Insights on the double glass ceiling for women immigrant entrepreneurs in high-tech industry

ABSTRACT: *Although the number of women-owned firms is growing, there still remains the gap in the technology sector. The purpose of the present study is to explore the barriers faced by women-entrepreneurs due to their immigrant and ethnicity status. The paper presents a literature review in order to shed light on the possible causes of the lower number of women immigrant entrepreneurs particularly in high-tech sectors. Given the human, financial and network disadvantages faced by women vis-a-vis men, the immigrant status escalates the barriers further and create additional layer of "glass ceiling" to pass for women who want to start a technology-based venture. In other words, immigrant women face a set of invisible barriers to advancement in their entrepreneurial career in high-technology sectors. The paper points out the existence of barriers and calls for researchers to find out ways to tear down these glass ceilings in order to empower woman and support their contribution to society as UN 2030 Agenda for Sustainable Development argues.*

Keywords: Women entrepreneurship**,** UN Agenda Goal #5, immigrants, high-tech

INTRODUCTION

Women-owned businesses are seen, to date, to be a key representative of the business sector with about 163 million firms owned or run by women (GERA, 2016). As reported by National Foundation of Women Business Owners (NFWBO), overall women owned firms in the United States of America (USA) have shown a tremendous increase in numbers in the past 20 years, with the number increasing by nearly 58% (NFWBO, 2018). Along with men, women entrepreneurs (WE) not only finance their families and provide employment but also develop and bring something new to the community.

Even though WE grow, by and large their start-ups are still confined to traditional female-typed sectors (classified as traditional business comprising mainly of retail and service sector industry) with a lower participation in male-typed sectors (classified construction, high-tech and manufacturing industries) (Loscocco & Robinson, 1991; GERA, 2016). In addition, researchers have found that performance of women owned firms are comparatively lower than men in terms of employment, profit, sales or survival period (Klapper & Parker, 2010; Marlow & Patton, 2005; Sharafizad & Coetzer, 2017). Literature offers a limited number of explanations for these kind of critical differences of start-ups owned by WE. One such explanation provided in the literature is the presence of "glass ceiling" a term coined by Wall Street Journal reporter in 1986 described as "the invisible barrier that blocks women from the most senior positions in corporate America" (Mattis, 2004 pp. 158). Several studies in the past have identified the presence of "glass ceiling" acting as a barrier in women's career advancement (Belle, Edmondson & Nkomo, 2001; Mattis, 2004).

Entrepreneurship literature has long been interested in exploring entrepreneurial characteristics while it has neglected the investigation of entrepreneurs starting technology-based ventures, specifically WE (Dautzenberg, 2012). Tech ventures focus on bringing innovativeness (Dautzenberg, 2012) to all the stakeholders in the ecosystem including customers as well as the market. Development of new products, services as well as building new and innovative business models, help in building a strong tech ventures which results in wage gains, productivity increment and capital accumulation (Hart & Arcs, 2011). Individuals, who can identify entrepreneurial opportunities and exploit them, can build a high-tech venture (Shane & Venkataraman, 2000). These firms play a critical role in building economic growth, but unfortunately many countries have been underutilizing their human resources by not having women in high-tech ventures (Marlow & McAdam 2012; Cetindamar & Beyhan, 2019). In spite of an increase in the number of WE in high-tech ventures, women still constitute only 5-6% of all start-ups population in high-technology (Robb & Coleman, 2009). Additionally, it's been observed that women run high-tech ventures are comparatively smaller and less profitable in contrast to their men counterparts (Mayer, 2006).

Another method adopted by advanced countries to escalate country's economy is accepting and promoting immigrants in the hope of alleviating their economic growth. In the USA, the results of Annual Survey of Entrepreneurs (Rametse et al., 2018) revealed nearly 20% of the USA high-tech firms have immigrant founders in their founding team. According to Rametse et al. (2018), the immigrant's possibility to start a venture is higher compared to natives because of the numerous barriers faced by immigrants such as their lack of language fluency or racial discrimination in their workplace, which pushes them to take entrepreneurship as their career.

