EXPLORING THE UNDER-REPRESENTATION OF WOMEN IN LEADERSHIP

ROLES IN THE INFORMATION TECHNOLOGY INDUSTRY

by

Estelle Jacquemard

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Approved: Dr. Catherine Loughlin
Supervisor

Approved: Dr. Margaret McKee
MBA Program Coordinator

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Abstract

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The information Technology (IT) industry has rightly been described as a male-dominated environment for some time. Although more women are now working in this sector, it does not mean that they have the same advancement opportunities as their male counterparts. The higher the level on the organizational chart, the more women are underrepresented. I conducted a series of interviews with six women, who have reached an executive status in this industry, to find out the common traits that may explain how they succeeded and what could be done to lessen the effects of female underrepresentation in the IT industry.

The results showed that various academic backgrounds allowed these women to get their first IT job; but none of their degrees were specifically focused in IT. Once the participants started in this industry, they liked the challenges and the opportunities that they found and decided to stay working in this field. With no mentors – but sponsors – they were able to make their way to the top and at the same time raise families, due to supportive and helping partners.

While we are beginning to see change in the IT industry, we must do more if we want to see equal representation of men and women at executive levels. These interviews suggest that the process may be twofold – first of all, during childhood, veering away from gender biases to encourage learning in all fields (i.e., science, technology, engineering, and math). Secondly, creating organizations that are willing to offer flexible environments with no tolerance for biases, equal compensation for equal work, and a fair advancement process.

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Introduction

In certain professions, women are well represented whereas in others, women are extremely underrepresented. For example, in the nursing industry women represent around 90% of the total population (US Survey, 2003). Unfortunately, in the Information and Communications Industry (IT), women only represent 16.5% of Board seats and an astonishing 0% of CEO positions (Catalyst, 2014). Similarly, a 2014 Annual Corporate Directors Survey from PricewaterhouseCoopers has shown that only 14% of the directors that serve on the boards of companies with more than $1 billion in annual revenue are female —closely aligning with gender distribution averages of Fortune 500 public company directors (PWC, 2015). Some research has been conducted to try and explain the gender gap in this industry, with different conclusions. Michie and Nelson (2006) found that the barriers women face are self-efficacy, passion and gender biases. Rosenbloom, Ash, Dupont and Coder (2008) showed in their study that men and women differ systematically in their interests, and that these differences can account for an economically and statistically large fraction of the occupational gender gap. For the purpose of this research project, I question why women's leadership potential has been massively untapped in the IT sector and I wonder whether it has to do with a lack of interest, social acceptance, and discrimination against women or gender stereotypes.

I have been working in the video games industry for 10 years as a General Manager. I have also been a Board Director of two associations: Digital Nova Scotia (DNS) which represents the digital industry, and the Nova Scotia Game Developer Association (NSGDA) that supports the video games sector in this province. In this highly male dominated environment, I was most often the only woman at the executive table. While I

never felt discrimination or different behaviour from my male counterparts, I wondered why this was such a male-dominated environment. However, in the last several years, I have seen an increasing number of women entering the ranks of the IT industry. Therefore, the purpose of this research paper is to examine women's successes and barriers in relation to reaching an executive status in the IT industry. Based on a literature review in the area, I investigated themes such as childhood, academic background and professional experience to find common traits that would help – or have helped – these executive women get to the top.

Perceived Gender Differences in Childhood

Competition

A series of psychology studies suggest that young men are more competitive than women. While boys spend most of their time doing competitive sports, girls select activities where there is no winner and no clear end point (Campbell, 2002). This difference increases through puberty, and by adulthood more men than women describe themselves as competitive (Niederle & Vesterlund, 2007). The influence of parents and community may have an impact on the competitiveness of boys and girls. For instance, Gneezy, Leonard and List (2006) explored gender differences in competitive environments. They examined a patriarchal society (the Maasai in Tanzania) and a matriarchal society (the Khasi in India). They found that Maasai men opt to compete at twice the rate as Maasai women. The results are reverse amongst the Khasi, where more women choose to compete than men. These results provide support for the argument that societal structure is crucially linked to the observed gender differences in competitiveness, and thus, that "nurture matters" (Crozon & Gneezy, 2009).

