

## 4 Gender and Equity in Openness: Forgotten Spaces

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### Introduction: Why Is Gender Equity Important?

Gender equity<sup>1</sup> is recognized by many to be critical to ensure an inclusive society that benefits all people. A gap in gender parity across the world has been well documented. The World Economic Forum's *The Global Gender Gap Report 2017* (Leopold, Ratcheva, and Zahidi 2017), which measures the gap between men and women in four key areas of health, education, economy, and politics, indicated that in 2017, an average gap of 32 percent remained to be closed between men and women. Some countries showed a reversal, and others some positive steps forward, indicating that context and sustained efforts are important while tracking gender measures. Yet these persistent gender gaps have focused global attention and stimulated a call for action to track progress and close these gaps (Leopold, Ratcheva, and Zahidi 2016).

Although the promise of open development is that it will be neutral, inclusive, and gender-fair, operationalizing openness to ensure that men and women benefit equally can be problematic. This is largely because gender asymmetries and the inherent social structures that fuel them are often not addressed adequately, even when technological and operational concerns are attended to. Addressing technological challenges faced by women is just that—a service delivery that reaches out to women. But participation is much more than numbers and attendance; it is about speaking up, sharing ideas, and being heard. Gender asymmetries in participation and voice have been attributed to a failure to address entrenched cultural and traditional biases and a lack of gender-sensitive policies (Neuman 2016). Participation is important for many open processes, but it does not happen on its own. Steps toward greater inclusion and participation involve gender-sensitive policymaking, strategies such as gender targeting (addressing the specific needs of women to ensure gender parity and representation), engagement with women's civil society organizations, information flows that include women, and greater decision-making by women.

This chapter takes a closer look at inclusiveness and nondiscrimination in the open processes where, collaboratively, knowledge is produced, shared, and consumed. The argument is that knowledge itself is not gender neutral because it depends on who, what, and how it is created and used. To unpack inclusiveness, this chapter nuances the processes of participation and engagement in relation to gender—how participative, equitable, and gender responsive are open production, distribution, and consumption processes, and are they truly nondiscriminatory? To do so, it uses a gender transformative viewpoint that places issues of power at the center of the discussion. The argument is that it is important to recognize that all openness processes are affected by structural inequities and imbalances of power that engender social norms and interactions. Therefore, to be gender equitable, gender fair, and nondiscriminatory, one must address the power and structure that underpin open social processes.

The chapter progresses as follows. In the first section, it looks at open development processes through a gendered lens, examining the differences in men's and women's<sup>2</sup> experiences of open processes *from the point of view of their socially constructed, ascriptive*<sup>3</sup> roles. This enables us to question the power relations between men and women which, in turn, intersects with power related to race, caste, class, abilities, and sexual orientation and keeps women in subordinate positions. Without using a gendered lens, one cannot address gender equity. In particular, it looks at the ways that open processes interact with and affect gender equity. Next, it describes gender concepts relevant to our discussion on open development and then explains how open processes (open production, open distribution, and open consumption of knowledge—see chapter 2 of this volume) can be engendered from or endowed with a gender perspective. The third section develops an analytical framework with guiding questions to determine the extent to which open processes are gender equitable, and then it illustrates the use of this framework with two case studies. The chapter concludes with recommendations for next steps.

### **Social Inclusion and Exclusion**

Social inclusion is the removal of institutional barriers and the enhancement of incentives to increase the access of diverse individuals and groups to development opportunities (Dani 2003). Between the two extremes of inclusion and exclusion, there are shades and levels of both, which are largely dependent on institutional and social barriers. It is important to note that one may be included in one domain but excluded from another. In other words, social inclusion is a multidimensional, contextual and relational process capable of enhancing integration, cohesion, and solidarity (Silver 2015).

Thus, the process of inclusion *necessarily* means that someone or something is or can be excluded.<sup>4</sup>

Historically, exclusion has been linked to gender, class, caste, age, religion, ethnicity, disability, and geolocation. While discussing his research on the use of digital technologies by Filipinos to improve transparency and accountability, Roberts (2017) points to digital technology emerging as a factor of exclusion. He identifies five A's of digital access: *availability*, *affordability*, *awareness*, *ability*, and *accessibility* as a series of concentric circles that structurally exclude particular groups whenever digital technologies are deployed. Exclusion *from* and inclusion *in* social structures imply that someone has more power over others and that there is either an explicit or implicit power relationship influencing praxis (World Bank 2013).

The idea of inclusion is to some extent *sameness*—that is, everyone should be able to use the same facilities, take part in the same activities, and enjoy the same experiences, including people who have a disability or other disadvantage. The concept of sameness is recognized in formal gender equality, as it is premised on the principle of the sameness of women and men. It assumes that if women and men are given the same opportunity and women are treated similarly to men, equality will be achieved (Murthy and Kappen 2017). Thus, one way to ensure gendered inclusion (and nondiscrimination) is through this principle of *sameness*. Much of the research on differential access to the Internet or to open artefacts is related to this principle.

However, we could also consider a more *substantive* gender equality, which recognizes that men and women have to be treated differently to achieve equality because women's disadvantages need to be addressed first, such as less mobility, lower buying power, different workloads such as child care, lower education, and lack of skills (Facio and Morgan 2009; Kabeer 2001; Kapur and Cossman 1993). Sen (1989) argues that outcomes cannot be judged in terms of access to resources, but rather people's capabilities to engage in different functions (i.e., a disabled, or differently abled, person might require more support to engage in the same activity as an able-bodied person). But it is substantive gender equality that stresses that it is power and hierarchy (not just capabilities) that discriminate against women.

It is for these reasons that this chapter frames the discussion regarding inclusive open practices by addressing the socially and culturally constructed gender roles and relationships that often limit the capacity of women and men to participate on equal terms, even when open processes are available. We do this from a strong belief that open practices can be fundamental for societal transformation; but to better understand how this can happen, we need to understand the barriers to gender inclusiveness.

## Gender Equity

Analytical frameworks related to gender have attempted to assess *to what extent* and *how* we address gender equity. Displaying change on a continuum, the Gender Results Effectiveness Scale (GRES) analyzes the extent and process of structural transformation resulting from a project/intervention (UNDP 2015, 46). The scale prioritizes *systemic* change and suggests that access to opportunities and resources, or changes in laws and policies, is not enough to make a difference.

These categories necessarily evolve over time and are contextual. Gender-targeted or gender-responsive results have the potential to become transformative because they

<b>GENDER NEGATIVE</b>	The result had a negative outcome that aggravated or reinforced existing gender inequalities and norms.
<b>GENDER BLIND</b>	The result paid no attention to gender, failed to acknowledge the different needs of men, women, girls, and boys, and marginalized populations.
<b>GENDER TARGETED</b>	The result focused on the number of women, men, or marginalized populations that were targeted.
<b>GENDER RESPONSIVE</b>	The result addressed differential needs of men or women and equitable distribution of benefits, resources, status, and rights, but did not address root causes of inequalities in their lives.
<b>GENDER TRANSFORMATIVE</b>	The result contributed to changes in norms, cultural values, power structures, and the roots of gender inequality and discrimination.

