

Female entrepreneurial experience in a male-dominated space

“YOU'RE TOO EARLY, COME BACK IN A YEAR”



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Rachel Bwatou
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How do female entrepreneurs of technology-based firms experience their 'male-dominated' work environment, what are the obstacles they encounter and how do they deal with it?

Author

Rachel Bwatou

Student number 6617921

HUMAN GEOGRAPHY MASTER PROGRAMME 2019/2020

Economic Geography – Business & Location

Supervisor

Dr. Ilse van Liempt

Universiteit Utrecht, Faculty of Geosciences

Human Geography and Spatial Planning, Urban Geography

i.c.vanliempt@uu.nl

7 august 2020



Universiteit Utrecht

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INTRODUCTION.

"I am focused on building my business. Of course, its rather silly to hear a comment such as: "do you understand all this tech stuff yourself as well?", but I laugh about it and don't care. Being a female entrepreneur has advantages as well. You're invited when they wish to hear the female perspective of leadership etc." *Janneke van den Heuvel, Try Likes' co-founder*¹

The citation above illustrates the contradictory experiences of female entrepreneurs and their specific challenges as entrepreneurs of new technology-based firms (hereafter NTBFs). This research defines female entrepreneurs as individuals who recognise and exploit new business opportunities by founding new ventures (Baron, 2008; Shane & Venkataraman, 2000). NTBFs gained growing interest from government, industry and research for its potential contribution to a country economy (Audretsch, 1995; Bertoni, Colombo and Grilli, 2011). Nevertheless, the rate of female entrepreneurs remains significantly lower in comparison to their male counterparts (Minniti et al., 2004). In information and communications technology (ICT), men are more than twice as likely as women to become an entrepreneur (Elam et al., 2019). So, within the context of technology, it is even more difficult for women to become entrepreneurs (Fisher, 2010; Lounsbury and Glynn 2001; Marlow and McAdam, 2013a; Navis and Glynn, 2011). According to Audretsch (1995), NTBFs are a great source of new job development. Kantis et al. (2002) summarised NTBFs contributions in the economy in four effects: helping in converting innovative ideas into economic opportunities, generating competitiveness, creating employment (see also Audretsch, 1995) and increasing productivity. In this study, NTBFs are firms which are (1) independently owned, (2) less than 25 years old, and (3) operating in a high-tech or knowledge-intensive industry (Ganotakis, 2012). Studies (e.g. Kesting and Jaeger, 2013; Verheul, Caree and Thurik, 2009; Cooper, Hampton and McGowan, 2009) have stated that it is difficult for women to become an entrepreneur because the sector is male-dominated. Since the technology sector is traditionally male-dominated (Kesting and Jaeger, 2013; Verheul, Caree and Thurik, 2009; Cooper, Hampton and McGowan, 2009) this research questions to what extent this contributes to the difficulties women experience setting up firms and/or if there are other factors.

Dautzenberg (2012) investigated female NTBFs in Germany and confirmed the gender gap in the technology industry. This study credited the gender gap in the high field technology due to men's possession of knowledge in the field of natural sciences, technology or engineering and their ability to accumulate capital required in these businesses more so than their female counterparts (Dautzenberg,

¹ See B-buildingbusiness (2019) for the full interview with Janneke van den heuvel.

2012). Zapata-Huamaní et al. (2019) explore the role of gender in setting up NTBFs and whether this role differs across developed and emerging countries, and also found out that being a woman and setting up a technology-based firm have a negative relationship. Zapata-Huamaní et al. (2019) attributed this negative relationship to stereotyping women as a 'riskier' investment, the assumption of more family responsibilities, while also having less access to financing and the absence of role model leadership (Zapata-Huamaní et al. 2019). Similarly, Marlow and McAdam (2012, 2013b) reported that women face gender-related barriers that hinder their progress, such as access to social capital. Possible explanations are that women find themselves in a heavily male-dominated work environment where most of those with whom they network are men (Cooper, Hampton and McGowan, 2009; Barrios and Albizu, 2015). Additionally, this is potentially compounded by women not having gained significant managerial or work experience in the technology sector and that prevents them from accumulating the necessary networks and relationships (Mayer, 2008). Also, women's networks are perceived to be less influential than 'old boys' networks because male norms are traditionally seen as standard and feminine traits are opposites and submissive to this (Ahl, 2004).

Interestingly, the literature focuses on explaining the gender gap but seems to overlook women's own experiences and potential ways of how women overcome the deficit (Kuschel et al. 2016). For instance, most studies use secondary data (e.g. Dautzenberg, 2012; Zapata-Huamaní et al. 2019; Marlow and McAdam (2012, 2013b), meaning there are little to no first-hand entrepreneurial experiences of female entrepreneurs of NTBFs, especially in the Netherlands.

Looking at the literature, three main obstacles in Western countries, primarily North America and the countries of the European Union can be identified (Zapata-Huamaní et al., 2019; and Dautzenberg, 2012; Marlow and McAdam; 2012, 2013b; Bruin et al., 2004): 1) **the socio-cultural status of women** ; (2) **access to information/social capital**; and (3) **assistance and access to capital**. When women face one or several of those challenges, then a barrier arises for female participation in setting up NTBFs (Robb, Coleman, and Stangler, 2014; Gottschalk and Niefert, 2013; Marlow and McAdam (2012, 2013b); Kobeissi, 2010; Fairlie and Robb 2009; Verheul, Caree and Thurik, 2009 and Autio et al., 1997). This research aims to explore female business owners of NTBFs' own entrepreneurial experiences and strategies of how to deal with it by raising the following question:

How do female entrepreneurs of technology-based firms experience their 'male-dominated' work environment, what are the obstacles they encounter and how do they deal with it?

Scientific and societal relevance

Given the current literature, women in male-dominated industries face a plethora of obstacles. This research makes at least three contributions. First, this research

aims to provide insight into the role of gender in setting up NTBFs and to what extent those challenges have an influence on female entrepreneurs in choosing the technology sector. Second, the finding of this study will add to the knowledge about women's own experiences of these barriers. Few studies explore female owners of NTBFs; most of the information is gained through quantitative studies and always in comparison with male entrepreneurs. This research will contribute to the literature by giving first-hand entrepreneurial experiences on understanding the particular subgroup of female entrepreneurs who start and run technology-based firms. Most studies on female entrepreneurship in comparison with male entrepreneurship studies give less information on specific industry (Henry et al., 2016). So, this study will add knowledge about how female entrepreneurs experience the high technology fields by clarifying the challenges they face as a minority. Most studies in this area (Dautzenberg, 2012; Cooper, Hampton and McGowan, 2009; Bruin et al. 2005; Verheul, Caree and Thurik, 2009; Carter and Shaw 2006; and Mayer, 2008) do not discuss how female entrepreneurs in the high technology sector deal with the obstacles they encounter and find solutions. Through this study, I aim to contribute to the findings on how female entrepreneurs cope with the gendered obstacles within this sector.

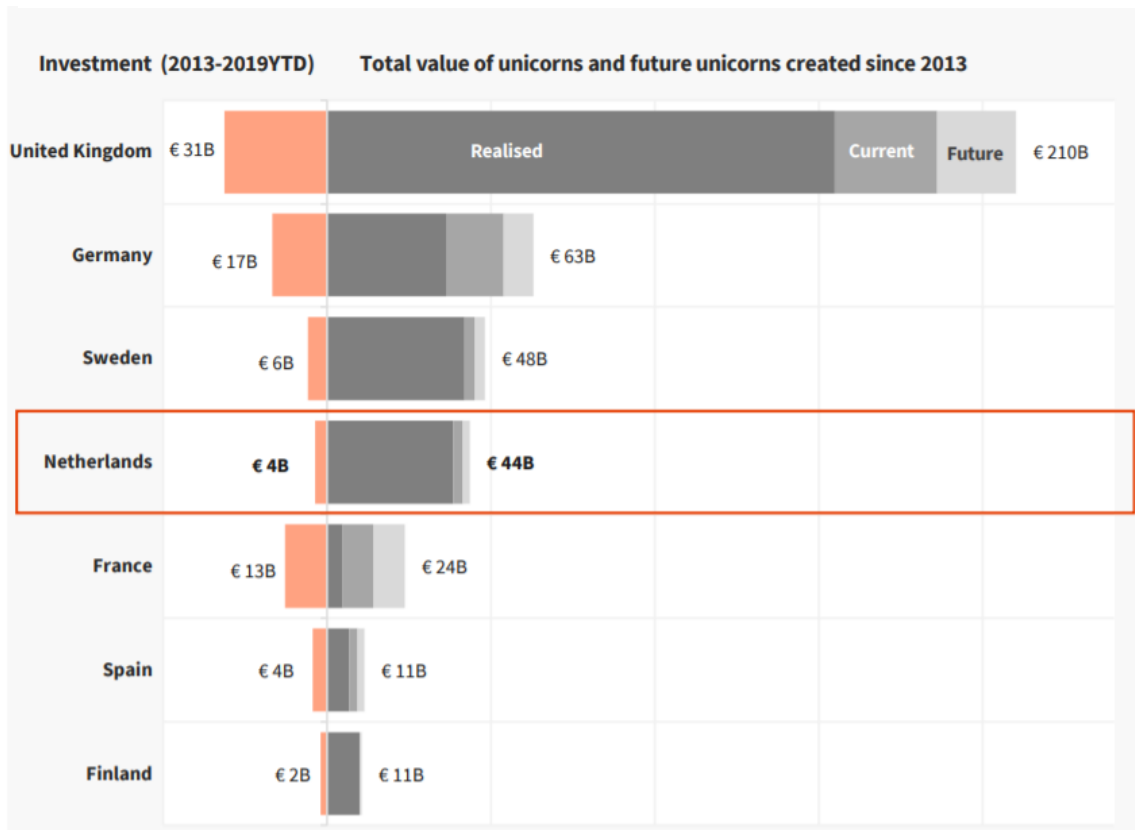
A recent review of the literature revealed that there is limited research on NTBFs run by females (Kuschel et al. 2016). So, a better understanding of the experienced obstacles, and how female entrepreneurs cope, will identify ways in which upcoming female entrepreneurs could engage in the technology sector. Also, policymakers may learn from the experience of these women to develop a better environment for female start-ups in technology in the Netherlands.