Ambition

Besides child competitiveness, male and females evolve differently in terms of ambition. According to Fels (2004) ambition requires both the drive for mastery and the support of an audience. She found in her work as a psychiatrist that women like men had great ambitions when young, but as they grow up, women's ambition declines. Fels calls it the "gender recognition differential" (p. 45). Men routinely expect their goals and achievements to be valued, and they seek recognition from others when it's not forthcoming. Despite 30 years of modern feminism, women still labour as the recognizers - generic listeners and deferential conversational partners (Fels, 2004).

Academic background

Half of the students with at least a high school diploma are women, and women have represented more than half of bachelor's-degree recipients since the mid-1980s. In 2010, 57% of bachelor's-degree holders were women (Ceci, Ginther, Kahn, & Williams, 2014). When examining STEM (Science, Technology, Engineering and Mathematics) degrees, the proportion of women varies. For example, women received only 25% of GEEMP (Geoscience, Engineering, Economics, Mathematics/computer science and the Physical sciences) bachelor's degrees in 2011, and this percentage has been decreasing since 2002. However, women are over represented in LPS (Life science, Psychology, and Social science) fields, with almost 70% being women (WebCaspar, 2013).

Women mention that negative aspects of their schools' climate, such as competition, lack of support and discouraging faculty and peers, cause them to re-evaluate their field of study (Goodman, Cunningham, & Lachapelle, 2002). Ceci, Ginther, Kahn and Williams (2014) conducted a study about women in academic sciences and found that the lack of

interest in Geoscience, Engineering, Economics, Mathematics/computer science, and the Physical sciences subjects is the result of one or more variables - chilly climate, biased interviewing and hiring, lack of female role models, lack of mentors (an experienced person who will advise and train them), biased tenure and promotion, unfair salary, sex differences in quantitative and spatial abilities, lower productivity and impact, stereotype threat, and sex differences in career preferences. However, they were unable to determine if these are really the causes for the underrepresentation of women in those fields, because of the complexity, nature and timing involved in their decisions to choose their career.

Perceived Gender Differences in Adulthood

Careers

In 1992, the Canadian Committee on Women in Engineering published a list of "common and difficult" barriers faced by women engineers, which include:

> "a lack of collaboratively planned career development; absence of policies that support individuals balancing career and family; workload demands; heightened visibility; promotion that depends on emulating management; traditional attitudes to women in professional roles; and absence of networks, mentors and role models" (Canadian Committee on Women in Engineering, 1992, p. 267).

Not much has changed since then. Technology is increasingly important in our lives, but there is no female equivalent of a "tech guru" like Mark Zuckerberg of Facebook or a Steve Jobs of Apple. Men tend to dominate in the tech industry and, unfortunately for women, the number remains stagnant. In 2011, women held less than 25% of STEM jobs. Furthermore, women with a STEM degree are less likely to work in STEM occupation

than their male counterparts and are more likely to work in education or healthcare. (United States Department of Commerce, 2011).

The gap is even more pronounced amongst entrepreneurs. According to Mathilde Collin, co-founder and CEO of Frontapp, which is a collaborative email app, there are some drawbacks of being a woman in charge. In an article in the Wall Street Journal, she wrote: "You do have to work a bit more to get credibility and have people listen to you; it might be harder to recruit developers and make them trust you; and you will end up going to a few sales meetings where the other person is more interested in you than in your product" (Collin, 2014, p. 1).

The disparity does not only concern the fact that women are underrepresented, but also a gender wage gap. Equal pay for women in the US is a relatively new concept. In fact, in the 1930s, the federal government actually required that female workers be paid 25% less than male workers in the same jobs (The American Association of University Women, 2015). Even if the gap has been reduced since then due to legislative action, it still exists. In 2013, among full-time, year-round workers, women were paid 78% of what men were paid. Babcock and Laschever (2003) have explored the possibility that gender differences in labour market outcomes may arise because women are poor negotiators and generally dislike the process of negotiating. Sheryl Sandberg, Chief Operating Officer at Facebook, made the same comment. Her solution is for women to not be afraid of talking about compensation and negotiations as it worked for her. When she was talking to Mark Zuckerberg about joining Facebook, she says she was inclined to accept the first offer he made. But after her husband encouraged her to make a counter-offer, she did and Zuckerberg came back to her with a much more lucrative proposal (Sandberg, 2013, p. 46).