**Figure 4.1**

The Gender Results Effectiveness Scale.

*Source:* Based on table 3 from UNDP (2015).

describe the differential needs of men and women and the unequal distribution of resources and rights. However, they are on a continuum and indicate the importance of moving forward toward the gender transformative category, which explicitly addresses the power structures and the roots of gender inequality.

Often, gendered responses have taken on a technocratic, apolitical form in an effort that appears to steer away from the structural challenges inherent in achieving gender equality.

Represented to technocrats and policymakers in the form of tools, frameworks, and mechanisms, “gender” appears as neutralised of political intent. Diluted, denatured, depoliticized, included everywhere as an afterthought, “gender” has become something everyone knows that they are supposed to do something about (Cornwall, Harrison, and Whitehead, 2004, 1).

Fundamental to any discussion on gender transformative change is the principle that patriarchal bias exists systemically and is manifest in structures (media, government, family, and other institutions), in interpersonal relationships, and daily lived experiences. In other words, gender permeates all that we do. As Hay (2012, 336) argues, “A gendered lens is recognition that the underlying structures and systems that create inequities cannot be programmed away within contexts that perpetrate and reinforce those systems.”

Applying a gender transformative approach to open processes would mean addressing gendered perspectives along with *intersectionality*, which refers to the intersection of gender with race, class, sexuality, ability, and other identities that marginalize and subordinate in the context of power. Such intersectionalities indicate how complex it is to address gender inequities. However, by using the gender transformative approach, open processes can demonstrate how the theoretical underpinnings of inclusion and nondiscrimination can be translated to practice.

A first step toward addressing gender and equity issues in openness is to better understand how access, participation, inclusion, and nondiscrimination are gendered, and how this affects decision-making and valuing knowledge that is created, shared, and consumed.

### **Interface between Gender and Openness: Key Concepts**

The Sustainable Development Goal (SDG) 5b on women’s empowerment has as one of its targets to “enhance the use of enabling technology, in particular information and communications technology [ICTs], to promote the empowerment of women” (UNCTAD, n.d., n.p.). Women’s empowerment is undoubtedly important for the attainment of this goal. Unlike the Millennium Development Goals (MDGs), which concluded in

2015, the SDGs are not just for the developing world; they are necessary for all nations, rich and poor, to address whatever inequities exist in *every* society. This means that we cannot talk about gender without talking about equity, and vice versa. Gender is only one axiom of inequity and cannot be abstracted from important identities, including race, ethnicity, class, culture, age, sexual identity, and physical ability. Gender (male, female, or other) injustice, a manifestation of exclusion and discrimination, is inextricably linked to these multiple identities. One may also argue whether it is possible to address equity without addressing gender, such as addressing poor people's access to the Internet or the needs of Indigenous communities, or making Internet accessibility affordable. Such approaches focus on efficiency and effectiveness but are gender blind and assume that there is no difference in the position of men and women. But we know that women's roles are gendered, ascribed by social roles, customs, and cultures that skew the power balance in favor of men. So, it is only when we *align* gender and equity that we are truly inclusive, we have ensured our commitment to having "no one left behind," and we have addressed the broader, intersectional concerns of inclusion.

Past experience in the field of information and communication technologies for development (ICT4D) indicated that although there was a vision of being inclusive and gender-fair, in reality, men and women did not equally participate and benefit.<sup>5</sup> At first, the slower inclusion of women was considered to be an artifact of digital access and paucity of skills. Then came the realization that the situation was more complex, and one needed to frame differences in terms of discrimination and barriers in participation that were structurally inherent in societies, often rooted in hierarchy and patriarchy. For example, Internet penetration rates among women from western Asia are lower than in any other place on the globe (Perryman and Arcos 2016). Citing research studies in Uganda and India, Perryman and Arcos (2016) show that women's digital exclusion in some developing countries is due to oppressive gender-based norms, as well as low mobile phone ownership (in India, for instance, only 30 percent of mobile phones are owned by women). They observed that many of the inequalities posing a barrier to ICT use in the developing world replicate broader social inequalities: lack of education, poor ICT infrastructure, self-efficacy to use ICT, and lack of gender-sensitive policies (165–166).

Recent data on access and participation indicate a complex web of gender differences in the way that women participate in different countries and contexts.<sup>6</sup> A recent set of household surveys found that, for the most part across the Global South, men have higher access to mobile phones than women, except in a few countries such as South Africa, Colombia, Paraguay, and Argentina. However, in all those countries except Argentina, men have a higher percentage of smartphones than women. Also interesting is that women in Ghana, Nigeria, South Africa, and Kenya use the Internet

more for education than men do, and this effect is particularly strong for rural women in Nigeria. Similarly, in contrast to the rest of the countries surveyed, there are only two—Nigeria and Paraguay—where women use the Internet more than men for work-related activities (e.g., in Paraguay, 29 percent of women use the Internet for work, as opposed to only 16 percent of men). We need more data and analysis to understand why women do not possess high-value phones, and, when compared to men, why Internet and social media use is lower—what are the reasons for such differences, and how do they affect women?

Both men and women have reported online bullying and posting of inappropriate content, with more women reporting such complaints in Kenya and Tanzania and more men reporting them in Rwanda, Mozambique, Ghana, and South Africa.<sup>7</sup> We need more research to understand the nature of the bullying and why it is gender specific.

Open development, typically predicated on ICTs, is subject to many of the same issues that emerged in the ICT4D field. In the same way that the diffusion of ICTs and their inclusion in development projects did not guarantee equitable benefits regardless of gender, open processes take place in the larger context of systemic inequities and do not necessarily transcend them. However, openness brings a particular subset of issues into focus and the normative impetus is gender equitable.

Looking through a gendered lens raises many questions regarding open processes and their underlying assumptions. For instance, in what ways are open practices engendered, and do those practices address hierarchical structures controlling knowledge production and dissemination? How and in what contexts are open development processes inclusive, nondiscriminatory, and therefore truly transformative *in practice*? When and how do open practices need to address power relationships that exist in society? What are the barriers for equitable participation of men and women across the intersections of class, ethnicity, status, and geographical location, and how do different openness processes address or affect them? Whose responsibility is it to ensure open and inclusive processes?

### Engendering Open Concepts

Open processes have distinguishing characteristics of being free, voluntary, and non-discriminatory (see chapter 2 for a more in-depth discussion of these characteristics). However, spotlighting these characteristics through a gender lens illuminates how open processes affect and are affected by the social differences between men and women and the power relations between them. Table 4.1 explains how engendering open processes can provide insights into the participation in and the development of knowledge artifacts.

Table 4.1

Engendering open concepts.