The remainder of this thesis is organised as follows. First, the country context of this study is described. Then, an exploration of the existing literature regarding obstacles women face as entrepreneurs, especially in a male-dominated work environment (high technology field) will be elaborated. Following, the data collection process will be explained. Additionally, a presentation of the methods in which the methodology developed for the analyses is explained and justified. Fourth, the results will be discussed. Then, the conclusion part will give answers to the research question, as well as insights into the literary contributions of this thesis. To conclude, this research ends with a discussion chapter.

COUNTRY CONTEXT.

As previously mentioned, the technology sector is, by a wide margin, a male-dominated industry. The Netherlands has a vibrant entrepreneurial legacy. The technology sector drives the start-up ecosystem. According to a study by Dealroom.co in collaboration with TechLeapNL and CBRE (2009), the Dutch Tech Ecosystem has over 4,300 tech companies and created 108,000 jobs in the Netherlands alone. In recent years those tech companies created 19,700 jobs, making the start-ups scene the fastest-growing job engine in the Netherlands (Dealroom.co, TechLeap.NL, & CBRE, 2019). Since the Dutch tech ecosystem has created a value of 44 billion euros, this value makes the Netherlands fourth-ranked in Europe, after the United Kingdom, Germany and Sweden (figure 1).

Figure 1 The Dutch tech ecosystem in comparison with other EU-countries



Source: Dealroom.co, TechLeap.NL, & CBRE, 2019

In the same report, it is stated that only 19% of start-ups are venture-backed. An explanation for this is that, not every start-up needs venture capital as they are profitable, and some founders prefer to stay independent (Dealroom.co, TechLeap.NL, & CBRE, 2019). Another characteristic of the 4,300 Dutch tech companies in the Netherlands is the number of employees; 55% of tech companies have 2-10 employees or less (Dealroom.co, TechLeap.NL, & CBRE, 2019). TechLeap.NL analysed about 1,600 start-ups and found out that 11,6% (274) of the tech companies have female founders. The tech companies with female

founders employ over 3,900 people. At the same time, between 2008 and 2019, only 5.7% of Dutch venture capital invested their money into start-ups with a female co-entrepreneur (Techleap, 2019). Therefore, the female entrepreneurs rely more on corporates, angels and crowdfunding. Niessen and de Mol (2018) analysed forty investment funds of the Netherlands. The research showed that in 2008, only 1.6% of the capital invested in start-ups went to tech companies with women as a founder. The study confirmed the image of male dominance in the tech sector. The analysis by Start-up Genome (2009) places Amsterdam as the 15th start-up ecosystem in the world and the 5th most active start-up hub in Europe (figure 2). However, only 12% of the start-up in Amsterdam have a female founder (figure 3).

Figure 2 Top 30 start-up ecosystem in the world

	Ranking	Change from 2017
Silicon Valley	1	0
New York City	2	0
London	3-4	0
Beijing		▲ 1
Boston	5	0
Tel Aviv	6-7	0
Los Angeles		▲ 3
Shanghai	8	0
Paris	9	▲ 2
Berlin	10	▼ -3
Stockholm	11	▲ 3
Seattle	12	▼ -2
Toronto-Waterloo	13	▲ 3
Singapore	14	▼ -2
Amsterdam-StartupDelta	15	▲ 4
Austin	16	▼ -3
Chicago	17	▲ 1
Bangalore	18	▲ 2
Washington, D.C.	19	NEW
San Diego	20	NEW
Denver-Boulder	21	NEW
Lausanne-Bern-Geneva	22	NEW
Sydney	23	▼ -6
Vancouver	24	▼ -9
Hong Kong	25	NEW
<i>26-30 in alphabetical order</i>		
Atlanta		NEW
Barcelona		NEW
Dublin	26-30	NEW
Miami		NEW
Munich		NEW

Source: Start-up Genome, 2009 p.9

Figure 3 Percentage of female founders among top 15 global start-up ecosystem

	Global Ecosystem Ranking	% of female founders
Silicon Valley	1	16%
New York City	2	22-24%
London	3-4	15%
Beijing	3-4	16%
Boston	5	14%
Tel Aviv	6-7	9%
Los Angeles	6-7	18%
Shanghai	8	22-24%
Paris	9	8%
Berlin	10	9%
Stockholm	11	16%
Seattle	12	8%
Toronto-Waterloo	13	16%
Singapore	14	13%
Amsterdam-StartupDelta	15	12%

Source: Start-up Genome, 2009 p.14

While Amsterdam is the Dutch tech start-up capital, there are other places where tech companies are being launched. For instance, the campus around Wageningen University has become a global centre of excellence for innovation in food and Agri-technologies. The map below illustrates the top ten Dutch cities with the most significant proportion of start-ups & scaleups with a female in the founder teams.

Figure 4 Top 10 Dutch Cities with the largest proportion of female founders



Source: Techleap, 2019

For the purpose of this study, I reached out to 10 female entrepreneurs in the tech industry, whose businesses are located in cities of Amsterdam, Eindhoven, Delft , and Groningen.

LITERATURE REVIEW.

This chapter discusses scientific theories that are important for this research, as it highlights the intersection between gender and entrepreneurship, and how that contributes to the prejudices against female entrepreneurs. The framework developed by Bruin et al. (2004) is vital, because it clearly defines three main obstacles: the socio-cultural status of women; access to information/social capital; and assistance and access to capital, while most studies only focus on one aspect. Therefore, the framework of Bruin et al. (2004) is more comprehensive because this study looks at the different aspects. Also, Bruin et al. (2004) framework is enhanced with the literature on motivation and human capital in this research. This is because the framework felt to mention the importance of motivation and human capital for setting up a business. Men and women's entrepreneurial traits may seem the same yet, they differ in terms of motivation to start up a business and human capital (Verheul, Van Steel, Thurik, 2006; Brush, 1992). It seems that especially for setting up a technology-based firm, motivation and human capital (e.g. work experience) is highly valuable (Dautzenberg, 2012; and Carter and Shaw 2006). Therefore, motivation and human capital are possible obstacles for female entrepreneurs. Lastly, the coping strategies of female entrepreneurs are discussed. The literature examines how female entrepreneurs deal with the challenges they encounter. Thus, this research will dive in the entrepreneurship literature on how female entrepreneurs cope with the obstacles.

Theme 1: The dominant discourse regarding female entrepreneurs

Historically and culturally, the literature presents entrepreneurship as a masculine concept (Ahl 2006). For example, Achtenhagen & Welter (2011) analysed how female entrepreneurship is depicted in newspapers and how this has changed over time in the German media. Their research reveals that German media recreates old-fashioned, traditional gender role stereotypes of entrepreneurs (Achtenhagen & Welter, 2011). For instance, they observed that female entrepreneurs are underrepresented in media, they frequently use of male notions and highlight that female entrepreneurs have strange or unusual business models (Achtenhagen & Welter, 2011). This notion made it difficult for women to claim the position of 'entrepreneur' (Ahl 2006; Ahl and Nelson, 2010; Calas, Smirch, and Bourne, 2009; Marlow and McAdam, 2015). Also, the literature on entrepreneurship mostly focuses on sex differences, for example, most researchers study the difference between female and male entrepreneurs in term of characteristics, traits, attitudes and behaviours (Ahl, 2002; de Bruin et al. 2007 and Terjesen, 2004). Brush (1992) reveals differences between male and female business owners in educational and occupational background motivations for business ownership, business goals, business growth and approaches to business creation. The same study also revealed similarities in terms of demographic features, some psychological traits and business skill-sets. Brush (1992) explained the gender-based differences found through psychological and sociological theories.

According to these theories, 'women perceive their business as a cooperative network of relationships which include family, society and personal relationships. Brush (1992), however, called for a feminist perspective in explaining the differences. In these studies, gender is seen as a characteristic of women and men's bodies and seen as a demographic category that is stable and fixed (Bourne, 2010). In many studies, gender is a social practice. It represents the meaning the society gives to maleness and femaleness within the cultural constraints, and thus gender is seen as nothing more than a biological sex difference (Eddleston and Powell, 2008). Ahl (2006) did a discourse analysis of research articles and observed that 'entrepreneurs' are typified as being masculine, heroic, self-reliant and assertive (p. 57). Also, those research articles situate feminine traits as opposites and further position male norms as being standard Ahl (2006).

Even though the literature presents entrepreneurship as something masculine, that is not always the case, women are also active participants. Lewis (2006) presents a notable aspect of entrepreneurship. His study discusses the differences and divisions between female business owners who are silent about gender issues and those who are not. He pointed out that gender-neutral women believe that the problem of gender disadvantage is solved and that gender is no longer an issue in entrepreneurship. In contrast to female entrepreneurship literature in which focus lays on the difference between male and female entrepreneurship, this research looked at women who are gender-blind and are of the opinion that they are similar to the male counterparts. Also, Lewis (2006) has stated that female entrepreneurs increasingly portray themselves as being identical to the male norm of entrepreneurship, refusing to accept the prevailing image of female entrepreneurship as lesser than, and thus acting 'gender blind'. Entrepreneurs, male or female, confront the same obstacles when starting a business of their own. However, women still are faced with barriers that are gender-specific (Yetim, 2008; Marlow et al. 2008), and men are more involved in entrepreneurial activities. This view confirms the fact that entrepreneurship is seen as masculine and thus is not gender-neutral. And these gender-specific barriers obstruct lots of women for starting their own business.

