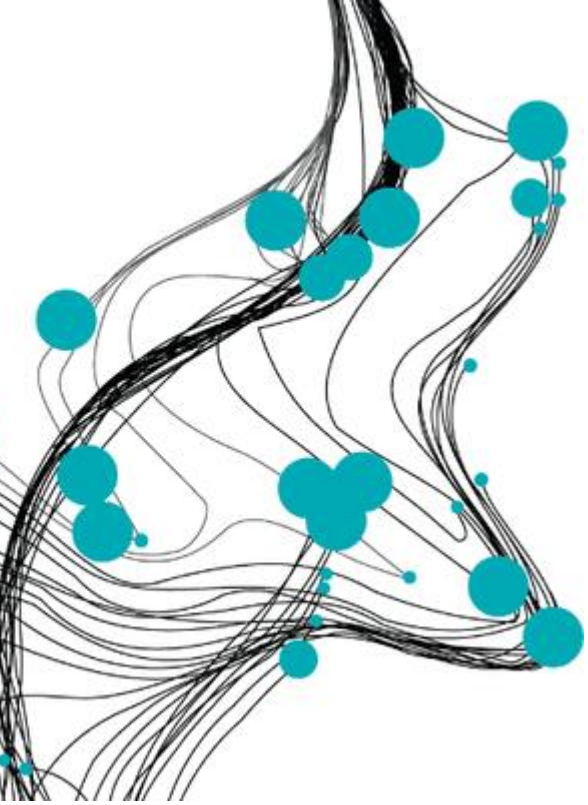

UNIVERSITY OF TWENTE.

Faculty of Behavioural,
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Should I stay or should I go?

STEM jobs & women's perceptions about organisational climate

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MANAGEMENT SUMMARY

The emancipation of women on the labour market has never grew faster than in the last couple of years. However, the number of women in science, technology, engineering and mathematics (STEM) stay far behind. The number of women in STEM even experience a double decline. At first, at graduate level because far more men choose a STEM education in comparison to women. And in addition, previous research has also shown that women will leave STEM at a higher rate than men. In this research we base the extra value of more women in STEM on the benefits of a diverse organisation. Research has shown that diverse organisations can create more creativity, innovation, market insights and improved problem-solving. More creativity, innovation and competitiveness are vital for STEM because they often have to deal with very complex problems and situations.

There are multiple reasons found in previous research for the underrepresentation of women in STEM. Main reasons are cognitive gender differences, the lack of female interests and the influence of work-life balance and work place bias in STEM organisations. The goal of this study is to research the influence of organisational climate on the withdrawal behaviour of women in STEM. Within this study we defined two relevant types of organisational climate: organisational supportive and justice climate. Based on the literature we defined two research questions for this study. First, what is the influence of the perceived organisational climate on the withdrawal behaviour of women in STEM jobs? And, secondly what are the perceived characteristics of such work climate?

In this study, a qualitative research method was used in two large organisations in the region of Twente in the Netherlands. In total there were 11 interviews conducted and one additional interview with a HR director of one of the organisations. Interviews were conducted with 7 female STEM employees, 2 HR managers and 2 managers of STEM departments. We chose to interview people from different jobs, departments and with different sexes, because we wanted a broad in-depth view from both of the organisations. The data was collected through unstructured interviews.

We found in our study that almost all women in STEM that we have interviewed were positive towards the supportive and justice climate within their organisation. Beside some minor individual incidents they all experienced equal opportunities, possibilities and treatment within their organisation. The minor incidents should not be overlooked, but they were often described as minor incidents caused by individuals in a group. Women are happy within their jobs and they had a high rate of work commitment. These positive climate experiences lead to a low rate of withdrawal behaviour of these women. However, they do experience a social pressure outside the organisation. This comes from norms and values, the way of thinking and the climate within a society. Many women described certain stereotypes that originate from a national climate in the Netherlands. This climate is more negative towards women's emancipation and women in STEM. This results is in line with results from other studies because the Netherlands is one of the lowest scoring countries on women in STEM.

From the findings we can conclude that the results aren't completely in line with our thoughts beforehand. The women were more positive towards the organisational climate than you would expect from previous studies and findings, there was a positive experience towards the supportive and justice climate and therefore there also was a low rate of withdrawal behaviour. Based on this study we conclude that the low number of women and the high rate of withdrawal behaviour of women isn't directly caused by the organisational climate. However, a negative climate within a country or society towards women in STEM which consists of negative stereotyping, expectations and bias can influence the climate within an organisation. This can also be one of the main reasons for the low number of women in STEM here in the Netherlands.

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Introduction

Over the past decade the number of working women in the Netherlands has grown faster than ever, outperforming the acceleration pace of the number of working men (CBS, 2017). According to the Central Bureau of Statistic (CBS) there were 4 million working women in the third quarter of 2017 against 3.6 million in 2007. For men there were 4.6 million working in the third quarter of 2017 against 4.5 million ten years ago (CBS, 2017). Even though the participation of women on the labour market is growing, the number of women working in science, technology, engineering and math jobs (STEM) stays behind (McKinsey, 2017). A striking indication is that the number of women choosing a technical or a STEM oriented education increases, but the number of women who are actually employed in STEM stays unchanged or decreases. According to the CBS (2016) 47 % percent of the 55 thousand men between 25 and 30 years who finished a technical education chose a technical profession. For women this percentage is much lower, because of the 15 thousand women who finished a technical education, only 29 percent actually chose a technical profession. Of the people who don't choose a technical profession appropriate for their education, more women than men choose for a profession that is commercial, creative or linguistic. The fact that there are fewer female technical graduates than male graduates not only applies to the Netherlands but also for the rest of Europe. However, the percentage of female technical graduates is much lower compared to other countries. In 2014 only 3 % percent of the women that graduated had a technical education. Only Ireland and Luxembourg had a lower percentage. So in this area, the Netherlands is really one of the hindrances (CBS, 2016).

Also according to a Labour Market Behavioural Research (LMBR) of the Intelligence Group (2012) only 31 percent of all the technical educated women still works in a technical profession. In contrast to the men were 54 percent still works in a technical profession. Compared to the men, there are relatively few women who still work in the technical sector after their 40th. What also stands out in comparison with this fact is that most of the women are higher educated than men. Of all the male technicians 21 percent has a HBO degree and 5 percent an university degree and of all the female technicians 41 percent has a HBO degree and 14 percent an university degree (Intelligence group, 2012)

What is remarkable is that the women that actually graduate with a degree in technical education and are suitable and interested in the STEM working field often don't pursue this career (VHTO, 2017). It means that the representation of women in STEM experiences a double decline: firstly, at the graduate level and secondly, in the transition to the workplace. On top of it, women leave STEM fields after a short period of work engagement, at a higher rate than do their male peers (Hewlett, Buck Luce, Servon, Sherbin, Schiller, Sosnovich and Sumberg, 2008). Women in STEM-related occupations are significantly more likely to leave their occupational field than women in other professional occupations, especially early in their career (Glass, Sassler, Levitte & Michelmore, 2013). Glass et al. (2013) followed female college graduates in the National Longitudinal Survey of Youth (1979) and compare the trajectories of women in STEM-related occupations to other professional occupations.

So there exists an observed and documented difference between the number of men and women in studying and working in STEM fields. However, relevant questions that arise from this observation are whether this difference is problematic, and what the extra value of women participation in STEM fields is. Moreover, one can rightly ask if there are enough men for these job fields, why is there a need for women?

Our answers to these questions would support a need to increase the inflow of female workers in the STEM field. First, research has shown that a diverse workforce creates better designed services, and scientific and technological products and solutions are better designed and represent all the users (Hill et al., 2010). For example, the first generation of automotive airbags was generated by a

predominantly male group of engineers, which resulted in avoidable deaths for women and children (Margolis & Fisher, 2002). Secondly, as Wegge, Roth, Neubach, Schmidt and Kanfer (2008) found, there is a significant effect of gender diversity on group performance. Gender-diverse teams perform better and have less health disorders than teams with a high proportion of mono-gender workforce. Third, gender diversity is shown to have an overall positive linear effect on employee diversity (Ali, Kulik and Metz, 2011).

Theoretically, positive relationships between gender diversity and performance is often explained by followers of the Resource-Based View of the firm (RBV). According to the RBV, a firm gains a sustained competitive advantage if it takes advantage of its valuable, rare, inimitable and non-substitutable resources (Barney, 1991). Barney (1991) suggest, based on past empirical research, that intangible and socially complex resources such as employee competence are a better source of sustained competitive advantage than tangible resources such as scale of operations. The research of Ali et al. (2011) argued that organisational gender diversity is a source of intangible and socially complex resources that provide an organisation with a sustained competitive advantage. Creativity and innovation, market insight and improved problem-solving are intangible and socially complex resources that are attributed to gender diversity (McMahan, Bell & Virick, 1998). Female workforce is found to make a special contribution to innovation, creativity and competiveness; that gains its vital importance in STEM fields because they often have to deal with very complex problems and situations (Hill, Corbett and St. Rose, 2010).

