



Women in the IT Sector: Queen Bee and Gender Judo Strategies

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Abstract

Women in IT are a minority and the situation is not improving. Data from Statistics Canada from 1991 to 2011 show the engineering sectors do not count very many women. Thus, it is observed that while Canada has policies on gender equity and women should be considered as having the right to work in any sector, the reality is quite different, as is indicated in Statistics Canada data. We observe a low presence of women in the IT sector, a well-paid sector that should be of interest, and women continue to be employed in traditionally female, often low-paid, occupations. We thus wanted to understand how women in IT deal with their minority status in this sector. What are the main obstacles minority women in the IT sector face in their day-to-day lives? How do they deal with these? Do they use ‘queen bee’ responses to be promoted? What is it in the IT sector that motivates their work? These are all questions that have interested us and the results help us to better understand the causes of women’s low representation in the IT sector. Our research is based on a qualitative approach, with interviews of women in the IT sector in Québec (Canada).

Keywords Women · IT · STEM · Segregation · Discrimination · Technology · Work

Contextualization and Introduction

Women in IT are a minority and the situation is not improving. It may be surprising today, but historically, before microcomputers, women were often preferred as programmers, because they “naturally” had the qualities required to write an effective programming code: “A good program was concise and elegant and never wasted a word. They were poets of bits” (Thompson 2019). In 1984, in the United States, women accounted for 37% of students enrolled in computer science, while the proportion dropped to 17.6% in 2010 (Thompson 2019). Even if they now represent half of the players in video games (Duggan 2015), young

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boys seem to grow up in a context of computer science-based socialization, unlike girls (Fisher and Margolis 2002).

Data from Statistics Canada from 1991 to 2011 show the engineering sectors do not count very many women. Thus, it is observed that while Canada has policies on gender equity and women should be considered as having the right to work in any sector, the presence of women is not observed equally in all sectors, as is indicated in Statistics Canada data, especially for engineering. Only two groups exceeded the 6–7% of women in engineering occupations, with the civil engineering and electrical engineering sectors accounting for 13 and 14%. Also, in the scientific sectors, it is only the IT professions that show a decline in percentage of women, from 30% in 1991 to 25% in 2011 (the decline is especially marked from 2001 to 2011). In fact, Statistics Canada data also show a decline, from 1976 to 2016, in the percentage of women in professional occupations (university level) and even more among technicians (college level) in computer science from 1987 to 2016. This is why we decided to investigate this sector. The decline is less marked among managers, but this is more the field of management than IT, even though IT knowledge is often required. (Dionne-Simard et al. 2016).

Recent studies in Quebec suggest that the drop in the female presence is also observed in the province, or at least stagnates at a low level (TechnoCompétences 2018). The statistics vary by sub-sector; for example, for programmers and developers in interactive media, women represent 17% of the workforce, which can be seen as a high percentage, knowing that in computer science registrations, only 9% were women (Chartier 2013).

If women are underrepresented in what is called the STEM sectors (sciences, technology, engineering and mathematics- see Tremblay 2016; Dionne-Simard et al. 2016), there are sectors where they are, on the contrary, dominant: studies in psychology and medicine in the province of Québec (Canada) are often chosen by women (Tremblay 2016). Also, a recent worldwide study based on the PISA2012 (a test run by the OECD each three years) showed that girls are as good as boys in math in school, so they have the scores to continue in the IT sector. However, the researchers noted that girls were often good in other domains as well: “They are more often good in both math and reading, hence less constrained than boys in their choice of study” (Breda and Napp 2019). Girls are reading more, have more communicational skills and a broader choice of domains. When they face options for their future, to study in a domain dominated by men can discourage them (Breda and Napp 2019). IT companies can seem to be difficult to access, especially since the media often mention the compulsory overtime in this sector, but also unveiled, especially in the wake of the #MeToo movement, scandals of sexual harassment (MacDonald 2018). Activision Blizzard made the news in 2019 because they used family-planning apps to have intimate information about fertility cycle and pregnancy possibilities of their female employees: “The information collected by the apps is then shared with the company, allowing it to see how many of its employees are pregnant, trying to get pregnant or facing high-risk pregnancies” (Mahdawi 2019).

Literature Review

To add to these negative reports in the media, sectors considered “masculine” tend to be associated with traits that are by definition “masculine” such as “[...] assertiveness, technical ability, the ability to reason, and physical strength. Clearly, the naturalist argument still carries weight despite having been deconstructed by sociologists, anthropologists and historians

working on gender relationships and social relations involving gender” (Buscatto and Fusulier 2013). However, these beliefs about what is “feminine” and “masculine”, begin very young according to a recent book published by sociologist Éric Macé, who describes gender as a social relationship that begins before the birth, continues during childhood by well-intentioned adults who recognize girls and boys “equal in their difference”, which eventually lead to different career paths. When they find themselves in the same environment, the “[...] direct and intentional sexist discrimination is not always the case of sexist men but of men and women who think, rightly or wrongly, that their customers, their collaborators, their employees, their sponsors, etc. are sexist. Secondly, we must not neglect the unintentional part of these direct discriminations because of the cultural anchoring of gender stereotypes in collective and individual imaginaries.” (Macé 2015).

