entrepreneurship rates. These findings led us to develop a sixth hypothesis.

Hypothesis 3b There is a negative relationship between female founders and the entrepreneurial experience.

2.5 Business model B2B vs. B2C vs. B2G

There is no generally accepted definition of the term business model (Morris et al., 2005). In our study, we focus more strongly on the customer group targeted by the company. Thus, in the survey, we distinguished between business-to-business (B2B), business-to-customer (B2C) and business-to-government (B2G) business models. In the B2B model, companies exclusively sell their products or services to other companies, while the companies directly interact with consumers in the B2C model (Kumar and Raheja, 2012).

In the B2G model, the company interacts with government or government-related companies as customers. In the survey, the models were subdivided into B2B, B2C and B2G for the sake of completeness, but many studies on venture capital don't differentiate between B2G and other models and usually emphasise B2B vs. B2C models. As already suspected based on prevailing literature, only an insignificant part of our sample is active in the B2G business model, which is why this field is not separately addressed in the further course of the paper. We focussed on the difference between B2B and B2C start-ups in this study.

The venture monitor for Q2 2020 by Pitchbook and NVCA shows that investors are more likely to invest in B2B start-ups, especially in the seed stage. This report states that a noticeable decline in investments is observed in B2C business models, especially in the early stages of the company (Tarhuni et al., 2020). A recent report on the German start-up scene also revealed a growing interest by investors in new B2B business models (Ernst and Young, 2020). This raises the question of why there is more investment in B2B start-ups than in B2C start-ups. Some authors have argued that market entry into the B2B market requires more time, since the entry barriers are higher than those into the B2C market. However, once the company has entered the market, it becomes more difficult for other competitors to enter (Streletzki and Schulte, 2012). However, Streletzki and Schulte (2012) contradicted the investors' current focus on B2B start-ups, showing that companies that focus on the B2C segment are more likely to achieve a high-flyer exit than companies that focus on the B2B segment or a combination of both. Although no clear explanation is available for why venture capitalists currently tend to focus on B2B start-ups, nevertheless, we referred to the currently observed preferences of venture capitalists when developing the seventh hypothesis:

Hypothesis 4a There is a positive relationship between the success rate in raising venture capital and the company's focus on a B2B business model.

If the business model is relevant to venture capitalists, we might ask whether the business model chosen by the founders influences the funding success rate more or less strongly than the gender of the founders. Another report revealed that women tend to focus more on B2C business models, while male founders are more likely to establish B2B business models (Hirschfeld et al., 2020). For this reason, we developed the following hypothesis:

Hypothesis 4b There is a negative relationship between female founders and the focus on a B2B business model.

2.6 Network/contact channel used

The network of founders can also play a decisive role in accessing venture capital as well as accessing customers or potential business partners (Baron and Markman, 2000; Hsu, 2007). Founders can benefit from direct, as well as indirect ties (Shane and Cable, 2002). Indirect social ties are relationships between two individuals who are connected only by a third person in their social network (Burt, 1987; Zuo et al., 2016). The advantage through direct or indirect ties can be justified by the fact that pre-existing social connections might give a venture capitalist access to private, exclusive information, which are meaningful in the case of high uncertainty and information asymmetry (Shane and Cable, 2002). Therefore, indirect or direct contacts can increase the likelihood that founders will

receive funding and increase the company's valuation (Hsu, 2007; Shane and Stuart, 2002). Consequently, we derive the following hypothesis:

Hypothesis 5a There is a positive relationship in the usage of the founder's own network for contacting venture capitalists and the success rate in raising venture capital.

Studies show that male founders in particular, have access to crucial network contacts with investors, while women are often excluded from these networks (Brush et al., 2004). Contrasting results were found in a study of female entrepreneurs in Jordan. In this study, the female founders established business ties and used them primarily to acquire financing from formal sources in the early start-up stage (Alakaleek and Cooper, 2017). However, since the present study was conducted in Germany and the literature show that women in Western societies usually tend to have smaller networks (Brush et al., 2004; Coleman and Robb, 2011), we take this perspective for the development of the hypothesis. Therefore, we hypothesise the following:

Hypothesis 5b There is a negative relationship in the usage of the founder's own network for contacting venture capitalists and female founders.