Family – Personal Life

Public speeches and blogs from women show that even the most successful ones feel guilty when they have children. A famous article from Slaughter (2012) expresses her difficulties of having a demanding career and children. She mentions that having support at home is very important (a spouse who can take care of the children and not feel diminished if his spouse earns more than him); sometimes women choose not to have children to focus on their careers. Sheryl Sandberg made a controversial point about it in her book "Lean In" where she says that women should ask their partners to do at least half of the parenting work and the housework. But Sandberg acknowledges that balancing work and family time is tough. She explains in her book that she restricts her time in the office from 9:00am to 5:00pm, has dinner with her kids when she is not travelling and works from home after they go to bed (Sandberg, 2013, p. 111). Some argue that it is easy for her given her position; she can afford to decide her schedule, while most working-women do not have the same flexibility. The importance of a partner's support has been supported by Heikkinen, Lamsa and Hillos (2014). In their qualitative study of spousal support, they interviewed women managers in Finland and concluded that a male spouse who is willing to break the traditional gender order and provide his wife with various forms of support is often constructed as having a positive influence on the career of his wife. It is quite obvious that raising children while having a demanding career requires support from partner or family.

Leadership Styles

A participant of a study conducted by Caliper (2014), Connie Jackson, Chief Executive of St. Bartholomew's and the Royal London Charitable Foundation stated, "Strong

leadership starts with being able to pull together a group of people—who may not have anything in common—and getting them to buy into a vision of themselves as a collective group who can achieve uncommon results." (Caliper Research & Development Department, 2014, p 3). In this study, the Princeton-based management consulting firm, laid out the qualities that distinguish women leaders in that they are more assertive and persuasive and have a stronger need to get things done. Eagly, in an article about female leadership advantage and disadvantage, recognised that women leaders on average manifest valued, effective leadership styles, even somewhat more than men do, and are often associated with successful business organizations (Eagly, 2007). More specifically, the women encourage participation, share power and information, enhance other people's self-worth, and get others excited about their work. All these things reflect their belief that allowing employees to contribute and to feel powerful and important is a win-win situation as it is good for the employees and the organization (Rosener, 1990). Bem (1974; 1975) defined a set of traits and behaviours for each gender. The ones labeled as masculine include the following traits - self-reliance, independence, assertiveness, has leadership abilities, is willing to take risks, makes decisions easily, is dominant, is willing to take a stand, and acts like a leader. The set of traits and behaviours labeled as feminine include affection, compassion, cheerful, does not use harsh language, is loyal, sensitive to the needs of others, sympathetic, gentle, and understanding, (Bem, 1974). Dr. Musimbi Kanyoro, the World YWCA Secretary General, in his speech to honour the YWCA, said attitudes toward leadership are changing, and what women offer is essential: "Domination as a leadership style is becoming less and less popular. There is a new growing appreciation of those traits that women use to keep families together and to organize volunteers to unite and make change in the shared life of communities. These

newly admired leadership qualities of shared leadership; nurturance and doing good for others are today not only sought after but also indeed needed to make a difference in the world....A feminine way of leading includes helping the world to understand and be principled about values that really matter." (Kanyoro, 2006, as cited by Lowen, 2015, p. 1).

Paustian-Underdahl, Walker and Woehr (2014) analyzed the results of 99 different studies that measured leaders' effectiveness from 1962 to 2011. What was interesting is that it depends on whom you ask. When the study is a self-report method, male leaders tend to rate themselves higher than women. But when other people (peers, bosses, or subordinates) did the rating, women were seen as more effective than men.

Method

I employed semi-structured interview methodology with specific questions asked of every participant but no set response formats – individuals were free to answer as they felt best described their experiences (Fontana & Frey, 2005). Because of my roles in the IT sector, I have been in contact with women that have a leadership position in their companies. I reached out to them by email, asking them to participate in this research project and if they would be willing to answer my questions (See questions list in Appendix A). Eleven participants were contacted and six participated, with titles such as Vice-President (VP), Executive Vice President (EVP), Chief Information Officer (CIO) or Chief Executive Officer (CEO). The companies they work for range from small to medium sized organizations, publicly traded companies or associations.

