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Gender Impact on Information Security in the Arab World

Abstract: Access to technology and the benefits derived from its use are not available on equal terms to men and women. In this paper, we review research that sheds light on the relationship between the Digital Divide and Gender in the context of Arab countries and suggest that the extent of gender digital divide is influenced by cultural attitudes and consider how this divide may affect information security.

1 Introduction

In recent decades, the spread of Information and Communication Technology (ICT) has accelerated the process of economic and social change to the extent that the new environment in which we live and work has come to be described as the Information Society (IS). In such a society, access to technology and the benefits people derive from its use are not available on equal terms to men and women. This raises the issue of the relationship between the Digital Divide and Gender.

The Gender Inequality Index (UNDP HDR, 2012) shows that no country in the world has achieved gender equality. According to WTIS (2013), most women tend to be poorer than men and in many countries they are less educated. The majority of the world's illiterates are women.

In general, women tend to earn less, hold fewer positions of power and make fewer decisions in the family, in business and political and public life. These inequalities impact women's ability to benefit equally from the opportunities offered by ICT and to contribute fully to shaping the developing global knowledge economy and society. Beyond the obvious significance of correlation between gender and digital divide, it is important to explore whether such a divide may have a direct impact upon information security and how it operates in this regard. The present paper explores the gender/digital divide relationship through a survey of relevant publications and focuses on the related prospective impact of gender on information security.

2 Women and Information Security Related Practices

According to Leyden (2009), based upon a survey conducted by the security software company PC Tools, women are shown to be more cautious than men with regard to common information security –related practices. According to the survey, 47 per cent of men use the same password for every website they visit, compared to 26 per cent of women who use the same insecure practice. Further, nearly two-thirds

of men polled said they would open a link or attachment from a friend without first checking its provenance, compared to a more cautious 48 per cent of women.

2.1 Women and Social Engineering

Elyan (2010) describes a game carried out during the DefCon gathering in 2010, in which contestants telephoned company employees and convinced them to voluntarily reveal information they probably should have kept secret. In that game, 135 employees from 17 large companies, including Google, Wal-Mart, Symantec, Cisco and Microsoft, were contacted to measure their ability to resist social engineering attacks.

When conducting the game, contestants were not allowed to ask for really sensitive information like passwords or social security numbers. However, they tried to get information, such as the locally deployed operating system or the preferred types of antivirus software or Internet browser, which could be misused later by potential attackers. They also tried to push company employees to connect to unauthorized web pages.

Of the 135 employees contacted, only five refused to deliver any information about their business. These five were women employees. With male employees, the success rate of the contestants was 100%, which underpins the view that women are more cautious and generally less vulnerable to social engineering attacks. On the other hand, according to Jagatic et al. (2007), the attack was more effective when it appeared as though the email was sent by a person of the opposite gender: 'this was true for both males and females but the effect was more marked for males'. The response rate for males increased from 53% - when the message was from a male - to 68% when sent by a female.

2.2 Women and Facebook

Bitdefender (2011) has conducted a study to assess how social networks users respond to friend requests from a stranger. The study, which targeted 1,649 individuals in the UK and USA, concluded that men are more likely than women to be victims on social networks such as Facebook and Twitter. Results from the Bitdefender survey show that 64.2% of women always reject friend requests from strangers on social networks, while only 55.4% of men would do so. Evidently, men are more likely to accept such requests, especially when presented with an associated picture of an attractive woman.

3 Gender Divide in the Arab World

According to the UNDP HDR (2013), there is no society in which women have the same opportunities as men. The extent of discrimination can be measured through the Gender Inequality Index (GII), which captures the loss of achievement due to Gender Inequality in three dimensions: reproductive health, education and labour market participation. This represents the percentage loss of human development due to shortcomings across these dimensions. The value of GII ranges between 0 to 1, with 0

being 0% inequality, indicating women fare equally in comparison to men, and 1 being 100% inequality, indicating women fare poorly in comparison to men.

The GII ranks 186 countries on a global scale. Higher GII values signify greater discrimination. The UNDP report shows that the GII has large variation across countries, ranging from 0.045 (in Netherlands) to 0.747 (in Yemen), with an average of 0.463.

When we pass the 32 top ranked countries, the value of the GII reaches 0.171 (with a further 153 countries below this level). This shows that it will take a long time for women across the world to achieve the equality, even in countries that seem to do better in this regard.

Regarding the Arab World and according to the report, high gender disparities persist in the Arab States (where the GII value is 0.555). In addition, the report shows that Arab states suffer from the widest education gender gap in the world (as depicted in Figure 1).