Open processes and principles	Open practices	Applying a gendered lens
Open production of content/knowledge	Creation of content and knowledge is participatory, anyone can contribute, and, in theory, no one is restricted from contributing. This means that whether peer produced or crowdsourced, all contributions to content/knowledge are equally valued (i.e., are nondiscriminatory).	Knowledge and values are culturally, socially, and temporally contingent. Knowledge is filtered through the person who knows. Thus, knowledge is not value free. It is influenced by one's own experiences, realities, and identities. It is contextual, privileging the knowledge of some people over others. Knowledge's value depends on the power of the decision-maker. In other words, who creates knowledge, how it is created, with whom it is shared, and for what depends on who is doing the decision-making. Women are particularly affected in this scenario because they have less power.
Open distribution and consumption	Anyone, without restriction of proprietorship or cost, can access, modify, remix, share, use, and republish the content/knowledge created.	Access is not just technological. Also, access does not necessarily mean use. There are gatekeepers for access and use—social, cultural, educational, financial, and geographical—representing privilege, power, opportunity, and agency. Those who have access to resources are able to control the process of modifying, sharing, and using. A resource may be free (no cost and in relation to participation), but social, cultural norms, and/or lack of agency (or skills) may restrict who can <i>actually</i> modify, share, and use. Women are especially affected, and open processes may not privilege women (or other marginalized groups). As a result, participation in the sharing and use of content/knowledge is not always equitable.
Principles of non-discrimination and freedom to participate	In theory, open processes are nondiscriminatory and provide a platform for anyone to participate.	In practice, inclusiveness and equality in participation both depend on various social cleavages such as gender, age, class, ethnicity, education, and geography. Inclusion and full and equal participation usually depend on existing socially structured power asymmetries. Even if there is no explicit exclusion, there may be implicit exclusion and discrimination.

Although open processes are based on technical principles of nondiscrimination, it is clear that they do not automatically mean that women will participate, or that women will participate in the same way as men (Buskens 2011). This is, of course, not surprising. What type of participation is valued (or not) is itself gendered—for example, *good* participation means that women participate with reference to their socially constructed, ascriptive roles or that they participate in ways that men do. But participation may not be *good* or valued if women participate, but do so differently from men.

### Access and Participation

To address gender and open processes meaningfully, we need a nuanced understanding of both access and participation. Participation cannot be understood as a binary function—either participation or nonparticipation. Rather, it is a continuum of various types of engagement and activity (Cousins and Whitmore 1998; Ramirez 2008).

A clear finding in the research is that access does not necessarily lead to participation. Access suggests the ability to use the information and the resources provided. Also, one may have access to resources but have no control over them, which means that participation is limited, particularly in decision-making. Graham (2014) and Warschauer (2002) acknowledge that greater access and participation driven by technological and operational innovations have not necessarily affected gender asymmetries, and they argue that much more work is needed to overcome inequalities in visibility, voice, and power in the networked society. A detailed discussion by Graham and De Sabbata (see chapter 5 of this volume) outlines the geographic asymmetries in openness participation. Information societies around the world are not free from existing and gendered global frameworks of governance, ownership, and control over resource access.

The analyses by Cornwall (2002) and Gaventa (2002) of how people participate are valuable for understanding how to frame participation in the digital world and, by extension, the social processes that define openness. Spaces for participation are important so that people can be directly involved and be able to exercise autonomous action. However, such spaces are *produced* spaces, never neutral, and reflect the interplay of existing power and difference (Gaventa 2002). It is no surprise that these spaces need to be situated not only within that context and its practices, but also with the multiplicity of *other* spaces with which they are in turn connected. Online participatory processes may serve simply to reproduce “echoes of dominant knowledge rather than to amplify the alternative, ‘bottom-up’ perspectives that are claimed for them” (Cornwall 2002, 9). All spaces have boundaries within which processes operate, acknowledging that

“power must be analyzed as something that circulates,” meaning that we need to ask questions such as who is inviting participation and who is taking part, what they think participation is about, and how people in different spaces perceive it (Cornwall 2002; Foucault 1980, 102). A valuable framing of participation and power (Gaventa 2002) is expressed through the Power Cube and relates to how important it is to interrogate not only visible power (laws, rules) and hidden power (such as with exclusionary rules), but also invisible power (internalized self-limiting self-beliefs).<sup>8</sup> Women and marginalized groups may not see their participation as valuable because they are told that it is not valued as much as that of men.

The concept of spaces of participation (and spaces of power) has value in our discussion of openness because no matter how open social processes are, they are always imbued with underlying status, class, and social position issues, which are reproduced in the ways that people communicate with each other in any social space, even those that are meant to be free (Kohn 2008). These prescriptors defining participation resonate with Lane’s discussion that educational divisions between people arise through a combination of factors—social, cultural, geographical, attitudinal, political, and economic (Lane 2009). These educational divisions can be easily extended to the digital world.

These issues are reflected in the data. For instance, a study of 3,705 responses of civic technology users who use mySociety’s open-source software extensively found the participation of women in civic applications such as FixMyStreet to be low. The fairly high gender imbalance among users diminishes women’s voices and marginalizes issues that are important to them – and consequently, the issues are less likely to be addressed (Rumbul 2015). Free and open-source software (FOSS) researchers Kuechler et al. (2012) make a comparison across a sample of open-source projects showing that although 25 percent of people employed in the information technology sector are women, only 7 percent of people who post online in open-source forums (i.e., post at least once) are women, and merely 2.5 percent of people who post regularly (i.e., ten or more contributions) were women. Women may have an online presence but do not contribute or speak out if they think differently from the online moderators, indicating a gendered pattern of participation that suggests women are “not supposed to” push back, assert themselves, or be otherwise expressive. A 2013 survey found that of more than 2,000 open-source developers who indicated their gender, only just over 10 percent were women (an increase from 2 to 5 percent in the early naughts) (Robles, Reina, Gonzalez-Barahona, and Dominguez, 2016). In this sense, the low and gendered participation is closely linked to autonomy and decision-making (World Wide Web Foundation 2015).

Studies have suggested that women tend to self-select what they do or do not do due to gender norms and social status rather than their technical skills and abilities.

Some of these considerations, such as time use of women at work and home, have been well documented. Lam et al. (2011) confirm the presence of a large gender gap among editors and a corresponding gender-oriented disparity in the content of Wikipedia's articles. They also hint at "a culture that may be resistant to female participation" (Lam et al. 2011). A Wikipedia Foundation survey found that only 13 percent of contributors were women and 9 percent of editors were women (Moeller 2009<sup>9</sup>; Wikipedia n.d.<sup>10</sup>). The reasons analyzed by Gardner (2011) elaborate on why women felt discouraged while contributing. Eight out of nine reasons cited by women had nothing to do with their skills but rather were related to women's gendered roles and male privilege and dominance. The major reasons were not having enough free time, aversion to conflict and lengthy edit wars, belief that their contributions would be reverted or deleted, a misogynistic culture, sexual overtones that distress women, lack of comfort with using the male grammatical gender as part of language, and lack of self-confidence. This was followed by another study, Bear and Collier (2016), which explores the issue by analyzing a subset of the original 2008 Wikipedia survey data (1,589 occasional American contributors, of whom 17.5 percent were female) and finding clear differences along gender lines. Women reported feeling less confident about their expertise, being less comfortable with editing others' work (a process that often involves conflict), and reacting more negatively to critical feedback than men (Bear and Collier 2016). There is already some research on the difference between men and women regarding confidence—but women do not actually score lower on ability and expertise (Torres 2016). Other studies have shown that while women are less confident than they should be, men are overconfident (Niederle and Vesterlund 2007).