On the other hand, it is a fact that successful female and male entrepreneurs combine masculine and feminine characteristics in their management styles (Cliff et al., 2005; Gupta et al., 2008). Between male and female entrepreneurs, there are differences in the business sector and size, financing, and growth. However, businesses are not gender-neutral; some industries are more eligible for women than for men and vice versa (Ahl, 2006). And so, some fundamental factors that may lead to entrepreneurial activity are different from gender (Yetim, 2008). Nevertheless, gender inequality in a society can be an obstruction as well as an encouragement for female entrepreneurship (Baughn et al., 2006).

Thus, the dominant discourse regarding female entrepreneurship discussed above is useful for this research question as it allows the researcher to analyse the participants' experiences. Firstly, the participants' statements about 'women' will contribute to both defining characteristics of female entrepreneurs in a male-

dominated work environment, but also referring to a shared social experience that can be understood as women's experiences. Secondly, the concept of entrepreneurship being masculine is nothing more than social practice which is constructed through the way people talk and think about it. This study will show that women can also gain masculine traits even though their position in the men-women hierarchy may stay subordinate. Therefore, this research argues that "masculinity" is not a property specific to men, but a constructed quality that women as well can make their own.

Theme 2: Female entrepreneurs' 'lacking' in setting up NTBFs

As stated, before Bruin et al. (2004) reported that there are three main types of barriers against female entrepreneurship: the socio-cultural status of women, access to information, and assistance & access to capital. The arguments behind the challenges that female entrepreneurs face have contributed to the social reproduction of a gendered subtext which represents women as 'lacking' in 'status', networks and credibility (Bruin et al., 2004).

The socio-cultural status of women and their motivation

Bruin et al. (2004) refers to the socio-cultural status of women as a family and domestic responsibility, which is primarily a female role, and therefore reduces the credibility of women to be entrepreneurs. According to Bruin et al. (2004), female entrepreneurs are described mainly in terms of their family role or about their family business, for instance, a constant theme in female entrepreneurship literature is the difficulties women face in balancing work and domestic duties. In the case of female entrepreneurs, gender is a dominant factor: work-life balance (also referred to as flexibility) (Dean et al. 2017) seems to play an important role in women's motivation to become entrepreneurs. In their literature review on female entrepreneurship, Dean et al. (2017) found out the entrepreneurial intentions are similar for both men and women, and importantly that all entrepreneurs, regardless of their sex, are motivated by a dynamic mix of both financial and social factors. Thus, both men and women attribute the same rating to flexibility as an essential motive for starting up a business (Scott, 1986). In the beginning, flexibility was studied as a potential obstacle for both male and female entrepreneurs but sooner became a problem for women (Greene et al. 2003, p. 10). This results in a strong association between female entrepreneurs and work-life balance. For example, flexibility seems to push women into setting up their businesses to escape salaried jobs that are not offering them enough flexibility (Thebaud, 2016). Studies (Ruiz et al., 2012) show that the technology sector is intense due to the required work hours and a high degree of flexibility expected which may lead to conflict with workers' family responsibilities (Mayer, 2008). This view is explained by Kariv (2012) as women being more focused on balancing work and family responsibilities. Therefore, they are more attracted to entrepreneurship because they can control their time and assignment, but this can lead to conflict in the high technology field. While family life plays a role for female entrepreneurs – as most studies state – male entrepreneurs are not asked questions about work-home conflict (Ahl, 2002). The societal view that family

duties take priority in women's lives implies that women are not trustworthy entrepreneurs because they do not have time to invest in their businesses (Bruin et al. 2004; Dean et al. 2017). Also, the assumptions that reproduction is a mainly female responsibility, that it should predominate over other responsibilities and that reproduction is a fundamental fact which does not distinguish giving birth from child-rearing, which also diminishes female entrepreneur's reliability (Bruin et al. 2004).

Bruin et al. (2004) stated that women's motivation to set up a business seems to be a complex mix between 'compulsion' factors which constrain women more out of necessity than choice, and favourable or 'attraction' factors which motivate women to see entrepreneurship as an opportunity. Interestingly, Bruin et al. (2004) have not include the motivations of female entrepreneurs as a barrier against female entrepreneurship. A possible explanation for excluding women's motivation as a barrier is the literature view of the entrepreneur being autonomous, independent and self-interested economic agent (Dean et al., 2017; Ahl, 2004). This view has led to the assumption that there are prerequisite characteristics and motivations of female entrepreneurs. So, the typical image of the female entrepreneur is crafted mainly through comparative studies of female and male entrepreneurs across the various components (Verheul, Van Steel, Thurik, 2006; Verheul, Caree M and Thurik, 2009). However, Brush (1992) stated that men and women start a venture differently due to their different life experiences. For example, Kesting and Jaeger (2013) found out that female entrepreneurs tend to choose various industries and products more than men (e.g. service sector and industries that do not require a high start capital).

Carter and Williams (2003) concluded, in their research in which they compared feminist theory in relationship with new firm growth, women's motives to start a new business is to fulfil a social need. In contrast, for men, a new venture serves as a means to gain economic benefits and advantages. This finding is in alignment with BarNir (2012). In his study in which he explored the factors associated with entrepreneurs' decision to incorporate innovative technologies in new ventures, BarNir suggested that women's motivations to start an NTBFs differ from men and that women tend to start a technology venture for socially meaningful motives. In contrast, men do so for self-realisation and wealth-seeking purposes. Reynolds et al. (2001) introduced the concept of opportunity and necessity entrepreneurship indicating that if the entrepreneur was starting and growing a business to take advantage of a unique market opportunity (opportunity entrepreneurship) while necessity entrepreneurship is need-based. Verheul, Van Steel, Thurik (2006) use GEM² data to investigate the impact of several factors on female and male entrepreneurship at the country level and concluded that women are more likely to start a business out of necessity in a situation of economic recession than men (more opportunity). However, Kelley et al. (2017) stated that in an innovation-driven country, such as the Netherlands, becoming an entrepreneur is an

² See Verheul, van Steel and Thurik (2006), GEM stand for Global Entrepreneurship Monitor.

attractive work alternative for highly educated women. Therefore, opportunity motives among female entrepreneurs in such countries increase with the level of education, and necessity motives decrease; for example, of the women who have at least a bachelor degree, only 18% state necessity as a motive. So, women's reasons to start a new business are associated with internal needs and are also affected by perceptions of opportunities.

Thus, for this research, it is also essential to look at the motivation of the women themselves and not only at the discourse or what is expected of women. This notion is in alignment with the research question that emphasizes women's own experiences. It is also important to note that other studies have shown that women's motivation to start up a business is the need for flexibility and autonomy that will serve the family (Kuschel, 2019; Annink and Dulk 2012). For instance, Kuschel (2019) explored the decision to become a mother among women in the technology industry and concluded that female entrepreneurs who were mothers created a technology venture as a strategy to gain higher levels of flexibility and autonomy than they experienced in the corporate world even though mothers acknowledge a huge family sacrifice for achieving business success, contrary to evidence from the work-family literature from the organisational or traditional entrepreneurship context.

Female entrepreneurs' human capital as obstacles in NTFBs

Bruin et al. (2004) framework of barriers against female entrepreneurship failed to include human capital as a potential obstacle. An explanation for this is the tendency of research in which female entrepreneurs are represented as inferior to men within entrepreneurship (Bruin et al. 2004). For instance, women have predominantly more experience in the service sector (Coleman and Robb, 2014; Gottschalk & Niefert, 2013; Gatewood et al. 2003; Robb and Coleman, 2009). Those sectors are easier to enter and which therefore have little value (Bruin et al. (2004). Also, the values of entrepreneurship are institutionalized as male and 'superior' (Bruin et al. 2004; Ahl, 2004, 2006). Therefore, researchers who study women often use men as their standards of comparison. Since masculinity constructs are deeply influential in the definition of entrepreneurship, and male entrepreneurship is used as the benchmark for entrepreneurship as a whole, the production of knowledge is based on gendered ideas (Bruin et al. 2004).

However, especially in the high technology sector, human capital (e.g. education,(work) experience) is for a higher value (Dautzenberg, 2012; and Carter and Shaw 2006). For instance, Van Praag (2006) made a clear link between the level of education entrepreneurial success ;ambitious entrepreneurs seem to be highly educated (Autio, 2011). Colombo and Grilli (2010) analyse the effects of the human capital of entrepreneurs and access to venture capital (VC) financing on the growth of 439 Italian NTFBs and found out that the human capital of entrepreneurs is one of the two key drivers for the success. BarNir (2012) studied

the role of human capital in the start-up decision of technology ventures. He made a distinction between general human (which is associated with education level or overall breadth of experience) and specific human capital (which is associated with industry or technology profession). The results show that general human capital, such as education or employment, together with multiple career paths, changes in jobs, or career disruptions have a more significant impact on their choices to start a venture. Nevertheless, few studies (Fairlie and Robb, 2009; Dautzenberg, 2012; Carter and Shaw 2006) show that women's education is mostly in fields other than engineering or technical areas, which may be essential for the set-up of NTBFs.

In the case of prior work experience, men have more managerial, scientific or technical positions (Gatewood et al. 2003; Robb and Coleman, 2009). Women, on the other hand, have less or no experience in scientific or technical sectors, and often hold the most knowledge and experience in the service sector (Coleman and Robb, 2014; Gottschalk & Niefert, 2013). Therefore, a male is perceived to be more equipped to succeed in setting up a business (Watkins and Watkins, 1984). Mayer, (2008) examines the women's business ownership in high technology in four metropolitan regions. He pointed out that his findings confirm the results of previous studies which state that women's entry into high tech business ownership seems to be shaped by their work experience and educational background. However, for high technology, barriers such as the 'glass ceiling' and masculine stereotypes may prevent women from entering management and executive positions that might equip them with skills and expertise necessary to start and own a business. Similarly, Bruin et al. (2004) stated that women lack specific technical skills making it difficult for women to start a business in the technology sector.