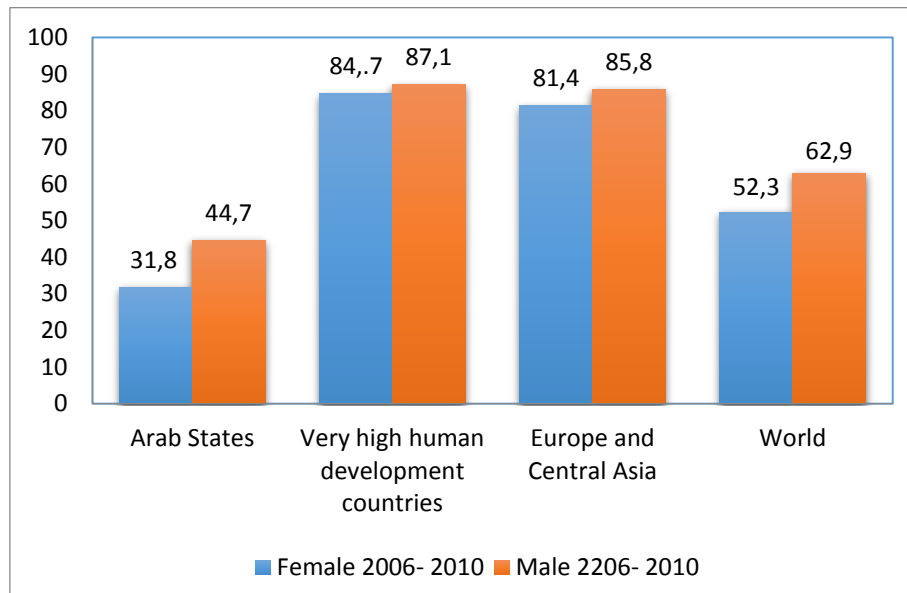


Figure 1: Percentage of the population ages 25 and older that have reached secondary education

The Arab Social Media Report (ASMR, 2013), showed that the percentages of young women graduating from schools and attending universities in some regions of the Arab World are much higher than that of young men, but women still face multifaceted barriers to enrolment in schools and universities in other regions of the Arab World (such as some countries within the Gulf Cooperation Council).

Further insights from the ASMR indicate that of the 20 countries with the largest increases in mean years of schooling over 1980–2010, 8 were in the Arab States. In most of these countries, employment opportunities failed to keep pace with

educational attainment, as shown by below-median employment to population ratios. In line with this finding, the UN fact sheet(2011), concludes that young Arab women are confronted with a double burden: their age and their gender. In Arab countries, the conflation of these two factors has resulted in the highest regional gender gap in terms of unemployment, due to profound cultural, social and economic gender divisions. According to the UN Fact Sheet 2011, ‘studies indicate that only 30% of women of working age participate in the labour market, and those who do find work are limited to low-paying jobs in the private sector, whether formal or informal’ (p3).

3.1 Gender Digital Divide in the Arab World

The Gender Divide has induced a Gender Digital Divide whose existence, according to the literature, is due to two types of cause: the position of women in the labour market and cultural/institutional issues. Men and Women show differences in Internet access and use according to the different availability of free time. Women are less incorporated into employment than men and a greater percentage of their time is spent in housework, while men spend more time in work where they embrace the use of the Internet in the workplace. Additionally, in countries with high Digital Divide, like many Arab countries, the Internet reproduces and amplifies gender stereotypes that identify women with the private sphere of household chores and men with the public sphere of paid work.

According to (Helia, 2013), ‘the Arab World is a strictly male-dominated culture, where male supremacy is the norm. In such a patriarchal society, the dominant discourse is based on a power relationship in which women's interest is subordinate to men’. In clarification, Fairclough notes that the term discourse is ‘used in general sense for language as an element of social life which is dialectically related to other elements’ (Fairclough , 2003).

These gender-based stereotypes also dominate media discourse, video games and even computer based educational material. Across the Middle East and North Africa (MENA), analysing the status of mainstream ICT from a gender perspective reveals the profile of the Gender Digital gap and highlights differences between men and women in terms of access and use of ICT. Thus, according to Brief (2011), ‘in MENA, the gender gap in mobile phone ownership is twice the global average, with women 24 percent less likely to own a mobile phone, and only 37 percent of Facebook users are female compared with 56 percent in the USA. Twice as many men in MENA use Twitter than women contrary to global trends of 55 percent female users’.

