*PA*rtecipazione e *CO*nflitto
** The Open Journal of Sociopolitical Studies*
http://siba-ese.unisalento.it/index.php/paco
ISSN: 1972-7623 (print version)
ISSN: 2035-6609 (electronic version)
***PACO*, Issue 11(2) 2018: 544-556**
DOI: 10.1285/i20356609v11i2p544

Published in July 15, 2018

SYMPOSIUM/6

GENDER EQUALITY AND BIG DATA IN THE CONTEXT OF THE SUSTAINABLE DEVELOPMENT GOALS

Aimée Vega Montiel
CEIICH UNAM

1. Introduction

The Sustainable Development Goals (SDGs) are the new paradigm of development. They have the potential to address structural barriers and to promote gender equality, social justice and peace. They can become a powerful tool for governments, the private sector and international agencies to become accountable and committed towards their societies. The SDGs agenda builds on the Millennium Development Goals (MDGs), launched in 2000, which focused on reducing poverty, hunger, diseases, gender inequality, and ensuring access to water and sanitation by 2015. The new sustainable development goals aim to complete what the MDGS did not achieve and go even further, as they are aimed at addressing also the causes of poverty and inequality.

The overall SDGs plan consists of 17 goals, 169 targets and 230 indicators, including a stand-alone goal on gender equality and the empowerment of women and girls (SDG n.5), as well as gender-sensitive indicators in other goals. The SDGs agenda represents an opportunity to ensure women and girls become benefited as all its dimensions – goals, targets and indicators – have implications for gender equality and women's empowerment.

Monitoring the implementation of the SDGs is crucial to ensure the actual realization of their potential. Together with traditional data, Big Data can contribute to such operation, particularly by providing a starting point to produce relevant information to monitor sustainable development in an open, participatory and transparent way, as well as to promote public debate and to improve public policies. Most notably, SDGs indicators can be based on Big Data sources. Therefore, Big Data become of paramount importance in relation to women and girls' needs.

In what follows, I will critically discuss the potentialities that are inherently connected with Big Data to defeat systemic unbalances as those addressed by the SDGs. I will do so in light of an undeniable gender gap that characterizes the broader technological environment in which Big Data are produced and which needs to be considered in any development-oriented initiative that intends to employ Big Data amongst its tools.

2. The Feminist Political Economy of Communication (FPEC) for a critical analysis of Big Data

It is widely acknowledged that one of the main sources for Big Data production are Information and Communication Technologies (ICTs). The technological development and its implications for the status of women, would have no meaning without the existence of capitalism, as this is one of the main causes of women's segregation in society (Riordan 2002). The critical approach of the Feminist Political Economy of Communication (FPEC) provides key elements for understanding this point. FPEC originates from the feminist critique of Marxism and its aprioristic assumption of the concept of class as gender neutral. Socialist feminists questioned the neutral character and the absence of values structuring work relations, class position and exploitation pointing out that capitalism has in fact a masculine bias (Riordan 2002).

FPEC opens the possibility of going beyond the conceptualization of capitalism as shaped to a large extent by neutral class relations. FPEC sees patriarchy as the first social system and grounds it within relations of power and domination of men over women. For this reason, the capitalist structure does not have the same effects for men and women, and patriarchy and capitalism reproduce together social injustices (Riordan 2002).

According to the FPEC perspective, ICTs are not a "natural" effect of the development of society, but a product of hegemonic interests geared towards gaining maximum benefit from these technologies as well as from the exploitation of the labor force (Martin 2002, 54). More importantly, FPEC sees ICTs as not existing in a neutral

way. Since they are determined by the gendered structures of power, ICTs rather represent the male culture.

Historically, women have been marginalized from the field of science and technology. Their exclusion was associated to an androcentric rationalism dominated by the idea of objectivity. Indeed, modern science institutionalized around "established dichotomies culture/nature, mind/body, reason/emotion, objectivity/subjectivity, public/private, in which the second element of the pair is always considered worst and related to women" (Castaño 2005, 28). By associating women to both the domestic sphere and nature, technology was defined as a field of male dominance and hostile to women, who were stereotyped as less intelligent and less capable to use technology or even as "technophobic". Thus, segregation of women from the field of technology "is based on a perverse relationship between power, technological control and masculinity" (Castaño 2005, 32). Hence, "because of their position in such structures developed by private industry, not only have men greater access than women to systems of communication, but their access is from a better location in the structures and, as Mosco would put it, places matter" (Martin 2002, 56).

