Role of information and communication technology in closing gender employment gap in MENA Countries

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Abstract

Within the framework of Sustainable Development Goals, the present study aims to investigate the role of Information and Communication Technology (ICT) in closing gender employment gap in Middle-East and North Africa countries (MENA). Using Panel Least Square for 21 MENA countries over the period 1995-2014, the small value of the estimated ICT usage elasticity indicates that MENA countries will fail to achieve gender equality if they depend solely on the actual ICT usage. In order to accelerate closing gender employment gap, policy makers in MENA countries have to promote higher ICT usage growth rate, boost GDP per capita and enhance openness; as the results reveal that these three factors exhibit significant and positive impact on gender equality in employment. On the other side, the policy makers in MENA countries have to shape a policy targeting to change the economic structure so as not to depend heavily on natural resources rents. Moreover, they have to increase the quality of female education and link the education system output with the labor market as the results show that natural resources rents and female education exert significant and negative impact on gender equality in employment.

1- Introduction

Sen (2001) defines gender inequality as "not one homogeneous phenomenon, but a collection of disparate and interlinked problems". He explains varies types of disparities between genders as mortality inequality, higher education inequality, employment inequality, professional training inequality and ownership inequality. In the current study, gender inequality is defined as inequality in employment participation in the labor market.

Despite the good level of human development achieved in several directions in the Middle East and North Africa countries (MENA) over the last four decades, this achievement has not been translated into better gender equality in employment. The participation of women in the labor market in MENA countries is just about half the global average WB (2013: xi). Accordingly, MENA countries will be affected negatively as the existence of gender inequality in employment has a negative impact on economic growth. In addition, gender inequality in employment lowers average productivity of labor which influences investment rates (Chen 2004: 6). Moreover, it increases fertility rates and lowers desiring female education. It adversely affects the possibility of exchanging information, overcoming surrounding problems, gaining representation in the government and lobbying for women's rights (Ross 2008:107).

As MENA countries suffer from gender employment gap, several empirical studies aim to identify the main determinant of this gap. Ross (2008) attributes the gender employment gap in MENA countries to the dominance of mining and oil sector in most of the countries, which is inherently a masculine sector. Rauch and Kostyshak (2009) conclude that Arab countries have a significant negative impact on gender inequality in employment because of the prevailing gender norms in the society. Markle (2013) indicates that women in MENA countries face continuous challenges concerned with sexual discrimination which is rooted in communities' cultures, religions, social and economic structures.

As MENA countries are mainly Arab countries (with the exception of Iran, Israel, and Malta) and as most of them depend on mining and oil sector, the dominance of these factors will lead to the duration of the gender employment gap in MENA countries. Within the context of the above results, the contribution of the current study to the existing empirical literature is to investigate the role of Information and Communication Technology (ICT) in closing gender employment gap in MENA countries. ICT usage is the main dimension that the present study examines. According to ITU (2014: 35), ICT usage includes individuals using the Internet, fixed (wired)-broadband subscriptions, and wireless-broadband subscriptions.

In literature, the role of ICT in closing gender employment gap is not conclusive. Proponents of ICT usage argue that it has a positive impact on bridging the gender employment gap. They see that the use of technology is gender neutral, thus, ICT will have a role in providing employment opportunities for women. ICT is characterized by its ability to transfer information and knowledge globally at no time with low-costs access. It helps women to search for a job and to engage in the labor market through opening economic opportunities. Moreover, It contributes positively to changing the norms of females' work. On the other side, Opponents argue that ICT usage will not contribute to close gender employment gap. They are convinced that the use of technology is gendered as it is shaped by society (Kucuk 2013: 76).

Within the above background, the present study aims to investigate the role of ICT usage in closing the gender employment gap in MENA countries regarding Sustainable Development Goals. Using Panel Least Square for 21 MENA countries over the period 1995-2014, the present study uses the estimated ICT usage elasticity to project the value of gender inequality in employment in MENA countries for the year 2030. Additionally, the present study computes and analyzes two gaps: the first gap is the difference between the gender equality in employment goal and the projected value for the year 2030, and the second gap is the difference between the actual and the required ICT usage growth to close the gender employment gap if countries depend only on the ICT usage to achieve the gender equality goal.

The paper includes six sections. The introduction is included in the first section. Theoretical framework and literature review are introduced in the second and the third section respectively. Estimation methodology is explained in the fourth section. Results are discussed and gender inequality of employment is projected in the fifth section. Conclusion and policy implication are presented in the sixth section.