Demographics

The average age of the women interviewed was 40-50 years and the numbers of years working in the IT industry averaged to be 23.5. Out of the six respondents, three hold a Bachelor Degree, two a Masters and one did not finish her Business degree. A total of 35 questions were included. For example, I asked what kind of sports they played as a child, what majors they had chosen and how they started working for the IT industry. All interviews started by explaining the context of the interview and why I was interested in the exploration of the under-representation of women in leadership roles in the IT industry. I also mentioned to participants the different themes I planned to address during the interview, which included: Childhood, Ambition, Academic Background, Careers, Family and Leadership style. I explicitly told the participants that if they did not feel comfortable answering one or several questions, they were free to refuse answering.

The interviews lasted between 35 minutes to an hour and a half, were conducted face-to-face or over the phone/Skype and were recorded for transcription. Audio records, field notes and transcripts were used alternatively to ensure the accuracy of the findings.

Findings

Childhood

When exploring the kind of sports played during their childhood, discussions with the participants highlighted two opposing experiences with sports. Outside of the sports proposed by schools, only two of them had played competitive sports - Track & Field, Soccer, Basketball, Tennis, Volleyball etc. - a mix of team and individual sports. These two women enjoyed playing with boys at a younger age, until physical differences required them to be on female teams later on. The respondents' best memories were playing and winning as a team, even if they recognized that the play was more competitive when mixed with boys. As one of respondents said:

> R1: "I prefer team sports; I like team building and I liked when the team won and even if the team failed, I learned from it."

It was not surprising to find out that these two women were highly competitive when they were young; a characteristic they both still have.

Among the other participants, they used to play sports for pleasure and a way to get some exercise. However, they preferred individual sports (swimming or dance), because there was no competition. They liked the social aspect of it (i.e. meeting with other kids and being outside of the house). One respondent stated:

> R4: "I liked the social aspect of it. The best times were actually to be on the bus. It was a kind of hanging out."

They had no interest in scores or results and as one of them told me:

> R3: "I stopped the ballet practice because I did not want to do the annual and final show."

It was interesting to hear that powerful women, with high positions in their companies were not and still are not comfortable with open competition. Being competitive may help a woman to reach powerful positions, by utilizing typically masculine traits. However, it is not the only key to career success and as the findings demonstrate, the lack of competiveness does not stop women from becoming an executive leader in the IT industry.

As children, half of the women interviewed had stated they thought they knew what they wanted to be when they grew up. One wanted to be a doctor because in her childhood, this profession was the symbol of power and independence. The most competitive participant, even though she did not have an exact profession in mind, knew from very young that she wanted to explore the world and have a lot of responsibilities.

> R1: "I wanted to do global work, but I didn't know in which country or company. I knew I would be leading a department or a group."

Interestingly, she was the only one claiming that she has always been ambitious. She has lived in various different countries and currently holds a CEO position. The other participants, however, even if they had a career in mind, were pretty assertive in saying that they had no ambition. Apparently, not having ambition at a young age does not prevent women from having a successful professional career. As I found out later with questions regarding their career, they climbed the ladder by accepting challenges and taking on opportunities. Surprisingly, none of the respondents had thought of a job in the IT industry. However, we have to remember that when these women started their careers in the 1990s, this industry was fairly new, vague and limited to few companies in the world.

Another interesting aspect of their background is that none of the women interviewed had a degree in Sciences or IT. The diplomas go from Bachelor of Commerce, to Masters of Art, Communications or Public Relations. The choice was either because of interest in the area of study, to follow friends who had chosen this degree, or like one respondent said:

> R4: "I studied accounting, not because I loved accounting, but I could be out of here in four years, have a job and pay my bills."

However, when asked if they would change degrees, if they had the choice to go back to the High School period, some of them said that they would choose a degree more in line with the IT industry such as computer science. As one of the respondents stated:

> R3: "If I could I would have had a diploma in engineering."

And another respondent mentioned:

R1: "If I could go back, I would choose something along the lines of technology. There was something called Informatics but it was little promoted."

Again, when those women were at the age of choosing an academic path, technology and IT were in their infancy, underdeveloped and not accessible to everyone. It has evolved a great deal since then. Despite the fact that none of them had a degree related to IT, they started in it by chance or like one respondent told me, she was at the "right place at the right time". Another respondent was interested in the IT industry and was determined to obtain an opportunity. She went to a call center she knew, asked to meet a manager and said:

R2: "you have an image problem and I have a knowledge problem. If you help me get the knowledge, I'll help you with your image. That's how I got into IT!"