Bourdieu described in *Masculine Domination* (1992) the concept of symbolic violence, which is not physical, but expresses itself through communication and environment between two social groups. There is one group which possesses greater social power, and the other is subordinate because of its minority status, related to gender, sexual orientation or ethnic identity. Because of social norms, the way women and men present themselves in working environments obeys invisible rules. Women in a context where they are a minority can face symbolic violence and be “encouraged” to adopt the “right way” to be, to act, to lead.

In our literature review, we found that women in IT in Silicon Valley mention various problems. They mention the fact that they can perceive this environment as difficult to reconcile with a family life, because women more than men tend to adjust their careers for family life (Moyser 2017; Parker 2015), even if male employees have also begun to talk about a “fatherhood penalty” recently (Working Families 2017; Harvey and Tremblay 2019). Furthermore, the IT sector is perceived as having a male vision of leadership, leading to less confidence in women, despite the recognition of their interpersonal skills (Mundy 2017). This would be particularly pronounced in an environment where they are a minority, where more women say they feel uncomfortable, unlike men in women’s sectors, who do not face as many stereotypes and expectations of performance (Qian and Fan 2018). Finally, there is a segmentation of jobs in the labor market, which results in a self-selection, or rather self-exclusion of women in this sector, the feeling of rejection being apparently shared by a certain number of women (Mundy 2017).

A study about online labor platforms, a new form of work which is developing in many countries including the USA, for example with Uber or Care “[...] has documented the devaluing of women’s work on platforms, even when they’re completing the same types of gigs as their male counterparts” (Ticona et al. 2018). Sexism in the workplace, as well as the fact that male workplaces tend to reproduce the male configuration (men usually hiring men...), contribute to a filter effect leaving women in sub-segments or sub-sectors in IT as elsewhere (graphic design, management, quality assurance). This is explained by network effects, i.e. the fact that friends can integrate their friends, or their peers into the business (Arenius and De Clercq 2005). In 2015, Amazon observed that the AI they put in place to scan the candidates’ resumes received by the company tend to disadvantage women: “Amazon’s computer models were trained to vet applicants by observing patterns in resumes submitted to the company over a 10-year period. Most came from men, a reflection of male dominance across the tech industry” (Dasting 2018). This is how male dominance tends to be reproduced not only by managers doing the hiring, but also by the AI supporting decisions.

Moreover, it cannot be ignored that, even when integrated into a predominantly male labor market, women who are in a minority position have to demonstrate that they are able to deliver

the work, tending to have to do more to “prove it”. They are put into an intense tension between the doubts about their competences and the feeling they might have been chosen to fill a quota in the company. It can have a side-effect: “survival of women in a male-dominated work environment entails a form of individual mobility, in the sense that they have to prove to themselves and others that they are unlike other women in order to be successful” (Ellemer et al. 2004).

The queen bee syndrome is a concept related to gendered analysis which has been used to describe the situation and attitudes of women in male-dominated sector. When they have gained their legitimacy, women can adopt an attitude qualified of “queen bee syndrome” by Staines et al. (1973): “Women who are individually successful in male-dominated environments and attain positions of high status are more likely to endorse gender stereotypes [...] they tend to view the women they supervise as competitors and possess negative attitudes towards them, making them more likely to discriminate against these female subordinates” (Blau and DeVaro 2007). Queen bee responses can be masculine self-descriptions, in-group distancing and denying of discrimination (Derks et al. 2011). The stereotype of this concept would be “a successful women who instead of using her power to help other women advance, undermines her women colleagues” (Cooper 2016).

This attitude, even if it is counterproductive for the integration of women in a male-dominated organizations (Cowan et al. 1998), is shaped as the results of gender disparities in career outcomes and queen bee responses make it possible for some women to achieve individual mobility in this context (Derks et al., 2011; O’Neil et al. 2018). Some studies even showed that “women reported experiencing greater incivility from female coworkers compared with incivility instigated by their male counterparts” (Gabriel et al. 2017).

The Queen Bee syndrome itself has been criticized as sexist because it supposes that women would be unsupportive of each other, as if it was a typically feminine trait to be in constant competition with other females. However, studies which observed the Queen Bee syndrome showed that this attitude is not a particularity of women, but a strategy to overcome prejudices when a minority is marginalized, as gay men who perform “straight-acting” (Eguchi 2009). The Queen Bee syndrome is therefore an individual technique to gain a legitimacy even when this attitude can do a disservice to the collectivity. Because leadership is hard to obtain for a woman in male-dominated sector, the Queen Bee syndrome can be seen as the only way to attain it (Sheppard and Aquino 2017). This is often the case, even if it reinforces the prejudice that “masculine traits”, like the precedence of work on family, is the best way to be promoted (Hurst et al. 2015).