2- Theoretical framework:

Regarding the Sustainable Development Goals (SDGs), achieving gender equality and empowering all women and girls is one of seventeen challenging goals for countries, particularly the developing ones (UN. 2015). This goal includes several targets; one of them is to enhance the usage of available technology especially Information and Communications Technology (ICT) in order to promote women's empowerment. In this respect, it is important to note that the main four dimensions of women's empowerment are economic participation and opportunity, health and survival, political empowerment and educational attainment. The participation gap, which is the difference between women and men in labor force participation rates, is one of three components of the economic participation and opportunity dimension (WEF. 2016). Based on the above, it is considered that ICT has a role in closing gender employment gap.

ICT usage can play an effective role in closing gender employment gap through different channels (Maier and Nair-Reichert 2008: 45). The flow of information and knowledge through ICT helps in influencing public opinion and changing people's attitude toward women, as it spreads awareness about gender equality in employment. Moreover, ICT is an effective tool in searching for a job as it increases search options, expanding labor market locally and globally, and it doesn't require social contacts (Abdel-Mowla 2009:12-13). Furthermore, ICT is considered a promising educational approach that can improve the level of female education and thus reduce gender

inequality in employment (Chen 2004: 10). Additionally, ICT has a favorable impact on gender equality in employment by providing economic opportunities for the women to join the labor market through various areas. Some of the main areas that facilitate the engagement of women in the labor market are E-commerce, Tele-centers, and Tele-work (Mandour 2009:11).

E-commerce, which refers to the buying and selling of goods and services through the electronic medium, helps women overcome distance and reach far markets and sell products without moving or traveling. This increases the opportunities for women to work and gain money, especially those who face restrictions in accessing resources or markets. Additionally, selling products online contributes to saving costs of distributing products and so helps in maximizing profits (Maier and Nair-Reichert 2008: 46). As E-commerce is characterized by its limited need for capital or particular level of education and training, the internet becomes an attractive tool for women's work (Mitter 2006: 7-8).

Tele-work, which refers to the home-based work or telecommuting (Mitter 2006:18), is a growing employment area that opens new opportunities for women. Tele-work provides job opportunities for women who do not have the chance to participate in social and economic life because of some cultures and traditions (Kucuk 2013: 76) that force women to stay at home, not to deal with strangers of men directly, nor to travel. The usage of some applications and ICT tools such as computer, telephone and internet allows women to work at home remotely (Chen 2004: 10). Even for women who don't face any restrictions on going out for work, they often leave their work in the case of marriage or giving birth. Accordingly, Tele-work, as it is characterized by flexibility in both working hours and working location (Mandour 2009: 12), provides the opportunity for women to work from home, to gain money and at the same time to reconcile between work and their roles as wives and mothers (Chen 2004: 11; Rauch and Kostyshak 2009: 184).

Tele-center is a mechanism based on ICT in order to support economic, social and educational development of communities, as well as to help reduce isolation, to support the health aspects, to bridge the digital divide and to empower women. Within the context of women empowerment, the benefits of Tele-centers are not limited to providing women with information and to facilitating dealing with government and private organizations (Ariyabandu, 2009: 4, 17), but it also provides opportunities to small and micro women entrepreneurs especially for those who face financial obstacles to buy a computer or to join the ICT networks (Mitter 2006:9).

Despite the favorable role of ICT usage in closing gender employment gap, there are some obstacles that may hinder this role. In many countries, especially developing countries, the population in rural and remote areas is almost untouched by the technological revolution due to the lack of basic infrastructure (Ariyabandu 2009:18). On the other side, Mitter (2006: 8) identifies seven barriers obstruct women from joining the labor market through ICT usage. These barriers are classified in the lack of the following: programming and applications skills, internet languages especially English, access to finance, technical and administrative skills about packaging and shipping products, information about trade and administrative skills relating to customers, the ability to deal with payments online, and controlling the quality of the product. Moreover, social and culture factors are other obstacles that limit women from using ICT. In this respect Gurumurthy (2004: 23) determines several factors that are responsible for impeding women's usage of ICT, they include limited financial capability of women to either own communication assets or use public facilities, lack of required qualifications to deal with ICT, unsuitability of timing and location of ICT centers for women in rural areas and discrimination against women and their access to ICT.