If in the scale of production women are at the lowest level and if ICTs is not a field that is inclusive of their gender identity, women experience both exploitation and occupational segregation. More importantly, the occupational segregation of women in the ICTs domain is, at the same time, a source and an outcome of men's power over women (Martin 2002, 75).[1]

Against this background, it becomes more evident that communication technologies can play a double role. On one hand, they constitute a key element for women's social, political and economic empowerment, as they could help to reduce poverty, illiteracy, gender-based violence and social segregation. On the other hand, they are also exacerbating gender and class inequalities (Martin 2002, 54). In addition, given that women are involved in capitalism not only as workers but also as consumers, their interests are largely in the hands of communication and information industries (Martin 2002, 57). Since capitalism grounds in the sexual division of labor, linking men to power and control of resources and women to the domestic sphere leads to associate products of-

[1] The concept of occupational segregation is useful to understand how patriarchy and capitalism operate together. Since women have an unequal position in the domestic space compared to that of men, they are responsible for the care, feeding, and management of everyday life and, when they enter the job world, they do so in a disadvantaged position. In this sense, "women's starting positions are often lower than men's and they rise slower, if at all" (Martin 2002, 83). Moreover, "the combination of men's power over women in both the home and in the labor force provides a powerful theory for sex-segregation at work" (Martin 2002, 83), which is the primary mechanism of domination of men over women in capitalist society.

fered through ICTs to predefined and, often, stereotyped gender identities (Byerly 2002).

As it shows, then, the relationship between gender and ICTs is very complex, and ideology plays a central role in supporting the androcentric power that dominates communication and information industries. As Margaret Gallagher has put it, "those with the ownership and control of the media industries also have the power to silence and render invisible women's voice, ideas, experiences, problems, and achievements" (1980 in Byerly 2002, 136).

One of the most evident expressions of gender inequality in ICTs, is the gender digital divide. If we adopt a gender perspective, we will see that the costs of the digital divide are not the same for men and for women. In the words of Abdul Waheed Khan, the gender divide is "one of the most significant inequalities to be amplified by the digital revolution, and cuts across all social and income groups. Through the world women face serious challenges that are not only economic but social as well as cultural obstacles that limit or prevent their access to, se of, and benefits from ICTs" (in Primo 2005, 5).

In both developed and developing countries, women constitute the minority of ICTs users. Women's access and use of ICTs is particularly limited in poor contexts, wherein not only communication infrastructures are less pervasive and of lower quality, but there are conditions of poverty, marginalization and violence of gender which determine the use women make of technologies. In developing countries, there are 600 million women online – i.e., 200 million less than men. By region, data show a dramatic gender digital divide (Intel & Dalberg Global Development Advisors 2012):

- In Latin America the access of women to the Internet is 36% while that of men is 40%, resulting in a gender gap of 10%;
- In Europe and Central Asia, 35% users are women, 49% men and there is a gender gap of 29%;
- In East Asia and the Pacific Region, 29% users are women, 37% are men and the gender gap reaches 20%;
- In South Asia, women are 8% of users, men are 11% and there is a gender gap of 33%;
- In the Middle East and North Africa women online are 18% against the 28% of men and the gender gap rises to 34%;

- In Sub Saharan Africa, 9% of women have access to the Internet against the 16% of men, resulting in a gender gap of 43%.[2]

Albeit the number of users of ICTs has increased in recent years, it is also important to consider that divides are not only numeric but relate also to the type and level of skills through which those technologies are accessed and employed. In this respect, the OECD classification of ICTs users (2007) becomes a useful lens. The OECD distinguishes between *specialists*, *advanced users* and *basic users*. ICTs specialists are professionals with knowledge and abilities to develop, operate and maintain ICTs systems. These professionals supply software and hardware. Advanced users are competent users of advanced software tools while basic users are competent with generic tools (Word, Excel, Outlook) and use them for their working life. Women are around 60% of basic users, 25% of advanced users and between 10% and 20% of ICTs specialists (OECD 2007). According to the OECD, the reason why women participation is lower in the more specialized levels is because of the male dominance in this area.