Terrell et al. (2017) quote a study by Stack Overflow, a question-and-answer community for programmers, which found "a relatively 'unhealthy' community where women disengage sooner, although their activity levels are comparable to men's." A large-scale study of gender bias at GitHub shows that women's acceptance rates of contributions are higher only when they are not identifiable as women. Their study indicates how deeply gendered responses are: women demonstrate a self-selection bias in how long they survive on the platform, but what was surprising is that there are different expectations for women's and men's work—women's work is likely to be less valued or judged against higher standards than men's.

What these data points illustrate is that, in practice, if we want openness to enable people to engage equitably, open spaces will have to address the particular needs of excluded groups and provide mediation between the various actors in that particular context.

## Inclusion and Nondiscrimination

Lessig (2003) questions whether the neutrality of the Internet is able to break boundaries influenced by power and ensure inclusion. But the reality is that knowledge institutions, producers, and distributors remain concentrated in a few locations, adding to inequity. The reasons Lessig identifies are the economic power of large knowledge institutions and the existing structure of intellectual property (IP) rights. Many organizations believed that correcting this imbalance was possible through a series of new-generation Internet tools that enabled global access to knowledge, as well as affording the opportunity to establish new institutions for sharing, peer production, and remixing of knowledge (Graham et al. 2011).

For instance, research on microwork has highlighted the complexity of addressing gender. Some argue that microwork and online jobs can benefit women because working online allows women to juggle family, work, and time use. A World Bank report (Rosotto, Kuek, and Paradi-Guilford, 2012) shows how microwork is successful in reshaping the global market, but it also points to a gender and age imbalance.<sup>11</sup> A recent study of a Latin American microwork platform by Galperin et al. (2015), however, shows how nuanced the gender dynamics can be. For example, overall, they found that, all else being equal, women were more likely to be hired over men (a small, but statistically significant effect). Yet women engage in microwork on the platform in smaller numbers than men *and* tend to submit lower bids for jobs than men do. However, when it is clear that women are doing the hiring, women will bid as much as men and will be chosen more often. There appears to be also a self-driven gendered perception which is nuanced across cultural perceptions of the value of men's and women's work.

Power is central to how gender affects open processes. Thus, it is crucial to address power and hierarchy if one expects everyone, including women, to participate in the open processes of production, consumption, and dissemination in an inclusive and nondiscriminatory way. If we address power differentials, which are often embedded in cultural norms and hierarchical values that impede women's full participation, we will necessarily have to frame progress on gender in transformative terms. We can do so by ensuring that we address both the practical and strategic needs of women such as connectivity access, skills acquisition, and understanding dynamics related to family responsibilities. Addressing the strategic needs of women targets equity issues, such as education, mobility, economic participation, empowerment, and norms, which have the potential to transform gender relations. In other words, questioning, researching, and analyzing gender disparities and gendered differences of openness have the potential to ensure true inclusion and prevent discrimination in open processes.

## Situating Knowledge

Looking at how knowledge is produced, shared, and used, it is imperative to understand the knowledge economy (i.e., who produces and reproduces, who has access, and how people are represented and excluded). It is also about discussing inequalities in traditional knowledge and information geographies before moving on to examine the Internet's potential to have new and more inclusionary patterns. However, studies show the divisiveness that exists in the knowledge economy. Graham (2014), in a study on the knowledge economy and digital labor, concludes that rather than democratizing platforms of knowledge sharing, the Internet seems to be generating a gendered digital division of labor, in which the visibility, voice, and power of the Global North are reinforced rather than diminished. Which knowledge system we value is clearly gendered—the knowledge system with more power is privileged over another, less powerful one. This is similar to modern knowledge being valued more than traditional ways of knowing (see also chapter 13 in this volume), or productive work being valued more than reproductive or caring work. Ann Weiner (2016, 1) writes that code is not neutral, as it is a creation, and that “[s]oftware products would be more powerful, more accessible, and more democratic—Twitter, for example, would look a lot different today if it had been built by people for whom online harassment is a real-life concern.” She claims that algorithms and code embody values and have been a concern for many years, quoting Ellen Ullman, one of the first women to enter the coding community in the 1970s, “[t]he engineer’s assumptions and presumptions are in the code” (Weiner 2016). Recent research acknowledges that gender bias pervades the open-source community (Terrell 2017). In interviews with women working in open source, Nafus (2012, 669 and 672) revealed that “men monopolize code authorship and simultaneously de-legitimize the kinds of social ties necessary to build mechanisms for women’s inclusion,” meaning that values are gendered, politeness is favored less by men, and “sexist behavior is... as constant as it is extreme.”

Rather than neutral and value-free, knowledge is deeply connected to a time, place, and social context. Feminist theorists talk about the *situatedness* of knowledge to a context and the effects of power on its production and validation (Brisolora, Seigart, and SenGupta 2014; Haraway 1988). This means that those who are marginalized have access to knowledge and viewpoints that are unique, not mainstream and dominant. Sandra Harding (1991, 185) asserts that such an approach is more objective and fair than traditional approaches to enquiry, which favor the dominant to shape knowledge, giving rise to a partial (and therefore distorted) view of reality. “Starting off research from women’s lives will generate less partial and distorted accounts not only of women’s lives but also of

men's lives and of the whole social order" (Harding 1993, 56). For knowledge to be constructed fairly, one must be aware of the skewed sociopolitical power and, more important, recognize that there are voices that have been left out and need to be heard.

This concept is important for openness because the cocreation (and cosharing and coconsuming) of knowledge assume that everyone has partial and contingent knowledge, and by participating in the crowdsourcing and peer-production processes, one achieves a shared knowledge. Similarly, perspective and experience shared through blogs and communities of practice provide important spaces for sharing, all adding to knowledge building. Knowledge sharing has become democratic (i.e., experts are not the only source of knowledge), valuing one's experiences and thoughts, which can be created, accessed, and shared immediately. Here, one must recognize that it is filtered through the knower's own realities, identities, and experiences, which shape the construction of shared knowledge. So knowledge has a social milieu and culture in which it is created and shared.

Situating knowledge helps us to be vigilant about who is *not* contributing to knowledge development. Masculine hierarchy can block and disregard the knowledge held by women. It is likely that the ones who are silent and have the least privilege may actually have the insight and knowledge that are valuable. Such knowledge may be traditional and gendered, and therefore less valued. Traditional bearers of local and Indigenous knowledge, be they men or women, may find themselves cut off from the networked society, where information, communication, and knowledge are tradeable goods. This is similar to the way that IP rights have taken away Indigenous ownership over traditional foods, medicines, and overall biodiversity (Thas 2008, 12). It has become essential that legal instruments are framed to recognize and protect knowledge created, developed, and enhanced by communities of people. These instruments need to be developed with the full participation of all parties who hold such knowledge, including men and women, and should acknowledge that men and women have differential access to the structures that shape knowledge systems (Primo 2003, 52).