Besides the benefits of more women in STEM for organisation, there are also important factors that influence women's emancipation in STEM. Scholars raise the issue of the wage gap that exists between men and women working in STEM (Arulampalam, Booth and Bryan, 2007; Hill et al., 2010). Women earn less than men in STEM jobs, just as they do on average in the overall workforce, however women in STEM jobs tend to earn more than women in other professional occupations (National Association of Colleges and Employers, 2009). Therefore the opportunity for women to pursue a career in STEM jobs is also a matter of a higher pay and pay equity.

Considering reasons for female underrepresentation

After we outlined documented observations about gender-related differences existing in STEM jobs, we move towards discussing reasons to explain this observation. Not only the presence and the importance of women in STEM jobs is important but also the reasons of why there is currently a difference in presence and turnover between men and women in STEM jobs. In previous research they found multiple causes of the female underrepresentation in STEM fields. For example, the research of Wang and Degol (2016) found six empirically supported factors as the leading perceived causes of the female underrepresentation: cognitive ability, relative cognitive strengths, career preferences, lifestyle values, field-specific ability beliefs, and gender-related stereotypes and biases. These factors strongly match with the findings of the research of Hill et al. (2010) where the authors present eight research findings that provide evidence that social and environment factors contribute to the underrepresentation of women in STEM: beliefs about intelligence, stereotypes, self-assessment, spatial skills, the college student experience, university and college faculty, implicit bias and workplace bias. The academic research on this topic has actually three main themes that emerge from the literature (Hill et al., 2010). First, there is the notion that men are mathematically superior and innately better suited to STEM jobs than women (Hill et al., 2010). Also a lot of articles address the cognitive gender differences as an explanation (Hedges & Nowell, 1995; Kimura, 2002). Secondly, there is the theme that girls lack interest in STEM in general. And thirdly, this theme involves the STEM workplace and organisations with issues that range from work-life balance to work place bias.

Another cause of underrepresentation that is mentioned in the research of Hill et al. (2010) is the nature of work and the departmental or organisational climate that surround STEM jobs. Hill et al. (2010) mention in their report the study of Trower (2008) among 130 universities and colleges, the goal of this study was to explore whether levels of satisfaction differ significantly by gender and academic discipline. Within the climate category of the research, Trower (2008) identified ten climate dimensions related to faculty satisfaction that are "actionable". Such as fairness of evaluation by the immediate supervisor or interest of senior faculty in your professional development. In their research they found that the nature of work and the departmental climate were the most important factors predicting job satisfaction, and the two factors were equally important for both men and women. They found that female STEM faculty were less satisfied than male faculty, and especially the sense of fit was the most important climate factor predicting job satisfaction. Sense of fit says something on the "fit" of a person in their department, so their sense of belonging in the right department or organisation (Hill et al., 2010). In this thesis, we define organisational climate as the meaning attached to policies, practices and procedures employees experience, the share perceptions and the behaviours they observe getting rewarded and that are supported and expected (Ostroff, Kinicki and Tamkins, 2003; Schneider, Ehrhart and Macey, 2011).

The goal of this study is to research the influence of perceived organisational climate on the withdrawal behaviour of women in STEM jobs. We will first analyse previous literature about organisational climate and withdrawal behaviour of women in STEM. We will then describe our research methods and thereafter we will describe the results of our research. Finally, we will discuss the results and describe the limitations and recommendations for future research.

The influence of organisational climate on the work commitment of women in STEM jobs

Gender segregation

A conventional wisdom dictates that the segregation of men and women in work and careers begins at a very early age, men and women or maybe better to say boys and girls conduct actions and activities that are relevant to their later careers. Some would argue that this process starts at the beginning of high school, where boys and girls choose topics and courses where they think of is likely for their following career. But it will be even more crucial when these high school graduates have to elect their college courses, where many young men and women elect different majors which produces gender differences in the type of job that are seen as plausible by the students for their career (AAUW, 1992). Granovetter, Tilly and Tilly (1988) state that because of this early gender segregation it is not surprising that the labour market matching processes, such as recruitment and selection, are highly segregated by gender. This means that even when all gender discrimination at the point of recruiting or hiring will be left out, there still will be considerable gender segregation because the different and apparently voluntary choice of men and women to choose different career paths (Correl, 2004).

Within the scholarly tradition of the labour market matching processes, researchers are inclined to relativize the problem of gender differences in the labour market and the job supply network. They assume that the differences in men's and women's choices in their career and/or jobs are caused by the assumption that men and women have different tastes, preferences, or ways of maximizing utility (Correl, 2004). For example Human Capital theorists have argued that women know when they will likely need to take an extended absence for child birth and/or care, so they chose jobs with flatter rates of wage growth because these jobs, which are primarily female-dominated jobs, have smaller wage penalties for prolonged periods of absence from work and have higher starting wages (Polacheck, 1976; Zellner, 1975). But Human Capital theorists have failed to answer the question why

men and women elect different careers and jobs. Glass (1990), for example, has shown that male-dominated jobs compared to female-dominated jobs are actually linked with more flexibility and autonomy. So it is logical to assume that women don't maximize their ability to coordinate family and paid work duties or their earnings by working in female-dominated jobs. While biological gender differences in tastes, interests and preferences may play a role, it isn't the whole story about the big difference between men and women in STEM jobs.

Various explanations for gender gap in STEM

Wang and Degol (2016) have reviewed, research from the past 30 years in the fields of psychology, sociology, economics and education in order to find explanation for US women's underrepresentation in STEM jobs. They found six reasons or explanations for the underrepresentation of women in STEM fields: cognitive ability, relative cognitive strengths, occupational interests or preferences, lifestyle values or work-family balance preferences, field specific ability beliefs and gender-related stereotypes and biases. These six reasons or explanations are strongly matched to the findings in the report of Hill et al. (2010) where they found eight important findings that provide evidence that social and environmental factors contribute to the underrepresentation of women in science and engineering. They found (1)cognitive ability, (2)relative cognitive strengths, (3)occupational interests or preferences, (4)lifestyle values or work-family balance preferences, (5)field-specific ability beliefs and (6)gender-related stereotypes and biases.

The similarities between the studies of Wang and Degol (2016) and Hill et al. (2010) are that the explanations of them for the difference between men and women in STEM jobs all fall under three main themes. Such as the mathematical 'superiority' of men as explained as the cognitive ability, relative cognitive strengths, beliefs about intelligence and spatial skills in the two studies (Wang & Degol, 2016; Hill et al., 2010). Subsequently, the two studies found a lack of girls' interest in STEM however this interest is also influenced by the society and their environment. Wang and Degol (2016) found occupational interests or preferences as one of the reasons for the difference between men and women in STEM jobs. However, Hill et al. (2010) explain this 'lack of interest' more as the social and environmental factors that influence the underrepresentation of women in STEM fields. For instance Hill et al. (2010) have found that the mathematical skills of women have advanced strongly in the recent decades, and the increase in "mathematically gifted" women proves that the right education can and does make a significantly difference at the highest levels of mathematical achievement. And this finding suggests that there is not only a biological explanation at work for the gap between men and women in STEM fields, as was thought many years ago. The contradiction of the increase in women scoring high scores on math tests and the actual number of women working in STEM, suggests that there are also cultural and social factors that are influencing the choice of women to pursue a career or job in STEM. The third main theme consist the issues involving the STEM workplace, work-life balance, bias and stereotypes. Such as the implicit bias that consists of the less conscious beliefs underlying negative stereotypes and continue to influence assumptions about people and behaviour. According to the gender-science test, that began in 1998, more than 70 % of the test takers more readily associated males with science and females with arts than reverse (Nosek, Banaji & Greenwald, 2002). This finding indicate a strong implicit association of female with arts and male with science among both women and men of all races and ethnicities. Besides the implicit bias, Hill et al. (2010) also state the workplace bias as one of the explanations of the difference between men and women in STEM jobs. The research of Heilman, Wallen, Fuchs and Tamkins (2004) suggests that people tend to view women in "masculine" job, as either competent or likeable but not both. Lastly, both studies found stereotypes as an explanation for the underrepresentation of women in STEM jobs. Such as the differences in parental support for math and science occur at very young ages, with parents discussing and explaining science content more often to boys than girls despite a lack of gender differences in the

number of child-initiated science initiatives (Crowley, Callanan, Tenenbaum & Allen, 2001). Hill et al. (2010) also found the existing stereotypes towards women in "masculine" jobs or STEM jobs. And that negative stereotypes affect women's and girls' performance and aspirations in math and science.