However, women cannot simply act as men to be recognized in a male-dominated sector. They face a second paradox, that of avoiding “male” leadership that seems too harsh for them, while avoiding appearing too nice, which can lead to misunderstandings. Slaughter explained that “we all have seen women who are criticized for being too assertive when they act like men and too passive if they act like (traditional) women [...]” (Slaughter 2014), what researchers Williams and Dempsey define as the “tightrope [which] describes a double bind: women often find that if they behave in traditionally feminine ways, they exacerbate Prove-It-Again! Problems; but if they behave in traditionally masculine ways, they are seen as lacking social skills” (Williams and Dempsey 2014). To resolve this paradox, women, especially those in leadership positions, can embrace feminine stereotypes like the “kind but somewhat severe mother” or the “dutiful daughter”, in order to put themselves forward, a gentle way which Williams described as the “gender judo” (Williams 2014).

Research Questions and Methodology

As the data show, there are few women in the IT sector, a well-paid sector that should be of interest to women, while they continue to be largely concentrated in traditionally female, and low paid, occupations (Moyser 2017; Dionne-Simard et al. 2016). The data thus lead to the question of how women in IT deal with their minority status in this sector. Macé's theories on discrimination deal with its influence on the career choices of students and the way they will act at work to deal with their gender image. They lead to this research which aims to determine if women in IT still have to deal with this type of situation in their daily work context. What are the main obstacles minority women in the IT sector face? How do they deal with these? Do they use queen bee responses to be promoted or is this an obsolete concept, as some suggest? What is it in the IT sector that motivates their work? These are the questions at the core of the research which aims at a better understanding of the causes of women's low representation in the IT sector.

The research seeks for answers to complement the general descriptive Statistics Canada data (which reports this low percentage of women in IT). A qualitative method was chosen to find answers to these questions, which the statistical data suggest but do not answer. The research thus aims for a better understanding of the situation and attitudes of women in the IT sector.

The research is based on semi-directed interviews, with female employees in IT positions. Data was collected on different aspects of their work: why they chose the IT sector and which advantages they find in this sector or work, as an employee but also as a woman, the various difficulties they encountered or expect to meet to achieve their goals, their experiences with respect to collaboration between men and women, what they encounter when they are in a leadership position and how they must deal with their employees, mostly male. The questions are derived from the literature review but also on research on labour market segmentation, labour economics and sociology of work and discrimination theory. As for the literature review, partly presented above, it is based on scientific articles on discrimination and women's place in the labour market, and also some articles in professional journals in IT, and some articles specifically on women in IT and multimedia.

For this research, we interviewed 39 women working in the IT sector in video games, telecommunications and the IT department of insurance companies. We contacted an association (sectoral committee in IT) which is specialized in training and professional development in the IT sector. This gave us some contacts with the main employers in IT in Montreal and Quebec City. We contacted some 19 companies to ask them to participate. We selected companies in various IT fields (public sector, insurance and banks, video games, consultants' firms, websites) to try to have diverse experiences in IT. When a company from a field declined, we contacted another company from the same field. At the end of this process, six companies had accepted to send the invitation to participate to their employees.

The employees who agreed to participate then contacted the researchers to schedule an interview. According to ethics and privacy requirements in Canada, firms cannot give us the emails or phone numbers of their employees, so this is the usual procedure. The firms who agreed to pass on the invitation for the research are quite important firms, hiring many people in IT, so are quite representative of the sector. The multimedia firms are smaller firms, so there is a representation of firms of different sizes. However, we cannot pretend there is perfect representation as might be the case for a quantitative survey by Statistics Canada, but Statistics Canada has no such survey on women in IT. The interviews are thus the best way to gain a better understanding of the statistics presented above on the low presence of women in IT.

Given the literature review and research questions presented above, the interviews focused on women's training, the path that led women to work in IT, as well as their daily lives in this specific area, their attitude with their colleagues, male or female, the attitude of colleagues towards them and the various difficulties they may have encountered.

The interviews were fully transcribed and analyzed with a technique developed by Savall and Zardet (1996, 1995a, b; Savall 1989). This technique is based on a selection of 'meaningful sentences' (phrases témoins) which best represent the information collected. The analysis of the interviews is based on the main themes considered in the organizational analysis presented by Savall and the Iseor team. It is composed of themes, sub themes, 'meaningful of witness sentences' and key ideas:

- The families of themes are extracted from the six areas of dysfunction of the socio-economic analysis model of Savall and Iseor: working conditions, work organization, time management, communication-coordination-concertation, training, strategic implementation. We concentrate mainly on the five first, as we did not conduct interviews with managers.
- The sub-themes correspond to a variation of the themes with an aim of precision and hierarchy, facilitating the reading of the restitution to the actors concerned.
- Meaningful or witness sentences: they are extracted from interviews and selected according to their added value and / or their representativity.
- Key ideas: they are used to classify, group and federate a set of meaningful or witness sentences, illustrating a common idea.

We thus proceeded to analyze the transcriptions according to these four elements, defining themes, sub-themes, and extracting meaningful sentences from the interviews according to their added value to the explanation of the situation of women in IT, and grouped the sentences into key ideas. We now turn to the results, which are presented on the basis of these key ideas extracted from the interviews and present some quotes to support these ideas.