In this regard, feminist scholarship argues against the exclusion of women from science, innovation, designing and usage of technology. The Gendered Technology/Culture Approach disputes that technology is not neutral, but it is affected by geographical conditions, local history and culture. Marxist approach returns the exclusion of women from technology to the division of labor according to sex and to the historical and cultural view of technology as masculine. Accordingly, Eco-feminist approach opposes the technological discrimination against women (Gurumurthy 2004:

3-4). Based on above, it's difficult to determine the role of ICT in closing gender employment gap in MENA countries without carrying an empirical study.

3- Literature review:

Turning to the literature review, it should be noted that the gender inequality in employment issue gains more importance as time passes. However, the literature that examines the role of ICT in closing gender employment gap is relatively limited.

Chen (2004) investigates the role of ICT as a key contributor to gender equality in education and employment in 78 countries over the years 1960-2002. Applying Ordinary Least Squares (OLS) and Instrumental Variables (IV) methods and using five variables as proxies for the ICT infrastructure, the results indicate that the increase in ICT infrastructure leads to reduction in both gender inequality in education and employment.

Sajid (2014) examines the impact of socio-political and economic factors on gender equality in education and employment in Pakistan for the time period of 1980 to 2012. After employing Autoregressive Distributed Lag (ARDL) approach to test the existence of the long run relationship between the variables, the study uses the OLS technique for estimation. The evidence shows that ICT is one of the main factors that increase gender equality in education and employment.

Mandour (2009) carries a study aiming to identify the factors affecting the gender employment gap in both ICT sector and the non-ICT related sectors in Egypt over the period of 1996-2006. The study uses Generalized least Squares (GLS) on pooled date. One of the main findings of the study is the existence of significant positive impact of ICT infrastructure on gender equality in employment in both ICT and non-ICT related sectors. Accordingly, the study emphasizes the importance of improving the ICT infrastructure and developing the ICT sector to bridge the gender employment gap in Egypt.

4- Model Specification and Data

4-1- Model specification and Methodological framework:

As the current study aims to estimate the ICT elasticity of gender inequality in employment, controlling the other factors, the following Logarithmic model is used.

$$LnGIE_{i,t} = \beta_0 + \beta_1 LnICT_{i,t} + \beta_2 LnGDPPC_{i,t} + \beta_3 LnNatural\,\mathrm{Re}nt_{i,t} + \beta_4 LnOpenness_{i,t} + \beta_5 LnYearsOfSchooling_{i,t} + d_i + u_{i,t} \quad (1)$$

Where $GIE_{i,t}$ refers to the gender inequality in employment. $ICT_{i,t}$ refers to female ICT usage, $GDPPC_{i,t}$ denotes to real GDP per capita, $Natural\ Rent_{i,t}$ refers to total natural resources rents (% of GDP), $Openness_{i,t}$ refers to trade (% of GDP) and $Years\ of\ Schooling_{i,t}$ refers to female average years of schooling. Subscript i for countries ($i = 1,\ldots\ldots,n$) and t for time ($t = 1, \ldots, T$). d_i represents dummy variables for Arab countries. $u_{i,t}$ refers to the error term.

Having estimated elasticity of gender inequality in employment with respect to ICT usage from equation (1), gender inequality in employment can be projected for the year 2030. Following Panda and Ganesh-Kumar (2007), Emara (2014) and Emara and Hegazy (2016), the method of the projection includes the following steps. Firstly, the 2030 goal level has to be specified according to the announced Sustainable Development Goals. As the fifth goal of SDGs is to achieve gender equality and empower all women and girls **(**UN. 2015), the gender equality in employment is aimed to be one by the year 2030.

Secondly, the ICT usage growth rate is estimated using the following semi-log trend function.

$$LnICT = a + bT \quad (2)$$

Where a refers to the constant, b refers to the ICT usage growth rate, and T refers to time.

Thirdly, after estimating equation (2) by using Ordinary Least Squares (OLS) for each country, the estimated parameter b from equation (2) and the estimated elasticity parameter β_1 from

equation (1) are used in the following formula to project the value of gender inequality in employment for the year 2030.

$$GIE_{2030} = GIE_o(1 + b\beta_1)^{(2030-K)} \quad (3)$$

Where GIE_{2030} is the gender inequality in employment projected value for the year 2030. It is important to note that the projected value is assumed to depend only on the ICT usage elasticity and ICT usage growth rate. GIE_0 is the value of gender inequality in employment for the latest data, which is the data for year 2014 in the present study. b is the ICT usage growth rate estimated from equation (2), β_1 is the elasticity parameter of the gender inequality in employment with respect to ICT usage estimated from equation (1), and (*2030-k*) is the number of years remaining to achieve the gender equality in employment goal according to the latest year k (2014).