Differences in the use of technology are also linked to the social construction of gender and to cultural norms related to variables of age, race, ethnicity, class, and education. In this respect, several aspects seem to emerge from a plurality of sources (Intel & Dalberg Global Development Advisors 2012; EC 2010; OECD 2007; UN 2005; Primo 2005; Vega 2016):

- Women have generally been less aware of the Internet than men as they have less familiarity with online environments and are often limited by gender norms for using the Internet;
- While women identify themselves as users, men do it as producers of content;
- The gender divide is more evident in the elderly than in middle age and young;
- According to the World Bank, in developing countries the tool that women use more frequently is e-mail because of cost of access, limitations of time, bandwidth and technical skills. Few women use ICTs for education, business and entertainment;
- While for men the Internet is a tool for work and leisure, for women it is for work, leisure and consumption of services related to the family needs (e.g., health, education, food, care, travel, etc.)
- Men spend more time online and access almost on the daily basis e-mail ser-

[2] As specified in the report, "to reflect the demographic profile of each country, survey data were weighted based on age and region, according to the latest census data, so that total scores were not biased towards certain regions or age groups" (Intel & Dalberg Global Development Advisors 2012, 95).

vices. Additionally, they consume other programs different to text processors, such as gaming, photography, video and music, while women spend less time online and use the Internet primarily to send e-mail and upon social networking platforms;

- The use of mobile Internet has increased among young and adult women from middle and upper classes. Adult women use it mainly for job reasons. The youngest women, for social networking, entertainment and education;
- In developing countries women use the Internet to search for a job and to earn additional income;
- In countries such as Mexico, Egypt, India and Uganda, women without formal education, are not familiar with the Internet;
- In countries such as India, where only 1% of households have broadband connection, cyber cafes would be the option for women and girls to access to the Internet. However, in some towns, these are not friendly places for women, these are unsafe;
- Given that technological development is concentrated in urban areas, there is a low access of women to ICTs in rural zones while 53% of women in developing countries live outside cities. This places these women at the lowest level of the gender divide. Constrains include poverty, social norms, infrastructure, lack of education and geographical location.

In light of the tight link that exists between ICTs and the production and circulation of Big Data, a gender perspective and, more importantly, a direct concern for gender inequalities cannot be avoided. More specifically, it becomes important to address how Big Data, which are a fundamental part of an inherently patriarchal ICTs system, can intersect current attempts to overcome gender-based inequalities, particularly those addressed by the Sustainable Development Goals.

3. What Big Data are and how they can matter for gender equality

Defined in relation to the action of gathering large amounts of data, Big Data are characterized by volume; variety, which refers to the diversity of sources and to the plurality of new technologies that function as data generators - financial transactions, social networks, citizen applications, blogs, health records, etc. - ; and by the velocity at which data is produced and transmitted, which helps to produce real-time information (Laney 2001).

Specific analytics developed to make sense out of those amounts of data complement their gathering. In this respect, fair and right uses and applications of Big Data must account not only for the availability of data themselves but also for users' capabilities and security issues. In particular, privacy and cybersecurity risks are a sensitive issue, as Big Data contains personal information.

When it comes to the accomplishment of SDGs, Big Data can be seen as a complement to traditional data. While these latter are produced with specific purposes and through the employment of typical statistical tools - census, surveys, etc., -, Big Data are generated in manifold ways: they can be a type of human-sourced information (particularly when they come from social networks, mobile data or blogs), they can refer to business systems – especially when they are produced through banks and financial flows or through and e-commerce – but they can be also produced through the Internet of Things – for example, through the use of GPS, smart appliances, health records. As much as they are produced by heterogenous sources, these data can potentially be used by a plurality of actors: citizens, NGOs, universities, policy makers, private companies, governments and human rights agencies.