Results

The IT sector's Image: A Dynamic Male-Centered Domain

While Québec and Canada have policies on gender equity and women should be considered as having the right to work in any sector, the reality is quite different, as illustrated by the data presented above. Because of the very masculine image that the IT sector carries, it is not always easy for women who feel attracted to this sector to choose to study and work in this domain. Jane who works in video games, an area she has always enjoyed, took a long time to dare to work in this field because IT is still labeled as a male world:

I, who secretly loved video games, do not want to talk about it with my other female friends... In college, at last I had people with whom I can talk more openly, and really be myself. That was the big thing that happened in my life, when I arrived in this sector. Sure I'm not the only girl to be interested in video games, but I'm sure there are a lot of

them that are too embarrassed... Who like it, but do not say so because they will be judged. I would like them to think that this is a sector where you can be yourself without being afraid. (Jane)

The vision that Jane explains is widely shared by the participants: IT is perceived as a science, but more detached from the human being than biology or even chemistry:

IT, it seems that it is man-machine world, it is the image that is given. I think women like to interact a lot, maybe that's what makes it look like a cold world. (Amélie)

If I look at my female friends, with whom I studied, I would say that there is a vision that is quite widespread among all my friends: we have the desire to help people, feeling like we are doing something good for people, I do not think that's necessarily what comes out when you think about IT. (Magali)

However, this perception is false and could be corrected by experimentation, according to the testimonials received, which clearly show the great variety of the IT field, as concerns writing, creating or solving puzzles in order to “heal” a software:

Programmers, developers, computer scientists, the general vision we have refers to the hardware, something similar to pipelines. Software is the information we put in these pipelines. IT is using these pipelines, so from literature [her training], I'm completely in my element! We are talking about information management, what is information? It's writing, it's text! (Juliette)

If I remember, what started to interest me in computer science was about arts. We had a little software to make fonts, it is perhaps the way to bring computer science to girls, more on the artistic side and after that, at a given moment, you realize that you can make beautiful letters, but if you want to go further, you could create, yourself, your own letters by doing programming! (Chantal)

I like the kind of challenge it brings, I always feel like I'm making a puzzle, because I'm looking at it: "Ok, the script is done like that, how could I make it work better. How can I find its weaknesses, its “sores”, to help developers with that. (Karina)

While it is true that women mentioned earlier said they wanted to work in the field, many arrived in IT by chance and it is the benefits offered in the IT sector that made them stay.

The fact that IT employees are in high demand, since almost all businesses need computer skills, women cite the ease of finding a job.

It was fate, I just ran into that, and I really liked it, and I continued. It's easy to find a job, you can do it. (Caterina)

It's really nice, because it's an area that can go from one side to the other. My father was very worried during my studies, he was wondering if I was going to find a job but it was not long that I found one. (Jane)

Even if jobs are not often unionized, and you work on successive contracts, the possibility of easily finding another equivalent job elsewhere, for some, is a form of job stability. The strong demand for computer science specialists can also lead to higher wages in the private sector, compared to government jobs.

I don't think it's difficult, there are a lot of positions in IT. What is difficult to secure is full-time employment. You can be full-time but self-employed. If you're comfortable being self-employed, with that level of insecurity, it's possible... (Mary)

Salaries are not frozen like in the public sector. We have rising wages. I'm doing 50% more than when I started and it was not long to get increases. It's fun for that. (Marie-Anna)

The fact that computer science is a field recognized to evolve quickly, technology constantly changing, could be perceived as a disadvantage, and it has been quoted as such by some, but the majority of women interviewed more often see that as a positive point to avoid boredom.

I am completely embedded in this sector while coming from a completely different field, every day it is an apprenticeship. You should not be someone who loves routine, you cannot be afraid of change. You must be ready to learn all the time. (Linda)

I never feel like I am stagnating. I was talking to someone yesterday, then he said to me: "My God, you still look enthusiastic." I said: "Yes, I feel that this year is going to be another different job..." The IT world is moving so fast, we do not have time to get bored. (Amelie)

Finally, they also talked about the relaxed atmosphere of the sector, often with a younger average age, driven by curiosity and the desire to learn.

People and the field are fun, it's young at heart, not serious. We're kidding all the time, we can laugh at everything, there's no barrier to what we can say, it will not be frowned upon as before. You do not feel like you are working. (Maria-Anna)

I could not change my work environment because I think it's a lighter environment, a dynamic different from any other workplace. I really like the versatility it takes, and the fact that it's very organic in the studios. It's never the same day, it's not really the same job. (Valerie)

So women in the IT sector found an environment that they appreciate, not so serious, constantly in movement, full of new challenges. They know that their skills are in high demand now, even if they don't always have an established full-time position; some see the fact that they can easily find another job elsewhere if they need it as a form of employment stability.