Organisational climate theory

According to Macey, Schneider, Barbera and Young (2009) 'getting everyone on the same page' is crucial to utilize the people and the resources of an organisation the best way possible, and to use these resources for the biggest advantage. Therefore, executives see alignment of the strategy and the execution of the strategy as a necessity. The challenge for the executive(s) is to create conditions within the organisation so that the behaviours that create competitive advantage are sustained. The key to the alignment of the strategy with the employees who create competitive advantage is the organisational climate construct thinking. Schneider, Ehrhart & Macey (2011) created a model where a *"focus on process issues (fairness, ethics) through practices and behaviours (climate) as well as socialisation and stories (culture) can produce a sense of employee well-being (climate) by demonstrating that the organisation values people (culture)"* (p43.) Organisational climate is defined as the meanings that people at work attach to the interrelated bundles of their experiences. Organisational climate should not be confused with the organisational culture, because the organisational culture is defined as the common basic assumptions, value and beliefs that characterize a setting and are transferred to new employees as the right way of thinking and working within the organisation. This could be done by telling stories or communicating myths within the organisation, and is part of an internal integration (Zohar & Hofmann, 2010)

Within the research of Hill et al. (2010) they found that the nature of work and the departmental climate were the most important factors predicting job satisfaction. They concluded in their research that there was a big difference in the satisfaction on departmental climate between men and women. In their research they tested departmental climate with ten identified climate dimensions: fairness of evaluation by immediate supervisor, interest senior faculty take in your professional development, opportunities to collaborate with senior colleagues, quality of professional interaction with senior colleagues, quality of personal interaction with senior colleagues, quality of professional interaction with junior colleagues, quality of personal interaction with junior colleagues, how well they "fit" (i.e. their sense of belonging) in their department, intellectual vitality of the senior colleagues in your department and fairness of junior faculty treatment within their department (Trower, 2008). The results of their research were striking, because the female STEM faculty that participated in this research were less satisfied than their male colleagues on all the ten factors. Three out of the ten factors were significantly less satisfied: sense of fit, opportunities to collaborate with senior colleagues and the perception of fair treatment of junior faculty in one's department (Hill et al., 2010).

Types of climate

According to Schneider (1975) there is no single type of organisational climate, but multiple organisational climates. Early research on organisational climate (e.g. Litwin & Stringer, 1968) was mainly focused on the whole or overall climate of an organisation, called the molar climate. However, organisational climate consists of multiple levels and therefore organisations typically have more than one overall climate. Schneider et al. (2011) refers to climates that are specific for important aspects of organisational functioning as strategic climates. According to Schneider et al. (2010) there should be a fundamental shift in the conceptualisation of organisational climate. Because organisational climate should instead of a macro-level, generic and generalizable construct, be conceptualised as a domain-specific or functionally specific construct. For example, Schneider's (1975) original research and arguments for a domain-specific construct focused on a climate for customer service. Within this climate construct the focus was on the shared perceptions within an organisation regarding the treatment of customers or clients (Schneider, 1980). Research has shown that a positive climate for service is actually associated with a higher level of service quality provision. Subsequently, researchers

have also defined several other types of climate, such as safety climate, efficacy climate and control climate. Safety climate refers to employees' shared perceptions of the value of safety within the work environment (Griffin & Neal, 2000). The efficacy climate refers to construct of self-efficacy of Bandura (1997) where self-efficacy represents individuals' beliefs regarding the likelihood that a particular course of action or behaviour can be carried out. And the control climate refers to the degree employees perceive the amount of control over their work, for example scheduling and how they approach their work.

As Schneider (1975) initiated the conceptualisation of organisational climate should be as a domain-specific or functionally specific construct, so there should be a "climate for ..(something)". So if there should be a climate for gender diversity within an organisation, there should be a climate that would be supportive and where employees feel treated and supported equally. In the research of de Clerq and Rius (2007) they also found support for the relationship between individual's perceptions of organisational climate and their organisational climate. They found a relationship between individuals' perceptions of organisational climate and their organizational commitment. The results of the studies suggests that individuals who perceive their work environment as safe and meaningful are more likely to invest in their employment relationship (Clerq and Rius, 2007).

Organisational work climate and withdrawal behaviour of women: Towards the research framework

Within this research we use two types of climate we believe is relevant towards the withdrawal behaviour of women: justice and support. Justice refers to the shared perceptions of employees concerning the norms of fair treatment and equity within an organisation (Rupp, Bashshur and Liao, 2007). The perceptions of fair treatment and equity can exist through multiple levels of the organisation. For instance, the organisational as a whole, work units or departments and for small work groups. So employees can hold different levels of justice climate perceptions through these different levels within the organisation. The roots of this justice climate lies in the equity theory of Adams (1963), this theory states that people have a congenital demand of being treated fairly. In the core this means that people want to get rewarded within a social exchange fairly, so that they get rewarded proportionally for what they put into it. From this equity theory of Adams (1963) researchers have extended this theory towards a justice theory. And this justice theory states that people or employees have the desire to be treated fairly in all of their transactions within their organisational settings (Colquitt, 2001). A great deal of research has explored different types of justice perceptions. Liao and Rupp (2005) crossed three types of justice (procedural, informational and interpersonal) with two foci (organisation and supervisor). Procedural justice refers to the honesty or fairness of procedures that are used to determine outcomes that are important to employees, such as pay raises or even disciplinary actions. A number of criteria may contribute to employees' perceptions of a fair decision process (Leventhal, Karuza & Fry, 1980): consistency, neutrality, accuracy, correctability, representativeness, morality and ethicality. Informational justice refers to the perception of employees how well they get informed within the organisation. This could be for example about important developments within the organisation or even big changes within the organisation such as big layoffs. The third perception of justice is the interactional justice, and this reflects the fairness of the treatment of employees regarding policies and procedures of the organisation. For instance a fairly treatment with respects and dignity of employees during performance reviews. People's perceptions of fair treatment can be enhanced by some key aspects of interactional justice (Bies & Moag, 1986): truthfulness, respect, propriety and justification. Well-designed systems that provide these three types of justice perceptions will profit both the individual and the organisation. An individual can respond different ways to perceived injustice with varying types of damage on the organisation. Employees that might feel be treated unfairly can respond in four different ways (Turnley & Feldman, 1999): exit behaviours, withdrawal behaviours, voice behaviours and loyalty behaviours.

These authors point out that widespread injustice would enable group members to validate their co-workers' perceptions of injustice on the basis of their own perceptions of injustice, and vice

versa. Therefore, an individual's attitudes and behaviour are influenced not only by his or her own justice experiences but also by the knowledge about how others are treated in the group.

In an organisational environment with supportive organisational climate, employees experience that they are valued, their needs are taken into consideration by their organisation and for this reason they do not hesitate to exert effort and devote time in activities related with their organisation (Randall, 1999). Social support within an organisation is a part of the supportive organisational climate, this could be support of colleagues, managers and the organisation as a whole (Cohen & Wills, 1985). Mercer and Bilson (1985) also found that supportive organisational climate was related to desired organisational outcomes such as organisational commitment and job satisfaction. This could be explained by the generalized beneficial effect of social support namely because large social support provide persons or employees with regular positive experiences and a set of stable, socially rewarded roles within the organisation. And this kind of support could be related to overall well-being because it provides positive affect, a sense of predictability and stability in someone's job (Cohen & Wills, 1985).

Supportive climate is related to the commitment of employees to their organisation (De Clerq & Rius, 2007; Mercel and Bilson (1985). This supportive climate is stimulated by social support through colleagues, managers and the organisation as a whole. But women in "masculine" fields, such as the STEM fields, are often either viewed as competent or likeable but not both (Heilman et al., 2004). Heilman et al. (2004) found that when success in a male-job was ambiguous, a woman was judged as less competent than an identically described man, although she was rate equally likeable. When women were working in a male-type job and they were clearly successful, they were rated as equally competent as their male colleagues, however they were rated less likeable and more interpersonally hostile. Interpersonally hostile could be interpreted as more 'cold', pushy or conniving. These results were not found in fields that were more "female" or gender-equal (neutral). So this judgement of colleagues could influence the perception of women in organisation and this could negatively influence their experienced social support or supportive climate.

Based on our theoretical framework we have formulated two research questions for this study. Firstly, what is the influence of the perceived organisational climate on the withdrawal behaviour of women in STEM jobs? And, secondly what are the perceived characteristics of such work climate?

Research methodology

The choice for the explorative research method

This study is explorative because in this study we intend solely to explore the research questions rather than offering a final answer or conclusive solutions. In our research there are more questions than answers, although the gap between men and women in STEM jobs has actually been studied and researched before (Hill et al., 2010; McKinsey, 2017). There have been multiple conclusions within these studies on the reasons of why there is a gap between men and women in STEM jobs and also recommendations on how to reduce this gap. However yet the issue remains unsolved, as the recent McKinsey (2017) report has shown. It allows to assume that there should be undiscovered reasons, conditions and factors that play a role on underrepresentation of women in the STEM jobs. It leaves still space for an open explorative investigation. In the theoretical chapter we have suggested to theorise the women withdrawal behaviour on the basis of organisational support and justice climate. With this, we suggest to move the gender STEM research arena towards organisational level support factors, a fairly unexplored field so far. As a result, we will offer new directions for the future steps in the new gender STEM research (Saunders, Lewis & Tornhill, 2012).