3 Methodology

3.1 Data source and sample

To detect differences in demand behaviour related to venture capital in the start-up seed phase and to test the hypotheses presented, founders were surveyed throughout Germany. Data was gathered by conducting an online survey between February and August 2021. The survey was shared on social media networks. Start-up networks all over Germany were also contacted and asked to distribute the link to the survey in their spheres of influence. The survey asked whether the start-up was founded in Germany, and all start-ups participating in the survey answered yes to this question. Accordingly, our sample refers exclusively to the German start-up landscape. When addressing the start-up networks and distributing the survey via social media networks, we always pointed out that one founding member could answer the questions on behalf of the entire start-up in order to prevent multiple representatives of a single start-up from participating, as this would skew the results.

Overall, 90 completed surveys were collected; these 90 responses represent 90 different start-ups, as only one respondent per company was explicitly requested. These 90 start-ups include 241 founders. Of these, 46 were female founders, representing 19.09% of the founders surveyed. This value corresponds relatively closely to the German start-up average, which was 15.9% in 2020 (Kollmann, et al., 2020). Thus, the sample reflects the distribution of female and male founders in Germany effectively. This could indicate that non-respondent bias does not affect these study results (Armstrong and Overton, 1977). An analysis of the team structure of the start-ups revealed 53 male-only teams, 22 mixed teams, and 15 female-only teams. All respondents stated that they had founded their company in Germany.

3.2 Description of variables

3.2.1 Dependent variables

We developed various questions to map the process of a venture capital investment and to collect detailed information about the demand behaviour of founders as well as the supply behaviour of investors (Metrick and Yasuda, 2011; Mitteness et al., 2012). The *number of venture capitalists approached* was used to determine the founders' demand behaviour.

The number of venture capitalists approached was then related to the *number of financing offers received* to measure the founders' success rate while seeking venture capital and to test the hypotheses. In this step, venture capital funds as well as business angels were considered as venture capitalists.

3.2.2 Independent variables

- Gender: The first independent variable was established as the founder's gender. However, most start-ups are founded by a team of individuals. It was important to analyse the team as a whole, as this is also what most venture capitalists do when making decisions (Macmillan et al., 1985). The variable, therefore, was not coded as one for a female founder and zero for mixed teams and male teams, as Lins and Lutz (2016) did in their study; instead, the variable was analysed in two different ways. First, the teams were divided into male, mixed (at least one male and one female founder), and female teams to perform a t-test. In order to carry out linear regression, the number of women in the team was related to the team size, which was expressed with the variable 'female quota'.

  To determine whether the gender of the individual influenced access to the venture capital or whether the experience and skills that prevailed in the team influenced this access, the results were also examined on the basis of the variables industry experience and start-up experience.

- Industry experience: Different approaches are described in the literature to measure the variable industry experience. For example, Gottschalk and Niefert (2013) only looked at the most experienced founder of the team and logarithmised these values. Fischer et al. (1993) also considered only one founder who was responsible for managing the firm's strategic direction, rather than taking all team members into account in the analysis. However, we assumed that the team as a whole was considered by the investors. Therefore, the industry experience, which refers to the founders' full-time work experience in the industry in which the start-up operates, was recorded per founder in years. This information was summed up for each team. The resulting value represented the total team experience.

- Entrepreneurial experience: Following the approach of Kwapisz and Hechavarria (2018), we measured the variable start-up experience as the total number of start-ups previously established by the founders. When testing the hypotheses, the total number of start-ups established by the team was considered.

- Focus B2B business model: We also investigated whether the founders' focus the B2B business model could explain the decision made to provide the start-up with

venture capital. Based on the survey by Hirschfeld et al. (2020), participants were asked to rank the customer shares in their business model as a percentage. The business models B2B, B2C, or B2G could be selected. To determine whether investors tended to invest in B2B business models, the share of revenue-generating customer groups of the turnover was used.

- Contact channel used: To capture the contact channel used when approaching venture capitalists, the founders surveyed had predefined categories, which were: Direct contact, contact via accelerators or incubators, websites, social networks (e.g., LinkedIn, Xing), investors event/start-up event, or others (free text). Multiple answers were possible, if different channels were used. The variable is coded 0/1.