Interestingly, there are contradictory findings regarding education and work experience on entrepreneurship. For example, Arenius and Kovalainen (2006) found education to be a predictor of self-employment, as they found a negative relationship between high levels of education and being an entrepreneur. Also, Coleman (2007) found a negative correlation between having prior experience and the growth of the company. Tegtmeier et al. (2016) also found that having prior management experience does not increase the likelihood of setting up a business. BarNir (2012) even shows that specific human capital, such as having a prior background in technology occupation, was a negative predictor for women to start a venture in the technology field.

Thus, because the production of knowledge on human capital is based on gendered ideas and this research emphasises the importance of female entrepreneurs' own stories, it is essential to get a better, more in-depth understanding of how education and prior experience is linked to entrepreneurship in the technology sector.

Access to information and assistance

Studies on networks (social capital) have included the influence of gender on the entrepreneur's ability to mobilise social capital in growing their businesses and have portrayed female entrepreneurs as being unable to network effectively (Murphy et al. (2007). Cooper, Hampton and McGowan (2009) explained the social capital barriers even further. Their report claims that the nature of the technology community means that women who establish ventures in this sector find themselves in a heavily male-dominated work environment where most of those with whom they network are men (Cooper, Hampton and McGowan, 2009). Therefore, women encounter difficulty related to expanding their networks to 'male-dominated' industries (Verheul, Caree and Thurik, 2009). Another essential characteristic of social capital literature is the consensus that female entrepreneurs prefer to network with each other (Fielden and Hunt 2011; Verheul et al. 2002). However, Cooper, Hampton and McGowan (2009) stated that other female members in formal networking clubs were often not so supportive in a male-dominated environment, while men in those clubs were open to women's involvement. The study by Verheul, Caree M, Thurik (2009) found that female entrepreneurs are more likely to ask family members for advice than their male counterparts which may relate to the difficulty of expanding their networks into industries which are dominated by men. Mayer (2008) suggests that women have not gained crucial managerial expertise and work experience in high-tech sectors, which prevents them from accumulating the necessary networks and relationships to connect with customers and suppliers, a founding team and a specialised labour pool required for getting the firm up and running (2008). Therefore, women rely on their existing network, which is more likely to be family members. The lack of networks has a consequence on the type of investment women use for the firms. For instance, Robb and Coleman (2010) suggests that women have been closed out of external sources of equity financing because they lacked access to crucial funding networks; this aligns with a prior study by Brush *et al.* (2001) and Gatewood *et al.* (2009).

Furthermore, Ahl (2004) observes that 'entrepreneurs' in the entrepreneurship literature are typified as being masculine, heroic, self-reliant and assertive (p. 57). She concludes that this situates feminine traits as opposites and positions male norms as being standard (Ahl, 2004). Therefore, women's networks are perceived to be less influential than 'old boys' networks, and female entrepreneurs are encouraged to partner with a man in order to access these networks (Godwin et al. 2006). McGowan et al. (2015) stated that female entrepreneurs are frustrated with existing networks, as they do not accommodate their needs. An explanation for this is that the literature uses the networks of men as the standard against which those of women are measured (Ahl (2004) and therefore found to be lacking.

Remarkably, the literature also ignores the diversity in networking activities and needs that exist among female entrepreneurs. Barrios and Albizu (2015) explains why women encounter difficulties networking in a male-dominated work environment. In their study, they clarified that to establish networking opportunities, one would need to express similar interests and characteristics to

the target population. Therefore, women are at a disadvantage in the creation of network ties. So, this research highlighted the importance of a network through the lens of women's own experience. But, also to what extent female entrepreneurs experience the lack of networks stated in the literature.

Financial capital

Firms owned by women face more difficulties in securing capital more often than firms owned by men (Gatewood et al. 2003; Tinkler et al. 2015; Orser et al. , 2000; Coleman, 2002). Firstly, Ruiz et al. (2012) explains the difficulty in accessing financial capital. The technology sector comprises high demands for investment (Ruiz et al., 2012). Setting up venture in the technology sector comes with uncertainty much more elevated than any other industry, and this has a more significant negative impact on female entrepreneurs' ability to receive funds than it does for males (Orser, Riding, and Manley, 2006; Thebaud, 2015a, 2015b and Tinkler et al. 2015). Firms owned by women tend to be smaller and more concentrated in low-growth retail and service lines of business rather than in technology-based companies (Du Rietz and Henrekson, 2000). Therefore, banks consider women to have little experience in competitive sectors (Neergaard et al., 2006) which renders access to financing even more difficult. The disparities in access to funds have led to women starting a new business with a lower amount of start-up capital and made them unable to create ventures in a field such as technology which in general has a higher level of start-up cost (Kesting and Jaeger, 2013).

Secondly, society views women as 'riskier' investments (Gatewood et al. 2003), because it is believed that women underperform compared to their male counterparts (Achterhagen and Welter, 2011; DuRietz and Henrekson, 2000 and Ahl and Nelson 2014). Similarly, female-owned businesses are perceived to have lower ratios of debt finance and less capitalisation than businesses owned by men (Alsos et al. 2006). However, the 'underperformance' argument is propelled by the fact that firms owned by women are concentrated in the lower-performing market sector and the fact that women are more likely to hold a part-time or home-based job than men (Marlow and McAdam, 2013b). This view reflects the constrained performance of most small firms and the claim that firms owned by women underperform reflects a gendered prejudice (Marlow and McAdam, 2013b).

Thirdly, Brush et al. (2004) and Gatewood et al. (2009) found that there were relatively few women with sufficient wealth and experience to allow them to serve as investors capable of promoting the cause of new growth-oriented female entrepreneurs. Consistent with this finding, Mayer (2008) noted that female entrepreneurs typically do not have the type of senior management decision-making experience that is required by external equity investors. The majority of

women in technology-based firms tend to occupy supervisory rather than managerial ranks, and they express frustration with being excluded from essential networks and decisions (Mayer, 2008; Robb and Coleman (2010)). However, this disparity in investment money has led female entrepreneurs to create a venture with less capital (Gatewood et al. 2003; Robb and Coleman, 2009 and Coleman and Robb, 2014). Considering this with the general view that women's businesses are younger, smaller with lower profitability and lower growth (Collins-Dodd et al. 2004) and the persisting stereotype that women are less capable in technical areas (see human capital debate above) and their ventures underperform more than those of men, the decisions made by investors on investment are coloured by biases (Coleman and Robb, 2014; Gatewood et al. 2003; Orser, Riding, and Manley, 2006).

Since the investors' decisions on investment are overwhelmingly biased and the research questions of this study emphasize women's own experiences, it is important to examine how the women themselves are experiencing the difficulties they encounter in securing capital.

Theme 3: Female entrepreneurs' coping strategies

Scholars (e.g. Hsieh and Eggers, 2010; Mäkelä and Suutari, 2011) refer to coping strategies as the individual's efforts at the cognitive, behavioural, and emotional levels to manage internal and external demands. In other words, these are actions individuals take to reduce or control the consequences of demanding situations beyond their capacity and resources (Clark et al., 2014). According to Clark et al., 2014, several studies have examined coping strategies in varying ways. For instance, Somech and Drach-Zahavy (2007) have researched how individuals cope with role conflict (e.g. family responsibilities and work environment) while others (e.g. Rotondo and Kincaid, 2008) have looked at how individuals cope with stress. This research will focus on dealing with role conflict.

Sarbin and Allen (1968) refer to social role expectation as the privileges, duties, obligations, behaviours of individuals in their social position. Eagly and Wood (2013) emphasize this by suggesting that social role expectations often allocate different roles and responsibility to women and men: domestic for women and career-related purposes for men. Thus, the gender stereotyping aspect of social roles has contributed to how men and women behave in their domains, e.g. as women versus men in business (Rosenbusch et al., 2009). So, social role expectation can influence individuals' behaviours in their work environment and therefore, can be a potential source of role conflict (Eagly and Wood, 2013). For instance, Podoyntsyna, Van der Bij, and Song (2012) examine the role of mixed emotions in the risk perception of entrepreneurs and suggest that an entrepreneur's response to social barriers depends on their background and level of entrepreneurial experience. Whereas, the Fligstein (2001) study on social skills of

individuals suggest that individuals, depending on their abilities, can change norms within their social environment. On the other hand, Battilana, Leca, and Boxenbaum (2009) highlighted the entrepreneurs' ability to convince a group to 'approve' their activities, which in turn can assist them to mobilise essential resources and social capital.

Kibler et al. (2015) showed that social support and exclusion (i.e. discrimination) significantly affect the development of businesses run by older entrepreneurs who also are a marginalised group as female entrepreneurs. Based on 22 in-depth interviews, the researchers identify four coping strategies to minimise discriminatory sanctions from the social environment, but also to improve the level of support provided by those groups. The four coping strategies are as follows: active negotiation, passive negotiation, modification and avoidance. Kibler et al. (2015) define active negotiation as the entrepreneur's intentional practices of changing the opinions of social reference groups from negative to positive while passive negotiation reflects the indirect transformation of opinions through the groups' observation of the entrepreneur's successful business development actions over time. According to Down and Warren (2008), social group members come to adopt a more positive outlook over time. Therefore, reference groups can be changed over time through a deeper understanding of the activities of the individual (Kibler et al. 2015). Ford and D'Amelio (2008) also suggested that over time, social groups may change the judgments of individuals, based on access to new information. This notion reflects the strategy of passive negotiation. Third, modification is the entrepreneur's intended alteration of their social environment, by abandoning certain reference groups and associating towards new social groups that provide higher levels of support for their entrepreneurial activities (Kibler et al. 2015). So, to manage societal judgement, marginalised groups such as female entrepreneurs can use the strategy of reference group modification.