The choice for the data collection

The data of this study is qualitative and is collected through unstructured open interviews. We believe that unstructured interviews fit best with the goal of this study and its explorative nature. We searched

to interpret meaning from these data that helped us understand social or in this case professional life through the study of women in STEM jobs.

We chose for an one-method study because we believe that we can gain the best in-depth insights on the experiences work climate of women within STEM organisations. Next to the use of qualitative data we also wanted to use case studies to analyse the policies of both organisation regarding gender- or women policies. However within both organisations there were no direct policies regarding gender or women available.

Research techniques

The research technique within this study is the use of in-depth interviews because the topics within the research are subjective feelings and reactions and are commonly "sensitive" topics (Renzetti & lee, 1993). Respondents in this studies are commonly selected on the basis of being, or being in an unsettling, disturbing or unique situation. Within this case it's about women in male dominated organisations. This type of interview target the respondents' perceptions and feelings rather than the social conditions around those experiences. So the collection of the interview material and its interpretation and analysis are not primarily focussed on establishing "objective facts". The primary aim of these in-depth interviews is to generate data which give an authentic insight into people's experiences. The in-depth interview was constructed by five main topics that are based on the theoretical framework of this study. The five topics are support, justice, happiness, work commitment and withdrawal behaviour. The perceived support and justice within the organisation will affect the happiness and work commitment of an employee. This could in the end lead to withdrawal behaviour of this employee. The interview protocols can be found in the appendix (1, 2 & 3). We have interviewed 11 employees distributed over the two organisations. We have interviewed 7 females that were currently working in a STEM job, 2 male managers that currently were supervising a STEM department with female employees and also 2 HR managers of both of the organisations. One female HR manager and one male HR manager. The length of the interviews were around 45-60 minutes on average. The transcribing of the interviews took around 4 hours per interview, so in total the transcribing took around 45 hours.

Besides the use of unstructured interviews we have also used documents and files to collect data regarding the exploration of reasons and explanations on the gap between men and women in STEM jobs. Next to the 11 in-depth interviews we have also interviewed one HR director of one of the companies to learn more about the gender-policy within this organisation.

Sampling of companies

For this study we have selected two large companies in the east of the Netherlands, in the region Twente. The selected companies are large companies with a solid background in the STEM fields. One of the organisations is a big tire manufacturer and has around 1800 employees worldwide. The other organisation is a key player in keeping the public safe and secure, guarding vital infrastructure and protecting the national security interests of countries around the globe. It is a large international organisation with approximately 65.000 employees worldwide. In the branch where the interviews were conducted work around 1500 employees. These organisations were selected because they have a strong relationship with STEM, where one organisation really relies on high-tech software-, electronic systems-, physics-, and mathematics engineering and the other organisation is more focussed on industrial- and manufacturing engineering and operational excellence. We believe that these two organisations combine a broad field of different type of STEM jobs and therefore provide different views from different angles within STEM. We approached in total two companies and both of these two companies agreed to participate with this study. Within the two organisations there were multiple

people within different type of jobs, such as system-, material- and quality engineers, product line managers, technical planner, STEM supervisors and HR managers, approached to participate in the interviews. By interviewing different types of jobs, we believe that we could get a broader view on this subject. Therefore, we could compare different point of views and perceptions by different people through the organisation. The first selection of respondents was done by the HR department of the organisations, thereafter the communication with the respondents was directly done with the researchers.

Analysis of data

All interviews were recorded with the consent of the respondents and subsequently a transcript of all recordings was written. By recording it and then transcribing it, we tried to stay close as possible to the reality and therefore enhance the reliability of our research. The transcriptions were written on almost literal detail level, except for the body language and facial expressions of the respondents. The directly interesting and striking parts of the interviews were literally transcribed in order to describe the quotes of the respondents within the results.

The first step in analysing the transcriptions was open coding. All transcripts have been analysed and all texts has been divided into different themes or constructs that where based on the literature. Subsequently, all pieces of texts in these different constructs were compared to each other by means of axial coding. In our study, the different pieces of texts in the various constructs were divided on the basis of positivity and negativity. Negative experiences in a certain subject were given a red colour and a positive experience a green colour, moderate experiences received an orange colour.

Trustworthiness

We ensure and describe the trustworthiness of this qualitative research through four criteria constructs: credibility, transferability, dependability and confirmability (Guba, 1981). One of the key criteria of qualitative research is that of internal validity, in which they seek to ensure that the study measures what is actually intended. We ensured the credibility of our research through the use of a development of an early familiarity with the culture of the participating organisations before the first data collections. We have also used triangulation, iterative questioning and frequent debriefing sessions in order to ensure the credibility. We first met with the HR director and HR business partner of the two organisations for the development of an early familiarity with the culture of the participating organisations, we discussed the history of the organisations within this topic and the process and topics of our research. Through triangulation we ensure that the research study's finding are credible. For us the main point of triangulation is to gain good understanding from different perspectives of an investigated phenomenon. We tried to increase the level of knowledge about this topics and to strengthen our standpoint from various aspects. Such as two different companies who operate both in STEM but are not exactly similar, also our respondents work in different kind of STEM jobs to capture different dimensions from different angles. Through the use of different samples we also tried to enhance the transferability. Through iterative questioning we tried to get most honest and sincere answers of respondents on our topics. We often rephrased questions and followed questions up to get the most detailed and in-depth answers. To ensure the credibility, the objectivity and the confirmability we had frequent debriefing sessions within or study group with our supervisor to discuss and seek for alternative approaches. Through the above mentioned measures we guarantee the dependability of our research, which means that our study could be repeated by other researchers and that the findings would be consistent.

Results

Organisational justice climate

In contrary to results that were found in the study of Hill et. al. (2010) most of the women we interviewed felt that they work in a just climate and organisation. Such as the procedural and informational justice they perceive within their organisations. They feel that there is no difference between men and women regarding the honesty and fairness within procedures, disciplinary actions and how they get informed in the organisation. The majority of them felt interactional justice such as fairness regarding policies and procedures but also in the mutual relationships with managers and colleagues.

"*I never had the feeling that I was treated differently than my male colleagues".* (R-9)

"I don't see any differences in this and I also have never heard from of other colleagues either". (R-1, on the question if they ever feel threatened differently compared to men)

However there are also examples of perceived injustice such as unfair treatment, lack of respect and the feeling women have to work harder in order to prove themselves. The mentioned negative stories and experiences are often stories about the behaviour of individuals.

"You just notice that you are treated very differently. They really saw me as a 'girly girl'. [..] *I was treated differently as a woman. He really treated me like a young girl, it was very frustrating. With my male colleague he just interacted normally".* (R-3)

"When I just started I really had to prove myself. More than my male colleagues, I believe". (R-8)

"I have heard that women felt that they started with 0-1 behind. I think it also has to do something with history, that women often have to prove themselves more than men". (R-10, HR manager)

The negative experiences were pretty tough for some women, but most of them were never really deterred by this. They described it as a difficult situation, but they did not feel that it was determined by a climate within the organisation. The behaviour of individuals was responsible for these negative experiences and the negative behaviour towards women. In addition, some women described a feeling that they had to prove themselves more than men would, but they didn't mentioned it as a really big problem. They mostly mentioned they were already used to it because they already experienced this during their studies. Overall there was a positive feeling towards the justice climate within the organisations, the negative experiences were more described as incidents than as deep-rooted problems within the justice climate of an organisation. But it is still important to keep these 'incidents' in mind because these incidents can still come from a broader climate of injustice.

Positive discrimination

Overall there was a positive description of the justice climates within these organisations, some women even described it sometimes as 'too positive'. Multiple times women mentioned that they know that they have an advantage as a woman in the STEM working field. Because they are in the minority and they also know that a lot of organisations are looking for more women in their (technical) organisation. So the women know that the current organisation are willing to go far in order to keep them on board, also other organisations are willing to offer extra to attract them.

"*I don't think I have less chances than men, maybe sometimes ever more because I'm a woman". (*R-9)

"I really feel that if you apply here as a woman you have a fair chance, even maybe have a higher chance". (R-2)

"*I know I am in a strong position because I'm one of the few technical women".* (R-8)

Organisational support climate

In an organisational environment with supportive organisational climate employees experience that they are valued and that their needs are taken into consideration by their organisation. A part of a supportive organisational climate is social support and this could be support of colleagues, managers or/and the organisation as a whole. The women we interview generally felt well supported. They felt support from both colleagues, managers and the organisation as a whole. As described earlier in the organisational justice climate, women generally feel respected and feel that they are supported by the entire organisation. Women felt that they are heard within the organisation and notice that there are many opportunities to develop themselves and thereby also get job development opportunities within the organisation. They also noticed no direct differences in the interaction with their colleagues or managers in comparison with their male colleagues. However, as described before some women felt that they have to prove themselves a little bit more than men. But after they proved themselves there is no difference in working together.