Given the higher possibility of immigrant to create a venture, an increase in women immigrant entrepreneurs has been observed (Baycan-Levent & Nijkamp, 2011). This increase has shown a paradigm shift in the social involvement, increased employment, revenue and technical advancement (Ahmad, 2011). Nonetheless, WE seldom get noticed compared to men (Ahl, 2006). Women immigrant entrepreneurs still remain "largely invisible and marginalised in mainstream entrepreneurship research" (OECD, 2004, p. 30; Collins & Low, 2010). Women entrepreneurship studies, to a large degree, ignore the ethnic/immigrant status, whereas the ethnic/immigrant specific studies pay no attention to gender (Collins & Low, 2010). Still, there are few studies on women immigrant entrepreneurs. For example, Boyd (1984) has highlighted the "double disadvantage" issue faced by women immigrant entrepreneurs, where he explains the "double disadvantage" concisely as follows:

> "sex adds another dimension to the stratification of immigrants within the workplace and within the larger society. In addition to the status of being a migrant, immigrant women experience additional difficulties in the labor force as women. Overall, the position of

> immigrant women in the labor force can be understood as reflecting the combined impact of sex and birthplace or the "double negative" effect." (1984, p.10)

Given the under-representation of women in high-tech industry and limited studies exploring the women immigrant entrepreneurship, we conduct a systematic review of literature to achieve two goals. First, we want to bridge both women entrepreneurship and migrant entrepreneurship literatures. By systematically analysing these two literatures, we compile dispersed knowledge on barriers that are faced by women immigrant entrepreneurs who start high-tech ventures. Second, the review helps us to develop a research agenda for future studies that could contribute to the UN 2030 Agenda regarding the Goal #5, reducing gender inequality.

The paper is structured as follows: the next section includes how the present research aims to attain gender equality in the UN 2030 Agenda. Then, we present the literature review.

MOVING TOWARDS ACHIEVING UN 2030 AGENDA'S GOAL ON GENDER EQUALITY: GOAL #5

Addressing the shortcomings of Millennium Development Goals (MDG), the UN 2030 Agenda, launched in September 2015, covers universal issues and is more inclusive with 17 Sustainable Development Goals (SDG). This research emphasise on Goal 5 of the agenda specially focussing on reducing the gender disparity and bringing equality in opportunities, employment, and decision–making as well as leadership position across all the levels. Many studies examine the gender equality agenda (Cornwall & Rivas 2015; Sakiko 2016; Sengupta & Roy 2018). For example, A McKinsey report (Woetzel et al., 2016) states that comprehending and working towards gender equality will result in increment of around $12 trillion economic opportunity all around the world by 2015.

Although a reduction in gender gap is observed at the global level (World Economic Forum, 2018), gender disparity still persists. Among the four dimensions of gender gap measurement used by World Economic Forum, namely economic participation and opportunity, educational attainment, health and survival as well as political empowerment, largest gap of 77% is witnessed in political empowerment. Followed by this, another key area of concern is the economic participation and opportunity: gender gap corresponds to 42%. Related with this problem, women are also trapped in a number of sectors where pay is low such as retail industry. It is also observed that women are twice as likely to leave their job in a high-tech industry and work in non-technical ventures (Singh et al., 2013; Ascraft, McLain & Eger, 2016).

163 million firms owned/run by women (GERA, 2016) across 74 countries, contribute towards economy in a number of ways, including employment creation. In addition, given the equal access to finance that both men and women have, women end up spending more (nearly twice) on household

compared with men (Chatterjee & Ramu, 2018). So, increasing their leadership by reducing gender gaps in entrepreneurship and technology could result in higher economic benefits. Past studies have found that countries with the gender gap in their labour forces suffer from income losses of nearly 30% of GDP per capita (ILO, 2014). Thus, reducing the gender gap and encouraging WE will result in economic development (OECD, 2012).

Due to its importance, gender disparity is one of the 17 accepted goals for UN Agenda 2030, namely the Goal #5. This study aims to contribute to this goal by understanding the barriers faced by immigrant WE in the male-dominated high-tech industry.

THE ANALYSIS OF THE EXTANT LITERATURE

Women entrepreneurship as an area of research has existed since late 1970s (Schwartz, 1976). Over the years, a significant growth in research has been observed in this topic (Poggesi et al., 2016). Studies in 1980s and 1990s are mostly confining in understanding the characteristics of WE and women-owned firms as well as identifying the differences with their men counterparts (such as studies conducted by Hisrich and Brush 1983; Cromie, 1987; Kalleberg and Leicht 1991; Cromie and Birley 1992). It was not until early 1990s, where the focus shifted in developing theories for interpreting WE and why does the difference exist between men and women-owned firms, which gave rise to feminist specific studies for example social and liberal feminism (such as study by Fischer et al., 1993).