Fourthly, the required ICT usage growth rate to bridge the gender employment gap by the year 2030 can be obtained by re-arranging equation (3) as following:

$$b_{req} = \left[\left(\frac{GIE_{2030}}{GIE_o} \right)^{1/(2030-K)} - 1 \right] / \beta_1 \quad (4)$$

Finally, two gaps are calculated. The first calculated gap is the gender gap in employment, which is the difference between the gender equality in employment goal and the projected value for the year 2030. This gap can be fulfilled either by depending on ICT usage only through achieving the required ICT usage growth calculated from equation (4), or by depending on factors other than ICT usage which are included in equation (1). The second calculated gap is the ICT gap, which is the difference between the actual ICT usage growth and the required ICT usage growth to cross the gender gap if the countries under study depend only on the ICT usage in this respect.

4-2- Data sources and definitions:

The present study uses unbalanced panel data for 21 MENA Countries, are listed in Appendix A, over the period 1995-2014. The starting year of the study is 1995 as the data for internet users is available for almost all the MENA countries from this year. The source of all the data (except female average years of schooling) is the World Development Indicator database (http://data.worldbank.org/data-catalog/world-development-indicators). The ratio of female to male labor force participation rate (%), as an indicator of gender inequality in employment, is divided by 100 to transform the values to be lower or higher or equal to one so as to be comparable with the gender equality goal which is equal to 1.

For the independent variables, it is important to note that the only available data for female internet users is the gender digital divide statistics issued by International Telecommunication Union (ITU) on the website (http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx). The available data in the above source is limited to some countries for recent different years; therefore, the data for internet users (per 100 people) is used as a proxy for female ICT usage, whereas the internet can be used via a computer, mobile phone, personal digital assistant, etc.

To take into consideration the impact of social and culture factors that discriminate against women, a dummy variable for Arab countries is used. It classifies countries according to the language. The dummy variable takes the value of 1 if the main language of the country is Arabic and 0 otherwise.

Real GDP per capita is expressed in constant 2010 US$. Total natural resources rents are the aggregate rent of oil, natural gas, coal, mineral, and forest; expressed as a percentage of GDP. A proxy for the openness is the trade (% of GDP), which is the sum of exports and imports of goods and services measured as a share of the gross domestic product.

Female average years of schooling 15 years and older is the sum of average years of primary, secondary and tertiary Schooling. The main source of the data is the website (http://www.barrolee.com/data/yrsch2.htm). Because the data is available every five years, the interpolation method is applied in order to obtain annual observations. As the data is missing in the

above source for Oman, Djibouti, Lebanon, and West Bank and Gaza, the data for these countries is sourced from websites (http://hdr.undp.org/en/content/mean-years-schooling-adults-years), (http://data.uis.unesco.org/#) and are combined together to complete the data for the countries under study.

5 - Estimation Results

Using Hausman-Test, the results show that the appropriate model is the Fixed Effects model. Following Panda and Ganesh-Kumar (2007), Emara (2014); Emara and Hegazy (2016), Panel Least Squares was used to estimate model (1). Table (1) presents the results of estimation. To test the robustness of the model, another proxy for the dependent variable is selected, so the ratio of female to male labor force participation rate (as a percentage) used as dependent variable in the estimation of model (1) is replaced by percentage of female in Labor force participation rate in the estimation of model (2). It is obvious from table (1) that the significance and magnitude of coefficients of the two estimated models are almost the same; accordingly, the following analysis is limited to the results of model (1).

Table (1): Results of Panel Least Square estimation

	Model (1)	Model (2)
Dependent variable	RF	LF
Constant	-2.007785 (-8.853560)***	1.562978 (6.413866)***
ICT	0.043063 (5.306333)***	0.044927 (5.151880)***
Dummy	-0.909140 (-11.82073)***	-0.670385 (-8.111561)***
GDPPC	0.184036 (9.461501)***	0.263630 (12.61298)***
Natural rent	-0.016898 (-2.542002)***	-0.013602 (-1.904119)***
Openness	0.220668 (4.637676)***	0.208417 (4.076252)***
Years of schooling	-0.491801 (-9.280549)***	-0.571139 (-10.02980)***
No. of Obs.	309	309
R^2	0.619379	0.613066

- All variables are in Log.
- The dependent Variable (RF) in Model (1) refers to the ratio of female to male labor force participation rate (%), While the dependent Variable (LF) in model (2) refers to percentage of female in labor force participation (% of female population ages 15+).
-Absolute value of t statistics in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%.

