Science and Technology Trends

Gender Issues in Science and Technology in Asia

Gender, Science and Technology in a Male Dominated Society, Iran

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1. Introduction

Iran is situated in Middle East with the approximate population of 78.1 million people in 2013. Despite all the socioeconomic barriers that Iranians have faced in recent decades, the advances in science and technology have never halted (kharabaf and Abdollahi, 2012). Moreover, a look at Iranian ISI publications records demonstrates that they have remarkable number of publications. This indicates that Iranian Scientists have contributed to a great extent to the international scientific community in various fields including science and technology, S&T.

Surprisingly, with all the restrictions imposed on Iran due to the political matters, Iran is at the top of the science growth in the world (Coghlan, 2011). MacKenzie (2010) emphasizes that the output of Iran's scientific expedition is increased 11 times faster than the world's average number. Science-Metrix (2005) has already confirmed that Iran owns the highest rate in science and the average yearly growth is 25% which demonstrates the double rate in just 3 years. This reveals that Iranians are active in promoting science and technology. However, the portion of women and men's participation in science and technology is not equal and despite Iranian women's hard efforts to get into science and technology, they still face many barriers

compared to their male counterparts. In other words, gender plays an important role in S&T trend. In the following section, we first look at the context of Iranian society and then we move to the role of gender in S&T progress.

2. Iranian Society through Gender Perspective

Iran is considered a male dominated society where patriarchal ideas are still practised in daily basis, socio-economic and political domains. Patriarchal culture is diffused in various domains and in family realm men have the right of decision making, marriage and divorce. This is enforced by some laws and more importantly by the culture of Iranian community. This has ultimately led to some women running away from male domination (Sreberny, 2014). Patriarchy is so dominant that Iranian women's "... rights and obligations are defined in relation to their male relatives" (Kian-Thiébau, 2008). Gender inequality is present in various social layers. According to SIGI (2014), Social Institutions and Gender Index, there is gender inequality in employment and women have less economic autonomy due to the high rate of unemployment among them.

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Figure 1 displays gender discrimination in terms of five dimensions of family code, physical integrity, son bias, resources and civil liberties in Iran. As can be observed, inequality rate in civil liberties is extremely significant and the rate of inequality for family code and access to the resources are high as well. While physical integrity and son bias bear no discrimination.
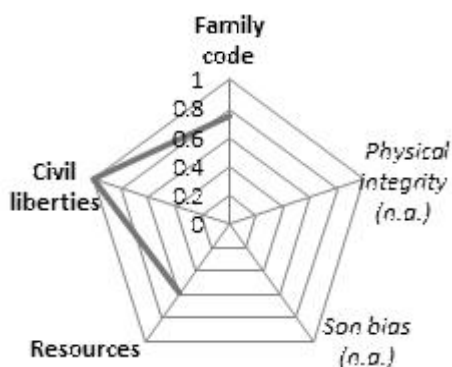
Figure 1. Gender inequality according to SIGI report (2014)

In spite of significant limitations on women's civil liberties, Iranian women have not been silent. They have rejected males' domination throughout the history. Nevertheless, the turning point for Iranian women occurred in the 1970s when Iranian society experienced the presence of an educated class with different values (Moghadam, 2011). Their values were against the existing patriarchal views in society and they demanded more liberty and equal rights. They also began to challenge the stereotypical features which have kept them as second citizens. This transition point granted women some freedom from prejudiced constraints. For instance, they forced some changes in the body of law to grant women more rights in society.

It is remarkable to observe that nowadays, male domination is less practiced by Iranian men, especially younger generation (Ansari, 2008). This is the positive outcome of Iranian feminists' movements. These changes have also made Iranian women much bolder in their interactions (Mohajer,

2015; Jariah and Mohajer, 2012).

However, the success that Iranian women have achieved is not what they were hoping for. Even with all the improving evidences that we can observe in the context of society, gender gap is still prominent and should be taken into consideration seriously. For instance, based on World Economic Forum report (WEF, 2014), Iran occupies a poor standing among the other countries in gender gap. Iran stands at the overall ranking of 137 out of 142 countries. Therefore, it is obvious that Iranian women have to pass through long roads to achieve gender equality and justice.