But whatever their first job was, they found a challenging environment that they liked. They have all stayed and continue to have a successful career in this industry, for more than 20 years.

Career

During the respondents' careers, most of them said that they had no mentor to help them grow. However, we should keep in mind that the whole mentorship concept is fairly new as it was non-existent when these women started their first jobs, or if mentoring was present, it was very informal. That is the reason why the respondents preferred to mention a 'sponsor', in relation to helping them be promoted.

R1: "When the company I worked for was acquired, a new position opened and one of my manager told me that I should apply for this position. I did and got it. That's why I would talk more about sponsor than mentor."

Interestingly, and in contrast to studies and research in this domain, none of the women interviewed felt treated differently because she was a woman.

> R2: "In this particular role (CIO), it wouldn't matter if you're a man or a woman. It would be how you present yourself."

However, some respondents acknowledged that obtaining their position might be more difficult for a woman. As one said:

> R4: "The rules are the same for men and women (you have to speak up). The difference is that we haven't been trained all the way along to play by these rules."

But all mentioned that sometimes, they would feel outside of the "Boys' club", where male values and behaviours prevail (Disesa, 2008) and that would push them to make comments and try to change the situation. A prime example was from one of the respondents, who said that when she reached the Vice President level, she was the only woman. During the first VP meeting, she discovered that the screen background of the computer on the meeting room was a young woman in a bikini. She was not offended but told her colleagues that it was inappropriate. They apologized and promised to pay more attention in the future. Similarly, another respondent concluded:

> R4: "You have to get used to being the only woman in the room. If that bothers you, you go and get another job."

None of the respondents described their current position as their dream job. Part of the reason is because most of them did not have a clear idea of what they wanted to be when they were young. But all of the respondents stated that they are satisfied with the field they are working in (IT) and are willing to take any new challenge that comes their way.

When asked about the compensation component of their job, more than half of the respondents thought that there was a difference between their salary and their male counterparts. There were two exceptions though:

R2: "In our organization (a public traded company), it's a requirement. If you are at this level, then you get paid this much money."

One of the women decided to fight this injustice relatively early in her career.

R5: "At this point (of my career) I had more responsibilities than anyone else on the leadership team and I was the lowest pay by a lot. You have to question it and ask who's adding the more value."

All of the respondents acknowledged that women are part of the gender pay gap problem. They feel less confident than men when it is time to negotiate an increase in salary and they have to work harder than their peers to prove their value:

R3: "Men are more confident in this industry and know how to 'sell' themselves when it comes to negotiating a salary. A woman has to demonstrate constantly that she deserves to be where she is."

All of the interviewees shared their concerns about their work/life balance. The women I talked to had one or more children with ages varying from five years old to twenty-five years old. All mentioned a supportive partner, that would share the household responsibilities, and/or "*step onto the plate*" when necessary, not only doing laundry or cooking, but someone who will not be resentful and will encourage his/her partner to take on responsibilities at work or to accept a promotion.

R2: "(when our kids were young) I had a very good partner… Deliberately, my partner and I determined that I would go for my career and she was ok with it."

R4: "I have lost good people that were on my team. As soon as they got kids, they quit … their job or stopped being ambitious… to be at home at 3.30pm to take care of the kids… without a partner who can share the responsibilities."

However, it is a constant struggle and the respondents recognized the guilt that they have to live with in relation to work life balance. For example, the impression of missing important times with kids when at work and thinking of work when with the family. As one respondent said:

R4: "You have to accept that it's true (juggling between family and work is not easy). It is my life."

Although the number of participants is small, it is interesting to note that most of them decided to have children *and* a career. Despite the difficulties in managing both, these women were not ready to give up one or the other. The only respondent who does not have children did not regret it:

R6: "I was never really that kind of women who was thinking about kids. I think my kids have been my businesses."

When asked about their leadership styles, the women I interviewed had different words to define leadership, but all seemed to be aligned with the feminine qualities such as collaboration, helping people, being concerned by what matters to them, supportive, being transparent, a good listener and having a good sense of humour.

R2: "it is less collaborative when dealing only with men, there is more ego involved."