The results in Table (1) model (1) shows that the ICT usage elasticity for the gender inequality in employment is 0.0431, suggesting that a 1% increase in the internet usage results in about 0.043% increase in the ratio of female to male labor force participation and thus decrease in gender inequality in employment. The result is in line with the findings of Kucuk (2013) and Chen (2004) which clarify that the improvement of gender equality in labor market can be achieved through improving the level of ICT density. Chen (2004:13) emphasizes that the usage of ICT helps in changing the traditional opinion about the women working, increasing the flow of information and enabling women's work from home.

The coefficient of the dummy variables for the Arab countries has a negative statistical significant impact on the ratio of female to male labor force participation. The result is consistent with the findings of Rauch and Kostyshak (2009: 183), which indicate that the Arab countries have a significant negative impact on gender equality in the labor market despite the high level of female education in the Arab countries and the low number of children they have. The study attributes this

result to the preference of Arab women to stay at home caring for their children and enjoying leisure time instead of going out to work, in addition to the traditional view that the married woman must be financially supported by her husband. In this respect, it is important to note that some studies distinguish between Arab and Islamic countries in estimating the impact on the empowerment of women in the labor market. Fish (2002) estimates the effect of Islam and Catholicism on several indicators of the status of women such as gender empowerment index which takes into consideration their income, their position in the workplace and their presence in the legislature. The study, which is conducted in 54 countries including 20 Muslim countries, concludes that the Islamic countries have significant negative impact on the gender empowerment. On the other side, the study of Donno and Russett (2004) which is built on Fish's work concludes different results. The study finds that the suppression of women is more in Arab countries than Islamic countries. Moreover, Ross (2008) concludes that the Islamic religion does not have a significant impact on female labor force participation; but MENA countries have significant negative impact on female's participation. Additionally, while estimating the impact on gender inequality in labor force, Rauch and Kostyshak (2009) distinguish between the Arab and Islamic countries as the number of Arabs represent less than 30% of the Islamic world. The study shows that the Arab's negative effect on the participation of women in the labor market explains the Islamic effect and not vice versa, as the impact of Islamic countries becomes insignificant when including a dummy variable for Arab countries in the estimation. On the basis of these results, the current study includes only a dummy variable for Arab countries.

Turning to the impact of GDP per capita, the results of model (1) shows that the coefficient of GDP per capita is positive and statically significant indicating that a 1% increase in GDP per capita leads to about 0.20% increase in the ratio of female to male labor force participation. The positive significant impact is consistent with the findings of Kucuk (2013:76) who returns the positive impact to the new employment opportunities for women that can be created due to the increase in economic growth. Moreover, economic growth contributes to the achievement of gender equality in the labor market by influencing wage. The increase in wages as a result of economic growth leads to increscent of the opportunity cost of leisure time or non-working, spurring many people to enter the labor market. In a community characterized by gender inequality in the labor market, most of the non-workers are female; thus most of the new entrants to the labor market will be female (Chen 2004: 13).

Despite the favorable impact of the economic growth on gender equality in employment, Ross (2008: 108); National Productivity Council (2008: 9) and Seguino (2007:4) emphasis that this impact depends on the sector causing the growth. Whereas the growth has positive impact on gender equality in employment if the source of growth is manufacture or service sectors. For example, the growth of the service sector, informal sector or labor-intensive industries such as textiles and clothing contribute to gender equality in employment, as these sectors almost absorb new female workers because they don't need great physical force or more specialized skills or a lot of training requirements. But, if the source of growth is the mining and oil sector, growth will lead to the increase of gender inequality in employment due to the categorization of this sector as a male dominated sector. Based on this point of view, the total natural resources rents (% of GDP) variable is included in the regression. The coefficient of total natural resources rents in table (1) shows a negative statistical significant impact on gender equality in the labor market, as 1% increase in resources rents corresponds to about 0.017 % decrease in the ratio of female labor force participation. This result is in line with the findings of Ross (2008:107) which conclude that oil rents per capita have negative impact on female labor force participation. His study indicates that the higher wages resulting of the booming oil sector raise the head of the family's income which almost leads women to prefer staying at home than having a job at manufacture or service sectors.