A key aspect of Internet accessibility is the cost of installation and availability of quality connections (such as ADSL). This is a significant factor that impacts households, and particularly affects rural women with specific economic difficulties due to the high rate of unemployment and low wages.

There is another barrier from the perception of the symbolic space, a space of lifestyles within which each person is identified in function of gender. Internet cafes,

for example, have been spaces used mostly by young people and men. At home, the priority of use is for husbands and sons. Another important aspect that may alienate some women from using ICT is their lack of technology friendliness which reflects the level of ICT-based training.

Lack of high technological skills is a further aspect of the Gender Digital Divide, a new divide related to women who lack the adequate skills that make them achieve technological fluency, i.e., have the qualifications that are required to work with information technology, knowing the conceptual foundations of how technologies work, solving problems, managing complex systems and implementing solutions. Such an aspect mainly affects the younger generation and calls into question the possibility that the Gender Digital Divide is self-correcting over time.

According to ITU (2013), ‘data show that there is a gender gap in the use of computers, mobile phones and Internet, and that the gap is more prevalent in developing than developed countries’ (p12). Further, according to this ITU report, available data suggest that men in developing countries, among which are Arab countries, tend to use the Internet more than women in commercial Internet access locations (such as cybercafés); and that men tend to be online more frequently than women (Figure 2).

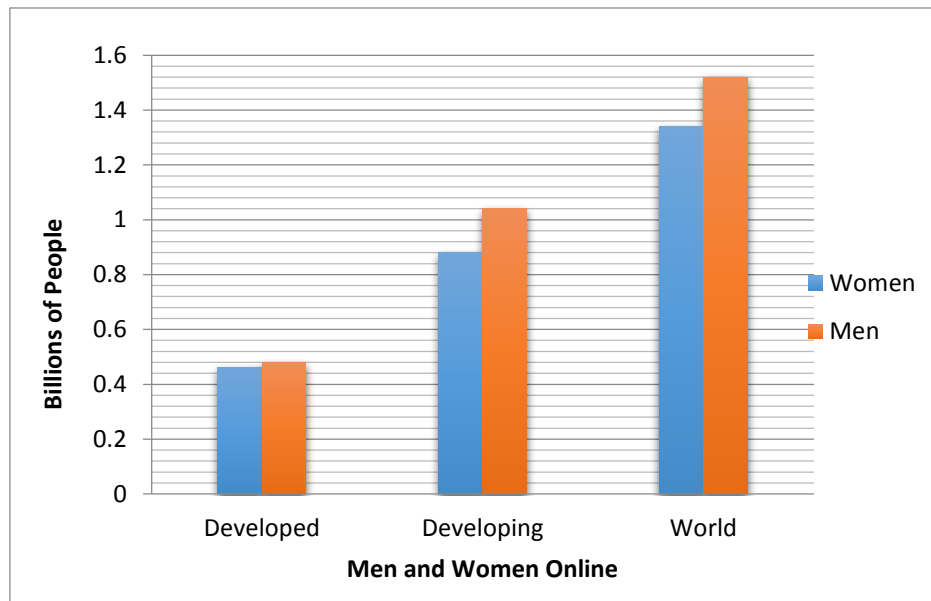


Figure 2: Men and Women Online (ITU 2013, p12)

With regard to the gender distribution of social network use in the Arab World, the ASMR report (2013), which discusses the outlook and trends of Social Networks in the Arab World, states that Social Networks are central to the digital experience

of Arab World users, reaching an audience of millions of people and generating a very high level of engagement. Among 54,552,875 Face book users in the Arab world, the percentage of female users has remained constant at 33.4% (in May 2013), having fluctuated slightly between 33.4% and 34% in the previous two years. This is still significantly lower than the global average of roughly 50%. Presently, no further reliable data on the Gender Digital Divide landscape in the Arab world is available.

Boujemi (2012) indicates that ‘the main challenge, with regard to gender Digital Divide landscape in the Arab world, is that ITU depends entirely on the data submitted by each government to set up ICT indicators. This data submitted by Arab countries rarely includes any gender specification which makes it difficult to define gender access discrepancies in the Arab region and therefore one has to rely on the socio-economic and socio-cultural facts to assess the state of the art of ICT access by Arab women’ (op. cit.).

Despite this limitation on available data, we can shed more light on the Gender Digital Divide in the Arab world by examining the available information about the Digital Divide. The Arab World, in a global perspective, according to the ITU report (2013), has a significant Digital Divide in many of its countries in comparison to the developed world. According to this report, Arab States international ranking, with regard to IDI access and use sub-indexes that reflect the diffusion of ICT, closely reflects income disparities in the region. Thus, Gulf countries have high ranking while other Arab countries have relatively low ranking.