3. Gender, Science and Technology

Technology and engineering are two paths which are less taken by women than by men (Legewie and DiPrete, 2014). Even in some universities, senior positions in S&T are mostly occupied by men (Howe-Walsh and Turnbull, 2014). Nevertheless, no one can deny the significant role of gender in affecting science and technology productivity (Sotudeh and Khoshian, 2014).

The participation of Iranian women and men in S&T is so varied and it appears that women are more interested in science while men are more attracted to technology and engineering. According to UNICEF Annual Report, "In 2009, more than half of all Iranian university students, 68% of the students in science and 28% in engineering were women" (UNICEF Annual Report, 2011). This confirms the fact that Iranian women are more inclined to get involved in science than engineering. Nevertheless, there is a study by Masood (2006) which discloses that 70% of university students' population in science and engineering are female. However, this high rate needs to be revised and confirmed by other researchers in this field due to the common agreement on gender gap among Iranians in S&T. Moreover, it is important to consider women's participation in S&T after their graduation

as well. For instance, despite large number of females at university level, Moghadam (2010) expresses that in managerial high positions, Iranian women's involvement possess a trivial ratio of 4%.

In 2012 news was announced that 77 study fields such as engineering, theoretical physics, nuclear Physics, Plant Production Technology and some other fields are banned for women in 36 universities of Iran. It has caused many debates and arguments and finally the IRI Assessment Organization which runs the entrance exams of universities announced that there is a misunderstanding in this regard. They stated that 77 courses out of 22,800 courses are announced exclusively for men in the current year and that this number does not decrease or restrict the number of seats available for women compared to the previous year (Nayyeri, 2013).

As for educational attainment and gender gap, Iran's ranking is 108 based on a report from World Economic Forum (WEF, 2014). This number is far from the women's ideal expectations. The forum, however, indicates a significant difference between women and men at the literacy level where men score higher. Gender gap in primary and secondary education enrolment is minor and in tertiary level is equal. The latter is also approved by the Social Institutions and Gender Index (SIGI). The following table adopted from WEF, 2014 describes it well.

Nevertheless, WEF has been questioned by some scholars in Iran. For instance, it is argued that although sexual discrimination is obvious and prominent in Iran, the amount of gender gap is much less than the number that WEF has announced (Namazi, 2014). Their evidence lies in the comparison between Iran and the countries in the region. They emphasize that Iran appears to be more successful in the social areas such as women's work force and political participation than the countries such as Saudi Arabia where there is no woman working as a high-ranking officer and MP. Yet, Saudi Arabia is ranked higher than Iran in WEF report (Namazi, 2014).

In Iran, women face a paradoxical situation whereby their education is affected by a combination of both socio-cultural exclusion and women's empowerment movements (Mehran, 2009). Despite this confusing paradox, Iranian women have been on top in some fields of science and technology. As an example, Maryam Mirzakhani, is the first woman in the world who has won the Fields Medal, Math's highest prize (Mathis-Lilley, 2014). Some other examples of successful Iranian women in the world are Shekoufeh Nikfar who is awarded the top women scientists by TWAS-TWOWS-Scopus in 2009 and Shirin Dehghan who was awarded the top woman in technology in 2006 (Wikipedia). There are more examples of successful Iranian women; however, most of them developed their works and achieved their success outside their original country. This can be mainly due to the gender discrimination which is still prevailing in Iran.

In the following sections, I present more detailed discussions on the manners in which gender discrimination is manifested in science and technology.

Table 1. Iran scorecard in educational attainment (WEF, 2014)

	Rank	Score	Sample average	Female	Male	Female-to-male ratio	Female-to-male ratio
EDUCATIONAL ATTAINMENT	104	0.957	0.935				
Literacy rate	108	0.89	0.87	79	89	0.89	
Enrolment in primary education	108	0.98	0.94	96	98	0.98	
Enrolment in secondary education	101	0.95	0.62	79	84	0.95	
Enrolment in tertiary education	1	1.00	0.88	55	55	1.00	

0.00 = INEQUALITY   1.00 = EQUALITY   1.50
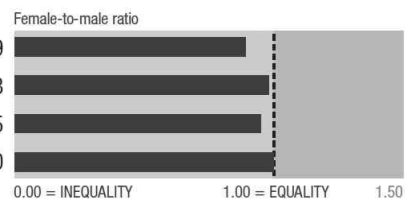
4. Gender, Information and Communication Technology

Information and communication technology (ICT) has received enormous attention and attracted many people since its blooming popularity in the world. While ICT involves the society in a kind of social interaction, it has been suggested that it should be viewed from the social perspectives (Kaplan and Duchon, 1988). Iranian society has also been affected from ICT and gender has a specific role in the manners in which it is used among people.