In table (1) model (1), the coefficient of openness is statistically significant and with the expected positive sign. It implies that 1% increase in trade (% GDP) leads to about 0.22% increase in

the ratio of female to male labor force participation. The openness variable is included in the regression as the supporters of globalization argue that economic growth which is accompanied by capital flows and openness have a greater favorable impact on gender equality (Seguino 2007:1). Openness increases trade opportunities and output (Arora 2012:148) which contribute to the provision of job opportunities for women compared to men because of her competitive position in wages.

Turning to the female average years of schooling, the result in table (1) shows an unexpected result in terms of the negative impact of the coefficient on gender equality in employment. Although the increase in female education increases the chances of working or staying in the labor market, increases wage level, and expands job search methods (Abdel-Mowla 2009:11-13); the impact is often different in the developing countries. WB (2013:3) indicates that MENA countries face gender equality paradox. Although MENA countries' performance is advanced in investing in human capital and so bridging the gender gap in education, this performance hasn't been translated in high rates of women participation in labor market. Chen (2004:13) finds in his empirical study limited evidence showing that improvement in gender equality in education improves gender equality in employment. (Markle 2013:2) returns the reduction in women participation in the labor market despite the spread of female education to the discrimination against women's work in MENA countries. Mandour (2009) concludes that the increase in female's education in Egypt is not sufficient to achieve gender equality in employment. She returns this result to the fact that a large percentage of educated women does not enter the labor market because of their own choice or because of the poor quality attributes. In line with these results, WB (2013:19, 45) returns the decrease in the women's participation in MENA countries, in spite of the increase in the women's level of education, to the contraction in the public sector employment and to the mismatch between the required skills needed for the private sector employers and the poor quality of the graduated person.

Turning to table (2), the estimated ICT usage elasticity is used in the gender inequality gap analysis. The first column in table (2) shows the latest available value for the gender inequality in employment in MENA countries. It is clear from column (1) that all the countries under study have a particular amount of gender inequality in employment. Syria and Iraq suffer from the lowest ratio of female to male labor force participation. A major reason for the lowest ratio in these two countries is the political instability (WB 2013:43). Algeria, Iran, West Bank and Gaza, Jordan and Saudi Arabia takes the third to the seventh position from below with ratio of female to male labor force participation ranged between 0.22 and 0.26. Although Egypt, Lebanon, Morocco, Oman, Tunisia, Yemen, Libya and Bahrain are in a better position than the above seven countries, they are below the average as the ratio of female to male labor force participation ranged between 0.32 and 0.45 in these countries. On the other extreme Israel and Malta have the highest level of female's participation in the sample, followed by Djibouti, Qatar, Kuwait and the United Emirates as the ratio of female's participation ranged between 0.84 and 0.50. WB (2013:55-60) surveys the literature on the main determinants of the low female participation in the labor market in MENA countries. He concludes that the economic structure, the social and cultural norms, the legal framework and oil-exporting are considered the main determinants in these countries.

Table (2): Gap analysis

	1	2	3	4	5	6
Country	Gender inequality Latest value (2014)	2030 gender inequality projection according to equation (3)	Gender inequality gap = (Gender equality) - column (2)	Required ICT "b" estimated from equation no. (4)	Actual ICT "b" estimated from equation no. (2)	ICT Gap = column no. (4) - column no. (5)
Algeria	0.222414	0.293708	0.706292	3.197332	0.4747	2.722632
Bahrain	0.45098	0.538806	0.461194	1.591929	0.259463	1.332466
Djibouti	0.536765	0.673169	0.326831	1.234735	0.330692	0.904043
Egypt	0.317333	0.410589	0.589411	2.328858	0.376632	1.952226
Iran	0.225676	0.299015	0.700985	3.064434	0.411662	2.652772
Iraq	0.2149	0.262655	0.737345	3.171747	0.292826	2.878921
Israel	0.841108	0.957298	0.042702	0.336984	0.188398	0.148586
Jordon	0.236173	0.294598	0.705402	2.965108	0.322766	2.642342
Kuwait	0.52581	0.628486	0.371514	1.276762	0.260109	1.016653
Lebanon	0.332865	0.405905	0.594095	2.227394	0.289469	1.937925
Libya	0.39267	0.486189	0.513811	1.87965	0.311864	1.567786
Malta	0.571861	0.668104	0.331896	1.1061	0.226662	0.879438
Morocco	0.351779	0.496196	0.503804	2.110549	0.504192	1.606357
Oman	0.352163	0.421848	0.578152	2.108248	0.263304	1.844944
Qatar	0.53089	0.63712	0.36288	1.257157	0.266019	0.991138
Saudi Arabia	0.260204	0.350375	0.649625	2.754658	0.435500	2.319158
Syria	0.187328	0.246411	0.753589	3.475263	0.400960	3.074303
Tunisia	0.35493	0.468741	0.531259	2.091746	0.406846	1.6849
United Emirates	0.499462	0.594991	0.405009	1.381854	0.255185	1.126669
West Bank and Gaza	0.235736	0.284661	0.715339	2.969147	0.275091	2.694056
Yemen	0.353103	0.49841	0.50159	2.102626	0.505223	1.597403