In the ITU report (2013), skills indicators (adult literacy, gross secondary enrolment and gross tertiary enrolment) provide a good indication of the overall level of human capacity in a country. This is important because, in addition to ICT infrastructure, education and skills are necessary for making effective use of ICTs and building a competitive and inclusive information society. (op. cit.). The report highlights that the skills ranking is considerably low in all Arab countries, even in Gulf countries that have a high degree of penetration of ICT and the Internet and a good ranking in ICT use and access.

Considering the findings from the ITU report and the noted education gender gap in Arab states, we suppose that this gap correlates to the Gender Digital Divide in Arab states. This is in line with the disparity of men and women on-line (as depicted in Fig.2.). Given that each Arab country has its own aspect of gender divide, reflecting the socio-economic context in that country, we suggest that the different size of Gender Digital Divide of each Arab country reflects the prevailing gender attitudes.

4 Conclusions

As a result of what has been addressed in the previously noted reports, we can say that, due to the wide education gender gap in the Arab world, indicated by the GII value, there is a corresponding Gender Digital Divide and, accordingly, a higher

Information Security risk among women. This means that while men, who represent half of the society, are at high Information Security risk due to the Digital Divide measured by the lack of adequate education, women (the other half of the society) are at even higher Information Security risk because this lack of adequate education is amplified due to the Gender Divide. In consequence, the society as a whole has higher Information Security risk due to the Gender Divide.

Additionally, social engineering attacks exploit the principles of ordinary human behaviour, and target vulnerability in an organization's workforce. In the Arab World, only 30% of working-age women participate in the labour market. When correlating this with the results of the DefCon test, we can conclude that men employees, who represent a high proportion of the labour market, place organizations at high Information Security risk because they are less cautious with regard to social engineering attacks, while women, who represent a low proportion in the labour market, are more cautious and less likely to be victims in such attacks.

Women are also, according to the PC Tools survey, more cautious with regard to some Information Security related practices, such as opening attachments and changing passwords. This means that Gender Divide serves to deprive organizations of the cautious behaviour of women with regard to social engineering attacks and with such Information Security related practices, with an associated increase Information Security risk.

To this context, we may add the insight from the Bitdefender study, that women exhibit lower risk behaviour than men on social networks. Consequently, decreasing the extent of the digital gender divide on the diffusion of social networks in the Arab world would induce lower Information Security risk in the society.

On the other hand, Arab countries of low-income economy remain on the other side of the Digital Divide and have, accordingly, another context related to Information Security. The only feature keeping millions of people in such countries from being victims of cybercriminals is the Digital Divide and lack of web penetration. The number of victims and offenders will be standing together on the rise. This means that while men, who represent half of the society, are at low Information Security risk due to lack of web penetration in Arab countries of low income, women (the other half of the society) are at lower Information Security risk because this lack of web penetration is emphasised due to the gender divide. So, the society as a whole in Arab countries of low-income economy attains lower Information Security risk due to the gender divide.

Of course, this does not mean that we should keep such societies undeveloped in order to reduce the negative side effects of ICT, among which are the accompanied Information Security risks. On the contrary, we should encourage ICT-based development in order to improve all aspects of life in those societies and extend the benefits of the Information Society to all, regardless of gender. The primary means to address the negative side effects of ICT are education and training.

From a global perspective, Information Security affects, and has been affected by, the Digital Divide in many ways. Due to digital illiteracy, which is a significant component of the Digital Divide, many people in the Arab World have not taken adequate measures to ensure Information Security. In its turn, the Gender Digital Divide, which represents an aspect of the multifaceted Digital Divide, has increased Information Security risks in the Arab World since it impacts upon women, who represent half of the society, more than men. With the effect that more of this (female) half of the society becomes less worried about Information Security risks.

Achieving equality between men and women in the Information Society is not simply a matter of making efforts to increase access and use of ICT for residents of areas on the other side of the Digital Divide. Further endeavours should be dedicated to promote inclusion of women in the Information Society in order to reduce the Digital Divide in terms of Gender. And it is essential for such endeavours, to be successful, that we accommodate the different expectations and different uses of ICT in men and women.

The challenge has two aspects. On the one hand, is the need to ensure equal opportunities for women in the information society - which in itself is a social objective. On the other hand, more incorporation of women in the workforce could mean an increase in cautious Information Security behaviour as well as different capabilities, beside those that are characterized by men.

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