Literature review

Do digital information and communications technologies increase the voice and influence of women and girls?

A rapid review of the evidence

Clare Cummings and Tam O'Neil

Key messages

- Information and communication technologies (ICTs) are a mirror on society. Social, economic and political structures – relating to gender and to class – influence how women and girls access and use digital ICTs.

- Digital ICTs *can* be important resources for women and girls' empowerment, but this depends on *which* women and *which* context.

- Through learning new skills and using digital ICTs, women and girls have been able to build self-confidence, increase their economic power and independence and make better-informed decisions.

- Digital ICTs can also enable women to communicate with peers online, to exchange information and build solidarity and to lobby decision-makers.

- But there is only limited evidence that women's individual or collective voice, enabled by digital ICTs, influences government policy and actions.

- Women's access to, and use of, digital ICTs can challenge gender-based power relations. This can provoke a backlash, including in ways that increase women and girls' insecurity and subordination.

- The digital divide means that, even if more women use ICTs, gender- and class-based inequalities could still increase overall.

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Acknowledgements

1 Introduction

This rapid review is part of a two-year Learning and Evidence Project on Women's Voice and Leadership in Decision-Making.[1] It focuses specifically on the evidence from programmes or interventions that aim to build women and girls' voice and influence through their use of information and communication technologies (ICTs), and specifically through their use of digital technologies and social media. Focusing on low- and middle-income countries, **the review asks:**

1. What is the evidence on whether women and girls' use of digital ICTs increases their *voice* and participation in public life?
2. What is the evidence on whether, by increasing their voice and participation, women and girls' use of digital ICTs increases their *influence* over decisions that affect their lives, and in ways that lead to better outcomes for them? This includes influence over private decisions but also public policy and service provision.[2]

ICT is an umbrella term for the many devices that can be used to communicate information. These include older technologies, such as radio, television and video, and newer ones, such as computers, mobile phones (a type of computer) and the internet. **This review focuses in particular on women and girls' use of digital ICTs** – where communication is through computer-based systems, and including social media (see Box 1). As the review looks at the relationship between ICTs and women's voice in and influence over decision-making, the *interactive nature* of much digital ICT makes it particularly pertinent. Digital ICTs hold the possibility that larger numbers of women and girls can not only *receive* information and ideas but also *convey* them – and this is a necessary, if insufficient, condition for their having voice and influence. However, **digital ICTs and media also represent a commercial space,** influenced by private sector interests. This means existing patriarchal attitudes towards gender can be reproduced as well as challenged in the online environment in ways that can limit the potential of ICTs to be tools for women's empowerment (Gurumurthy, 2013).

Box 1: Key definitions – information and communication technologies[3]

- **Communication** is about the sending and/or receiving of information and ideas. **ICT** is an umbrella term for the many different devices for communicating information, such as radio, television, computers (including mobile phones) and the internet.
- In this context, **media** refers to mass communication by government, private companies, civic organisations and, increasingly, individual citizens. The media uses ICTs to communicate.
- **Digital ICT** is communication through computer-based systems. This includes **social media**, a many-to-many model of communication and interaction through digital technologies, in particular websites that allow users to create, share or exchange content.

This is not to underplay the importance of non-digital ICTs for women and girls' voice and decision-making. In fact, with the emergence of newer forms of communication technology, radio and video are now cheaper to access, affording women greater opportunities to use them for their own purposes (Asiedu, 2012; Gurumurthy et al., 2012). Different ICTs also do not have to be considered in isolation. Instead, women may have access

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[1] This rapid review accompanies a larger report that provides a more comprehensive assessment of the evidence on women's voice and leadership. This latter looks at the evidence relating to increasing women's voice and leadership through interventions in the following areas/sub-areas: women's social activism (social mobilisation; social accountability activities); women's political participation (quotas, political parties, electoral reform, constitutional reform, peace agreements); and women's economic empowerment (access to assets; labour market participation) (see Domingo et al., 2015). The project will also involve case studies and a synthesis report.

[2] These research questions are based on the two research questions for the project as a whole. This rapid review complements the larger review of the literature by looking at a potential enabler of women's voice and leadership – ICTs – that the main review did not capture.