Thus, Big Data can provide organic information, particularly in geographical communities where there is a gap of traditional data sources, on issues related to women and girls that have been invisible in the international agenda - e.g., access to justice, political participation, cyber-violence, etc.; real-time information on crises issues – e.g., unsafety conditions for women in both private and public spaces; and real impact of policies in women's well-being. Big Data can also help rising awareness on women's conditions, needs and interests in various domains, from economy to health and education. In this way, they can support and, potentially, re-orient the implementation of development programmes, particularly when they are employed to substantiates indicators that aim at improving women's conditions all over the globe and in different spheres. Ultimately, Big Data can become a key resource in all mechanisms that are pushed forward, particularly by national and supranational institutions, to eliminate gender-based gaps.

But are indeed Big Data potentialities exploited towards greater gender equality? One first element that helps answering this question is looking at who are the actors that are benefiting the most from the progressive rise of the Big Data industry. Most of available Big Data are in fact concentrated within male-dominated private companies which, far from using them to close social, economic and cultural gaps, are implementing innovative systems or analytics to turn data into marketing tools. Moreover, Big Data produced by these companies are characterized by two limitations. First, they are not representative of the population because they do not include those groups that do

not use technology. Because, as seen above, women are in a disadvantaged position when it comes to the access and usage of ICTs, they are often under-represented through the very data that these tools produce. Second, when data are available about women, they often convey a stereotyped vision of their interests and needs – as they tend portray women as consumers, and not as tech-savvy.

Hence, a crucial question becomes to what extent Big Data can actually serve as a quality base for measuring indicators that government and international agencies adopt to monitor the progress of an initiative. Indicators have indeed become a key tool to measure development in the world as they are shaped in a way that allows to identify where we are and where we are going with respect to specific objectives but also to evaluate and measure the impact of programs (CIDA 1997). Consistently, indicators are essential to achieve the SDGs and, more particularly, gender indicators allow us to identify the progress of gender equality and make visible the participation of women in society, but also the obstacles they face.

To be sure, in order to be effective, indicators need to be substantiated by data that allow to monitor dynamically the implementation of development programmes by making progresses or setbacks visible and understandable. In this respect, Big Data, with their volume, variety, and velocity, could potentially serve as a great starting point.

However, indicators of gender equality challenge Big Data along several aspects. A critical aspect in the process of developing indicators is to avoid an ethnocentric view. This is particularly important when it comes to gender equality indicators, which must have a local perspective and be accountable to the gender condition of women. Nonetheless, traditionally, international agencies located in developed countries have failed to produce indicators that are relevant to measuring gender equality in developing countries. Similarly, Big Data generated using ICTs and applications that are produced and pervasively diffused in highly developed areas seem to have only a limited potential to "tell" local stories of daily gender-based discriminations that occur fluidly across the online/offline boundary.

Another key factor in the development of efficient gender equality indicators is the combination of both quantitative and qualitative perspectives. Historically, quantitative indicators - for example, the number of women working in ICTs industries - have been prioritized, arguing that they guarantee objectivity, and have often become a political tool. However, this type of indicators does not allow to unveil the very experience of women linked to their gender condition – for example, the obstacles they face in these industries. In fact, this dimension is often better grasped through qualitative approaches such as interviews and ethnographies. As argued by the Canadian International De-

velopment Agency (CIDA): "qualitative analysis is used to understand social processes, why and how a situation determined by indicators, became such, and how that situation can be modified in the future. The qualitative analysis should be used in all stages of the process and together with quantitative and qualitative indicators "(1997, p.12). As much as indicators need to be both qualitative and quantitative, also their analysis and reading need to be of different nature: not only statistical but also interpretative.

Ultimately, the key to enrich the measurement of development is to complement both perspectives as, together, qualitative and quantitative data reinforce the reliability and validity of the indicator, and qualitative and quantitative takes help to give consistency to the monitoring processes. And yet, precisely for their inherent characteristics, Big Data are not particularly suitable for qualitative analysis. In this sense, they cannot be thought as a resource able to provide, by itself, all the information that is necessary to effectively measure developments towards greater gender equality.

A third challenge relates to the necessity of bending Big Data towards measuring a whole set of complementary aspects that, altogether, contribute to define “progress” towards gender equality. Indeed, according to the CIDA (1997, 16), there are different types of indicators, each of which corresponds to a specific part of the monitoring process:

a. Risk indicators, which measure the influence of external factors in the implementation of a program;
b. Influence indicators, which register the resources devoted to the project or program;
c. Process indicators, which measure the activities carried out from the resources devoted to a program or project and serve to monitor achievements during the implementation;
d. Performance indicators, which help assessing medium-term results;
e. Result indicators, which relate to long-term project results.