Most of the respondents discussed similar answers when asked the type of leader they would prefer to work for. They found men's leadership styles being more assertive, directive, less emotional and more egocentric. I must mention however, that the

respondents did note that they have worked with males who have utilized a 'feminine' leadership style and females who have utilized a 'masculine' leadership style, which suggests these styles are not confined to being a man or a woman.

When asked what they could improve on to be a more effective leader, the respondents mentioned qualities that are described in the literature as being more masculine (i.e., less emotional, assertive etc.). Despite the respondents' success, the feeling is still that a woman should act more masculine to reach powerful positions.

> R1: "when women speak, they seem hesitant.. it has to do with body language too …When a man speaks up, it's more louder and that's why they may be more listened to."

Discussion

There may be many reasons explaining the under-representation of women in the IT industry. It often starts with childhood and the way we raise our kids. Parents have different expectations for their kids based on their gender. While boys are encouraged to be assertive, girls are encouraged to show empathy and be egalitarian (Ruble, Berenbaum, & Carol, 2006). We as parents can prevent the biases that we involuntarily instil in our children. As we appear as roles models to them, we are cultivating behaviour from early ages that they will reproduce later in their adult lives. Research led by Weissbourd (2015) has shown that 36% of boys preferred male business leaders and 6% preferred female leaders, 58% didn't express a preference. There was no significant difference between girls' preference for male versus female business leaders (Weissbourd, 2015). We should discuss with our kids that success of individuals and leaders should be based on their successful qualities and not on their gender.

Similarly, studies show that girls whose fathers play a part in housework and laundry—no matter what their income levels—directly contribute to their daughter's health, happiness, ability to do well in school and broader career prospects. Our sons and daughters need to see their fathers as good role models. As well, our daughters must not think that by becoming a mother, she would become a second-class citizen, whether she opted to stay home or work outside the home for pay (Erasmus, 2015).

One of the issues with career growth for women may have to do with gender itself. Sheryl Sandberg said that women keep themselves from advancing because they do not have the self-confidence and drive that men do. Sandberg (2013) stated, *"We lower our own expectations of what we can achieve"* (p. 40). She adds that when a man is successful, he is well liked. When a woman does well, people like her less. In her book "Lean In", she tells a concise story to illustrate her point. At her first performance review with Zuckerberg six months into her job at Facebook, he told her that her desire to be liked by everyone was holding her back. "If you please everyone, he said, you will not change anything" (p. 51). "Mark was right," she writes. "Everyone needs to get more comfortable with female leaders," she insists, "including female leaders themselves" (p. 65). Similarly, an experiment lead by Heilman, Wallen, Fuchs and Tamkins (2004) arrived at the same conclusion. In evaluating a woman in a male-dominated field, observers saw her as less competent than a similarly described man, unless there was clear information that she was competent. In that case, they saw her as less likeable than a comparable man. Both male and female raters saw competence as the norm for a man and as something that has to be demonstrated unequivocally for women.

On the same note, Arnold and Loughlin's (2010) data suggests specifically that female leaders are almost three times more likely than male leaders to put their personal interests

aside in order to assist employees to develop their skills and careers. As well, a 2014 U.S. gender parity research study conducted by Bain, Coffman and Neuenfeldt (2014) revealed that young men and women entering the work force in their early 20s are equally confident in their abilities and 43% of women aspire to top management, as opposed to 34% of men. After two years on the job, 34% of men still report a desire to reach a top management position, while the percentage of women aspiring to the same echelon drops to 16%. According to the study, it seems that it is not the lack of ambition at a young age that prevents women from reaching executive position in companies. The authors suggested that part of the problem might come from the women themselves and the fact that they need to learn how to keep the confidence they had when entering the workforce. However, men need to be conscious of their biases, beliefs, behaviours, and know when and how to support, and sponsor (future) women leaders. Finally, at the organization level, the culture needs to create new processes that support the growth, development and promotion of women. Several studies have argued that there is a positive relationship between a firm's financial performance and women's presence on boards or at senior levels. Konrad (2003) has stated that a diverse workforce increases the organization's capabilities to deal with a more global and diverse customer base and therefore leads to an increased market share. She also noticed that demographic diversity increases innovation and creativity, which in turn enhances the competitiveness of the company (Konrad, 2003). This should be an appealing argument to IT organizations to diversify their workforce and welcome more women within them.