Interest in looking at the immigrant status of WE grew only in mid-2000 where researchers looked into different characteristics of women immigrant entrepreneurs and looked into the barriers faced by them due to their immigrant status (Collins & Low, 2010; McQuaid, Smith-Doerr, & Monti Jr, 2010).

Past research shows that WE are confined to the female-typed industries such as retail (Robert et al., 2009). However, there has been an increase in non-traditional sectors such as technology industry (Mayer, 2006). The major reason behind this increase in number of WE in technological sectors is perceived due to the rise in the education level of women, as more women are completing four-year degree course compared to men (Mayer, 2006). The only few human capital areas in which women differ from men are identified along their skill set, work experience, academic qualification, growth strategies, and problem-solving (Mayer, 2006). Since societal context is not taken into consideration to a large extent in the general entrepreneurship literature (Ahl, 2006), these individual differences are conceived as major individual level drivers of starting and running technology-based firms.

The literature on technology-based firms are predominantly consisting men as their major samples (Dautzenberg, 2012; Hampton, Cooper, & McGowan, 2009; McQuaid, Smith-Doerr, & Monti Jr, 2010; Robert et al., 2009). This clearly indicates a need to focus on WE in non-traditional sectors. For instance, Mayer (2006) investigates women-owned high-tech firms in four major regions of the USA and finds

out that women are more likely to be involved in "female-typed high technology" firms (such as computer designing services, management consulting services or software publishing firms). Based on the existing studies, some of the reasons of the lower number of women in the technology industry includes women's lack of experience in the technology industry, underdeveloped managerial skills, discrimination faced in getting funding, and women's negative perception of oneself (Dautzenberg, 2012; Joshi, Inouye & Robinson, 2018; Mayer, 2006).

Non-specific gender studies show the inclination of immigrants in the high-tech sector. Among high-impact high-tech ventures in the USA, 16% of the firms have an immigrant as a founder (Hart & Acs, 2011). A study conducted by Brown et al. (2019) also found nearly 20% of the USA firms with immigrant founders in the high tech industry and when they compared the immigrant firm with natives, they found the immigrant firms outperformed their native counterparts in 15 out of 16 dimensions of innovation. Immigrant entrepreneurs also tend to locate their businesses where the immigrant population is higher and advances to build more strategically oriented relationships with some foreign companies (Hart & Acs 2011). The study of McQuaid et al. (2010) finds out that immigrant entrepreneurs try to create a link to their homeland in order to expand the businesses because homeland connections could expedite their growth process.

With the varied rationales provided in the literature for lower participation of immigrant women in the tech industry, this paper has first categorized these rationales or barriers into three broad groups inspired by previous studies (Adler & Izraeli, 1994; Cetindamar & Beyhan, 2019): (i) individual level, (ii) firm level and (iii) institutional level. These distinctions help us to understand possible causes that obstruct women's careers. But, then we added two additional lenses to the three level categorization: (1) barriers specific to high technology industry and (2) barriers arising from being an immigrant. We present all barriers we could identify from the analysis of literature in Table 1 and discussed them in-detail in the following paragraphs.

TABLE 1. TYPE OF BARRIERS FACED BY WOMEN AT INDIVIDUAL, FIRM, AND INSTITUTIONAL LEVELS DUE TO THEIR IMMIGRANT STATUS OR EXISTENCE IN HIGH TECHNOLOGY INDUSTRY

Type of Barriers	Due to being immigrant	Due to being in high-technology industry
Individual level	- Lack of host country's language fluency	-Lack of technical education
	-Citizenship status	-Prior work experience in technology industry
	-Motivation to opt entrepreneurship	-Low Self-efficacy
		-Role investment in families
		-Lack of confidence
Firm level	-Racial discrimination	-Limited access to technical resources
	-Culture of the industry	-Lack of professional network

	-Limited access to finance	-Lack of mentors
Institutional/societal level	-Country of origin	-Inadequate networking opportunities
	-Limitation of independence and mobility due to cultural factors	-Male-dominated culture
	-Limited country/ city-specific human capital	-Lack of information about career opportunities
	-Limited mentoring support in the host country	-Lack of women role models/mentors

Individual barriers

Barriers in High Technology industry

In high technology context, gender differences in individual levels are observed in human capital characteristics such as education level and prior industrial experience (Ahuja, 2002). A study by Cukier (2009) explains the gender differences on the basis of the expectation of success among men and women as well as self-efficacy in terms of technology and mathematics. In other words, the study argues that women incline for curriculum focussing on human interaction, which prevents women engaging themselves in engineering, technology, and computer sciences. This, in turn, derives the under-representation of women in technical programs and over-representation in arts and social sciences (Cukier, 2009). Contrary to this argument, a recent study clearly shows that when proper policies are induced to increase the education of women in science, technology, engineering and mathematics, the likelihood of them becoming entrepreneurs in high technology industry increases (Dilli & Westerhuis, 2018).