[3] See Appendix 1 for a fuller glossary of terms related to ICTs.

to a range of ICTs, and these may complement each other so that, for example, locally produced radio broadcasts could be combined with the global reach of the internet, thus increasing their impact (Asiedu, 2012). Therefore, while the review focuses on digital ICTs, references to evidence on non-digital ICTs are used to illustrate specific findings or deepen analysis. Ultimately, it is important to recognise that ICTs are continually developing while attitudes to gender are also always changing, so the interaction between ICTs and gender relations is an ongoing process (Marcelle, 2002).

The review is structured as follows:
- Section 2 reviews theory and assumptions about digital ICTs and women and girls' empowerment.
- Section 3 provides an overview of the nature and quality of the evidence base and the main findings.
- Sections 4 summarises the evidence on whether use of digital ICTs increases women and girls' *voice and participation in public life,* and the reasons for this.
- Sections 5 summarises the evidence on whether use of digital ICTs increases women and girls' *influence* over decision-making processes, particularly public/state, and the reasons for this.
- Section 6 draws out implications for international support to digital ICTs and women and girls' voice and influence in public life.

2 Common assumptions about digital ICTs and women and girls' voice and influence

> *The centralising tendencies of new ICTs have given a new lease of life to the hegemony of capitalist forces [...] and totalitarian states and fundamentalist forces have also used ICTs to centralise their power through surveillance and controls on citizen freedoms [...] On the other hand, ICTs can be seen as harbingers of new freedoms for women [...] [the information society] enables women across geographies to connect and engender collective identities [...] it offers spaces for their self-expression and action [...] it creates new meanings of citizenship through avenues for voice, agency and participation in the public sphere* (Gurumurthy, 2008: 5-6).

We use an empowerment framework to structure the evidence on women and girls' use of digital ICTs and their voice and influence (see Box 2). Voice and influence are central to empowerment. The extent to which digital ICTs can contribute to women and girls' voice and influence relates to whether they are able to use the information and communication opportunities to build their self-belief (or 'power within') and express their views, on the one hand, and to influence private and public decisions, on the other. Therefore, this is less about the hardware, software and other components of ICT systems, and more **about whether and how women and other members of society access and use these tools, and the effect of this on power relations and institutions.**

Many studies present ICTs as tools to overcome gender inequities and for women and girls' empowerment more generally. However, authors do not always set out the assumptions and theory on *how* digital ICTs lead to increases in women's power. Surprisingly, few researchers build on or situate their studies within the substantial body of literature on women's empowerment. A notable exception is Gurumurthy (2008), a lead author on gender and ICTs, who, following Sen's (1985) capability approach, argues 'ICTs are not instruments for material gains alone' but can be understood as **a 'new set of capabilities'**, and so a lack or limited access to ICTs is a form of 'capability deprivation' (p.8).

Authors also do not always look at the outcomes of digital ICT use to examine whether and how they have effected change in power relations and the reasons for this, including whether women are more able to exercise voice and advance their interests, alone or with others. Some, such as Antonio and Tuffley (2014), Gurumurthy et al. (2006) and Hilbert (2011), explicitly examine the extent to which ICTs have a positive impact on women's voice. Others tend to look at ICT use and assume, implicitly or explicitly, that ICTs afford women and girls more opportunities to participate in public affairs, access information and form advocacy networks.

However, while few studies examine the causal pathways between ICT use and women's empowerment, most acknowledge there are significant barriers to women's use of ICTs that limit the potential of ICTs to be tools for empowerment (Hilbert, 2011).

Box 2: Analytical framing and key definitions – empowerment, voice and influence

To structure the evidence on women and girls' use of ICTs and its contribution to their voice and influence, we use the conceptual framing for the Women's Voice and Leadership Evidence and Learning Project as a whole. This places women's voice, leadership and influence – the outcomes of interest to the project – within a broader empowerment framework (see Domingo et al., 2015).