Female Characteristics

Many of the women in the industry mention that they prefer to work with men rather than women. They mention their more direct way of approaching things, of coming back with the problems, even if it is without nuance:

I am more comfortable when I manage my projects with men. A man, you tell him I want A-B-C-D by the end of the week, he will do it without a question. After that he leaves with the order, if there is a problem, he will come back to you. With a woman, she will discuss much longer. A woman, even before beginning something, she will do more analysis, she will ask more questions, ask for more details. (Linda)

Just working with guys, I liked it, it's not the same kind of way to work! A guy is more direct! Girls sometimes, we must think about what we say so we will not hurt someone, a guy he sees nothing, there are less nuances in the language with a guy than with a girl. He will not stay in the background! Guys, I think they do not back-up, they do a back-wash of all the things that irritate them at the end of the day! (laugh) (Chantal)

Others note that women have little solidarity with each other, that they seek to dominate the small female group in the company, which one of the participants identifies as the privilege of being the “queen of bees”, an advantage which is threatened as soon as another woman enters the company. Without knowing the syndrome as explained by scientific articles, participants describe the situation:

I call this the principle of the "queen bee", it's rewarding to be a woman, surrounded by men, you feel special, everyone is a little afraid of losing this feeling. When you have your circle of friends, that you feel really good with them, you're afraid that a girl will come and steal your friends. And it's stupid, it's really childish, but I feel like that sometimes, and I found that other women feel like that too. (Nathalie)

I admit that I prefer working with guys than girls... Because girls, you will have more “drama” that will create rivalries or innuendo. There will be hostilities. I do not exclude myself from the problem either. (Violette)

For IT women, the more direct attitude of men can be an advantage to adjust more quickly and some women describe themselves as “non-girls” in the sense that they do not have the interests expected by society for a woman:

The one I have close to me, she does not speak, I mean, she is as non-girl as I am, in the sense that she is also used to blending with a gang of guys and then she behaves as such. I still do not hang out with girls because of that, they start talking about makeup and diet and then I do not know what to say, so I leave. I am used to dealing with guys and I'm no good at dealing with women, it's super different! (Sylvie)

Since they are a minority in their community, the interview explored whether they thought their presence brought something because of their gender. Many pointed out that women's way of interacting is different.

I think very much that women act as a link between the parties, because in the natural traits of women, there is much more social support and socialization. I think we can easily share things, whereas guys are more competitive and performance oriented, so maybe they have less of a natural tendency to share. (Ariane)

Even among respondents who hold a leadership position, they also mentioned this ability to work together they sought to create in the team:

I have a team of about 250 people working under me. I think I'm more of a team player, I'm not trying to pound on the backs of others to move forward. I have always been more a caring person. Yes, have the customer at heart, move the company forward, but take people with it, not crush anyone. I think it's a little bit the leadership style that I have, I think I'm great at motivating people, to give a vision, but not at the expense of people. (Caroline)

Others spoke about organization, planning, attention to detail that women generally have.

In meetings, girls, we are much more structured than guys, anyway, in my work experience, we are pickier. In computer science, there is a lot of development going on, and not a lot of documentation and it's really important. The guys have a lot of trouble with that, and then I think we're wasting a lot of time not documenting. (Chantal)

I spoke with my lead during an evaluation, and he told me that [in the videogames' industry], without wanting to stereotype, women are usually better at small movements, dialogue, while men, they really like to do more fights, big business. (Jane)

Respondents denounced the many questions that women ask themselves before starting to work, being perfectionists as to the details, the approach. However, as we can see, this ability can also become a positive point.

Girls and guys, it's a very different way of thinking, regardless of the training. I think it's so rewarding to have teams with both. All the teams I saw that had guys and girls, I thought it worked better... We talk a lot about multi-ethnic teams, all that it brings to the teams to have people from outside, but there is perhaps not enough emphasis on having teams of different gender. (Chantal)

Either too picky or well-organized before starting a project, either preferring to be queen of bees, not in solidarity with other women but more capable of sharing and creating links, women themselves often described the same characteristics as good and bad simultaneously.

The “Seduction” Game

In this study, the women interviewed reported that they either contributed to slut-shaming themselves or were victims of slut-shaming (Tremblay and Harvey 2019). The term “slut shaming” in social sciences is a phenomenon in a workplace where male representations are dominant (performance, competition, leadership). So female employees face more judgments when they display a typical “feminine” image. If women do so, they will be criticized or disqualified based on an attitude or clothing considered out of the ordinary, too provocative for a particular environment. The term “slut” refers to the stereotype that a woman displaying her femininity in a male environment is perceived as “open” to sexual proximity with her colleagues. Those who engage in such relationships are then called “whores” while men who have the same behavior are admired and valued for their number of conquests: “A flipper-yet apt-definition that encapsulates the sexual double standard is that a “slut” is “a woman with the morals of a man.” (Hess 2016).

Being a minority places women in front of a choice: to become invisible, “one of the boys” or, on the contrary, to be themselves, doing their jobs without denying women’s attitudes or clothes. This tension characteristic of a minority community, however, gives the impression to many that they will lose, whatever they decide. It is what was exposed in the next themes, related to kindness, the desire to do more and leadership.

We used the expression “queen of bees”, which was also chosen by one of the participants, to illustrate the fact that some women prefer to work in an environment where they will be minority not only because they like the field, but also because they feel privileged to be the only representative of their gender at work. Many of them mentioned the different way in which men act: more direct, sure of themselves and frank. In contrast to the women whom they described as uncertain, wanting to be more prepared (which requires more information) and not publicly disagreeing. Women seek to keep the image of kindness generally associated with femininity.