Differences among gender behaviour in high technology are also observed in role investment in families. Women, on one hand, invest the majority of their effort on the household role while men invest in time for some paid job (Lobel, 1991). Role distinction can easily be observed in childcare decisions, devoting time allocations to commercial tasks as well as difficulties in bringing work/life balance (Orser et al., 2012; Kirkwood & Tootell, 2008). Thus, role investment explains the lower participation of women in business ownership. This also helps in explaining why women in the technology industry are relatively less likely to be married and to have kids while being more inclined towards part-time work, think about family before making any career decisions as well as having some flexibility in the jobs (Myers, 1990). A study on the American technology sector reports that compared to women, men are significantly more likely to be married as well as more likely to give primary responsibility for the household and childcare to their partner (Simard et al., 2008). These findings are in line with Cukier's study (2009) that shows how women's career advancement in the technology industry suffers from the lack of support received from their families.

Looking into career outcomes, substantial gender disparity is observed in terms of salaries and business ownership. Women-owned high-tech businesses in the USA operate in 'female-typed' industries such as software publishing, management/consulting and research services contrary to labour-or capital-intensive sectors as aerospace, semiconductors, navigation and communications equipment manufacturing (Mayer, 2006). Possible barriers faced by women in the advanced technology sector include lack of women investors, limited coverage of media showcasing women in the technology industry, myths about women in technology, and lack of confidence (Orser, 2009).

Barriers based on immigration status

Rametse et al. (2018) in their study of immigrant entrepreneurs find that in general, immigrants decide to start a venture due to push or pull effect; in their study; they also find how a mix of these factors influence their start-up decisions. Some push factors that force women to start their venture include lack of English fluency, racial discrimination, lack of qualification recognition as well as having weak local work experience (Collins & Low, 2010; De Vries & Dana, 2012). Pull factors refer to being achievement and/or goal oriented as well as having strong internal locus of control (De Vries & Dana, 2012; Rametse et al., 2018).

Women's confidence is affected by a number of push or pull effects, including (Collins & Low, 2010; De Vries & Dana, 2012; Watson & Newby, 2007): language level, field of education, citizenship, accents, and unrecognised academic qualification of the home country. In addition, the inability to get funds for business growth also affects their human capital (McQuaid et al., 2010), because most of the women have either a family business background or comes from the middle socio-economic background (Collins & Low, 2010; De Vries & Dana, 2012).

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Firm level barriers

Barriers in High Technology industry

An analysis evaluating the firm level gender differences can be observed through the culture of the organisation including informal behaviour rules, procedures, and priorities of the organisation along with incentive schemes of the organisation (Carrillo & Gromb, 2006). In order to bring cultural uniformity along with focussing on 'good fit', an inertia is created which indirectly results in organisations implementing a culture for 'specialists' (like engineers, or technical experts) compared for 'generalists' (like administrators) which may create outlining work that are more masculine (Carrillo & Gromb, 2006). Therefore, this could be seen in the firms where men are employed in the primary

position whereas women hold secondary roles which are, in general, low waged, less prestigious as well as offering little flexibility to the primary positions (Peitchinis, 1989).

Looking into the high-technology firms, women are generally employed in routine jobs (such as data entry), generic jobs (such as customer relations or sales) or specific tasks (such as graphic designers or writer) rather than in analytical or managerial jobs (such as planning, product development) (Cukier, 2007). This prevents women in gaining management or technical experience which is essential in creating a venture given the importance of prior work experience in the business growth (Orser et al., 2007).

Given the barriers faced at firm-level including the disparity in access of resources, professional networks and mentors (Ragins & Cotton, 1999; Schaubroeck & Lam, 2002), career expectations in the high-tech industry may differ for men and women (Simard et al., 2008). Irrespective of the size of the tech firms, similar firm-level challenges are experienced by women. A UK study conducted on WE in the technology industry find that nearly 40% of women face gender-related challenges when creating their ventures (Prowess, 2008). Additionally, there are inherent assumptions of women that add invisible barriers; the most notable assumptions are considering women not being technically proficient, not having social networks, and 'being a mum and an entrepreneur'.