However, Podoyntsyna, Van der Bij, and Song (2012) suggests that serial entrepreneurs, an entrepreneur with experience in setting up a business before, are more positive and retain fewer negative emotions in comparison with novice entrepreneurs. Therefore, modification is especially useful for novice entrepreneurs who have limited entrepreneurial confidence (Kibler et al. 2015). Kutzhanova, Lyons, and Lichtenstein (2009) explains that coaching is often necessary for entrepreneurs to accomplish modifications of their entrepreneurial community. The last strategy is avoidance. Avoidance means that the entrepreneur tries to hide or mask certain symbols or traits that provoke negative perceptions within a particular reference group. For instance, Tornikoski and Newbert (2007) went further on this and proposed that to become legitimised in the eyes of potential business clients; it may be necessary to hide certain maskers. Also, Becker (1993) argued that individuals who perceive or fear to be discriminated against and

judged as 'outsiders' in certain social contexts, often start to hide their 'deviant' in different ways.

Since female entrepreneurs face various challenges which are gender stereotyping aspects of social roles, they may develop strategies to manage social barriers and discrimination. Therefore, this research must identify the coping strategies that female entrepreneurs are applying to manage social obstacles in entrepreneurial settings since the literature has overlooked this aspect of female entrepreneurship.

METHODOLOGY.

In this chapter, the methodological choices applied in this research is elaborated. First, this research will discuss the selection of in-depth interviews as a method. Then, I will discuss how the respondents were accessed and what the characteristics of these respondents are. I will proceed to briefly explain how the data was analysed. Finally, the reliability and validity of this study and some limitations that emerged during the study are discussed.

The rationale for qualitative research

To answer the main question, the study uses in-depth interviews. The in-depth interviews provide insight into the personal experiences and strategies of female entrepreneurs in the technology-based industry. This study follows a Straussian grounded-theory design to guide the collecting and coding of interview data to identify emerging categories and generate theory. This research uses the Straussian grounded-theory design to generate a substantive grounded theory of female entrepreneurs' experience in a male-dominated work environment.

According to Marshall and Rossman (1999), qualitative research is both inductive and deductive. However, grounded-theory is primarily inductive. The research goal is to interpret and see the act of interpretation as one of the factors determining the shape of the reality that emerges (Creswell, 1994; Glaser & Strauss, 1967). Also, this method is suitable to understand the environment of female entrepreneurs from within. Glaser and Strauss created the grounded theory research design in 1967. They described it as a two-fold effort to maximise the discovery process and to generate a theory mapped carefully to the data (Glaser & Strauss, 1967). The critical element of grounded-theory is the generating of ideas throughout the process and coming up with a theory that has emerged from data and is closely linked to, or grounded in, data. However, over the years, Glaser and Strauss developed their approach opposing one and other. Corbin and Strauss (1990) promote the inclusion of early literature review because of its ability to stimulate theoretical sensitivity, its usefulness in providing secondary data, its value in raising questions, its versatility in providing a guide to the conceptual sampling process, and its ability to provide extra vitality.

This research will be using the Straussian grounded theory because of the inductive approach. In this study, much reading was done on the topic to become familiar with the subject. That prior knowledge has guided the researcher in identifying a starting point for data collection. However, this knowledge should be awarded no relevance until validated or dismissed by the formulation of the emerging theory (Breckenridge and Jones, 2009).

Data collection process

In their 1967 publication, Glaser and Straus also have highlighted the importance of not making data collection rigorous. Sunstein & Chiseri-Strater (2012, p. 225) went on to emphasize the importance of having a flexible plan when conducting the interviews. So, the in-depth interviews were chosen for two reasons:

- Ability to respond flexibly with follow-up questions
- Ability to pursue more profound revelation

In the period from March 2020 to May 2020, the female entrepreneurs were contacted by e-mail and through social media such as LinkedIn. In the beginning, the participants were selected through a non-profit organisation network group that stimulates and supports female leadership and entrepreneurship, incorporates SMEs and start-ups called Female ventures. Second, a group of female entrepreneurs were selected through 'YES!Delft' which is a tech incubator affiliated to the Delft University of Technology. 'YES!Delft' supports technological entrepreneurship on the road from a promising idea to the leading firm. Lastly, other participants were selected through a Bidbook published by TechLeap.NL in which 200 promising Dutch start-ups in High technology with at least one female founder in the founding team were reported.

The semi-structured interviews conducted were phone or video interviews through diverse social media platforms such as Google hangout and Zoom. Before the meeting, the participant was always informed about the subject of the interview. Then a verbal consent was required. The verbal consent gives information about the objectives and scope of the study, and that recording will remain anonymous. All of the participants agreed to participate in audio- or video recorded interviews. All the interviews were conducted in the period between April and May 2020. The in-depth interviews lasted between 26 minutes and one hour and 22 minutes. To fulfil the requirement of the research questions, each female entrepreneurs followed a semi-structured script with questions related to the following six topics: (1) Women's motives; (2) socio-cultural beliefs and attitude in a male-dominated setting; (3) the role of human capital for female entrepreneurs in setting up an NTBFs; (4) the influence of gender on getting funds in a male-dominated environment; (5) social capital in a male-dominated setting; and (6) coping strategies on the experienced obstacles. The topic list is included, see appendix I. The following is a sample of the kind of questions included in the in-depth interviews: 'What was your primary motivation to start your company?' 'How would you describe being a woman in the technology-based industries?' 'What kind of investments did you raise for your company?'. The interviews were recorded while taking notes and then transcribed verbatim. After the transcription, the transcripts were entered into NVivo software for qualitative analysis.

The sample

The dataset consisted of 10 participants: (1) nine interviews conducted with female entrepreneurs who own and run businesses in the tech sector; and (2) one interview with a female entrepreneur who does not own or run her company any longer. The female entrepreneurs who were interviewed for this study were concentrated in four cities: (1) five in Amsterdam; (2) two in Eindhoven; (3) two in Delft; and (4) one in The Hague. The majority of the respondents have at least a bachelor degree, have no children and no co-entrepreneur. Relatives, friends or acquaintances have inspired about half of them in becoming entrepreneurs. Also, they all agree that they operate in a male-dominated work environment. For example, female entrepreneurs have mentioned that on a daily basis, they mostly interact with men; especially when talking to "stakeholders, developers or investors". In the case of female representation in NTBFs, most of them work in "marketing, communication, health or safety departments, and rarely in a technical field or the CEO". The respondents seem to be aware that they are in an industry with mostly men, and second, that masculine attributes such as performance and cost reduction prevail over feminine traits. See table 1.

Table 1 Sample characteristics

Business characteristics						Entrepreneurs characteristics				
Entrepreneur ID	Industry	Co-founder (s)	Co-founder Gender	Employees	Company launch date	Age group	Educational background	Number of Children	First company	Influenced by relatives, friends or acquaintance entrepreneurs
F1	Apps Social networking	Yes	Male	2 - 10	2017	25 - 34	Master's Degree (e.g. MA, MS)	0	Yes	No
F2	EdTech	No	-	2 - 10	2015	35 - 44	High school degree or equivalent	0	No	No
F3	Apps Social networking	No	-	2 - 10	2017	25 - 34	Master's Degree (e.g. MA, MS)	0	Yes	Yes
F4	Deep Tech	Yes	Male	2 - 10	2016	35 - 44	Master's Degree (e.g. MA, MS)	0	No	No
F5	Clean Tech	No	-	11 - 50	2016	25 - 34	Master's Degree (e.g. MA, MS)	0	No	Yes
F6	MedTech	No	-	11 - 50	2004	56 or older	Bachelor's Degree (e.g. BA, BS)	0	Yes	No
F7	FoodTech	No	-	2 - 10	2017	25 - 34	Master's Degree (e.g. MA, MS)	0	Yes	Yes

F8	EdTech	No	-	2 - 10	2017	45 - 55	Master's Degree (e.g. MA, MS)	1	No	No
F9	Deep Tech	Yes	Male	2 - 10	2015	25 - 34	Bachelor's Degree (e.g. BA, BS)	0	Yes	Yes
F10	Deep Tech	Yes	-	2 - 10	2017	45 - 55	Master's Degree (e.g. MA, MS)	Missing information	No	Yes

Analysis of the data

The grounded-theory approach is the most commonly used methodology for analysing data called constant comparative analysis (Strauss, 1987). It is called relative meaning that the researcher is required to carefully analyse data into precise units or indicators even after the first data collection, and systematically compare units of study indicators to each other and, second, to data collected (Strauss, 1987). With this theory in mind NVivo was used to analyse the data collected. The first step to start analysing the data is the research looking back at the research question and determining what is essential for this study. In their 2008 publication, Corbin and Strauss suggested that the analysis begins with open coding followed by axial coding (Corbin and Strauss, 2008; Corbin & Strauss, 1998). Subsequently, the second step of this study was open coding of the ten in-depth interviews, which resulted in a rough code tree within the NVivo program. At this stage, the researcher also uses memo writing. The memo writing was used to summarise significant findings, critical comments and reflection on the in-depth interviews. According to Strauss (1987), writing memos helps the researcher towards the theoretical realm and generating of concepts and theories.

Then as suggested by Corbin and Strauss (2008), the research moved on with axial coding. This phase resulted in further refining and categorising the themes. This phase resulted in a code tree which can be found in Appendix II. The result section is written based on the code tree and the relationship between the responses of the participants. In this research, the quotes are in written language, meaning the "hmm"s and with punctuation. Further, the results of the interviews are linked to the theoretical framework in the result section.

Reliability and validity

Grounded theory researchers have identified reliability and validity as other areas in which the researcher can take steps to ensure soundness. Accuracy is essential to entail reliability. According to Kirk and Miller (1986), reliability is assessed by the truthfulness of responses and accurate answers. Therefore, the interviews were recorded and transcribed to ensure the accuracy and integrity of the data collected. Also, there is nothing that suggests that respondents in this research were not telling the truth about their perception. Besides, the study informed the respondent that the interview was anonymous. Also, there seems to be a congruence in the responses provided, which provide a full and coherent story. Lastly, the codes were continually analysed in NVivo and perfected. Validity addresses the integrity of the conclusions that emerge from the result Bryman (2012, p. 47). Especially for qualitative research the external validity; are the results generalisable? Ecological validity is also crucial in this research. To assure the validity of this research, the study asked feedback from the university supervisor, other readers (peer) and even during the mid-term presentation. Also, an attempt was made to create the most diverse group possible.