Furthermore, following CIDA, another recommendation that must be taken into account for the development of gender equality indicators, is to produce them in such a way that it becomes possible to measure changes over time and achieve, through them, the active participation of social groups that are involved (CIDA 1997). In this respect, the extent to which Big Data can serve as a base to adequately include women in the achievement of a more just position in society and in the labor market remains an open question.

4. Conclusion: Where are we now in the field of gender indicators and what is the place of Big Data?

It is important to stress out that progress on gender equality indicators is slow and that, in spite of the increased spread of Big Data, the availability of official data on structural aspects of the lives of women and girls in the world remains insufficient. Feminists from all regions of the world met at the United Nations Commission on the Status of Women (UN CSW) in 2016 and pointed to the critical absence of data that account for gender inequality. During several sessions of the Commission, concern was expressed about the lack of gender data at both national and international levels. In turn, this lack reflects the low priority that the achievement of gender equality has for most countries and, more generally, for what is measured and how it is measured as intrinsically linked to gender.

A clear example of this is the available governmental statistics on women and ICTs. In Latin America and the Caribbean, Africa and the Middle East, the availability of data is still precarious. In North America the focus is mainly set on access. Quite differently, the countries of the European Union have made the greatest efforts in the production of gender-sensitive data. Among the Asian countries, a good exception is South Korea, whose government has pumped qualitative and quantitative information on access differentiating by sex and gender but measuring also types and frequency of use (Hafking 2003).

Some available data about general indicators have been produced by international agencies – particularly by the UN, UN Women, UNESCO, ITU, OECD, but also by scholars and by national and regional NGOs. In these cases, attention has gone often towards analyzing women's access to Internet, but very little is known about their relationship with other technologies. Finally, some data come also from private companies, such as Nielsen or Media Matrix/Jupiter Communications. However, these data have been produced for commercial purposes and, as Nancy Hafking (2003) warns, some of them data are questionable and contradictory.[3]

More in general, the lack of data disaggregated by sex is a strong limitation: not only it hampers the reach of analysis but, more poignantly, makes gender inequality invisi-

[3] An example is the report from Google about Internet access in India. The company reports that 40% of Internet users are women: (http://articles.timesofindia.indiatimes.com/2013-06-20/computing/40092965_1_hair-care-four-women-skin-care, access August 1). In contrast, the CISCO Institute reports that women are only 23% of Internet users in that country (http://www.hrindiaonline.com/printContent.php?MpoQSrPnM=MjE=&flag=2, Access: August 1).

ble. In this sense, as Nancy Hafking points out, "without data, there is no visibility; without visibility, there is no priority "(2003, 1).

Against this background, a crucial question raises about the possibility of Big Data to provide evidence of the structural aspects of gender inequality and power relations between women and men and to become an asset for women's empowerment. Following Anita Gurumurthy (2016), it is necessary to go beyond simplistic indicators that focus on the access dimension, for example, on the ownership of cell phones or televisions, and complement the statistical data with a qualitative approach. Also, it is essential to analyze the intersectional aspects, including indicators of age, class, disability, nationality and ethnicity. It is also necessary to look at the contexts, which shows the need to build indicators at a global, regional and national level, but at a sectorial level as well. In the same way, it is necessary to constantly review the indicators and the methods to measure them, as society is constantly transforming.

In this context, Big Data potential as a reliable source of information to achieve the SDGs cannot be ignored. Their obvious advantages in comparison to previous types of data can certainly be valorized as they are crucial to shed light on previously uncharted dimensions of inequality as well as on already-known structural obstacles to gender equality.

At the same time, the peculiarities and the potentialities of Big Data need not to be over-emphasized. As I showed above, the structural nature of gender inequality, which is embedded all sectors – financial, political, social – and within institutions, constitutes the main obstacle for the effective contribution of Big Data to the achievement of women's human rights.