Iranian women use ICT to acquire information and increase their knowledge as much as they can. In addition, from a social perspective, ICT has some other advantages for Iranian women. Iranian women have found a quick way to express their voices and challenge the patriarchal norms. The evidence lies in the increasing number of female bloggers who discuss about gender discrimination and their rights. Shirazi (2012) believes that blogging has provided the opportunity for Iranian women and other marginalized groups to declare their demands. However, he emphasizes that the limited accessibility of rural women to ICT has restricted this population to take part in this area of technology.

As can be observed, apart from the educational benefits, ICT plays a much essential role among Iranian society. Besides, it has made a big change in women and men's perspectives and perceptions about gender gap and discrimination.

5. The Underlying Reason

At this juncture, I would like to discuss some possible reasons for the gender gap in science and technology in Iran. Nonetheless, it is difficult to cover all the grounds of gender inequality. Thus, I will present some of the underlying reasons based on the discussions presented in the previous sections.

5.1 Cultural and Social Issues

Cultural values and social interpretations in a society are very strong as they affect many aspects of individuals' lives. While looking for the causes of a social issue, you cannot disregard cultural norms which are practiced by the people of that social community. Gender as being performative (Butler, 1990), is defined by some acceptable acts which are performed by both females and males in a specific society. Therefore, cultural practices of a country can affect the ways in which women and men participate in various domains. In this regard, Jaja (2013) emphasizes "Gender issues are those activities or duties which differentiate a man from a woman that are within people and their cultural settings".

Moghadam (1991) emphasizes that marginalized role of Iranian women in society is the outcome of the social and cultural constructs which are prominent in Iran. Therefore, one can speculate that gender roles and cultural orientation are integrated. Grosso et al. (2014) utters that cultural values can form a kind of mind set that can affect social practices of people. Cultural values can also explain why S&T are mainly practiced by Iranian men. In a culture where women possess lower social status, the fields which can empower people are offered to men much more than women. Therefore, culture in Iran decides on gender suitability for study fields and can result in exclusion of women from masculine fields (Mehran, 2009). That is one of the underlying reasons that we have a small number of Iranian women in S&T.

5.2 Policymakers

In the beginning, I should state that policy making is not something separate from cultural norms in Iran and as Ostadalidehaghi and Béland (2013) mention "...various cultural assumptions about women interact and compete with each other within Iran's policy-making process... but these assumptions are unequal, in terms of the political influence they exert" (Ostadalidehaghi and Béland, 2013). The

following examples elaborate this scheme more.

The unequal cultural assumptions can be seen in various articles of Civil Code in Iran. For instance, the patriarchal culture, which is still practised in the context of Iranian society, has influenced the legal right to work for women. In this regard, article 1117 of Civil Code states the husband is able to prevent his wife from an occupation or any other technical professions which is not compatible with the family's interests or it may endanger the dignity of him or his wife. Nayyeri (2013) elaborates this article and reveals that according to this law, women are not forbidden to work. However, it has given the right to the husband to decide on what is appropriate for the wife. In addition, he can ultimately prevent her from the jobs that he believes they may jeopardise family's dignity. As it is clear, patriarchy has influenced this article in law where the authority is dedicated to men to distinguish right from wrong and make decisions for women. This can partly explain the reason why we have a small number of Iranian women in high status professions (Moghadam, 2010).

There are also other policies and regulations which try to confine women and limit them from social participation in the society. As an example, government has proposed a plan for women to work distantly from their homes which will result in more gender segregation (Nayyeri, 2013). Another instance is observed when the Ninth Government's policy makers decided to decrease the budget of the "Centre for Women's Participation" to one-third and they also renamed it the "Centre for Women and Family Affairs". The new title suggests that women and their affairs are defined not as individuals but as someone in family confinements.