Limitation

However, this research has some limitations. The COVID-19 pandemic outbreak forced businesses to close. Due to COVID-19, many organisational functions needed to prioritise and optimise spending or postpone tasks that do not increase value in the current environment (Donthu and Anders, 2020). Also, due to COVID-19, managers of various companies needed to quickly delve into the "unknown unknowns" as they strive to help their workforce adapt to and cope with radical changes occurring in the work and social environment.

For example, employees who formerly spent all or most of their time working inside their organisation's physical boundaries now had to adjust to remote work environments within a small space of time. Many start-ups, for example, have implemented an undefined hiring freeze. In the case of this research, the participants are female entrepreneurs who own NTBFs that are in most cases start-ups. The COVID-19 outbreak also has a negative impact such as the high risk of loneliness, a felt lack of purpose and associated adverse effects on well-being. All of this made it challenging to reach female entrepreneurs willing to participate in the research. For example, some female entrepreneurs have responded by saying that they did not have time to participate in the study.

One of the main reasons for not participating was that they were busy, especially with the COVID-19 outbreak happening now. Aside, due to COVID-19, it was not possible to have face-to-face in depth-interview. Therefore, the in-depth interviews were held through zoom and telephone conversations. Another limitation was generating new names through snowball sampling. The original idea was to start with a list of three names selected through Female venture, and from there, a snowball sampling will emerge in which research participants recruit

other participants for the study. From the first two interviews, no new significant names were mentioned. Therefore, I needed to look for different ways to find participants. One part of the interview was to map the participant network; however, this was mostly sent by email, and only three out of ten returned the form. Later, the mapping was incorporated in the video interviews. However, including the three returned forms and the mapping through video interview, a total of five out of ten forms were filled in. So, the decision was made to leave this out of the report.

RESULTS.

In the following section, I will present the results under the following seven themes: women's motives, socio-cultural beliefs and attitudes in a male-dominated setting, the role of human capital for female entrepreneurs in setting up an NTBFs, the influence of gender on getting funds in a male-dominated environment, social capital in a male-dominated setting and Coping strategies on the experienced obstacles.

(1) Women's motives

The results from this study revealed that the majority (8 out of 10 respondents) of female entrepreneur's motives (eight out ten respondent) to start an NTBFs was to fulfil a social need. Concerning this, F3, a female entrepreneur who developed an application comment, was typical:

"I actually started my company out of personal frustration. I was looking for a platform where I could do socially accessible and fun things with others based on the same interests. But what had nothing to do with dating or other social media components. And I haven't come across anything for young people".

This quote illustrates that social need was the primary goal for starting an NTBFs. This was also found by BarNir (2012) and Carter and Williams (2003). However, even though the majority of female entrepreneurs in this study seem to have started an NTBFs for socially meaningful motives, few started businesses for self-realisation motives. The results of this research contradict the findings of Kariv (2012). He suggested that women are more focused on balancing work and family responsibilities. Therefore, they are more attracted to entrepreneurship because they can control their time and assignment, and this can lead to conflict in the high technology field. However, the women of this study's motivation for starting a firm has nothing to do with their family responsibilities but more about internal needs and perceptions of opportunities. A possible explanation for this is the fact that only one woman in this study had a child. This may explain why, for the majority of the women in this study, family responsibilities are not as crucial as stated in the literature. Also, the results of this study provide evidence that female entrepreneurs are motivated by a dynamic mix of both financial and social factors. These findings are consistent with Dean et al. (2017) work, confirming that all entrepreneurs, regardless of their sex, are motivated by a dynamic mix of both financial and social factors.

(2) The role of human capital for female entrepreneurs in setting up an NTBFs

The result of this study provides evidence that an education background does not necessarily prepare female entrepreneurs to start an NTBFs. While the female entrepreneurs of this study are highly educated, when asked how their education contributed to them establishing their current company or becoming an entrepreneur, they all replied in the same way. F10, a serial entrepreneur, the comment is a representation of their response:

"My university degree was just the foundation of what I need in my role. The most important part was hands-on learning and learned from past mistakes''".

F10's comment was a typical response in the interview. The female entrepreneurs of this study all suggested that their Bachelors and Masters degrees (table 1, p. 21) did not contribute to them becoming entrepreneurs; however, it may have helped to develop individual skills that are useful to them as entrepreneurs. F8, a female entrepreneur in EdTech, suggested that having an MBA or a master degree in business administration may contribute to becoming an entrepreneur; however, that is not her case. She went on explaining this:

"What I studied has absolutely nothing to do with what I'm doing now. You know, what's really important is the soft skills. However, I like to call them the essential skill. How do you manage yourself? How do you make sure that you take good care of yourself? How do you make sure that you deal with situations? Well, that you deal with your team well, that you deal with your stakeholders. Well, how do you know how to negotiate, all these interpersonal skills? It asks a lot of yourself, and I didn't get any of that in my engineering studies".

This statement illustrates that the education background of female entrepreneurs is not essential for setting up NTBFs, as stated by Fairlie and Robb (2009). So, female entrepreneurs do not experience their educational background as an obstacle. Also, this study contradicts Arenius and Kovalainen (2006). In their research, they found a negative relationship between high levels of education and being an entrepreneur. This study, however, indicates that a high level of education to be a predictor of becoming an entrepreneur for women.

Another characteristic of human capital is the previous work experience. In this study, female entrepreneurs got questions about their prior work experience and how they utilise that to become an entrepreneur. Some of the female entrepreneurs are serial entrepreneurs; however, in most cases, it was not an NTBFs. Nevertheless, those experiences have contributed to setting up their current company. F4, a serial female entrepreneur's comment illustrates how having prior experience in setting up a business was an indicator for her to set up her current company:

"What I noticed from first-time entrepreneurs is that the complexity is usually around us having the first employee. So, it's very complex because as an entrepreneur, you always think that you know it best and that there is no one else who can do whatever you do as well as you do. And that's a trap many entrepreneurs fall into. [SIC] And so, I already had companies before, and I've learned that. Although you might think that you are the best for a certain task, sometimes you need to let it go and trust someone else to deal with it. So, that's something I already knew from previous companies, as well as how to let someone go or so all these little things which you still need to figure out along the way. Already done that many times before, know it works, practical things".

This study indicates that having prior experience in setting up a business and regular work experience have contributed to female entrepreneurs setting up an NTBFS. The evidence here supports the claim by Mayer (2008) in which he pointed out women's entry in high tech business ownership seems to be shaped by their work experience and educational background.

(3) Socio-cultural beliefs and attitudes in a male-dominated work setting

This research provides evidence that female entrepreneurs are experiencing socio-cultural challenges. For instance, female entrepreneurs are not taken seriously in the technology sector because of their gender. Their gender in a male-dominated space, seems to reduce their credibility as entrepreneurs. F7, a FoodTech entrepreneur explained this further:

"I'm 30. And I do get questions about what if I want to plan and have a family. Would I still have time for my business? And I know that a lot of male entrepreneurs don't get those questions. It is stupid, on the one hand, but I get it. Because if I were to put my money into something (...) I mean, I'm the one who's pregnant and (...). My partner is not going to have that problem. I know once the baby would be here. Yes, I'm all for a 50/50 care agreement. But yeah, I mean, the reality is that in most families, it's not like that. So, I do understand. I do understand why the question is asked, but I would just wish it would be asked to everybody my age and five years up and not just to women. Because I think it stigmatises".

This remark supports the claim of Bruin et al. (2004) in which it is suggested that family responsibility reduces trustworthiness of the female entrepreneurs.

There is a tendency of questioning women's knowledge or not giving her the credit she deserves. F4 went on explaining how socio-cultural beliefs and attitudes harm her:

"They want to test me. They are testing me. And that's sometimes super annoying. (..) so they ask me all sorts of questions, and I'm like (..). They want to challenge my knowledge. And that's annoying. I feel like sometimes I need to work twice as hard to be able to be taken seriously. (...) one example is I'm giving a presentation, full hour presentation. And then as soon as the presentation is done, which I just gave in front of a roomful of guys, I'm standing there next to my colleague, who is a grey-haired 50 plus male. Literally all the questions are directed at him. Like literally, he's standing next to me, the decision-maker and all questions are directed to him".

This quote highlights how gendered-social norms mask female entrepreneurship. For instance, the belief that women are not knowledgeable in engineering or technical areas (Fairlie and Robb 2009) which is essential for the set-up of NTBFs. But, also how women are portrayed as opposites and position male norms as the standard (Ahl, 2004; Brush, 1992).

Furthermore, female entrepreneurs in this study talked about what restrains their professional capacity such as low self-esteem, sense of inferiority or lack of specific skills. Female entrepreneurs are giving a lower rating to their competence in realms of technology or being the entrepreneur. F4, who has a company in DeepTech, explains how she feels about being called 'woman in tech':

"You're calling me a woman in technology. I would say I'm not because I'm doing the business sides. So, I'm not a woman in technology because I'm not writing code. So, I feel like a fraudulent technologist".

These remarks provide evidence for a sense of inferiority and lack of specific skills for numerous reasons. First, female entrepreneurs believe that they need to have a certain capacity or level to get credibility in NTBFs. Second, female entrepreneurs themselves root certain feelings, beliefs and opinions that reinforce socio-cultural norms that limit the women themselves. Since the literature portrays 'entrepreneurs' as being masculine, heroic, self-reliant and assertive (Ahl, 2004) and therefore suggesting that feminine qualities are opposite to men and positioning male norms as being standard, this view is contributing to low-self-esteem and sense of inferiority amongst female entrepreneurs.