Which knowledge is relevant and how it is expressed, therefore, depend upon one's standpoint. The dominant paradigm is influenced by the politics of location combined with a specific scientific methodology (Baghramian and Carter 2017). Many researchers have commented that the dominant logic of the scientific knowledge paradigm (methods, writing style, and assumptions) is shaped by discourse that privileges dominant groups, such as the male European paradigm (Euro-androcentric), and shuts off alternative perspectives, typically held by less privileged groups. So, observations, expressions of lived realities, and the diversity of women's experiences are often dismissed as subjective and irrelevant, and this overlooks the fact that there are often differences in how men and women think, what they think about, and what they consider important (Brisolara et al. 2014, 7). A project in the Open and Collaborative Science in

Development Network (OCSDNet)<sup>12</sup> (called Understanding Open Hardware and Citizen Science) used language that was not part of mainstream science, such as the use of the word *design* rather than *engineering*. The project's advisors from mainstream academia faced the dilemma of whether to use words that are commonly seen as "objective" (such as those commonly used in mainstream science) or to privilege women's experiences (see Chapter 13 in this volume for more on OCSDNet).<sup>13</sup>

So how does one navigate gendered open processes to create opportunities for systemic inclusion of marginalized or minority groups? In the next section, a framework is introduced that helps to illuminate gendered differences, which become apparent when a research framework exposes gendered patterns and contributing factors for those dynamics.

### Gender Analysis of Open Practices

A gender analysis of open practices describes a systematic approach to examining factors related to gender and identifying and understanding the various roles, relationships, situations, benefits, constraints, needs, and interests of men and women in a given sociocultural context. Further research and analysis can contribute to understanding the nature of structural inequities in specific contexts and how they affect open practices. It is important to question preexisting differences that skew the distribution of positive impacts to men more than women, as well as analyze if the impacts themselves reinforce gender differences.

A number of researchers have explored the framing of gender analysis in relation to power relationships among men and women. Ineke Buskens looks at researcher intent, which she categorizes into three types: conformist (aims to produce knowledge), reformist (to produce knowledge in order to understand how to reform existing unequal gender relationships), and transformist (to enable women to produce knowledge themselves) (Roberts 2015). The latter type enables a better understanding for women about existing unequal gender relations and the structural power interests that support them so that these can be transformed.

### Using a Gender Analysis Framework for Openness

In this section, I develop the novel Gender Analysis Framework for Openness (GAFO), which incorporates key questions that can help to assess the extent of gender inclusion in open development projects.<sup>14</sup> The GAFO framework suggests that power is pervasive and can be described as power to, with, over, and within (Rowlands 1997), as well as power to empower (Chambers 2012). These categories can be described as follows:

- *Power to*: The increase in skills and capabilities so that one can contribute, decide, and take the lead. An example of how knowledge production can increase the power that comes from an OCSDNet project in Kyrgyzstan,<sup>15</sup> which notes an increased participation of girls in citizen science in testing their communities' water quality.
- *Power with*: Seeking collaborative and collective action for the collective good and to create an enabling environment. An OCSDNet project in Lebanon notes that the group of "community volunteers" testing well water were all women, and the team in Southeast Asia exploring open science through open hardware design workshops report that using the phrase "design and collaboration" drew more participation from women than did "tools and infrastructure" (see chapter 13 of this volume for more details).
- *Power within*: Leads to increase in motivation, confidence to contribute, sense of belief to bring change, excel, and lead change. Power within is usually expressed once power to, power over, and power with has been experienced. Both the previous examples, in Kyrgyzstan and Lebanon, indicate the power to confidently contribute.
- *Power over*: A person's ability to overcome resource and power constraints to reach one's potential and take control of one's own personal and professional decisions and, in doing so, enable the person to increasingly influence and have a voice. The notion of *cognitive justice* used by the OCSDNet team from Haiti and Francophone Africa is one such example, which talks about empowered and confident researchers using all kinds of epistemologies and methods, not only those from the North (see chapter 13).
- *Power to empower*: Inspiring others, working on, and influencing broader agendas to multiply opportunities (i.e., being a champion). Examples can be found in the attempts of various forums to increase women's representation and participation. The International Open Data Conference (IODC), a place for sharing experiences, networking, and discussing the most crucial issues of the movement toward open data, reported that only 34 percent of the speakers were women at its 2015 conference. This prompted an open letter to IODC 2016 from Mor Rubinstein, who called for gender-balanced panels for IODC 2018. "Let's aspire (and commit) to have 50 percent women speakers this round" (Rubinstein 2016). It is not only important to see the increase in numbers, but also to review how men and women participate and engage in the open spaces provided for producing, reviewing, and using knowledge. Power to empower is possible only when there is power within to contribute. For example, Open Heroines created an online blog, providing a visible platform and public voice for women to express their thoughts, ideas, and critiques. This space emerged mainly because, despite women contributing to the open spaces, many felt their voices remained unheard, and were frustrated by this "underrepresentation."<sup>16</sup>

### Vignettes: GAFO Analysis

In this section, I test the usefulness of the GAFO by using vignettes from various research projects supported by the International Development and Research Centre (IDRC)<sup>17</sup> to understand how gender affects open processes. I chose relevant questions from the framework to describe gender dynamics, determine how gendered the open processes were, explain how power relationships were affected, analyze the various types of empowerment, and discuss the impact of doing so.

**Case study:** Teacher professional learning communities—A participatory open educational resource (OER) creation and adaptation approach in Karnataka state, India (a subproject of the ROER4D program)<sup>18</sup>

The Research on Open Educational Resources for Development (ROER4D)<sup>19</sup> network aims to provide evidence-based research from a number of countries in the Global South (see chapter 12 of this volume). One ROER4D project in Karnataka used a bottom-up approach for teacher professional development, where teachers collaboratively and actively cocreated educational resources to respond to local needs.

The project worked with sixty-seven mathematics, science, and social science high school teachers and teacher educators in Karnataka. This group was embedded within a larger professional learning community of around 15,000 teachers across Karnataka, developed through the Subject Teacher Forum, an in-service teacher education program in the public education system. The research approach included periodic workshops with the sixty-seven participants, where they attended collaborative OER adoption processes. Analyses of data regarding the outcomes of the project indicated that teachers found meaning in reuse, creation, revision, remixing, and redistribution of resources on the mailing lists and the OER portal they used; experienced professional development and agency in using the digital platform; and increased their skills.

Questions from the GAFO (table 4.2) provide insight into the interrelationship between gender and openness. The project had to make special efforts to ensure that 50 percent of the teachers participating were women. Although female teachers are 41.42 percent of the total teacher population in Karnataka, only 20.9 percent (or a little over one in five) of the participant teachers in the OER project were women.<sup>20</sup> The selection process of science and math teacher resource persons was open and not discriminatory, and yet women's participation was low. Here, it would be useful to enquire why many women lacked the *power to*. For example, the researchers might ask: What challenges do women face in order to participate and benefit from these open processes?

**Table 4.2**

The Gender Analysis Framework for Openness (GAFO).