"My manager is super and he has supported me from the start. In the beginning, when many people were still sceptical, he always said that I could do it and that he saw it in me. He really gave me a lot of self-confidence". (R-8)

"They sometimes see that you do things in a different way and they are happy with that and they also encourage it. Now I notice that if they are happy with what you do, there are also completely open to your input and they take you very seriously". (R-2)

Also managers with women in their team don't feel that there are difficulties in the interaction with women and men in their team. They support the women just as much as the men and they really believe in the opportunities for the organisation. One of the managers described that there is no direct difference in how to interact with men or women, you just have to deal with them equally.

"For me working with a woman in my team is not very different, but I think it depends on how you stand in this". (R-4, manager)

One of the big aspects of the supportive organisational climate is that employees experience that their needs are taken into consideration. Such needs could be learning opportunities, career paths or the possibility to work part-time. The supportive climate is related to the commitment to their organisation, so if an employee doesn't feel that they are supported this could lead to less work commitment or even withdrawal behaviour.

"What was important to me was that they really supported my wish to work part-time when I got my children". (R-7)

"I would not know at which company I can only work for 3, 5 days a week but still have a supervising job on university level". (R-7, on the support and possibilities she experiences at her organisation)

Multiple women described the STEM-work field as an honest, fair and no-nonsense field. Therefore, they get the feeling that if you're just good in your work and you have a lot of knowledge and skills, people just automatically support you. They experienced actually that women in STEM don't have the

feeling that they are subordinated or treated differently. But for example in the areas of marketing and sales that there are much larger differences. They felt that in these areas exists a more "masculine" or even a "macho" culture, and in STEM it is much more about your abilities.

"*But I don't see men and women as black and white, for me, everything is about abilities. I think you just should look at someone's abilities and then it has nothing to do with whether someone is a man or a woman".* (R-4, manager)

"In technology it is much more about what you can do, are you smart or can you solve a technical problem in a smart way? That's what counts". (R-9)

Over-support

There is a long lasting discussion on promoting and taking action for more women in STEM and women in the labour market in general, because if you specifically talk about women and promote women don't you actually discriminate against men? Or do you actually oppose the women? Lately governments and organisations have talked about women's quotas in certain positions. But through these quotas you might just oppose the power of women because then the question arises: did the woman get the job because she was the best or because she is a woman? It is a difficult situation and also the women we have interviewed are divided on this topic. Most of the women really appreciated the promoting and the actions for more women in STEM and in organisations in general, they really see the chance and the necessity of this. Because they themselves have experiences how skewed the distribution is in STEM during their studies and also during their career. They therefore believe it is important to make women in STEM "normal", that it is no longer a point of discussion. That there are about as many boys as girls that choose for a technical education in high school and later on a technical study. However, many women also experienced the negative aspects of promoting women and campaigning for more women in STEM.

"*I'm against putting people on positions because they are female. I find that really terrible. I really think we have gone too far. I would stay very far away from that".* (R-7)

"I think the whole women's policy is a bit tricky, sometimes it goes way too far and you are actually disadvantaging women". (R-8)

"By recruiting women specifically for certain jobs you actually make sure that these women start 0-3 behind. The women that is hired that way, must prove herself more". (R-9)

Women's policy is therefore very dual, on the one hand there is the "need" to get more women into STEM, but on the other hand you create the feeling amongst employees of injustice and you maybe actually oppose the progress of women and their abilities. Women also described an atmosphere within the organisation of dishonesty and resistance against the policy, because men would get the feeling that women are put into jobs just because they are female and not because they're smart or the right one for the job. That is why different women indicated a contradiction within the policy, because women even have to prove themselves more because no one believes in their abilities. Women think it is very important that organisations understand what the consequences are of their policies. It must be clear for them what the pros and cons of a particular policy are. Some also believe that sometimes "sacrifices" have to be made to achieve a higher goal. First, there should be a culture or norm within our society where women in STEM are "normal". If you do not promote and stimulate this to a certain degree, you will not get there.

"*If you don't enforce it and if you don't take a proactive approach to promoting and stimulating women, you will not get there. Because everything that is in our culture and in the unwritten rules ensures that decisions are made on gut feelings".* (R-5)

Happiness

In general women were quite positive on the experienced organisational support and justice, therefore practically all women were happy in their job. They feel appreciated, heard, respected, supported and experienced honest opportunities and fair treatment within the organisation. This ensures that women are happy within their job and this provides extra motivation and devoting time in activities related to their organisation. For women to be happy there were some key point that needs to be in order: you can be yourself, social employer with many possibilities, experienced support and possibilities and friendly and personal working atmosphere. Also managers acknowledged the happiness of women within their organisations, and the long-term employment of these women confirm this happiness.

"I'm very happy here, before this job I have also applied by some other companies but here there is just a very friendly personal atmosphere. It is nice to work here". (R-8)

"I think we are a very warm bath for any new people who come to work here. A female team leader I spoke with, said after a few months here that it was a relief to come and work here". (R-11, STEM manager)

However all the women were happy in their current job, there also were moments within their careers they weren't as happy as now. There have been cases of unfair treatment, making annoying or insulting comments and cases of a clear difference in interaction between men and women. These negative cases and examples also resulted in unhappiness, less job satisfaction and frustration among these women. As mentioned before these women did not experienced these cases as a direct attack on them or as a larger cultural problem within the organisation. They saw these cases as individual problems with certain people (men). They described it as problems of men that weren't used to work with women and didn't really know how to interact with them. Most of the men within their organisations treated them as equals and there weren't any problems, so the women didn't see it as a bigger climate problem. Yet, these actions and these cases could be the result of a larger climate, not only within the organisation but in the whole society. However, this of course still had a big influence on their happiness.

"*I found it horrible".* (R-3, on the question how she felt when she was treated differently than men)

"*You have to realize that the problem is not with you as a woman, because then you will involve yourself and then you will break. I can imagine if you involve everything on yourself, that you will break".* (R-5)

Work commitment

Looking at the long-term employment of most of the women and in addition the answers during the interviews, we can conclude that many women have a high degree of work commitment. The key factors on why these women have a high degree of work commitment is consistent with the key factors on why these women are happy within their job. One of the most important factors are the possibilities within the organisation, women describe that they have a lot of possibilities within the organisation and they feel really supported about these possibilities. Therefore they gain work commitment and

therefore they don't get the urge to leave the organisation. Especially the feeling of injustice within an organisation can lead to exit and withdrawal behaviours.

"Very few people leave here, many people stay here to work for a longer time". (R-11, STEM manager)

"*The women who work here now will not be dissatisfied with the company, given the long employment".* (R-6, HR manager)

"*Why should I leave? I have had many different positions in recent years and they offer a lot of possibilities. I sometimes doubt whether there is as much as possible at other companies".* (R-9)

Withdrawal behaviour

Given the facts and the data extracted from previous literature, you would expect that there are many women who would leave STEM. There have been studies that have shown that women leave STEM more quickly than men, but we do not see this directly in this study. Looking at the theory of organisational support and justice, the outcome of the research is very logical. In general, the women we have interviewed are very satisfied with their experienced support and justice within the organisation and as result they will also show hardly no signs of exit behaviour or withdrawal behaviour. Women are satisfied with the opportunities they receive and they are also generally satisfied with how they are treated, but they are still the big minority in these "masculine" organisations. A key point for women to stay at an organisation are the possibilities and the space to create their own job. Part-time work is also an important factor within this aspect, because a lot of women have the need to work part-time, especially when they start their family. Currently, there is still the culture that women will have to work part-time and the man full-time. If there would not be a possibility to work part-time this could be a huge factor for women to seek for another job.

"*I think it is important to keep developing myself and if that's it not possible here than it can be done elsewhere".* (R-3)

"*I think that if that was not supported then, and they said that I had to work full-time then I would not have worked here anymore. I think it's really great that they have been so flexible and I also know that if they don't, I hadn't worked here anymore".* (R-7)

However, there are still some cases of unfair treatment, injustice and no support of women. These cases also directly link to the withdrawal behaviour of these women. Based on theory, this is also very logical because a sense of injustice or no support can lead to exit behaviour, withdrawal behaviour, less work commitment, bad overall well-being and less job satisfaction. The aforementioned negatives cases however, are rather scarce and the predominant is carried by positive stories. We are therefore inclined to say that the overall picture is positive with an occasional negative incident. These negative incidents make however a big impression on women and therefore also directly have an effect on their exit behaviour.