(4) The influence of gender on getting funds in a male-dominated setting

Finance and especially acquiring the start-up capital are a big challenge for female entrepreneurs of NTBFs. The female entrepreneurs interviewed agreed to the extent that investors are less likely to invest in a company owned by women simply because of their gender. F8, a serial entrepreneur, states gender issues when talking to potential investors:

"Well, it's for example, requesting a meeting and not getting a response back or saying, oh, you know what? You're too early to come back in a year. That's a classic one. So, when it comes to investment, that's the typical response that you get. (...) Come back in some undefined time later. And then sometimes when I also talk to them, I also get this feedback of like, you know, you are too early. (...) the other one is like they cannot really. It's more of like. It's not interesting enough, or they don't give you a really clear reason. (...) If they tell me, for example, you need to have X customers, and you need to be with your technology at this level. Then we can talk. That's tangible feedback, but most of the time I get this intangible feedback and I would say 40 per cent of the time it is, it feels like there is this issue of me being a woman".

This comment supports the claim of previous research (e.g. Gatewood et al. 2003; Tinkler et al. 2015; Orser et al. , 2000; Coleman, 2002) in which they stated that firms owned by women face more difficulties in securing capital more often than firms owned by men. The data (table 1 p. 21) illustrates that women's businesses are younger and smaller (Collins-Dodd et al. 2004)

Also, the data provides evidence for the male-dominance in the investment world. The women of this study rely on male investors since they are not sufficient women who serve as investors. Social capital literature explained this further by suggesting that women have been excluded from external sources of capital financing because they lacked access to crucial funding networks (Robb and Coleman, 2010; Brush et al., 2001; Gatewood et al. 2009). So, the investment world is full of biases, as the quotes illustrated. Therefore, female entrepreneurs raised significantly smaller amounts of capital from the start and relied more heavily on internal sources of financing, such as angel investments or crowdfunding.

(5) Social capital in a male-dominated setting

The result of this study indicates that female entrepreneurs are not a shortcoming in an established professional network in a male-dominated work environment. Though, they are the minority which is typical since the majority of NTBFs are run by men. So, establishing a network is not necessarily complicated F3 clarified that there is this feeling of not belonging:

"You are the minority, so psychologically you are by definition out of the group. By definition, you do not belong".

This quote illustrates how the women of this study are aware of being a minority. Research has stated that female entrepreneurs encounter difficulty when expanding their networks in a male-dominated work environment (Verheul, Caree and Thurik, 2009). Barrios and Albizu (2015) explains this further by suggesting that, in order to establish networking opportunities; one would need to express similar

interests and characteristics to the target population. Since the women of this study are a minority and do not show similar characteristics to the dominant group, they are at a disadvantage in the creation of network ties.

The high technology field is male-oriented and does not have a "good old boys club" yet, and the women in this study do not see the point of creating a women-only network group. When asked if it is helpful to have a woman only network group, most of them said that it was not essential. F7 explained the following about women-only network group:

"(...) it feeds the stigma of the stereotypical image that men have about us. We should not say together we are stronger because of a too homogeneous group. We must be diverse. We must stand strong with men, especially with men who are also behind us. Going into the world and not saying we are a club of women and think everything is bad and that is why we have now become a club. That's not the way to go if you ask me. That is my personal opinion".

This comment provides evidence that the 'old boys' networks are more influential than women's networks, for two reasons. Female entrepreneurs recognised that there are fewer women in their networks and that women-only network groups provide critical support to counter feelings of isolation and boosting confidence. However, they instead accepted the suggested networks and preferred to build a strong relationship with the existing network (Gehrels & Beqo, 2014). So, it can be concluded that female entrepreneurs attach more value to the existing networks and especially one with men in it. Furthermore, some women prefer working with other men than other women in creating their networks. These findings are parallel with Hampton et al. (2009) study in which it stated that women informal networking clubs were not so supportive in a male-dominated environment. However, the women of this study consider mixed-gender industry network groups as crucial to business development.

(6) Coping strategies on the experienced obstacles

To cope with gender-based bias, some female entrepreneurs decided to remove themselves from negative reference groups to other more positive ones. Therefore, they use the strategy of reference group modification to manage adverse outcomes. F1, a female entrepreneur who developed an application, suggested that she brings her male co-founder with her to meetings, especially when talking to investors. She discussed this strategy:

"I usually bring one of my co-entrepreneurs or the fundraiser of my start-up studio with me. (...) I get some credibility".

The quote illustrated what other female entrepreneurs do to abandon certain reference groups and gravitate towards new social groups that provide higher levels of support for their entrepreneurial activities (Kibler et al. 2015). Nevertheless, it also emphasizes the influence of having a male co-entrepreneur and how women become more trustworthy simply because she has a male co-founder in a male-dominated work environment.

Other female entrepreneurs use avoidance strategy to mask attributes associated with femininity which may form the basis of discrimination. As outlined in the following comment, avoidance allows female entrepreneurs to diminish their attributes such as age, appearance or other characteristics (Becker 1963):

"I am very aware that I have a high-pitched voice, and I'm very aware that I giggle. So, whenever I have conversations, especially with guys, males. I tend to be aware of that. That's typically adjusting my behaviour".

The female entrepreneur in DeepTech comment is an example of how she alters her behaviour. By doing this, one can say that female entrepreneurs are doing what is necessary to fit into the standard. This study provides evidence for Tornikoski and Newbert (2007) work in which they proposed that to become legitimised in the eyes of potential business clients; it may be necessary to hide certain masks. So, this research identified two coping strategies that female entrepreneurs use to deal with gender-based obstacles, based on the perception and opinions held by different studies earlier (Podoyntsyna, Van der Bij, and Song, 2012). These coping strategies include reference group modification and avoidance, as cited by Kibler et al. (2015).

CONCLUSION.

Traditionally, the literature portrays entrepreneurship as a masculine activity (Ahl 2006; Ahl and Nelson, 2010; Calas, Smirch, and Bourne, 2009; Marlow and McAdam, 2015). For instance, women are underrepresented in the media, the frequent use of male notions and highlighting that female entrepreneurs have strange or unusual business models (Achtenhagen & Welter, 2011). Also, most of the entrepreneurship research does not incorporate analyses of aspects that might be unique or particularly relevant to female entrepreneurs such as the tech sector (Henry et al., 2016). Hence, this study sought to explore the experiences of female entrepreneurs of an NTBFS by clarifying their challenges and identifying the coping strategies that enable them to continue their career paths in a work environment which is defined and experienced as male-dominated. NTBFs are firms which are operating in a high-tech or knowledge-intensive industry (Ganotakis, 2012) and have gained growing interest from government, industry and research for its potential contribution to a country economy (Audretsch, 1995; Bertoni, Colombo and Grilli, 2011). However, studies (e.g. Dautzenberg, 2012; Zapata-Huamaní et al. 2019) have shown that entrepreneurs who set up NTBFs are usually men and therefore women face various challenges since they find themselves in a male-dominated work environment.

This research has discovered that women indeed encounter numerous obstacles. For instance, female entrepreneurs are experiencing socio-cultural challenges. As stated by Bruin et al. (2004), female entrepreneurship is hindered by the traditional belief that women's primary role is family and domestic responsibilities. The ascription of women to the family responsibilities (Achtenhagen and Welter, 2003; Welter et al., 2003) and the societal attitude (Bush, 1992) in which female attributes are portrayed as of lesser value compared to men, has led to lower credibility and legitimacy, especially in a male-dominated space. The women of this study have mentioned that they need to have a certain capacity or level to get reliability in their work environment. Therefore, female entrepreneurs themselves root certain feelings, beliefs and opinions that reinforce socio-cultural norms which in turn, limit the women themselves. Also, they have mentioned how their work environment is masked by gendered-social standards which reduce their trustworthiness as entrepreneurs. For example, the female entrepreneurs are questioned about their skills, knowledge or family responsibilities which they experience as something they get asked about because of their gender.

The findings of this study also revealed that female entrepreneurs are the minority, and therefore they experience difficulty in entering male-dominated networks. This result supports the claim by early research (Cooper, Hampton and McGowan, 2009; Verheul, Caree and Thurik, 2009; Barrios and Albizu (2015) in which the general view is that women who establish NTBFs find themselves in a heavily male-

dominated work environment where most of those with whom they network are men. Therefore, women encounter difficulty related to expanding their networks because of the concern of not expressing similar interests and characteristics to the male-members. However, even though the women are the marginalized group, it appears that they do not necessarily want to create their network group such as the 'old boys' networks group. It seems like women-only network groups hold less value in a male-dominated work environment even though it provides critical support for countering feelings of isolation and boosting confidence.

Furthermore, female entrepreneurs in this study face difficulties in securing capital. Gender plays a useful role in this for two reasons. The data (table 1 p.25) illustrate that women's businesses are younger and smaller (Collins-Dodd et al. 2004) which reinforces the claim that firms owned by women underperform, which reflects a gendered prejudice (Marlow and McAdam, 2013b). Also, the investment world is male-dominated meaning that women who are seeking capital rely on male investors since they are not sufficient women who serve as investors. Thus, as suggested by the social capital literature women are excluded from external sources of capital financing since they lack access to crucial funding networks. So, gender plays a role in getting capital, and it is symbolised by personal experiences or assumptions that potential investors' decisions on not investing is not well communicated. Therefore, the women assume that the investors' decisions are coloured by biases (Coleman and Robb, 2014; Gatewood et al. 2003; Orser, Riding, and Manley, 2006).

At odds with the literature, women's education and prior work experience are criticised for not being in engineering or technical areas (Bruin et al. 2004; Fairlie and Robb 2009; Mayer, 2008) which may be necessary for the set-up of NTBFs (Dautzenberg, 2012; Carter and Shaw 2006). Thus, female entrepreneurs in technology will face barriers. However, the finding of this research suggests that educational background and prior experience even though not related to the technology field still have a positive relationship with setting up an NTBFs. Also, the result of this study suggests that the women in this study started a business for socially meaningful motives or self-realisation motives rather than the need or search for harmony between work and family.