Empowerment is 'a process of personal and social change through which women (or men) gain power, meaningful choices and control over their lives' (O'Neil et al., 2014: 1). Rowlands (1997) distinguishes different types of power, 'power over' (the ability to control others), 'power to' (the ability to exercise choice and change external conditions), 'power with' (the solidarity and strength from collective action) and 'power within' (self-respect and awareness of the socially constructed nature of human relations and oppression – that is, 'critical consciousness'). Importantly, empowerment is a multidimensional concept, and empowerment in one area of a women's life does not necessarily mean she will be empowered in others. Women can gain (different types of power) in different dimensions of their life, including psychological, political, social and economic (Eyben, 2011; Luttrell et al., 2009; O'Neil et al., 2014). In whichever sphere it takes place, Kabeer (1999) argues empowerment has three interrelated elements: access to resources, the ability to use these to define and act on goals or choices (i.e. agency) and the achievements or 'realised capabilities' that result from these actions.

Voice is making one's preferences, demands, views and interests known, whether individually or collectively and whether at the household, community or national level (O'Neil et al., 2007). Voice and empowerment are closely related. In many societies, women are expected to remain silent in debate, denied the right of consent and seen as irrational or trivial. This diminishes the perceived validity and reliability of their voice, even when these discriminatory norms and assumptions are historical (Goetz and Nyamu Musembi, 2008). 'Power within', including belief in the value of one's opinions and the legitimacy of expressing them, is therefore a necessary, if insufficient, foundation for voice. Exercise of voice is also closely related to women's 'power to', such as the power to make informed choices and the power to influence others. To exercise 'power with' others, women also need to be able to share their views and ideas.

Influence is the ability to have an effect on someone or something. To have influence, women and girls must exercise power over others, in either persuasive and/or coercive and controlling forms. This in turn depends on their having self-belief, capabilities and, often, the ability to act collectively with others to advance their views and interests. Influence is difficult to observe or measure directly, but can be seen in the objectives or goals women are able to achieve (their realised capabilities).

In this respect, **theories of 'information poverty' and the 'digital divide' are used to understand why ICTs may not increase women's power.** People who experience 'information poverty' have insufficient access to 'information and knowledge that could improve earnings potential' (Kenny, 2000, in Dlodlo, 2009: 168). In the context of the connected information society, the 'digital divide' is a related concept widely used to describe 'inequality in the power to communicate and to process information digitally' (Hilbert, 2011: 4).

Rather than being simply about the 'haves' and 'have nots', Antonio and Tuffley (2014) describe how the idea of a digital divide has developed into an understanding of access to ICTs as a 'multi-faceted phenomenon consisting of four factors that work to regulate access: psychological, material, skills and usage' (p.674). All four can prevent women from using digital ICTs to access and communicate information and ideas as, for example, women may assume they are incapable of learning to use ICTs, may not have access to ICT equipment or may not have the resources to pay to use ICTs. Similarly, Torenli (2006) discusses how examining access to ICTs from a social inclusion perspective moves the debate away from 'providing equipment' to underlying structural reasons why some socioeconomic groups lack access.

Asiedu (2012) criticises ICT and development discourse for using the 'language of empowerment' while at the same time presenting women as **'passive recipients'** of ICTs rather than examining whether they are able to be '**active users**' (p.241). While not a lens that authors themselves always use, this division between women

engagement with ICTs as being either passive (i.e. others use ICTs to communicate information and ideas to them) or active (i.e. they use ICTs to communicate information and ideas to others) is evident in the literature. Even when women are passive users of ICTs, this can increase their access to services and information in ways that empower them and provide an important base for voice and influence. However, for women to use ICTs to voice their views and influence others, they need also to be active users of digital ICTs.

Surprisingly, in the studies reviewed, there is **little explicit use of social accountability frameworks**[4] to understand the potential pathways through which women's increased access to information, communication and social capital may lead them to have more influence over the decisions and behaviour of public officials. However, analysis of the literature overall suggests ICTs have the potential to change power relations in ways relevant to accountability processes in two ways. First, new ways of accessing information *could* disrupt information asymmetries between women and others, as women gain greater access to public policies and services relating to the redistribution of entitlements and resources, such as land and inheritance, economic and educational opportunities and control over household finances. Second, new ways of communicating could enable women to mobilise more effectively and lobby government. This involves women gaining 'power with' others and using it to have 'power over' public decisions and social norms, as well as women gaining 'power to' realise legal entitlements and access economic and educational opportunities.