"I can imagine that women here thinks I try my luck somewhere else, but that is based on how you interpret it yourself". (R-4, manager on the question how he thinks women feel if they get treated differently)

"*That does stimulate the decision to leave an organisation for me. I can't imagine that I am the only woman that experiences this".* (R-5, on different treatment between men and women)

"*I don't come across these things very often. And I also don't hear it of other people either, it's really sporadic but you will remember it!".* (R-8)

External climate factors

Based on the results of the interviews and the conclusions described above, women are generally positive about the climate within their organisation. We see almost no signs of withdrawal behaviour of women, however there are also still incidents and cases of women unfriendly behaviour or unfair treatments towards women. Because the organisational climate in general is perceived as positive, this negative behaviour and cases may not come directly from the organisation's climate. This behaviour could also be caused by a "broader" climate such as a national climate or a climate that prevails within a society. During the interviews several times emerged that women experience a climate in which certain stereotypes arise towards women. These are the kind of stereotypes that emerge from society, for example the feeling that women have to take care for their children and that the men have to earn the money. This is a certain culture that stems from norms and values that were seen as "normal" decades ago. The image of a woman as a housewife and the man as the one that earns the money. Multiple people even noticed that the Netherlands really lag behind, compared to other countries. People mentioned their experience in foreign companies and they said that the male/female ratio in these companies was much more in balance.

"That's not how culture works, and that's not the culture here within the organisation but also the culture here in the Netherlands or Europe. So there are also a lot of cultural aspects that play a part, so we are all influenced by that. It is difficult to put that aside, because that is in your system. For example, I have a heavy technical background, but I don't think many people here realize that. I can tell them that, but it's irrelevant because the first thing they see is a woman". (R-5)

"The big difference in the number of women and men has always surprised me. I have worked abroad a several times and the proportion is completely different. It is actual a relief, because with more women you get a warmer, more social and diverse culture. In the organisation in Sweden I have worked for, there were women in all positions within the organisation, including high project manager positions. I have also worked for an American company and there were 40 % female, and they were everywhere in the organisation and in the top as well". (R-11, manager)

"The differences in the number of men and women in STEM also have to do with demographic and economic developments, but also with the social system and family formation. It is indeed also culturally bound, the fact that we employ women in technology is not an automatism, so that should be encouraged". (R-6, HR manager)

If a climate prevails within a country or society where women are treated differently than men, this has naturally a major influence on the climate within companies, schools, universities and institutions. However it hasn't always has to directly influence the whole climate of an organisation, it can also influence the individual behaviour of people. For example, women can experience a positive climate at a company, but the overall climate of that country can affect the behaviour of individuals within the company.

There are examples of both positive and negative experiences in the perceived climate. Especially in the field of interactional justice there are positive and negative experiences of women. They often experience benefits because they are female and sometimes even feel they have more chances within the organisation, but there are also examples of women that feel injustice and a disadvantage of being

a women. However, almost all women describe a kind of stereotype that exists of woman in STEM or how a woman should act in STEM. This stereotypical image is often created during their studies where women are already in the minority in STEM studies. During their entire school- and student time these women are in the minority and are therefore always surrounded by men and a “masculine” way of thinking and working. Women described it as a kind of process where a women or girl passes through during their school- and student time. They either get used to the way of thinking and working or they get discouraged and choose a different career path. The women who subsequently are going to work in STEM are used to a certain culture and that is often a “masculine” culture. Within this masculine culture women have to stand their ground as women described during the interviews, this is in line with the feeling that women have to prove themselves a little bit more than man. Also the masculine culture often consists of direct and harder communication combined with hard or sexual jokes that can be experienced as annoying, rude or offensive by women. Yet women often describe this as something you should be able to counter and something you get used to. This sometimes means that you literally need to be able to stand your ground as a women.

“If you would talk to women in STEM now, you are already talking with a subset. Because if you currently work in STEM, that says something about how you are as a person and how you deal with these difficult circumstances. Once you’re in the STEM education, it doesn’t set you off anymore”. (R-5)

“If you would come here to work as a woman, you already have a certain attitude, so you could work well together. But you have to be able to stand your ground here, so to speak. I think it has to do with the insecurity, so the question is if you can stand your ground and how strongly do you come across”. (R-2)

Even with this stereotyping and “masculine” culture women choose to work in “masculine” companies and “masculine” cultures. They find the way of working of men, which often happens in a direct, honest and no-nonsense way, very pleasant. They also described the fact that you have to stand your ground as a women not disturbing or dissuasive, they describe it as ordinary and that is just the way it is. They are not used to anything else.

“I honestly prefer to work with men than with a whole group of women”. (R-2)

In addition to the stereotypes in the way of working, there are also certain stereotypes of women in the workplace in general. These are stereotypes that are broader than just STEM, they actually apply to all women in the workplace. These are focussed on our way of thinking and how we see our society. This is an image of a working man with a wife and a family. The wife can also work but the man is often still seen as the main earner. At the time that people choose to start a family it is normal that a man will work less, however the women will work a lot less. She becomes responsible for the family and the man is responsible for the income. Therefore women will start to work part-time more than men will do. This is not because women rather want this than men, but this is due to a certain image that exists in society. The image of a full-time working man and a part-time working woman (mother).

“I often see that the man is going to work less, but the women even less”. (R-7)

“It is a kind of social norm: as a man you “just” work full-time”. (R-1)

The division between full-time and part-time work is an important factor in the presence of women in the workplace. From the image that has been sketched above, it emerges that women are seen as the

ones who are responsible for the household and the children. Because of that it is seen as "normal" for women to work less than men, especially at the time when they start a family. Multiple women described during the interviews the skewed image of the division between men and women. Some women described it as a conscious choice to work part-time, as they had consulted with their partner. Yet they also described a certain pressure they felt as a women. It is considered "normal" to work part-time as a woman, not as a man. It is therefore also difficult to deviate from the "normal" standard. This "normal" standard arises from a national climate and culture and develops a social pressure to do things in a certain way.

"If more women continue to work full-time, these children also see examples of how things can be done, that will change the whole culture". (R-2)

"You can also look at other countries where it is better arranged. As in Scandinavia, and in particular to the preconditions that they have there. For example, it is differently and better arranged with health care and leave of absence etc." (R-5, on the question how to deal with the work-family/private balance)

"Here in the Netherlands we think very differently, for example a woman becomes mother then she is asked how she will arrange that with her work etc. But if a man becomes father, no one asks that. As a man we just expect you to work 5 days a week, maybe 4. But no one will ask how you will arrange your work with the baby, the other way around they will ask the mother. So I think we really lag behind here in the Netherlands". (R-2)

"In the Netherlands the culture is such that the women are raised with the image of a 'nice job and then maybe 2, 3 or 4 days working a week and for the rest they are responsible for the social and private life. I wasn't raised like that, so it has to do something with the culture at home. I was raised to be independent and that I could manage myself. If you are not raised like that, you will never develop it". (R-5)

The stereotypes and normal standards that arise from a certain climate therefore influence women and men on their choice to work part-time. But in addition, women also described a certain stereotype with regard to women in STEM. They describe that STEM studies and jobs are still often seen as something masculine. One respondent even said that a manager once told her that there are male and female jobs and that was just how it is. This image still exists in our current society and young girls already experience this pressure at primary school and after that during their secondary school and study. This does not necessarily have to be hard factors such as someone who tells them they can't study or work in STEM. But this is often due to a certain climate that prevails and this can therefore be a national climate that ensues at home but also at school. In, addition, there are certain examples that women experience or actually don't experience because how often do these girls see technically educated women of women in STEM jobs. All these factors influence how many girls ultimately choose a STEM study and work in STEM jobs. So girls and women need to have role-models, just like they need role-models on women working full-time and still take care of their family.

"Once there is the prejudice that STEM is not something for girls, then you don't have to necessarily speak it out loud, but then it's difficult to get rid of that prejudice. So you don't have to speak it out oud, it's just in the culture around you. Then it also doesn't surprise me how few women work in STEM". (R-11, manager)

"*Well, I didn't care a lot about social pressure otherwise I wouldn't have studied physics, I think. If I cared about the social pressure I might not have followed a technical study".* (R-7)

"There must certainly be enough women in STEM to be role models. Nowadays you only think of men when you think about technology". (R-8)

"I think it's very difficult for many women to make a choice to be not too different. If more women opted for a technical study, more women would follow. If you are the first deviant in a group, you should probably cross a big threshold". (R-9)

So women experienced a certain pressure from society or their direct surrounding to follow a STEM studies. This certain pressure is a big threshold for women to choose a STEM studies and therefore a threshold to ultimately work in STEM.

Because of the stereotypes and "normal" standards that exist here in our culture it is not strange that so few women work in STEM. When women don't choose for STEM studies to begin with, it is only logical that ultimately only a few women are employed in STEM. So the climate certainly has an influence on the behaviour of women, however this isn't just a particular climate that exists only within STEM organisations. It is a climate that exists within our country or within our society, and this climate can have a big influence on the climate within an organisation or have a big influence on the behaviour of people within these organisations. Based on the results of the interviews we can conclude that everyone sees the value of more women in STEM, and they are really trying to enhance the amount of women in STEM. Maybe sometimes a little bit too hard, but there are simply said too few women who choose STEM.