Women, most women, we want to please. Since we were small: "Ah, you're nice, you're fine! Be wise!" For guys, it is less true: "Go ahead, take risks, it does not matter!" The little girl, she must be careful. When I speak, I try to pay attention... Since we are small, we must be nice, stay in our place, not bother. (Lyne)

This special situation, linked to the desire to please, tends to increase competition among the few women working in the sector, which can lead to moral harassment.

She asked me if I got there because I had been “using the sofa”... Which means having sex with someone to have a promotion in the company. It came from a woman who disliked another woman for some reason. (Alexandra)

This status of “queen of bees” can be disputed between employees, and men sometimes confirm they saw women in a special way. But this different treatment does not please all:

When I play online, I'm going to hide the fact that I'm a girl, because I do not want to be treated differently. There are many games where if a girl is discovered, she will be given gifts by the other players. (Karina)

The gifts (a special weapon, game credit, useful items) are offered because the gamer is a woman. For some women, they fear that the online “friend” is waiting for a counterpart. In the same way, a nice attitude on the part of a woman can be confused for an opening, in the same way that some feminine clothes can be labeled as an “attempt to seduce”.

There are people who confuse kindness and dragging. I made lots of male and female friends working in the video game industry and I never flirted. But I had a huge problem of perception between kindness and dragging, still today... (Alexandra)

For some participants, this has led to more serious problems. And the measures put in place were insufficient to protect them. On the contrary, those who end up being “less friendly” have been penalized:

I was harassed by my new boss... I tried to fix it with him, it did not work. I went to HR, human resources' people could not believe it, it lasted several months, it resulted in a complaint that I made, there was an investigation, and they found him guilty and responsible. Normally they should have given me all the means to take back my place, to find out how I was going too... But they left him there, I was moved to another area that I did not know at all. They made me pay for it ! (Eleonore)

The manager began to harass me a bit, he sent me messages on Messenger at midnight or in the evening: "What are you doing here? You're not asleep? Why are you on Facebook on a Saturday night, do you not have a boyfriend who takes care of you?" You know, silly things like that... But he was one of my superiors... I was uncomfortable, I did not want to reject him... It was three or four times a week and lasted for three months... Then, at one point, I told him clearly, maybe too abruptly... From that moment, I stopped being invited to strategic meetings, they stopped giving me writing assignments, I was limited to my tasks. I was put aside. (Juliette)

Like Eleonore, Juliette also ended up changing jobs in the company, having no other way to limit interactions with the person who was harassing her, even if this boss had accumulated complaints from four women and was “severely reprimanded, but had been promoted since then”.

The #MeToo movement was often cited by women as bringing up situations they had experienced, but also as a reason for companies to be more attentive for fear of denunciations.

There are also #MeToo cases. In the parties. You have to deal with that. Every girl, there's always a guy who likes her. It happens in all areas, but here we have one girl for

20 guys. You have to deal with it: if someone is interested and you are not. And if the guy has a director position... (Marie-Anna)

For Eleanor and Juliet, who reported harassment, the management did not solve the problem, but they seemed to believe that it would have been worse without the #MeToo movement.

He was contacted directly by Human Resources, that's the first thing they did, and they scared him because there are things that came out in the newspapers. (Eleanor)
 Since last year, I was in that, I denounced things to the #MeToo movement. By changing places, it is certain that at least I got back my integrity. After this revelation, I went to court, in therapy too and the whole process of denunciation. Here, I became who I am. (Juliette)

Minority work contexts such as IT make women “visible”, which can lead to misunderstandings as to the place they should occupy: employed, but also woman and, therefore, potential girlfriend for a large pool of male employees.

Some women like to be noticed as well, competing with others to keep this status. But for others, this is not a good thing. It is difficult for them to adopt the right attitude, the kindness can be perceived as an opening, but a clearer refusal to put an end to discomfort or harassment can be received negatively.

Need to Do More to Prove their Competences

Women in a minority environment, particularly in the area of science/IT which has been dominated by male employees and male role models for several generations, are forced, even if they have the qualifications or experience, to prove that they have not been hired because of quotas put in place, which would have them pass before male candidates. It is a fear that came up often in the discussion when we talked about the quota solution: the idea that an incompetent woman would quickly discredit all the other women in the same field.

The guy said to me, "We hired women to respect quotas, so we really picked up idiots for a long time, so you might have to work harder, to prove that you're not an idiot. Because we've had too many before and we're tired of that." (Satine)

Moreover, whether there are quotas or not, it seems that employees often think that a woman is hired because of this kind of measure.

With quotas, people will think that a woman has been taken even if she is not so good. They just changed my VP, it's a woman they hired, and everyone thought it was because of that. (Julia)

A new female employee began with this prejudice because it was believed that she was hired because she is a woman, not because of her skills. She will have to “prove herself”, to work harder than a man in the same position to counter this prejudice, which is reflected in the discourses of several of the women met.