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[4] See, for example, Fox, 2014; Goetz and Jenkins (2004); O'Neil et al. (2007); Rocha Menocal and Sharma (2008); Wild and Wales (2014).

3 Summary of evidence base and main findings

Nature and quality of the evidence

The review identified 101 studies/reports through a search of academic databases, expert recommendations and targeted searches for grey literature. We assessed 56 studies as being relevant to women and girls' empowerment and these were included in the review (see Appendix 2 for detail). The review's findings and conclusions are drawn from this set of material, and do not claim to be a comprehensive assessment of the evidence base. Importantly, digital ICTs and women's empowerment is a new field of enquiry, and material may not be readily available through traditional literature search methods. However, as the gaps in the literature and analysis identified through the review suggest, there is a need for more systematic research on this topic.

The literature on (non-digital and digital) ICTs and women and girls' empowerment is relatively large, but **most studies focus on women's economic empowerment,** and these rarely draw connections between women's economic power and their voice and influence in society or politics. With respect to research on media in particular, Ogan et al. (2009) found that, between 1998 and 2007, 44.1% of research articles published in communication and development journals focused on the role of ICTs for development rather than on mass media (e.g. television, radio and print media). The review of literature for this study found, however, that more literature was available on gender and earlier forms of ICT, such as television, radio and (un-networked) computers, than on digital ICTs and social media.

Most of the studies reviewed are **secondary reviews** of the literature (30 out of 56), and these vary in the degree to which they assess the quality of the primary studies they use. Several meta-reviews of literature on women's use of digital ICTs provide useful overviews of key arguments and findings. A large review by the Association for Progressive Communications (APC) and Hivos (2013) compiles thematic analysis of the impact of ICTs on women's rights and provides case studies of varying quality from developed and developing countries. The non-governmental organisation (NGO) IT for Change has published several studies on this topic, including an annotated bibliography compiling recent, high-quality literature (IT for Change, 2014). The South Asia Seminar on Gender in the Information Society conference papers are also a valuable source of research on gender and ICTs (Gurumurthy et al., 2006).

Few studies directly address our research questions, but many look at relevant issues, such as women and girls' use of digital ICTs to access and share information. While many reports refer to more anecdotal findings (e.g. observation and opinion without substantive evidence to support reported findings), there are empirical studies that set out research design/methods. Of the primary studies, **journal articles and books (12 of those reviewed) are more likely to demonstrate analytical rigour than the grey literature** (e.g. working papers, conference reports, programme reports). In other words, they are more likely to define key concepts and present and test hypotheses about the relationships of the phenomena of interest, such as between women's use of ICTs and their voice and/or influence over household decision-making, social movements, political processes or economic enterprise. Lack of analytical rigour affects the quality of the research and makes it difficult to assess whether research methods are appropriate. The primary studies use different research methods (12 mixed methods, 8 qualitative, 6 quantitative). Project evaluations generally use a **combination of qualitative and quantitative methods** (notably GSMA, 2010; Intel, 2013; USAID, 2013). No studies using experimental research design were identified.

Lack of **statistical data** also impedes research on women's use of ICTs. In developing countries, centres for research or statistics have begun to collect more reliable data on internet use (Hilbert, 2011), but detailed data on ICT usage disaggregated by gender are still limited. This makes quantitative measurement of the impact of ICT on women's voice and influence difficult.

Common themes and main findings

Overall, the **literature on digital ICTs and women or girls' empowerment was found to follow one of three themes.** First, a literature on **women and girls' use of digital media** focuses on how women in

repressive societies can use online media to express themselves publically, access uncensored information and form virtual networks, including for campaign purposes. These studies' subjects are usually educated women who have ICT skills but whose autonomy and power is constrained by social norms that limit their freedom to form associations, participate in formal governance structures and access public information.