A strategic plan is therefore needed that ensures the availability of indicators that are sensitive towards gender justice and to exploit Big Data consistently. Indicators and their data should be framed according to an intersectional approach to account for the condition of women and to link these very conditions to the 17 SDGs in all countries and regions. Furthermore, it is imperative that reports generated on this base are published transparently and on a regular basis, so that they can serve to improve public policies.

Implementing these actions requires the participation and the coordination of a multiplicity of actors at all levels: international agencies at the global level; regional agencies and organizations that have the responsibility of defining indicators and to provide regular reports on progresses and divides; national states, which must devote both human and financial resources to the monitoring of the gender dimension of the SDGs, through both traditional and Big Data, and should involve Universities and NGOs

in this process. Between these levels, the private sector has the responsibility of making available all the data and the information that they currently monopolize.

Ultimately, it is only when Big Data are exploited in the context of a people-centered development view "that embraces the principles of social justice and gender equality by addressing the needs of women and starting a process of fundamental redressing economic and socio-cultural gaps" (Primo 2005, 78) that they can become real assets to make the Sustainable Development Goals an initiative that effectively promotes development.

References

Byerly, C. (2002), "Gender and the Political Economy of Newsmaking: A Case Study of Human Rights Coverage", Meehan, E. and Riordan, E. (eds.), *Sex & Money, Feminism and Political Economy in the Media*, University of Minnesota Press: Minneapolis, pp. 130-146.

Castaño, C. (2005), *Las mujeres y las tecnologías de la información. Internet y la trama de nuestra vida,* Alianza Editorial: Madrid.

CIDA (1997), *Guide to Gender-Sensitive Indicators*, Quebec: Canadian International Development Agency.

Gallagher, M. (1980), *Unequal Opportunities: The Case of Women and the Media*. UNESCO: Paris.

Gurumurthy, A. (2016), "Restoring to development debates a feminist vision of the right to communicate", Paper presented at the 2016 IAMCR Conference, University of Leicester, 27-31 July, Leicester (UK).

Hafking, N. (2003), "Some thoughts on gender and telecommunications/ICT statistics and indicators". Accessed on May 18th, 2013. http://www.itu.int/ITU-D/pdf/5196-007-en.pdf.

Intel & Dalberg Global Development Advisors, (2012), *Women and the Web. Bridging the Internet gap and creating new global opportunities in low and middle-income countries*. Accessed on May 13th, 2013. http://dalberg.com/documents/Women_Web.pdf.

Laney, D. (2001), "3-D Data Management: Controlling Data Volume, Velocity and Variety" META Group Res Note 6. Accessed on May 18th, 2013. http:// blogs.gartner.com/doug-laney/files/2012/01/ ad949-3D-Data- Management-controlling-Data- Volume-Velocity-and-Variety.pdf.

Martin, S. (2002), "The Political Economy of Women's Employment in the Information Sector", in Meehan, E. y Riordan, E. (eds.), *Sex & Money, Feminism and Political Economy in the Media*, University of Minnesota Press: Minneapolis, pp. 75-87.

Primo, N. (2005), *Gender Issues in the Information Society* UNESCO, Paris. Accessed on May 18th, 2013. http://portal.unesco.org/ci/en/file_download.php/250561f24133814c18284feedc30bb5egender_issues.pdf.

OECD (2007), 'ICTs and Gender' *OECD Digital Economy Papers,* No. 129, OECD Publishing [Online] Available at: http://dx.doi.org/10.1787/231011217663 [Accessed 15 May 2013].

Riordan, E. (2002), "Intersections and New Directions: On Feminism and Political Economy", in Meehan, E. and Riordan, E. (eds.) *Sex & Money, Feminism and Political Economy in the Media*, University of Minnesota Press: Minneapolis, pp. 3—15.

UN (2005), *Women 2000 and beyond. Gender equality and empowerment of women through ICT* United Nations, New York. Accessed on May 5th, 2013. http://www.un.org/womenwatch/daw/public/w2000-09.05-ict-e.pdf.

Vega, A. (2016), "Participation: Women´s human right to communicate in the digital age", in Picard, R. (ed.), *What Society Needs from Media in the Age of Digital Communication*, Ramada, Porto, pp. 95 -- 130.

Author's Information

Aimée Vega Montiel is Researcher at the National Autonomous University of Mexico, Center for Interdisciplinary Research in Sciences and Humanities.