Concerning the obstacles female entrepreneurs face in a male-dominated work environment, two coping strategies were identified in this study: reference group modification and avoidance. The four coping strategies involve modification and avoidance. Modification means that female entrepreneurs do not directly or indirectly shape social appraisals of their businesses. The female entrepreneurs instead move from negative reference groups to other, more positive ones who provide higher levels of support for their entrepreneurial activities. For example, female entrepreneurs prefer building a strong relationship with the existing network, then creating a woman-only network group. Therefore, it can be concluded that female entrepreneurs attached more value to the existing

networks and especially one with men in it. The female entrepreneurs in this study the second strategy is called avoidance, implying that female entrepreneurs can find ways to hide or mask specific feminine attributes that provoke negative judgments, such as appearance or other characteristics. The avoidance strategy is symbolised by altering feminine attributes such as clothes and the way of talking. The results of this study add knowledge to the debate on women's educational level and prior work experience in the technology sector. This study has shown that education and prior work experience, even though not related to the technology field, have a positive relationship for venture creation in the technology field contradicting other research (e.g. Arenius and Kovalainen; 2006; Tegtmeier et al. 2016; BarNir, 2012; Dautzenberg, 2012; Carter and Shaw 2006). So, this notion regarding education and prior work experience might encourage upcoming female entrepreneurs to engage in new venturing in the technology sector and not restrict themselves to the service sector where female entrepreneurs are predominantly active. Also, this study extended the knowledge on coping strategies of female entrepreneurs in a male-dominated work environment. While female entrepreneurs recognize that they find themselves in a male-dominated work environment and that they face gender-specific barriers, this study has shown that female entrepreneurs can alter their behaviour and or gravitate towards new social groups that provide higher levels of support for their entrepreneurial activities. Furthermore, the analysis demonstrates that entrepreneurship is seen and portrayed as masculine and thus is not gender-neutral and extends the knowledge on how gendered-social norms influence the confidence and activities of female entrepreneurs.

DISCUSSION.

Female entrepreneurship within technology should be supported, given the nature of labour and the positive impact of technology on economic prosperity. Therefore, a better understanding of the issues surrounding the activities of female entrepreneurs would also help identify ways in which others might be encouraged to engage in new venture creation.

This study demonstrates that the unavailability and non-existence of female entrepreneurs in the technology sector push female entrepreneurs into creating connections with the existing networks, male or female even though the literature suggests that female entrepreneurs prefer to network with each other (Fielden and Hunt 2011; Verheul et al. 2002). Also, those female entrepreneurs understand the need to participate in more diverse networks to increase the development of their firms. Therefore, the majority of the women of this study do not see the necessity of having a women-only network group. Cooper, Hampton and McGowan (2009) on the other hand suggests that, often, other female members in formal networking clubs were not so supportive in a male-dominated environment, while men in those clubs were open to female involvement. This reinforces the image that female entrepreneurs do not support each other in formal networking clubs, especially in a male-dominated environment, continues to impact negatively upon the nature and level of female entrepreneurs' social capital. It is essential to reverse this notion.

According to female entrepreneurship literature, reasons to start a venture is related to the search of harmony between work and family (Mayer, 2008; Kariv, 2012), and therefore can lead them to orient their initiatives to sectors that demand less intense dedication than the technology sector (Ruiz et al., 2012). Yet, the finding of this research opposes this view. The motives for female entrepreneurs in technology are connected to the perception of opportunities rather than they need or the research for harmony between work and family. Also, the limited number of female entrepreneurs in technology reinforces the opinion that women are not typically engaged in this kind of entrepreneurship. Thus, it is of enormous importance to support and profile successful female entrepreneurs in the media, especially in the technology sector.

Concerning future research, studies that focus on male and female technology entrepreneurs experience with gender-based bias would also help to highlight the extent to which the men are aware of gender biases against the women of this study. Also, it will be interesting to study how women's leadership and decision-making are affected by the decision-making behaviours of investors. Furthermore, research is needed into the decision of investors, including how network relationships contribute to that. Additionally, research is also required for the role of the women-only network, especially in a male-dominated environment. It will

also be interesting to study the societal impact (e.g. social performance) of new technologies from a gender perspective. This research concluded that women are more likely to be oriented toward goals with a societal impact, so it will be interesting to see how female and male founders might differ as far as their goals.

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APPENDIX.

I Topic list

Thank you for participating in this study. My name is Rachel Bwatou. I am a Master student in Economic geography at Utrecht University. I am currently doing my Master thesis, and my topic is "Female entrepreneurial experiences in a 'male-dominated' work environment". For this, I'm interviewing female entrepreneurs who start and run a technology-based firm. During this interview, I will discuss several topics related to your educational background, previous experience, your industry, challenges you face as a woman in your industry and your coping strategies to those challenges. All the information shared today will be shared with my supervisors and other participants; however, the interview is anonymous. Also, is it ok with you for me to record this call/video to transcribe it later, please? Finally, I might make a few notes in case I want to come back to something then, is that ok, as well?

Topics	Possible follow-up questions
Motivation & previous work experiences	<ol style="list-style-type: none"> 1. What was your primary motivation to start your company? <ol style="list-style-type: none"> a. As a female in society, how did your life experiences affect your entrepreneurial motivation? b. Do you have relatives, friends or perhaps any acquaintances who are or were entrepreneurs? And have you been inspired by any them? 2. Could you walk me through the period of starting your own business? <ol style="list-style-type: none"> a. Could you mention your previous experiences, briefly? How did you utilise your past experiences to become an entrepreneur? b. Is this your first company/business? c. How is your prior work experience related to this position?
Women in technology-based industry	<ol style="list-style-type: none"> 1. What attracted you to the technology-based industries? <ol style="list-style-type: none"> a. How would you describe being a woman in the technology-based industries? b. From your point of view, what are the pros and cons of the technology-based industries? c. Do you think that your industry is a male-dominated one? How does that impact your work? (ask for examples)

	<ol style="list-style-type: none"> 2. Based on your experiences, do you feel that men and women are treated equally in your industry (Please tell me more about that)? 3. Do you think that being a woman influenced your career path (in the technology-based industry)? <ol style="list-style-type: none"> a. <u>If so</u>, in which way and how? <u>If no</u>, what was the most critical factor in reaching your aims?
<p>Experience with obstacles of women in technology-based industry</p>	<ol style="list-style-type: none"> 1. How did your education (s) prepare you in establishing your current company/entrepreneur? <ol style="list-style-type: none"> a. What challenges did you face regarding your educational background in establishing your company? 2. What is your thought on your current existing professional network? <ol style="list-style-type: none"> a. Are you part of a professional network group? If so or not, why? b. I was wondering if it is helpful to have a woman only network group? 3. What kind of investment did you raise for your company? If so, can you tell me about the process? <ol style="list-style-type: none"> a. What kind of unique obstacles did you face regarding raising capital for the venture? b. Reflecting on these obstacles, do you think that you have faced it because you are a woman? If yes/no, elaborate, please 4. What are the most critical challenges you have faced in your industry? <ol style="list-style-type: none"> a. What do you think are the possible reasons for these challenges? b. Reflecting on these challenges or other challenges exist because you are a woman?
<p>Coping strategies on the obstacles</p>	<ol style="list-style-type: none"> 1. How have you tried to overcome these obstacles (education, motivation, work experiences, funding or network) you mentioned? <ol style="list-style-type: none"> a. Which of your characteristics helped you to overcome the challenges? b. Did you receive professional support from a person, organisation, or institution?

	<p>i. <u>If yes</u>, what was their role in supporting your venture? Did they meet your expectations, and why? <u>If no</u>, what was the reason for choosing not to receive support?</p>
<p>Lastly, if you do not mind, can I add some brief personal questions about your life? But you do not have to answer those.</p>	<p>How old are you?</p> <p>Do you have children?</p>
<p>Close up</p>	<p>What tips/advice do you have for other women who would like to start their businesses?</p> <p>Is there a question I did not ask but should have?</p> <p>Anyone else that would be useful to speak to? A name?</p>

II Code tree

Name	Description
<i>Characteristics of the work environment</i>	Every mention on describing the sector/industry by the respondents
Difference between men and women in the industry	Every mention on the difference between men and women
<i>Experience</i>	Every mention of personal experience, negative, neutral or positive in having a firm in male-dominated work environment
Not perceived obstacles	Every mention of experienced obstacles by the respondent themselves
Women's motives	Every mention about the female entrepreneurs motivation to start a business
Opportunity motives	Women start a business because they see an opportunity (e.g. social need)
Necessity	Female start a business out of necessity (e.g. employment, flexibility)
The role of human capital for female entrepreneurs in setting up an NTBFs	Every mention of education or prior experience influence on setting up business an NTBFs
Education	Every mention of educational background relatedness to setting up an NTBFs
Prior (work) experiences	Every mention on prior experience relatedness to industry or technology profession
Perceived obstacles	Every mention of experienced obstacles by the respondent themselves
Socio-cultural beliefs and attitudes in a male-dominated work setting	Every mention of belief and attitude towards women in a male dominated world
Female founders	Every mention of the women self-image

themselves-belief and feelings	
The influence of gender on getting funds in a male-dominated setting	Every mention of challenges respondents faced regarding getting funds in establishing a NTBFs
Social capital in a male-dominated setting	Every mention of challenges respondents faced regarding establishing a professional network
Opinion on existing networks in NTBFs	Women opinion on their current professional network
Opinion about a network group	Every mention about men-only and women-only network group
<i>Coping strategies on the experienced obstacles</i>	Every mention on how deal with the obstacles they are facing or have faced in establishing NTBFs
Active negotiation	Respondents changing the opinions of social reference groups from negative to positive
Passive negotiation	Every mention that the dominate members in the industry come to adopt a more positive outlook on female entrepreneurs
Modification	Respondents altercation of their social environment (e.g. professional network)
Avoidance	Respondents hide or mask certain symbols or traits † in fear of being judge as 'outsiders' (e.g. feminine traits).