Barriers based on immigration status

Traditionally, most of the immigrant entrepreneurs have started businesses in retail as well as the service sector (Collins & Low, 2010; De Vries & Dana, 2012; Rametse et al., 2018). These businesses require low skill people and low capital investment, thereby not contributing much to the country's economy (McQuaid et al., 2010). With the increase in qualification and greater opportunities, immigrants move towards other technology-based sectors (Rametse et al., 2018).

Financial issues have always been raised for all the entrepreneurs (Rametse et al., 2018), specifically immigrant entrepreneurs. The fact that "double disadvantage" faced by immigrant women could be the reason why they face financial difficulties (Collins & Low, 2010; De Vries & Dana, 2012) as being an immigrant as well as being a women. Based on the discrimination faced by the immigrants by the natives which include difference in wages, additional need of documentation for starting a venture or biasness towards natives demotivate immigrant entrepreneurs (Bruder & Raethke-Döppner, 2008).

Institutional/societal level barriers

Barriers in High Technology industry

Evaluating gender disparity as well as understanding their differences at the institutional level is based on the assumption that organisation itself is not gender neutral and differences in gender can

penetrate in society level too (Adler & Izraeli, 1998; Kawarazuka & Prain, 2019). Various studies have looked into the cultural biases that exist in the high-tech industry. Simard et al. (2008) defined the technology industry as 'masculine, white, and heterosexual, associated with hard programming, obsessive behaviour, and extensive working hours'. Gender biases in hiring, promotion along with evaluation process for incentives and bonuses deter women to attain a higher position in any organisation (Simard et al., 2008). Developed countries like the UK (Panteli, Stack, & Ramsay, 1999), Singapore (Tan & Igbaria, 1994), and Australia (Hellens & Nielsen, 2001) have seen the gender-specific barriers in the advanced technology sector.

Dautzenberg (2012) studies German high-tech firms owned by women owners and finds that the gender gap exists in tech-based firms but the success of the firm is independent of the owner's gender as there are other factors such as firm size, firm age, and type of business which play a critical role. Entrepreneurship literature has identified the importance of family relations for WE and the role of networks in building and running a venture (Hampton et al., 2009). The study by Hampton et al. (2009) shows how the role of network differs with the growth of firms. It is observed that before the starting of a firm, WE use networks to gather information whereas when the venture is established and starts running, WE use their networks to expand their business. Contrary to this, men try to expand their network by establishing connection with some established business, venture clubs or networks (Hampton et al., 2009). Lack of self-confidence, thoughts and concerns about discrimination, self-perception of dearth of competency compared to men and lastly the extra time and effort required to create and foster the networks are some possible reasons provided for lower number of these 'quasi-formal' networks of WE (Smelter & Fann, 1989).

Additionally, culture influences immigrants to opt for becoming an entrepreneur (Verheul et al., 2001). Past studies have suggested that culture could be a barrier or enabler, depending on the perception of the entrepreneur (Azmat, 2012; Cetindamar et al., 2012). However, recent studies suggest that culture influence women founders in building and running their business in developing countries (Tambunan, 2009; Cetindamar & Beyhan, 2019). Cultural barriers including religious boundaries, cultural practices and norms escalates the issue (Roomi, 2013; Dhaliwal & Kangis, 2006), thus restricting women's liberty, independence, mobility, and possible career opportunities and creating gender disparity in the society. For instance, in South Asia, Hindu and Muslim cultures women are generally not motivated by the family to compete with men thereby limiting their knowledge, and access to market information (Roomi, 2013). With technology industry being more male-dominant, women tend to face societal obstacles in creating their technology-based venture in such a strong male-dominant institutional environment (Marlow & McAdam, 2012).

Barriers based on immigration status

The immigrant entrepreneurs might play a crucial role in finding and developing high tech ventures (Hart & Acs, 2011), but the number of studies focusing on immigrant or ethnic entrepreneurs is few and most of these studies are interested in men entrepreneurs (Collins & Low, 2010; De Vries & Dana, 2012). For example, a study (Collins & Low, 2010) points out that even though the number of female-founded firms have become one-third of small businesses owned by women in Australia, there still exists a gap that explains the complexities and issues faced by women immigrant entrepreneurs compared with the men counterparts.

Immigrant entrepreneurs coming from a developing country face various barriers when building their business in a developed country (Azmat, 2012). This variations are mainly due to the disparities in the regulatory and legal framework of their home country which are not too strong compared to the developed economies. Thus, these immigrant entrepreneurs face obstacles in creating their venture and adapting the regulatory and legal framework which forces them to follow the law and regulations.

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