4 Results

4.1 Tests of hypotheses

Two different statistical procedures were carried out to test the demand behaviour. First, the teams were divided into male, mixed, and female teams, and t-tests were conducted to compare these different study groups. Table 1 shows that, on average, male teams requested 20.63, mixed teams 24.94 and female teams 66.88 venture capital investors. The t-test results show that the differences between male (p = 0.047) and mixed teams (p = 0.024) as compared to female teams are significant. We also ran a linear regression analysis of the female quota to further examine this variable for relationships. Table 2 demonstrates that the relationship displays a significant positive correlation between the increasing female quota and the number of venture capitalists approached (β = 0.285; p = 0.018). Therefore, the results indicate that women are not more reluctant to request venture capital in the seed phase than male founders. The female founders in our sample displayed the opposite behaviour and requested more venture capitalists than the male founders. Therefore, *hypothesis* 1a is rejected, as women and men in our sample did not show the same demand behaviour as initially hypothesised. The women in our study invested significantly more effort in the search for venture capital than men did.

Table 1 Results of the independent t-test

		Approached VCs in the seed phase			*Total sum of financing offers*			*Success rate*		
	n	*Mean*	*One-sided*	*Two-sided*	*Mean*	*One-sided*	*Two-sided*	*Mean*	*One-sided*	*Two-sided*
Mixed	18	24.94	0.29	0.581	3.0278	0.384	0.768	0.6305	0.178	0.357
Male	41	20.63			2.7561			0.3975		
Male	41	20.63	0.024	0.047	2.7561	0.243	0.486	0.3975	0.00	0.00
Female	9	66.88			2.0000			0.0308		
Female	9	66.88	0.012	0.024	2.0000	0.222	0.443	0.0308	0.01	0.021
Mixed	18	24.94			3.0278			0.6305		

Table 2 Regression results for the independent variable 'female quota'

Independent → dependent variable	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*
Female quota → industry experience	–0.223 (p = 0.067)				
Female quota → entrepreneurial experience		–0.582 (p = 0.001)			
Female quota → focus b2b business model			–0.223 (p = 0.067)		
Female quota → approached VCs				0.285 (p = 0.018)	
Female quota → financing offers					–0.112 (p = 0.363)
R^2	0.05	0.338	0.05	0.081	0.013
R^2 adj.	0.035	0.328	0.036	0.067	–0.002
F	3.461	33.726	3.469	5.846	0.838

After showing that women's demand behaviour was no more restrained than that of male founders and concluding that this could not be the reason for low amounts of funding, we examined the success rate. First, we scrutinised the number of funding offers and compared these again by dividing this number into male, mixed, and female teams, and t-tests were conducted to compare these different study groups. No significant differences could be found. Therefore, the results show that female teams did not receive significantly fewer funding offers than male and mixed teams. The linear regression analysis using the women's quota also did not reveal significant results. However, because the women in our study requested significantly more venture capitalists, it is surprising that they did not receive significantly more funding offers. This result led us to examine the success rate regarding the relationship between the number of venture capitalists approached and the number of financing offers received. The t-test results reveal significant differences between the male and female teams ($p = 0.00$) as well as between the mixed and female teams ($p = 0.021$). However, when considering the variable gender in the multivariate model with the dependent variable success rate applying a linear regression, no negative relationship is provable. Therefore, we cannot confirm hypothesis 1b either. Accordingly, female founders asked venture capitalists more often, but the lower success rate does not seem to be due to the gender of the founder.

The literature review results revealed that other variables can influence the financing decisions made by venture capitalists. To avoid making a spurious correlation, we examined the variable success rate with respect to other factors. First, we examined the influence of industry experience in the team on the success rate. In our sample, no significant relationship between these two variables was found; therefore, our findings do not support hypothesis 2a, which assumed a positive relationship between these two variables. Hence, our results are more similar to those of Hall and Hofer (1993) and Zacharakis and Meyer (1998) who did not assign much importance to industry experience in venture capitalists' decision-making. In our sample, we found a significant negative

relationship between the female quota and the amount of industry experience ($\beta = –0.223$; $p = 0.067$); therefore, hypothesis 2b is supported by our findings. These two findings indicate that the women's low level of industry experience did not influence their low success rate. Our results confirm those of previous research, showing that the women in our sample had less industry experience when they set up the business and sought financing. However, we considered the team as a whole when testing our hypotheses. Since women tend to start businesses in small teams (Gottschalk and Niefert, 2013; Hischfeld et al., 2020; Kuschel et al., 2018), it is logical that they display lower levels of industry experience in the seed phase.