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Engendered processes	Open production: open to more people (e.g., crowdsourcing, peer production) Open distribution: sharing, republishing; nondiscriminatory access, use at no cost Open consumption: create, retain, reuse, revise, and remix for use
Power to do Choosing to do	What are the differences in who, what, and how knowledge is created? Is it inclusive or not, and, if so, for whom and how? To what extent is traditional knowledge expressed? How is it done, and who does so? How does such engendered knowledge creation (e.g., sex-disaggregated statistics) affect the quantity and quality of research that can help to fill the gaps in knowledge? To what extent do women have access to resources to produce, share, and use knowledge? What challenges do women have to face in order to participate and benefit from these open processes? What advantage do women have when involved in open processes, as opposed to a more conventional way to produce knowledge? To what extent do women have the freedom (and choices) to develop, publish, share, use, and be free to innovate? To what extent are women's voices heard so that they lead open practices?
Power with Do together	How did women's collaborative work, such as through peer-to-peer (P2P) and crowdsourcing, affect what knowledge was created, shared, and used? What barriers do women face in communication and engagement with others in open processes? In participating and/or leading collective or collaborative action? What opportunities were created for women to produce, share, and use collectively? Was there a change in the profile of users, types of usage, and new avenues opened up or avenues closed down?
Power within Agency	How confident did women feel about producing, sharing, and adapting open content? How confident are they to share the knowledge of their lived realities and traditional knowledge in the way they choose? Was there greater assertiveness in taking on new tasks? Did women understand their strengths and weaknesses, and how to manage them better to advance their work? How did women personally benefit? Did it change the way that women produced knowledge? Do women feel "safe" to share or participate?
Power over Control	What opportunities are (or should be) provided to overcome underlying resource and power constraints so that women can contribute, lead, and inspire? How do women's voices and achievements influence a larger audience in open processes? To what extent are women able to exert control over their personal and professional decisions, so that they can realize their full potential?
Power to empower Being a champion	What leadership contributions are women making to open processes? How did they change the nature of open processes? How are women and men inspiring other women and multiplying their opportunities?

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This OER project team made attempts to encourage women teachers to join in (*power to empower*) and to address the challenges faced by women teachers, both online and offline. We find that the participating women teachers had limited *power with*. While some women did participate in communicating through emails and sharing information from home, they contributed only 7 percent of all the emails; 93 percent of the emails were from male teachers.

The project explored a key *power with* question: What barriers do women face in communication and engagement with others in open processes – and/or in participating and/or leading collective or collaborative action? Women participants cited their various household and childcare responsibilities and a lack of time, preventing them from using their computers at home. Interestingly, male teachers reported that using the computers at home was more acceptable, and they did not categorize doing so as *work*. Such barriers affect the creation, sharing, and use of knowledge; limit participation in social processes; and, by extension, make them exactly the opposite of what they were meant to be—discriminatory and not inclusive. Although women who participated did show increasing confidence to participate (*power within*), the observation and gendered perspective of the project lead revealed greater nuance: women did not like conflict during discussions, were worried about being wrong, and were willing to go along with their male colleagues. The analysis indicated how gendered women’s (and men’s) responses to participation are, and, to ensure that open processes are transformative, strategies for inclusion, participation, and power have to be formulated right from the beginning.

The offline situations for the same group of participating women teachers included logistical barriers, such as the residential nature of the training program (which led to difficulties with childcare, seeking permission to travel from in-laws, and other issues); poor arrangements at the training venue, like dysfunctional toilets, lack of drinking water, and nonavailability of food arrangements; and public transport facilities close to the training venue. Some of the district training centers were far from the city center and not easily accessible. Women also mentioned that they did not feel safe at these centers. Those who did come said, “We came in spite of the home, we braved it” (*power within* and *power over*), indicating an attempt to exert control over barriers.

If we review this OER project on the gender effectiveness scale (see figure 4.1), the project could be classified as gender targeting—trying to get more women involved in the project by specifically addressing their practical gender needs. To be gender transformative, the project would need to question and address the power relations between men and women teachers and the roles that they played in their daily lives, which in turn affected their contribution to the OER development, sharing, and use.

**Case study:** Indigenous Knowledge and Climate Change Adaptation (a subproject of OCSDNet)<sup>21</sup>

OCSDNet explores the role of openness and collaboration in science as a transformative tool for development thinking and practice with researcher-practitioners from the Global South. The Indigenous Knowledge and Climate Change Adaptation project used a political and ecological approach to understand the relationship between climate change, IP, and Indigenous peoples, focusing on these facets as they pertain to Khoe peoples, and the Griqua and Nama groupings in particular, in South Africa. The project used participatory action research design and methods to reduce the power relations within and between researchers and the researched and hierarchies of knowledge production by involving marginalized groups within the design, implementation, and outcomes of the research. By doing so, these community researchers would be able to influence and contribute to the coproduction of knowledge.

Analyzing the case using the questions provided in the *power to do* category in table 4.2 helps reveal the role of gender in knowledge sharing and use in this project. Because men were the herders, they were de facto *holders* (or owners) of the knowledge about changes in the environment, and, within this group, it was the older and more experienced ones who held the *power to do*. In other words, gender roles influenced who possessed the knowledge; women did not have the *power over* to overcome the access to this knowledge, and neither could they have the *power to* nor the *power within* to access knowledge. However, there were some caveats to this scenario. For instance, some women had taken over herding, as they were widows or because their husbands were migrating for work. In these cases, they *did* possess knowledge, and had the *power to* contribute. But researchers noted that women were not comfortable coming to meetings, and, even if they did come, the male elders preferred to talk to researchers and express their views to them. Women had little *power within* or *power over* to overcome the barriers. In fact, it was easier to have more interactive conversations separately with women.<sup>22</sup> Clearly, the filtration of Indigenous knowledge, despite its coproduction, is still gendered. Researchers involved in this project mentioned that to explore the role of gender deeply, it is important to have more time, resources, and expertise at their disposal.

If we review the project using the Gender Results Effectiveness Scale (see figure 4.1), it could be considered gender discriminatory because it did not question at all the place of women in sharing the knowledge. In fact, the researchers in the example noted that men were given precedence, even though there were circumstances where single women herders were the holders of knowledge. To be gender transformative, they had to challenge the male hierarchy so that women could participate in joint meetings, have their voices heard and valued, and reconstruct Indigenous knowledge through a

gender lens. This is possible only if the research design and openness values of inclusiveness specifically articulate such questions.

### **Enabling Spaces for Gendered Participation**

As can be seen from the examples given here, many criteria need to be considered in making openness inclusive and nondiscriminatory. Open spaces are not neutral, and definitely not gender neutral. In some cases, these spaces are pointedly gender discriminatory. The following sections attempt to address how open spaces can be gender-fair and safe.

### **Making Open Spaces Less Discriminatory**

A few of the ROER4D projects have shown that women need much more than mere persuasion and open space to participate. For example, Maria Pilar Saenz Rodriguez from the Colombia OER project spoke during her interview about the need for a collaborative and supportive space, where women teachers can talk freely about their personal lives, as well as work professionally.<sup>23</sup>

Some other OER project leaders also noted a similar trend during interviews; Lauryn Oates and Mubarak from Afghanistan<sup>24</sup> mentioned that in their OER project, men and women had separate times to access a computer lab, which is itself telling. Men tended to dominate discussions, even though teachers were university educated and the training was located in capital cities, where a more equitable attitude was expected. There were more male teachers in Afghanistan, but the project had ensured a 50:50 representation. Similar to the Karnataka project, there was a difference in the online participation of men and women, with more men uploading the material and using the data. Men were more used to the technology and stayed longer to use the computers, unlike the women.