At this juncture, I would like to note that it is very difficult for policy makers, who are mostly men, to consider women's rights in their decision making. It is mainly due to the fact that including women may signify that they have to relinquish

a part of their power. Moreover, giving in to their opposite sex is not a pleasant transition especially for Iranian men whose patriarchal culture dictates otherwise. We should clarify that it is not only Iranian men who are reluctant to consider women and their rights in their policymaking. This transition is not easy for a large number of men from different nations with different social backgrounds. The reason is that men find this change a threat to their social status and power. Men may feel insecure and anxious if they are not in power (Walker, 2005). Morrell (2002) has also emphasized on ambiguous feelings of men in response to women's independence and equality. Therefore, this transition can create an ambiguity in their masculine role because they are not in power as before.

Following feminists' activities in Iran, men's power and autonomy is challenged by women who were so far considered second citizens. Iranian men's strong ego made it even more difficult not only for Iranian women to pursue their dream for power and equality but also for Iranian men to accept and respect this transition of power.

Perhaps, the biggest recognized women's movement against Iran's policy makers is One Million Signature campaign. This campaign is pioneered by some feminists who demanded policymakers to put an end to legal discrimination against women and reform gender biased laws. The campaign was officially launched on 27 August 2006. One of their activities was to distribute leaflets in public to educate women on the discriminatory laws against women. The leaflet was entitled 'The impact of the legal order on women's lives'. The rationale behind this action lies in the belief that "...women who knew the law were more likely to fight for their right" (Sreberny, 2014).

The discussion above clarifies that, at some stages, we are not able to decrease gender gap in S&T unless we strive for a more gender neutral policy in Iran. Otherwise, Iranian women would experience

more of injustice and favouritism in science and technology as mentioned in previous sections.

5.3 Women's Choices

It has been observed in some cases that when women are given the equal opportunity to participate in social activities like men, they refrain from participating. According to Zhang (2014) women with the same opportunities and capabilities as men, are less willing to compete for the occasions which can ultimately result in advancing their productivity. She also notes that women's reluctance to take part in competitions shows that they are less willing to go for the jobs with competitive nature and seek promotions. In the same vein, Caliendo et al. (2014) believe that women's lower interest to take risky actions can produce and widen gender gap and in Iran, taking risks equals struggling with men's power.

I would like to emphasize that although culture and biased policy making have very important roles in keeping women oppressed, we should not forget that it is women's choice to struggle and take actions to elevate and lift up gender gap discrimination. This is well said by Shirin Ebadi, a former judge and human rights activist in Iran "Women are the victims of this patriarchal culture, but they are also its carriers. Let us keep in mind that every oppressive man was raised in the confines of his mother's home" (Brainquote). However, she emphasizes that we need fundamental cultural activities to reduce the gender gap in Iran. As stated earlier, S&T are mainly in Iranian men's domain. Hence, it requires women to have strong will and enthusiasm to break this barrier.

6. What Can Be Done

Schools and specifically high schools can play an important role in reducing gender gap (Legewie and DiPrete, 2012) and directing boys and girls towards science and engineering fields (Legewie and DiPrete, 2014). However, the early years of childhood and their orientation at this period is deemed to be a determining factor for future tendencies towards various occupational fields (Tai et al. 2006).

Moreover, education should be accompanied by information-rich contexts to be effective in shrinking gender knowledge gap (Fraile, 2014). This demonstrates the importance of the knowledge achieved via science and technology in various fields for both genders. In other words, science and technology can be used to decrease gender gap.

Nevertheless, we should not forget that changing people's perspective is among the first steps to be taken. What Iranian women need is to get the courage to stand against discriminatory laws and regulations and demand a balanced power in the context of Iranian society. Therefore, Iranian women need to be educated in this regard and the importance of S&T should be clarified for them to create motivation. However, Iranian women need to be persistent in their struggle to enter the masculine domain of science and technology.

7. Conclusion

Though science and technology is advancing in Iran rapidly, gender gap is still a big issue in this trend. Science and technology are mainly owned by Iranian men due to various causes expressed above. It is clear that Iranians cannot eradicate the gap over a night but both men and women should work together to promote their status in S&T and decrease gender discrimination accordingly. Apparently, culture, public awareness and policymaking strategies should experience a revolution to create a positive role for gender in S&T. Patriarchal culture should be moderated and ultimately eliminated in order to change both genders' points of view and also policymakers to understand the important position of women in S&T.

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