Using equation (3), the second column in table (2) shows the calculated values of gender inequality projection for the year 2030. The important result from this column is that although all gender inequality projections are higher than gender inequality latest value, which means that all the countries are moving ahead toward gender equality, gender inequality projection value is lower than the gender equality goal for year 2030. The third column presents the gender inequality gap, which is calculated by subtracting the values in the second column from the value of one which represents gender equality goal according to the announced Sustainable Development Goals for year 2030. It is obvious from this column that the gap is huge in most of the countries especially in Syria, Iraq, West Bank and Gaza, Iran, Algeria, and Jordon.

Using equation (4), the fourth column in table (2) presents the required ICT usage growth which is estimated from equation (4). The fifth column shows the actual ICT usage growth rate which is estimated from equation (2). The last column shows the ICT gap, which is the difference between the required ICT usage growth (fourth column) and the actual ICT usage growth (fifth column). It is obvious from the last column that there is a positive gap between the required ICT growth and actual ICT growth, which means that an increase in the ICT usage is required compared to the post-2014 actual ICT usage growth rate in order to close the gender gap in employment if MENA countries depend only on ICT usage in this concern. For example, Iraq, Algeria, West Bank and Gaza, Jordon and Iran require about 3% growth rate in ICT usage during the period 2015-2030 to achieve gender equality in employment. On the other side, Djibouti, Qatar, and Kuwait require only about 1.3% growth rate in ICT usage during the same period to achieve the same goal. It is important to note that ITU Plenipotentiary Conference, which was held in 2014, adopted the Connect 2020 Agenda to motivate the growth of the ICT sector during the years 2015-2020; it also aimed to put the

foundation of ICT in order to take part in totally achieving the 2030 Agenda for Sustainable Development Goals. The Connect 2020 Agenda includes four goals and seventeen targets. Under the dimension of inclusiveness, the second goal scopes to provide broadband for all. Accordingly, one of the targets of this goal is to increase the percentage of people using the internet to be 50 in developing countries by 2020 (ITU 2015:3, 32).

6- Conclusion and Policy Implication

Promoting gender equality does not stop at Millennium Development Goals, but still it gains a special importance which appears clearly in setting the Sustainable Development Goals. Within the context of SDGs, achieving gender equality includes several targets such as enhancing Information and Communications Technology (ICT) in order to promote the empowerment of women. Although ICT open several opportunities for women in the labor market, some have cast doubt about the role of ICT in this concern. Accordingly, the current study presents the two views, estimates the ICT elasticity of gender inequality in employment in MENA countries over the period 1995-2014 and discusses the role of ICT in closing the gender employment gap in MENA countries by the year 2030.

The estimated ICT elasticity is small, which denotes the limited role of ICT in closing the gender employment gap in MENA countries. Consequentially, the study indicates that MENA countries will fail to close the gender employment gap by the year 2030 if they depend solely on ICT usage according to its actual growth rate. As a policy implication, policy makers in MENA countries have to promote higher ICT usage growth rate. Moreover, boosting GDP per capita and enhancing openness must complement the promoted higher ICT usage as the results reveal that these three factors exhibit significant and positive impact on gender equality in employment. On the other side, policy makers have to design a policy to change the economic structure so as not to depend heavily on natural resources rents, they also have to increase the quality of female education and link the education system output with the labor market; as the results show that natural resources rents and female education exert significant and negative impact on gender equality in employment.

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Appendix A

According to the classification of the world Bank, the MENA countries include: Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates, West Bank and Gaza, Yemen. (http://data.worldbank.org/indicator)