"I think that we go too far on raising percentages of women in teams. Because I really want to increase the number of women within my team, but where are the women?" (R-11, manager)

"We also work with targets for example diversity, but in the Netherlands it doesn't work because there aren't enough women in STEM". (R-10, HR manager)

"The core cause why there are so few women in an organisation like ours is education. Because the proportions here in the organisation are identical to the proportion of education (studies)". (R-11)

Discussion

The goal of this research was to explore to what extent the organisational climate has influence on the withdrawal behaviour of women in STEM. Based on the literature it was assumed that a perceived justice and supportive organisational climate would lead to more satisfaction and work commitment of employees. This would then lead to less withdrawal behaviour of women in STEM. In our study we found a positive experience towards the organisational justice and support climate. Important factors for the perceived justice climate were the perceived equal opportunities and the fair treatment in social interaction of women. Women felt no difference between men and women regarding the honesty and fairness within procedures, disciplinary actions and how they got informed within the organisation. Also they felt fairness and quality in their mutual relationships with colleagues and managers. However, there were also a couple of cases with unfair treatment in social interaction, and this can directly influence the perceived justice within the organisation. However, many of the women saw the few incidents as actions by individuals within the organisation instead of consequences of the climate within that organisation. In our study we found a couple of main factors that influence the

perceived organisational support climate, these factors are job autonomy, possibilities for child care and the possibilities for part-time work. Within this climate employees experience that they are valued and their needs are taken into consideration by their organisation. Job autonomy is "the degree to which the job provides substantial freedom, independence and discretion in scheduling the work and in determining the procedures to be used in carrying it out" (Hackman & Oldham, 1975. P.62). Women in our study experienced job autonomy through freedom in designing their own tasks and jobs, besides the freedom in their own job they also experienced the freedom to explore for other jobs within the organisation. Through these constructs of job autonomy the women felt supported by their organisation and therefore they had a higher work commitment and this is in line with Eby, Freeman, Rush and Lance (1999) who already found that job autonomy was positively related to organisational commitment. Besides job autonomy women feel support through the possibilities with child care and part-time work within their organisation. Many women described the need for good child care arrangements and the possibilities for part-time work when they got their children. Women that got good arrangements and many possibilities during this time felt more committed to their organisation, and if this wasn't arranged properly women had to urge to leave the organisation. However, there can also be a negative aspect of support and that's what we call over-support. Women experience sometimes "extra" support as negative because it can negatively influence the atmosphere within an organisation. People might think that women get the job just because they are female instead of their knowledge and skill. This is therefore a very important aspect of support that organisations have to take into account, because if 'over-support' occurs there arises a lot of negativity around women in STEM. This could affect and disrupt the process and further limit the growth of women within STEM companies. What is in conjunction with the perceived over-support is the positive discrimination that some women experience. This positive discrimination consists of the feeling that women have extra opportunities and possibilities just because they are female. This could be seen as something positive because women get more changes within an organisation, however it can also be counter effective because it could lead to the same effect of over-support.

The perceived supportive and justice organisational climate has direct influence on the happiness of the women in their job. In the theory we found that people that feel organisational support and justice and are happy in their job have a higher rate of work commitment. We also found this is our study, the women that feel justice and support are happier in their job and therefore show work commitment. As a result, they are also more inclined to stay with in organisation and therefore show little or no signs of withdrawal or exit behaviour.

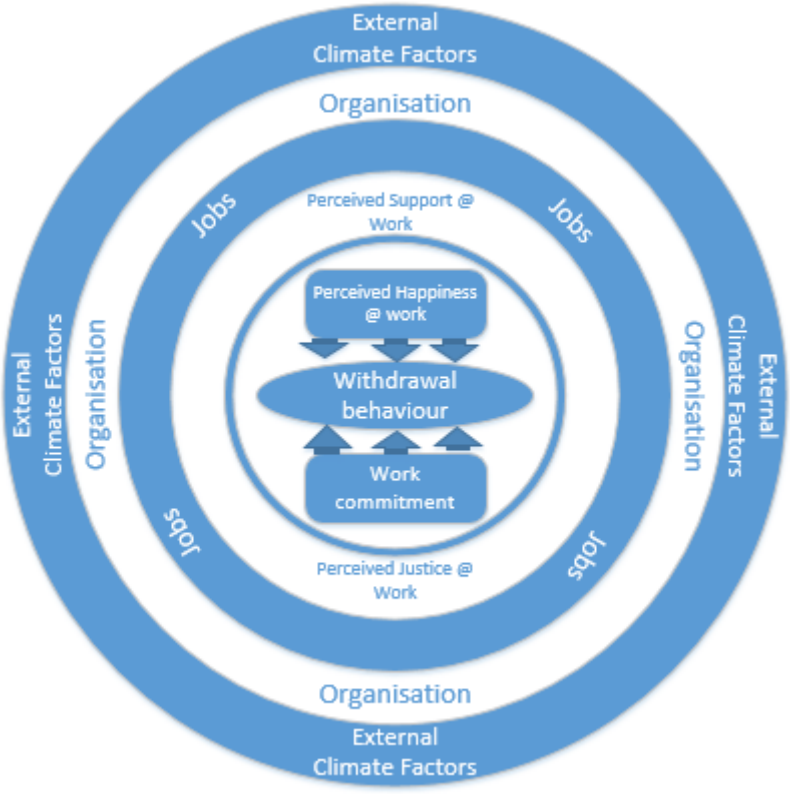
Based on the results of our research regarding the organisational justice and supportive climate we suggest a gender-friendly climate in which employees of both sexes are equally supported and experience equal justice through fair processes, equal opportunites and treatment, job autonomy and fair childcare and part-time work opportunities. This is a climate where there is no distinction between men and women, through this type of climate organisations are more attractive for women and this gives them the opportunity to enhance the number of women in STEM. For organisations it is important to keep in mind to stay in balance, so a gender-friendly climate is very important however too much support for one gender and you create the opposite of what you want. People may get the feeling that one gender is being pre-empted and then you create a negative image around this gender.

Besides the organisational climate within companies there are also other factors that are just as important, namely the external climate factors. Based on earlier research there isn't a biological explanation for the gap between men and women in STEM, as was thought many years ago. This suggests that there are also cultural, climate and social factors that influence women to pursue a career in STEM. Especially in the Netherlands the numbers are striking, because with only 18 % women in

STEM the Netherlands occupies the last place in Europe. While a country like Bulgaria has 41 % women in STEM (Janssen, 2015). These numbers indicate that in the Netherlands there are cultural, climate and social factors that influences women, and this is in line with the findings of our study. We found that many women experience certain stereotypes and social pressure during their career but also in their social life. This doesn't has to be within their direct work environment, but a more "broad" national climate towards women's emancipation and women in STEM. This is a climate with still a "traditional" view on the work distribution between men and women. This is an image where men are mainly responsible for earning money and the women are mainly responsible for the children and the household. Women therefore should work part-time when they have a family. Through internationalisation, globalisation, women's emancipation and all the other fast developments in the world this image should be changed and distorted. However, in the Netherlands there is still a certain "traditional" view on women's' emancipation. This "traditional" view or way of thinking causes certain stereotypes and prejudices in our society. A gender stereotype is a generalised view or prejudice about attributes, or characteristics that are or expected to be possessed by women and men or the roles that are or should be performed by men and women. Gender stereotypes can be both positive and negative, for example *"women are nurturing"* or "*women are weak"* (United Nations, 2014). An example of a stereotype regarding this subject is that most people associate science and math fields with men and fields like humanity and arts are often associated with women (Hill et al., 2011). This bias not only affects individuals' attitudes toward others but may also influence girls' and women's likelihood of growing their own interest in STEM. In an important research of Good, Rattan and Dweck (2009) was found that if girls and women believe stereotypes, such as that they have a fixed amount of intelligence compared to men, they are more likely to believe the stereotype and lose confidence and disengage from STEM as a potential career when they encounter difficulties. So girls and women have to cope with the stereotypes that they don't belong in STEM or have less skill and knowledge of STEM than men. Besides the existing STEM oriented stereotypes there are also still the stereotypes and prejudices that all women have to cope with during their career. These are the stereotypes and prejudices that arise from the "traditional" view within the national climate and culture of the Netherlands. Therefore it's important to keep in mind that the women we spoke and the other women in STEM are a small subset of women and for them the rule "survival of the fittest" actually exists. This is because women who choose a STEM course and eventually a STEM study and job already had to deal with stereotypes, resistance and always being in the minority during their school- and study period.

Only creating a gender-friendly climate within organisations is therefore not sufficient to increase the number of women within STEM. There must also be an overall gender-friendly climate in the environment of these organisations, so in their country or even in their continent. As long as the Netherlands is not yet capable of this, it will be difficult for many companies to attract more female STEM employees. In addition, it will also be difficult for many girls to make the choice for a STEM oriented study and in the end a STEM career. It is therefore necessary to break through the current stereotypes and create a gender-friendly climate so that everyone has the same honest opportunities and possibilities.