I have a well-established career, I have experience, I am recognized, people know that I have made big projects, but I still have to struggle a lot. Recently, I had a meeting with people who are more technological, in infrastructure, servers and all that, and they had brought techno friends. I entered the room and I thought: "Ok, there are more than I

thought and it's a bunch of guys... Ah it's going to be tough!" Because we have to prove ourselves... (Eleonore)

To get where I am, I am convinced that I put in a lot more effort than a man. (Lyne)

We give ourselves a warrior look precisely to demonstrate that we are capable, and we will give twice more. I've seen many women like this, in this world. When I look at women who are VP, they are all women who have a lot of character, who do not hesitate. I think of this feeling of "I have to give more to prove that yes, I can." (Amelie)

So, regardless of the position, women have to show that they are not in this position because the company wanted to fill quotas, but because they deserved it.

Sometimes you have the misogyny of a client who hears your name and says: "What, no, no, I want someone else in charge of my file." You have to prove that you deserve trust because it is not ensured automatically. (Isabelle)

These disproportionate demands on what is required of women mean that they feel they cannot make mistakes because that would prove that they are not completely "worthy" of this position.

Men, even if they don't have the skills, they will go ahead, they will try it. Women will be very honest in their attitude when starting a new job. Because of the impostor syndrome, we always tend to say: "I have to know everything if I apply for this job". Men will "bullshit" much more than women because, for us, to prove ourselves takes longer. The woman, when she is going to apply, she has to feel confident that she is able to do it, while men will give themselves the chance to try and... Come what may! (Amelie)

Thus, not only do women have to prove that they know the field and the work they will be responsible for, but to make a mistake confirms the prejudice that the position was obtained at the expense of a man who was as competent.

Emotion and Leadership on a Gray Line

One of the points that women have emphasized is that, as soon as they speak at meetings to oppose or bring up a different point of view, they must be attentive to their attitude, because they may quickly be accused of being "aggressive" or too emotional. Some colleagues do not hesitate to refer to menstrual cycles to explain their opposition.

People take my attitude as: "You're too emotional, you're too aggressive, you're in your week..." It's always like that! (Beatrice)

There is a guy who said to me, "How do you manage to control your emotions in this kind of meeting? Everyone was trying to destroy your solution and then they found some flaws, how do you manage your emotions?" I said, "Pretty much like you I think!" He replies, "Anyone would have cried!" "No, I do not feel like crying." He replies, "Luckily you're not in PMS huh?" I left! (Eleonore)

By highlighting the emotivity of women, referring to their hormones and their inability to "control" them, men also insinuate that they are less rational, that they have more difficulty to be logical.

I insist on a file and my boss tells me: "The problem is that you are emotional, and I keep cool, I am here to bring you back". I said: "Excuse me, I think you meant that I'm

passionate, not emotional, I'm not crying or whining, I have not even raised the tone of my voice." It's enough to hear that women are emotional... I saw some guys crying, screaming, destroying an office because something was not working. There are prejudices. (Lyne)

As Lyne points out, men who are angry or are moved will not be judged in the same way as if these attitudes are observed in a woman. For males, it is a sign of strength, determination, authority; while among females, it is a lack of control over emotions, a misplaced aggressiveness. This was described by other participants.

What is annoying, sometimes, if a girl is more rough, she is temperamental. So... There is no way out. "Hey, she's frustrated." The guy, he may look a bit temperamental, it does not matter. "Hey, I was not happy with my salary!" (Genevieve)

For women though, if you are more forceful in your convictions, you are tagged as being overly aggressive, whereas if a man does that, I have seen it, a man can be that way and get away with it. But from a woman's perspective it doesn't seem to be well accepted, yet the message could be the same message. We get labeled the "b" word, we're not nice if we're fighting back, and I don't think it's fair, we also have the right to be passionate about our ideas without being deemed emotional. Whereas from a man's perspective he can be as boisterous, as loud, as aggressive as he wants to be and people will look at that more favorably than they would from a woman. (Mary)

Thus, the attitude to adopt for women is very difficult to identify. They should not be too direct or too passionate because they will then seem aggressive. How to get the message across, especially when leading a team? It is necessary to use tactics, to adopt a role of leadership typically related to femininity like that of the mother:

We'll play the mother, it's sad to say, but in that case, we have no choice. (Chantal)

Another person described another opportunity for female leaders to take the role of a reigning princess, acting assertively, but with kindness towards her team.

You become the little princess. Yes, they are nice with you, but you must be a princess, you must not forget that. It's a two-edged knife. Guys do not like being told what to do or think by a girl. If a guy does not agree with my point of view, I'll try to convince him and then I will lobby with an ally. Then with the ally, I'll go see him. Yes, it takes a lot of effort, but you have to fight with what you have. (Lyne)

Find a male ally on the team to spread the word. I have a female colleague who plays clumsy and when she wants to be heard she will go through an ally who is in the same team who will pass her message. By, herself, alone, it does not work. (Satine)

Women must therefore adopt a less direct attitude, use long term strategies, to achieve their ends. Whether it is the supportive "mother" or the nice "princess" who are used, the IT women evolve on a thin gray line as to the appropriate behavior.