Analysing entrepreneurial experience in the multivariate model, we have been able to demonstrate a positive relationship between this variable and the success rate. Therefore, our findings support hypothesis 3a ($\beta = –0.219$; $p = 0.062$). We then asked whether the women's teams had less entrepreneurial experience than the men's teams. Hypothesis 3b was supported by our results, because a negative correlation was found between the variable female quota and entrepreneurial experience ($\beta = –0.582$; $p = 0.001$). Like Hsu (2007), Shane and Cable (2002), and Zhang (2009), our results show a significant relationship between entrepreneurial experience and success rate. We therefore hypothesise that this negative correlation may likely be a reason why female teams are less successful in seeking venture capital.

For the variable business model, no relationship was identified between the favoured use of a B2B model and the success rate of venture capital financing; therefore, no support for hypothesis 4a was found. As mentioned above, the B2G business model was also considered in the survey; however, only 8 out of 90 start-ups reported having government or government-related companies as a customer group. No start-up had customers that were exclusively government or government-related companies. Due to the low relevance of this model in the sample, we only investigated whether the company's focus on a B2B business model had a positive effect on the venture capital financing success rate. Although no support for hypothesis 4a was found, we examined whether woman-led start-ups are more likely to favour a B2C business model than their male counterparts. The linear regression results indicate a significant negative relationship between the proportion of women in the founding team and the proportion of business customers as a profit-generating customer group in the company's business model ($\beta = –0.223$; $p = 0.067$). These findings confirm those of Hirschfeld et al. (2020), i.e., that women are more likely to establish B2C business models. However, our findings do not allow us to conclude that this focus negatively impacts the venture capital financing success rate.

When examining the contact channels used, no positive relationship between the use of the founders' own network and the success rate could be demonstrated. Our results therefore do not support hypothesis 5a. However, we were able to reveal that the contact channels 'accelerator/incubator' and 'social networks' show a negative relationship with the success rate.

Analysing the contact channels using a binary logistic regression, we could not prove that female founders used their network less than male founders when approaching venture capitalists. Therefore, Hypothesis 5b was not supported by our results. However, we were able to show that women increasingly use websites as a communication channel in addition to their personal network ($p = 0.060$).

Table 3 Regression results for the dependent variable 'success rate'

Independent → dependent	*Model 1 (univariat)*	*Model 2 (univariat)*	*Model 3 (univariat)*	*Model 4 (univariat)*	*Model 5 (univariat)*	*Model 6 (univariat)*	*Model 7 (univariat)*	*Model 8 (univariat)*	*Model 9 (univariat)*	*Model 10 (multivariat)*
Female quota → success rate	–0.227 (p = 0.063)									–0.045 (p = 0.752)
Industry experience → success rate		0.126 (p = 0.304)								–0.003 (p = 0.920)
Entrepreneurial experience → success rate			0.192 (p = 0.116)							0.219 (p = 0.062)
Focus B2B business model → success rate				0.058 (p = 0.638)						–0.007 (p = 0.958)
Channel: websites → success rate					–0.276 (p = 0.002)					–0.134 (p = 0.182)
Channel: personal network → success rate						–0.113 (p = 0.386)				0.120 (p = 0.371)
Channel: startup event → success rate							–0.20 (p = 0.020)			–0.079 (p = 0.354)
Channel: accelerator → success rate								–0.132 (p = 0.115)		–0.153 (p = 0.067)
Channel: social networks → success rate									–0.258 (p = 0.002)	–0.197 (p = 0.035)
Control variable: team size → success rate										–0.066 (p = 0.177)
R^2	0.051	0.016	0.037	0.003	0.135	0.011	0.080	0.037	0.136	0.300
R^2 adj.	0.037	0.001	0.022	–0.012	0.122	–0.004	0.066	0.023	0.123	0.177
F	3.583 (p = 0.063)	1.072 (p = 0.304)	2.538 (p = 0.116)	0.224 (p = 0.638)	10.319 (p = 0.002)	0.762 (p = 0.386)	5.7060 (p = 0.20)	2.553 (p = 0.115)	10.403 (p = 0.002)	2.446 (p = 0.017)

Table 4 Binary logistic regression for the independent variable 'female quota'

Independent → dependent variable	*B*	*S.E.*	*Wald*	*Sig.*	*Exp(B)*
Female quota → usage of websites	1.385	0.735	3.549	0.060	3.997
Female quota → own network	1.370	1.446	0.898	0.343	3.934
Female quota → start-up event	0.666	0.762	0.762	0.383	1.946
Female quota → contact through accelerator/incubators	0.071	0.695	0.01	0.919	1.073
Female quota → social networks	1.056	0.712	2.198	0.138	2.875