But gender can work the other way, too, as happened in an OER project in Sri Lanka, where female teachers in Colombo managed to attend more workshops while juggling childcare, whereas male teachers preferred to pursue other degrees where there was greater monetary gain.<sup>25</sup> This example indicates that participation is often nuanced and contextual, and the perception of benefit can differ between men and women.

### **Need for Safe Spaces to Contribute Productively**

Generally, as power structures get disrupted due to increases in inclusion and participation of women in development, we are warned of the possibility of a backlash. This is equally true of digital spaces.

Susan Herring's research on gender dynamics in participation in online discussion lists provides plausible reasons for the gender gap reflected in the 2011 Wikipedia editor's survey; more women than men gave their main reason for not participating in online posting as that they felt unsettled by the "tone of the discussions" and "antagonistic exchanges" (Herring 2011).<sup>26</sup> Similarly, Reagle (2011) points to the presence of a "culture of hacker elitism," which can deter female contributors from utilizing free culture projects like Wikipedia and free and open-source software. Reagle (2011) suggests that the "ideology and rhetoric of freedom and openness can then be used (1) to suppress concerns about inappropriate or offensive speech as 'censorship' and (2) to rationalize low female participation as simply a matter of their personal preference and choice."<sup>27</sup>

Linked to safe participation is the need to promote digital rights, which is not a very commonly known set of human rights issues, especially in the South Asian context. At the *Hamara Internet—Ending Online Violence against Women* conference, held in Pakistan during November 2016, Shumaila Jaffrey of the British Broadcasting Corporation (BBC) referred to a recent report of the Federal Investigation Agency on cybercrimes, which suggested that 45 percent of the victims in the 3,000 cases of online harassment in Pakistan were females.<sup>28</sup> Thus, digital security and protection is critically important in our discussions of gendered inclusion in open processes. Buskens's (2011, 72–73) experience with the Gender Research in Africa and Arab Countries into ICTs for Empowerment (GRACE) project indicates that power dynamics in the environment have the potential to corrupt "the quality of openness," despite the intentions of stakeholders and role players.<sup>29</sup> She points out that "even within this network space, open sharing between the researchers had to be mediated by their need for safety. There was an awareness that... GRACE researchers are also members of many social systems in their countries of origin, as well as regionally and internationally, which are very diverse, and not all share enlightened perspectives on women's empowerment and gender equality. The GRACE social platforms were therefore managed through a rhythm of openings and closures" (Buskens 2011, 74).

There is a need to address the context and the sociocultural milieu so that women are motivated to contribute to the cocreation of knowledge without being threatened. For example, on realizing the low number of female editors, Wikipedia initiated "edit-a-thons," with the idea of (1) increasing the coverage of topics related to women in Wikipedia; (2) encouraging more women to edit Wikipedia through projects like VisualEditor; and (3) providing a user-friendly environment for female newcomers through the Teahouse project. The Wikipedia initiatives show the possibility of having two strategies: (1) women need to be targeted separately from men, and (2) the setting should include both men and women and be sensitive to women's concerns. Both

strategies have their advantages and disadvantages and can be used creatively by other organizations besides Wikipedia.<sup>30</sup>

These examples exemplify *power to empower* to provide safe online space to women contributors. Women's *power to contribute*, to be able to exercise *power over* online harassment, and the *power within* to challenge safety issues link to the work-in-progress GAFO framework.

Whether a radical idea such as the feminist Internet (Association of Progressive Communication n.d.)<sup>31</sup> is the answer, or if there must be rules that protect women in social praxis until cyberprotection is ensured, discussion of openness as being nondiscriminatory is limited.

### Conclusion: What Have We Learned?

Roberts (2017)<sup>32</sup> discusses how, by focusing on the excluding mechanisms, designers of digital development projects can use different and imaginative ways to seek the participation of marginalized groups, including blending offline and online activities and using analog as well as digital technologies. He underscores that if there is an intent to include the most marginalized in digital development initiatives, then there is a “need to design for equity from the outset.”

While openness implies a normative principle of inclusion, if we do not explicitly populate it with inclusion principles, it will only reflect the dominant paradigms existing in society. What is evident is that if gender is not addressed specifically, any discussion on openness is likely to bypass it—that is, “If you don't ask about gender, you don't learn about gender” (ROER4D 2016). Most likely, the knowledge created, accessed, and shared will reflect the dominant experience, which is likely to be male and white. To reach truly equitable representation, it is clear that one has to create conditions that address the barriers that prevent participation.

At the simplest, one must assess the differential use rates of men and women. It is important to then assess the direct impact on women (in terms of communication, decisions, and information); compare the impact among men and women, in terms of the relationships and the gendered actions, roles, and resources available; and finally examine the forces (sociocultural, institutional, and organizational) that influence gender (and gendered) norms, power, and practices (Heeks and Molla 2009).

Since openness, which is about production, sharing, and use, is ultimately a collaborative endeavor, it is often necessary to accommodate dynamic teams that are more geographically distributed. This is important, as it is one of the more positive and significant predictors of productivity (Terrell et al. 2017). Bias mitigation activities can be

useful here, such as (1) “bias busting” workshops,<sup>33</sup> (2) open-source codes of conduct,<sup>34</sup> (3) blinded interviewing,<sup>35</sup> and (4) acknowledgments by the community that biases are widespread, so that it can make a practical impact on the practices of open development (Terrell et al. 2017).

The need to create and nurture a safe and nonbullying atmosphere for the Internet in general, and open processes specifically, as a global concern cannot be overstated.

It is imperative to tackle barriers to women’s empowerment by enhancing their participation and representation in decision-making processes at all levels. Only this long-term process can have a sustained impact on developing a gendered Internet space and, therefore, on openness.

However, several steps and strategies may be initiated so that this extensive endeavor becomes manageable. The following actions are suggested for centering gender in openness. First, as one’s gendered orientation will determine whether gender will be addressed in open development, it is important to build the capacities of all those involved in open production, cocreation, sharing, and usage to review processes using a gender lens. If you put on a different lens, you can ask: “How is this issue for women?” “How is it different for men and women?” “Why and how can we change it?” Second, having gender consultants involved in the open development process of a project could be a short-term way out, but the long-term approach of training all those involved and creating a gender equal work ethos would be more sustainable. It is essential to improve the capacity of program leaders and partners to develop and scale up gender-responsive programming to advance gender-related outcomes in program areas. Third, the inclusion of team members and consultants, trained for gender analysis, needs to be accompanied by the appropriate resources for developing a strategy for engendering openness—right from the start. Fourth, there is a need to address women’s practical needs and expand safe spaces for voices, choices, and access; good practices like HarassMap and the Government of Canada’s commitment to feminist strategies in international development need more visibility. Fifth, we must encourage good practices and critical feedback from reviewers and evaluators to remove the defensiveness within networked economies about gender-related concerns.

Gender equity in openness needs much more than just wishful thinking. It requires a head-on discussion regarding the power interplay, explicit and implicit, that colors gender in open development.