Discussion

With this study, we wanted to determine what were the main obstacles women in minority in the IT sector face in their day-to-day lives and, especially, how they were dealing with these.

Researches tend to demonstrate that strategies like queen bee responses (Staines et al. 1973) and gender judo (Williams and Dempsey 2014) can be of use to be recognized as an employee, and to work around the fact that women have to prove themselves, to face harassment or reject, even from other women.

Queen bee responses as masculine self-descriptions, in-group distancing and denying of discrimination (Derks et al. 2011) were mentioned by participants of this study. This can explain why so few women are interested in pursuing a career in IT, the same as in education. In law firms in the US, researchers found the queen bee syndrome “[...] furthering the negative stereotype of women not helping women which [...] can contribute to a general impression of the legal profession as gendered and inhospitable to women” (O’Neil et al. 2018). Another study in Netherlands and Italy stated that it was faculty members who “perceived female students to be less committed to their work and female faculty endorsed these gender-stereotypical perceptions most strongly” even with data which show that female doctoral students were equally committed (Ellemers et al. 2004).

For some of the women that we met, being a minority of women in the IT sector is not a problem because they feel more at ease with men than with women or they simply accepted the more direct way men have when they express themselves. However, this is not what happens in reality: women experience a motherhood penalty when they have children (Moysen 2017; Tremblay 2019) and face many stereotypes and expectations of performance (Qian and Fan 2018).

Among the women interviewed, many spoke of the importance of becoming invisible (one of the boys’), of being non-girls not to attract attention, to try to control the “excesses” of women who do not want to erase their femininity (and face slut-shaming). They spoke of their hesitation when they receive unsolicited gifts or were the object of seductive attempts that were difficult to refuse, especially when they came from a superior. When a woman gets a job, there is also the doubt that it may be motivated by the “quotas” or an innuendo that she used sex to make her way. For some, this has gone as far as sexual harassment.

In the case of women in leadership positions, stereotypical perceptions seem to have changed little. They are either too emotional or aggressive as soon as they warm up. Some female leaders spoke clearly about maneuvers, roundabout ways to achieve their ends with male teams: team up with some of colleagues before a meeting, adopt a warm attitude, make sure you are not “threatening” and rather appear as a kind princess. They faced symbolic violence in the sense of Bourdieu (2002) because they are part of the “women’s group” even if they are in a male-dominated sector, and in a dominant position. Because of that, some women try to dissociate themselves from other women to be “one’s of the boys”.

To change what Macé (2015) calls cultural discrimination, which causes girls to hesitate before enrolling in certain areas labeled as “masculine”, we must act as soon as possible to prevent further discrimination, which is often implicit in the positions occupied, as well as in the attitudes to adopt for men and women. Women have a negative view of quotas. It can be understood: even without quotas, they have to fight the perception that they were chosen because the company needed a better image, that they took the place of better “male candidate”. Given that some form of symbolic violence occurs in a minority workplace, women adopt a profile that emphasizes their status as little as possible and may even harm other female employees (queen bee responses), it will also be necessary to seek to increase their numbers so that they feel comfortable to speak, without fear of being accused of favoritism (quotas) or being emotional. Some studies indicate that a minimum of 30% is needed for the minority to feel at ease when they have to speak up and contribute.

This qualitative study cannot be generalized, and we must explore the subject further in order to truly understand the impacts of what we exposed in this study. But still, with their clear discourses, the interviewees showed that there is still much work to be done in the IT sector for women to be treated equally. It seems that women who work in IT have developed techniques to succeed in doing so. They appreciate the sector, they like their work. For many, the IT sector was a domain they wanted to work in, while for others it was discovered after they changed their vision about the preconception of IT being a “man-machine” sector. And they suggested that the experimentation of the diversity of computer sciences by girls, at a young age, would help to transform this vision. This is exactly the project of the organization ‘Les filles et le code/Girls and the Code’ in Montreal which has tried to do just this, by allowing girls to experience programming.¹

Studies also show that the younger generation may have less biased judgments (Ellemers et al. 2004; Ellemers et al. 2012). Also, it was noted that, for men, it is positive to deviate from the “gender-based norms” (Hussein et al. 2014) and to support diversity at work (women or minorities); this gives them higher performance evaluations (Gabriel et al. 2017). If companies have put in place rules to reduce incivilities from men, we can speculate that it can be useful to focus more attentively on men as agent of change (Williams 1992).

In addition to introducing girls to programming early on, in order to increase enrollment in this area, other techniques need to be implemented in the workplace. Resumes without names to make it impossible to determine if the candidate is female or male may be an option, as well as mandatory ratios for company quotas, mentor relationships, proactive reactions when harassment happens: a lot of ideas can be put in place to help women to pass the barriers for their integration into the IT sector. With more women in the IT sector, companies will gain in performance, and possibly in creativity as well, and women will also have more liberty to chose their career without constraints.

*All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee (Social Sciences Research Council of Canada and Tri-Council Ethics Guidelines) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.”

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¹ <https://concertationmtl.ca/ce-que-nous-faisons/concarter-et-connecter/mouvement-montrealais-les-filles-le-code/>

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