The women I talked with have a successful career in the IT industry; however, none of them have a diploma related to that sector. It is worth noting that when they chose the field of their studies, the IT industry was obscure to anyone who knew nothing about

programming, and the only degrees proposed were related to coding. It was seen as a male, or rather a "geek" environment. The participants started soon after graduation to work in IT companies, because they accepted an opportunity. Nowadays, with the explosion of technologies, there are more defined jobs related to the IT industry including software engineer, systems analyst, technical support, network engineer, web developer and software tester. A degree exists for almost all of these careers but the sector is broad and remains vague. If a student has a precise idea of his/her future role, he/she has plenty of degree choices. But like the participants of my research, many other backgrounds (communication, psychology, business or administration management) could lead to a successful career in this industry.

To attract young girls to the IT industry, this sector needs to promote an image of being more gender neutral. As Von Hellens, Neilsen and Beekhuyzen (2004) stated, IT work is constructed as a 'masculinised' domain, despite the undertaking of such work by women. The image of the industry will only change if more is done to support women working in the industry who wish to combine home and family life. Another factor to increase female representation is to showcase successful women that will be regarded as role models for youth. It would show that women could overcome gender discrimination and other challenges of this industry. There were always women that had a successful career despite the difficulties, even in the early ages of technology. We can take the example of Margaret Hamilton, a computer scientist and systems engineer. With an MIT team, she helped to develop the software for the Apollo Space Program, between 1961 and 1972 (Matthews, 2015). In an era where computer programming was limited and seen as a man's job, she found her place, enjoyed what she did and never stopped because of gender bias. Role models exist now more than ever, but not enough in number or

publicity to attract young women to this industry. Mentoring needs to be more common in every organization. It will develop and retain talent by providing guidance and advice from an experienced employee to an employee with less experience and to help the latter in his or her career advancement, educational and personal development (Hayes, 2005). The employee is often looking to learn from someone who is successful and well respected. What is interesting is that it does not have to be a woman mentoring another women. Men can be great mentors as well and the gender should not make a difference. Pamela McCauley, professor of the Department of Industrial Engineering and Management Systems at the University of Central Florida in Orlando, recommends to look for a mentor with enough power and experience to truly help, and not based on the gender (McCauley, 2012). It has to come from women at the top level too. They know the barriers that could stop young women in their evolution and they are at the best place to help others in their careers. They can "give back" by being mentors and sponsors.

Conclusion

Working in the IT industry for quite a while and noticing that gender parity at executive levels has not yet been reached, I was interested to get the point of view of successful women about possible reasons. Their answers concurred with the literature: chilly climate, lack of female role models, lack of mentors, and unfair salary and sex differences in career preferences. Although the IT industry is beginning to shift in response to more women entering the ranks of this sector, the shift is incredibly slow. The research suggests that we need to increase the interest of young girls for GEEMP studies to enhance their skills and promoting the IT industry, even though the interviews have shown that there are opportunities for an IT career without a related degree. However, the promotion of this sector is tricky, as the rapid rate of change makes it difficult to

conceptualise in a meaningful way what constitutes the IT industry. Definitions produced by industry organisations do not necessarily reflect the experience of people working in the industry (Von Hellens, Neilsen, & Beekhuyzen, 2004); an exhaustive list of jobs description of this sector is nearly impossible. As well, to get a more balanced male-female ratio, we need to improve the work environment and make it more female friendly; having a successful career and raising a family requires some trade-offs. Men regretted that they could not see more of their children, whilst for women the major issue was the exhaustion they experienced from attempting to manage parenthood and working life (Lift & Ward, 2001). Proposing a better work-life balance and flexible work arrangements would allow women to feel more confident that they don't have to give up one or the other. Overall, the under-representation of women in IT should not be configured solely as a 'women's problem' but as problem of the industry itself and a problem related to the (unequal) gendering of domestic and care (i.e. parental) work. (Moore, Griffiths, & Richardson, 2005). My interviews would support these arguments and suggest that there is room for improvements in increasing the number of women reaching leadership positions in the Information Technology industry.

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APPENDIX A – Questions list

Childhood - Sports

1) What kind of sport were you playing when you were young?

2) If team's sport: was IT a mix between boys and girls, or girls only? Maybe IT was a mixed sport at young age and became girls' sport only? At what age? An idea of why?