## Notes

1. Gender is different from sex. *Sex* refers to biological differences, whereas *gender* refers to the socially constructed roles and relationships between men and women. Some theorists go beyond

the description of binaries of male and female and discuss sexual identities when referring to gender inequities. In this chapter, we use *gender* as a reference to women's lived realities. *Gender equity*, sometimes used interchangeably with *gender equality*, is different. Gender equality requires equal enjoyment by women and men of socially valued goods, opportunities, resources, and rewards. Where gender inequality exists, it is usually women who are disadvantaged. Gender equity, on the other hand, is the process of being fair to women and men, one that facilitates strategies and measures for compensating for women's historical and social disadvantages. Gender equity helps to level the unequal playing field and empower women and thus becomes essential to achieving true equality (according to the United Nations Populations Fund). (Also see <http://www.unfpa.org/resources/frequently-asked-questions-about-gender-equality>.)

2. We can extend this argument to include other population groups of diverse gender identities because sex and gender are not binaries.

3. By "ascriptive," we mean that the position describes the gender, such as a brother is a male and a sister is female. It also refers to describing, assuming, and accepting a gendering role (e.g., that a director is male and an assistant is female when there is no biological reason why this should be so).

4. There is a body of literature on inclusion and exclusion defined by various social science paradigms. This chapter does not critique them; rather, it uses these concepts to discuss how gender and the dynamics of inclusion affect participation in open development.

5. The Beijing Platform for Action, Section J, affirmed the importance of gender inclusion in ICT policy development at local, national, regional, and international levels. By 2000, policies to direct the ICT tools, so celebrated for their potential to effect change in developing nations, were implemented only sparsely toward programs for women's development (see Dumas 2006).

6. See IGF 2017 Panel. 2018. *After Access: Let the People Speak Using Evidence from the Global South to Reshape Our Future*. Geneva: Internet Governance Forum (IGF) Geneva. [https://researchictafrica.net/wp-content/uploads/2018/01/AfterAccess\\_IGF2017-1-2.pdf](https://researchictafrica.net/wp-content/uploads/2018/01/AfterAccess_IGF2017-1-2.pdf).

7. See Calandro and Mothobi (2017).

8. See <http://www.powercube.net/analyse-power/forms-of-power/>. To identify visible power, we ask "who decides"—they are seen as legitimate decision-makers since they 'represent us' (e.g., government, international bodies). To identify hidden power, we ask 'who influences'; they are less visible but are very influential (e.g., corporations, religious institutions, or others who exclude certain groups from decision-making or dismiss their concerns). To identify invisible power, we ask "what are the norms and who benefits" (e.g. women do not use public forums, being socialized that girls do not speak up, therefore benefiting men's voices).

9. See <https://blog.wikimedia.org/2009/04/16/first-preliminary-results-from-unu-merit-survey-of-wikipedia-readers-and-contributors-available/>.

10. See [https://en.wikipedia.org/wiki/Gender\\_bias\\_on\\_Wikipedia#cite\\_note-Gardner110219-21](https://en.wikipedia.org/wiki/Gender_bias_on_Wikipedia#cite_note-Gardner110219-21).

11. See World Bank, ICT Note no. 3. June 2012. [https://olc.worldbank.org/sites/default/files/New%20Frontiers\\_0.pdf](https://olc.worldbank.org/sites/default/files/New%20Frontiers_0.pdf).

12. See “Understanding Open Hardware and Citizen Science.” <https://ocsdnet.org/projects/hita-or-do-natural-fiber-honf-foundation/>.
13. “Our applications and efforts at getting female participation in workshops backs up previous research that pits framing of workshops in ‘design’ rather than ‘engineering’ or other socially gendered terminology as more accessible for female participants,” feedback from OCSDNet June monthly reports and communicated via email by Becky Hillard, August 30, 2016.
14. The chapter draws from Naila Kabeer’s social transformation framework and adapts it to open processes. Kabeer’s framework conceptualizes gender as central to development thinking. It helps to analyze existing gender inequalities in the distribution of resources, responsibilities, and power. For more detail, see <http://www.ilo.org/public/english/region/asro/mdtmanila/training/unit1/socrelfw.htm>.
15. For more detail, see Kyrgyz Mountains Environmental Education and Citizen Science, <https://ocsdnet.org/projects/kmeecs/>.
16. See Open Heroines (2016).
17. Projects were selected for the vignettes using these criteria: (1) projects identified gender as an important issue and maintained relevant data or (2) were willing to reflect and respond to questions related to gender and had documented the data. Others may have addressed gender but had not maintained data on it; therefore, they were not selected for the vignettes.
18. For more detail, see “Teacher Professional Learning Communities: A Collaborative OER Adoption Approach in Karnataka, India.” <http://roer4d.org/collaborative-creation-of-oer>.
19. For more detail, see “ROER4D Overview.” <http://roer4d.org>.
20. Source: Interviews and emails with Anita Gurumurthy, October 3, 2016.
21. <https://ocsdnet.org/projects/natural-justice-empowering-indigenous-peoples-and-knowledge-systems-related-to-climate/>.
22. Interview with Dr. Laura Foster, October 13, 2016.
23. Interview with Maria Pilar Saenz Rodriguez, Project Leader of “ROER4D Subproject 6—Collaborative Co-creation of OER by Teacher Educators and Teachers in South Western Colombia: A Participatory Action Research Study.”
24. Interviews with Lauryn Oates and Mubarak, Project Leaders of “ROER4D Subproject 10.4: Impact of the OER Darakht-E Danesh (Knowledge Tree) Library on Educators in Afghanistan,” October 19, 2016 (Lauryn) and October 20, 2016 (Mubarak).
25. Interview with Shironica Karunanayaka, Project Leader of “ROER4D Subproject SP10.6: Impact of OER in Sri Lanka / Impact of Integrating OER in Teacher Education at The Open University of Sri Lanka,” October 20, 2016.
26. See <http://www.nytimes.com/roomfordebate/2011/02/02/where-are-the-women-in-wikipedia-communication-styles-make-a-difference>.

27. See <https://www.nytimes.com/roomfordebate/2011/02/02/where-are-the-women-in-wikipedia/open-doesnt-include-everyone>.
28. See <http://nation.com.pk/30-Nov-2016/hamara-internet-helpline-launched-to-tackle-online-harassment>.
29. See <https://www.apc.org/en/news/grace-project-state-research>.
30. See [https://en.wikipedia.org/wiki/Gender\\_bias\\_on\\_Wikipedia](https://en.wikipedia.org/wiki/Gender_bias_on_Wikipedia).
31. See <https://feministinternet.org/>.
32. Tony Roberts, "Digital Technologies Exclude." *Making Real Voices Count* (blog), May 2, 2017. <http://www.makingallvoicescount.org/blog/digital-technologies-exclude/.cescount.-exclude/>
33. See <http://www.forbes.com/sites/ellenhuet/2015/11/02/rise-of-the-bias-busters-how-unconscious-bias-became-silicon-valleys-newest-target>.
34. See <http://contributor-covenant.org>.
35. See <https://interviewing.io>.

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