Table 5 Correlation matrix

		I	*II*	*III*	*IV*	*V*	*VI*	*VII*
1	Female quota	1						
2	Industry experience	–0.243 (p = 0.021)	1					
3	Entrepreneurial experience	–0.408 (p = 0.001)	0.075 (p = 0.485)	1				
4	Focus B2B	–0.222 (p = 0.036)	0.180 (p = 0.089)	0.144 (p = 0.174)	1			
5	Approached VCs	0.285 (p = 0.018)	–0.211 (p = 0.085)	–0.336 (p = 0.005)	–0.032 (p = 0.798)	1		
6	Financing offers	–0.146 (p = 0.170)	0.003 (p = 0.978)	–0.008 (p = 0.941)	0.107 (p = 0.316)	0.347 (p = 0.004)	1	
7	Success rate	–0.227 (p = 0.063)	0.126 (p = 0.304)	0.192 (p = 0.116)	0.058 (p = 0.638)	–0.621 (p = 0.001)	0.284 (p = 0.019)	1

5 Conclusions

The study results support the hypothesis that women's demand behaviour shows a positive development, as has already been demonstrated in other studies (Artz et al., 2018; Bongiorno et al., 2014). Furthermore, the women in our sample made more enquiries to venture capitalists than male founders. These findings challenge those of previous studies, which suggest that women do not ask for what they want. However, even though female founders demanded more financing, they did not receive significantly more venture capital funding offers.

Looking at the results of our study, it might be argued that this was not due to gender per se but to differences in entrepreneurial experiences. In addition, we were able to identify that different contact channels seem to lead to different success rates. Even though we were not able to follow the previous literature, which attributes a higher success rate in accessing venture capital to the entrepreneur's own network (Hsu, 2007; Shane and Cable, 2002), we were able to show that, for example, the acquisition of

venture capital via social networks is less successful. These findings are of importance in terms of how founders can gain better access to venture capital. Since this already starts with the right choice of the communication channel.

Nevertheless, the results raise a number of questions. First, was the quality of the applications the same? Research suggests, for example, that entrepreneurs should be well prepared and organised when approaching venture capitalists (Swartz et al., 2016). Therefore, the chosen communication channel might also be related to the quality of the application. Answering this question, however, was not within the scope of our study. Second, were additional variables responsible for the rejection of requests? In our research, we examined the contingency factors of industry experience, start-up experience and the business model used. The industry sector, market size, or unique nature of the product or service also play roles in investor decisions and could have been reasons for rejection (Golis et al., 2009; Hall and Hofer, 1993). Third, did venture capitalists make their decisions in the same ways or by following the same process? In this study, we only asked how many venture capital funds and business angels were approached, rather than explicitly which ones, so no real comparison could be made among them. Other researchers have shown that different venture capitalists apply different decision criteria (Macmillan et al., 1985). Therefore, this field also offers the possibility for further research. Further limitations of our research were the sample size and the distribution through social networks sites. There is no randomisation in the use of social network sites and therefore the data derived from users is biased towards certain demographic groups (Hargittai, 2015). As stated before, to counteract this bias, the survey was not only shared on social network sites but further distributed through local and nationwide start-up networks.

In conclusion, the results of this study provide interesting indications about the demand behaviour of female founders, but the study should be repeated with a larger sample and possibly more variables (such as age of the company when requesting financing or industry sector). It may also be advisable to strengthen the validity with qualitative results (e.g., focus groups or expert interviews) in order to gain better insight into the process of requesting and being reviewed for venture capital from the founders' point of view and to identify differences. Nonetheless, our finding that women have a lower success rate than male founders fits the prevailing picture in venture capital research, which reveals that female founders have difficulties obtaining this form of financing (Greene et al., 2001; Kanze et al., 2018; Malmström et al., 2017). However, the picture needs to be drawn wider, and differences between the genders need to be addressed and highlighted, for example, in support programs for founders. These findings can also create awareness on the part of venture capitalists to assign more attention to different contact channels.

One last aspect of note is that the survey was conducted in 2021. Founders who had begun to look for venture capital only right before the survey was carried out might have been negatively affected by the investors' restraint. Especially in the seed phase, a significant decline in venture capital investments was observed in 2021 (Bellavitis et al., 2021).

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Notes

1 Please note: In the context of this paper, only the genders woman and man were examined for their similarities and differences. Of course, it should be pointed out that gender should not be considered only binary.

2 The US Department of Commerce reported that 29.6% of firms were women-owned in 2007 (US Department of Commerce, 2014).