Figure 1. Influencing factors towards withdrawal behaviour



Limitations and future research

The biggest limitation for this study is the use of only women that were currently working at the two organisations. There is a high change that the women that were still currently working there, were satisfied and happy within their job. Therefore their answers could also be more positive than the answers of women that have actually left a STEM organisation. The amount of organisations that are used can also be a limitation because in this study there were only two organisations included.

For future we recommend to include women that left STEM organisation(s) and study their experiences towards organisational support and justice climate. In addition, we only interviewed women from two companies therefore the results can be hard to generalize from. We therefore also recommend for further research a more extensive study that includes more companies and more respondents, this could lead to more significant relationships. Within this research we mainly focussed on the climate factor of the withdrawal behaviour of women in STEM, however in future research also multiple factors could be included on why there are this few women in STEM. To conclude, our qualitative research concerns developing an in-depth of understanding of the problem and therefore we believe in the choices that we made during this research. We therefore also believe in the importance and the generated insights of our study.

Practical recommendations

Based on the results of our study we divide our practical recommendation in two levels of recommendations. At first our study was focussed on the STEM business and on the organisational climate within these businesses. However, in our study we also conclude that organisations are influenced by a broader climate from outside the organisation. In this broader climate we see a negative image of women in STEM and therefore the growth of women in STEM remains behind. For

the organisations we recommend to focus on their gender-friendly climate, so organisations must have a supportive and justice climate within their organisations where people feel supported, appreciated, experience equal opportunities and possibilities, equal treatment, job autonomy and child care and part-time possibilities. The organisations we have studied scored pretty high on these factors, however there are also enough organisations where this is not self-evident. Organisations will have to look at their internal processes and policies and judge if they are fair and equal for everyone. Through these improvements organisations will also be more attractive for new and current (female) employees. For organisations it is important to be in balance, so organisations should keep over-support and positive discrimination in their minds. Because this will actually lead to the opposite that organisations want to achieve.

However, if organisations will improve their gender-friendly organisational climate and their attractiveness then there must of course be enough (new) female STEM employees. And here lies an important task for businesses, government, schools, universities and the society as a whole. We must get rid of the image that STEM isn't something for women. Therefore there must be something changed within our climate and culture. The change of a climate and a culture is a long and hard process and it will probably take a long time. However, there must be fought for otherwise there never will be change. Awareness must be created by people through campaigns and information. This can already happen at an early age such as primary schools so that young girls already come into contact with role-models in STEM. But also the parents must be aware of these possibilities because children get influenced by their parents. Through these role-models girls and parents can see that STEM is also something for women. A good example of an organisation who already works with role-models and campaigns is VHTO. In addition the government and universities can also analyse other countries that score high on the amount of women in STEM. What is different there? And can we maybe adopt something from them? For example, the government can change the child/day care possibilities because nowadays the day-care in the Netherlands is too expensive for a lot of families. Therefore many women quite working or go work part-time, and because of the 'traditional' climate and culture it's almost always the women that go work less or quite working. Good examples for good child- and day care arrangements are in Scandinavia, and the number of women in STEM is there considerably higher. This doesn't have to be the main reason for the higher rate of women in STEM there, however just like businesses, the government must assure that there are fair opportunities and preconditions for both men and women in the Netherlands. By improving the preconditions and create fair opportunities by the government, schools, universities, institutions and companies we can step by step change our climate and our organisations towards more equality between men and women.

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Appendix

Appendix 1. Interview protocol STEM employee

Interview protocol

Introductie

Hoe lang werk je hier?

Meer vrouwen op je afdeling?

Waarom heb je toegestemd?

Wat betekent dit thema/onderwerp voor jou?

Hoe zijn je ervaringen binnen deze organisatie?

Support/Steun

Kun je mij iets vertellen over de support/steun die je krijgt binnen deze organisatie/leidinggevenden?

Waarom voel je dit zo? Kun je een voorbeeld noemen? (doorvragen)

Ervaar je verschillen tussen mannen/vrouwen?

Justice/eerlijkheid/gerechtigheid

Kun je mij iets vertellen over de justice/eerlijkheid/gerechtigheid die je krijgt binnen deze organisatie?

Waarom voel je dit zo? Kun je een voorbeeld noemen? (doorvragen)

Ervaar je verschillen tussen mannen/vrouwen?

Happiness/geluk

Kun je mij iets vertellen over je geluk/tevredenheid binnen deze organisatie?

Waarom voel je dit zo? Kun je een voorbeeld noemen? (doorvragen)

Ervaar je verschillen tussen mannen/vrouwen?

Work commitment

- Ervaren workcommitment bij (organistie)?
- Wordt deze commitment beïnvloedt door de ervaringen in de verschillen tussen support/justice?

(Vertrek) gedrag vrouwen

- Kun je mij wat vertellen over je toekomst binnen (organisatie)? En binnen het STEM werkveld?

- Heeft de ervaren support/justice/ algemene verschillen tussen m en v in het werk invloed op je vertrek gedrag?

- Ervaringen met andere vrouwelijke collega's die weggingen of weg willen? Vertrekken vrouwen sneller dan mannen?

Toekomst

- Wat is jouw visie op het verkleinen van het verschil tussen m en v? In STEM jobs?

- Tips voor organisaties/scholen/maatschappij

Appendix 2. Interview protocol manager

Interview manager

- Kun je iets over jezelf en over je functie hier bij (organisatie) vertellen?
- Wat betekent dit onderwerp voor jou?
- Kun je iets vertellen over de samenstelling van jouw team mbt man/vrouw?

Jobs

- Ervaar jij een verschil in de dynamiek van een groep met daarin vrouwelijke medewerkers?
- Hoe ervaar jij zelf de omgang met de vrouwelijke medewerkers?
- Hoe kijk je naar bepaalde quota's en het beleid mbt het verhogen van het aantal vrouwen in de organisatie?

Support & Justice

- Denk jij dat vrouwen in technische banen dezelfde kansen krijgen als mannen in die banen?
- Hoe probeer jij zelf iedereen dezelfde kansen te geven?

Happiness

- Ervaringen van verschil in geluk tussen mannen en vrouwen in STEM jobs?
- Ervaar jij verschillen in de belangen en wensen tussen mannen en vrouwen?

Workcommitment

- Ervaringen van verschil in work commitment tussen en mannen en vrouwen in STEM jobs?
  - Als er verschillen zijn, waardoor komt dit?

Withdrawal behaviour

- Ervaringen van verschil in vertrek gedrag tussen en mannen en vrouwen in STEM jobs?
  - Als er verschillen zijn, waardoor komt dit?

Toekomst

- Wat is jouw visie op het verkleinen van het verschillen tussen mannen en vrouwen in STEM jobs?
- Tips of verbeterpunten voor de organisatie/scholen/maatschappij
- Wat is volgens jou het belang van meer vrouwen in technische banen?

Appendix 3. Interview protocol HR manager

Interview HR manager

- Kun je iets over jezelf en over je functie hier bij (organisatie) vertellen?
- Wat betekent dit onderwerp hier bij de organisatie?
- Hoe is HR ingericht om het aantal vrouwen binnen de organisatie te verhogen?
- Zijn er negatieve ervaringen met vrouwen in STEM banen?

Jobs

- Ervaren verschillen tussen STEM banen en "normale" andere banen binnen (organisatie) op het gebied van m en v?
- Problemen in STEM jobs in vergelijking met andere banen?

HR policy

- In hoeverre is het HR beleid van de organisatie gericht op gender gelijkheid?
  - Als er problemen zijn, hoe komt dit? Hoe kan dit verholpen worden?
- Zijn er voorbeelden van vrouwen die vertrekken uit STEM banen? Waarom vertrekken zij?
- Hoe probeert HR en de organisatie steun en eerlijke kansen te geven aan vrouwen in technische banen?

Support & Justice

- Ervaringen van vrouwelijke STEM medewerkers die klagen of problemen hebben met support & justice in hun werk?
  - Andere ervaren problemen van vrouwelijke STEM medewerkers?

Happiness

- Ervaringen van verschil in geluk tussen mannen en vrouwen in STEM jobs?
  - Als er verschillen zijn, waardoor komt dit?

Workcommitment

- Ervaringen van verschil in workcommitment tussen en mannen en vrouwen in STEM jobs?
  - Als er verschillen zijn, waardoor komt dit?

Withdrawal behaviour

- Ervaringen van verschil in vertrek gedrag tussen en mannen en vrouwen in STEM jobs?
  - Als er verschillen zijn, waardoor komt dit?

Toekomst

- Wat is jouw visie op het verkleinen van het verschillen tussen mannen en vrouwen in STEM jobs?
- Tips of verbeterpunten voor de organisatie/scholen/maatschappij