3) What was your best memory when playing team's sport? The worst?

4) If you played in a mixed team, how did you feel? Did you prefer playing with boys or girls only? why?

5) Were you competitive?

Childhood - Ambition

6) Did you know what you wanted to be when you were young? At what age? What was IT?

7) What ambition did you have when you were young?

8) Are you now what/where you wanted to be?

9) How did you get there?

10) Do you still have ambition? For what?

Academic Background

11) If you have diploma, what are they?

12) When did you choose that academic path? Why?

13) Did you find your student time enjoyable or difficult? Explain

14) If you had the possibility, would you go back and change of university courses? To do what?

15)   Do you think your academic background helped you to be where you currently

        are?

Careers

16)   Is your current position your dream job?

17)   When did you start to work in IT field?

18)   Did you have (have you) a role model / mentor. Was (is) IT a male or female? Is

        there a difference to have a male mentor than a female? Why?

19)   Do you feel that your position is more difficult to get as a woman?

20)   Do you think you are paid fairly? Compared to men in the same position?

21)   Why do you think there are not more females in an executive position in the IT

        industry?

22)   What, according to you, are the enablers and/or blockers that prevent more women

        for having leadership roles in the IT industry?

23)   Do you feel you have a successful career? Why (or why not)?

Family

24)   Do you have children? How many?

25)   If you don't have any, could you explain why?

26)   If yes, how do you manage family and work?

27)   What kind support are you seeking at home or outside to manage work and

        family? Does it work?

28)   Are you happy with your work/life balance? If not, how would you improve it?

Some Definitions

29)   How would you define your leadership style?

30)   Do you see it different than a male leadership style? Explain

31)   What kind of leader are you comfortable working with/for? Describe the qualities

that you'd like to see in this leader

32)   Do you think that you have these qualities?

33)   What do you think would make you a better leader?

Culture

34)   In which country did you study? Which province if Canada?

35)   If you have job experience in more than one province/country, do you feel a

difference

in women in leadership position here as opposed to other provinces/country? Explain

Certificate of Ethical Acceptability

Certificate of Ethical Acceptability for Research Involving Humans

This is to certify that the Research Ethics Board has examined the research proposal:

SMU REB File Number:	15-251
Title of Research Project:	Exploring the Under-representation of Women in Leadership Roles in the Information Technology Industry.
Faculty, Department:	Sobey School of Business, Management
Faculty Supervisor:	Dr. Catherine Loughlin
Student Investigator:	Estelle Jacquemard

and concludes that in all respects the proposed project meets appropriate standards of ethical acceptability and is in accordance with the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans (TCPS 2) and Saint Mary's University relevant policies.

Approval Period: June 05, 2015 – June 05, 2016*

Continuing Review Reporting Requirements

ADVERSE EVENT
Adverse Event Report: http://www.smu.ca/academic/reb/forms.html
Adverse events must be immediately reported (no later than 1 business day).
SMU REB Adverse Event Policy: http://www.smu.ca/academic/reb/policies.html

MODIFICATION
FORM 2: http://www.smu.ca/academic/reb/forms.html
Research ethics approval must be requested and obtained prior to implementing any changes or additions to the initial submission, consent form/script or supporting documents.

YEARLY RENEWAL*
FORM 3: http://www.smu.ca/academic/reb/forms.html
Research ethics approval is granted for **one year only**. If the research continues, researchers can request an extension one month before ethics approval expires.
FORM 4: http://www.smu.ca/academic/reb/forms.html
Research ethics approval for course projects is granted for **one year only**. If the course project is continuing, instructors can request an extension one month before ethics approval expires.

CLOSURE
FORM 5: http://www.smu.ca/academic/reb/forms.html
The completion of the research must be reported and the master file for the research project will be closed.

*Please note that if your research approval expires, no activity on the project is permitted until research ethics approval is renewed. Failure to hold a valid SMU REB Certificate of Ethical Acceptability or Continuation may result in the delay, suspension or loss of funding as required by the federal granting Councils.

On behalf of the Saint Mary's University Research Ethics Board, I wish you success in your research.

Dr. Jim Cameron
Chair, Research Ethics Board, Saint Mary's University

923 Robie Street Halifax NS Canada B3H 3C3
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