Second, a literature on **rural women's access to services and enterprise** considers how poor, marginalised and/or geographically isolated women use digital ICTs to connect to information, knowledge and people outside their immediate locality. The benefits of ICT use is discussed in terms of increased self-esteem, greater respect from others and decision-making power within the household, new micro-business opportunities and easier access to public information and services.

Third, a literature on **e-governance and data** looks at how the government/public sector and civil society use digital ICTs to gather data on service users and provide public information through digital platforms so as to deliver public services more efficiently and effectively. The literature does note, however, that e-governance type innovations are not necessarily designed with women's specific needs in mind, and who has access to data is critical to its impact on women's voice and influence (e.g. Dé, 2006). This literature is potentially important in terms of women's engagement with, and influence over, public services and decisions, but is largely separate from studies discussing the other two themes and tends not to analyse e-governance in terms of its impact on women's influence in politics and governance.

In terms of findings on the **relationship between use of digital ICTs and women and girls'** *voice* – that is, their ability to express and share their views and ideas or make their preferences known – the evidence is concentrated around whether and how ICTs contribute to changes in women's self-belief and confidence (enablers of voice), in their personal decision-making power and their personal and business relationships. There are seven main findings on the potential benefits of women's use of digital ICTs, alongside two structural constraints acknowledged to limit their empowerment effects. (Section 4 provides a fuller discussion with citations and examples.)

1. The process of learning to use digital ICTs can increase the self-confidence of women and girls and enable them to critically reflect on traditional gender roles and their role in a global society (i.e. increased power within).
2. Women and girls' use of digital ICTs can expose them, and their communities, to alternative representations of women. Presenting women in non-traditional roles can influence existing social attitudes towards women, on the part of men and women, and change women's personal aspirations (i.e. increased power within).
3. Learning new digital ICT skills and the use and ownership of ICT can increase women's social status (i.e. increased power to/over).
4. Gaining both skills and access to digital ICTs can provide women and girls with alternative channels for self-expression and engagement in public affairs, regardless of their physical location and if they experience gender-based constraints on their voice locally (i.e. increased power to).
5. ICT use can increase the independence of women and girls, giving them a sense of greater freedom and power to pursue activities, such as education and enterprise, including those outside their traditional gender roles (i.e. increased power to).
6. Using ICTs can be a way for women to access new opportunities in the public sphere, such as by providing them with access to information about, and online access to, education or business services. Through this, women and girls can develop greater control over their own lives (i.e. increased power to).
7. ICTs provide a new channel of communication and engagement that can make networking easier, increase social capital and facilitate the creation/growth of women's movements, and their ability to exercise oppositional voice. Sharing ideas and information online can improve offline mobilisation (i.e. increased power with).

Two frequently occurring conclusions about how **structural inequalities limit women and girls' access to ICTs**, and to particular groups of women's access, qualify the more positive findings on the benefits of ICT use.

1. **Gender inequality:** Not only do gender norms limit women's access to and use of ICTs, but also digital ICTs are a tool that can be used to repress women's voice and influence and/or increase men's control over them. Women's use of ICTs in public spaces, including when this challenges gender norms, can also provoke a backlash, both on- and off-line, in ways that increase their vulnerability to/experience of violence.

2. **Socioeconomic inequality:** There is a common concern that, as public services, information, culture and economic transactions increasingly occur online, those who do not have access to digital ICTs will become more marginalised. Because the digital divide coalesces around class and other forms of disadvantage and discrimination, as well as gender, elite women have many more opportunities than poor ones to benefit from ICTs. To avoid gender- or class-based inequities worsening, it is held to be necessary for all women to be able to access and use ICTs.

These structural factors can produce barriers to ICT use (Box 3). They therefore indicate a need to ask which women are using ICTs, for what purpose and under which conditions

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Box 3: Structural barriers to women and girls' access to and use of digital ICTs

Structural inequalities can limit women and girls' access to and use of digital ICTs. Gender hierarchies can produce barriers to ICT use for women and girls, as can other forms of discrimination and disadvantage. This means that women marginalised because of their class, caste, religion, age, sexuality or disability are least likely to benefit from digital ICTs. The interaction between different forms of discrimination and disadvantage – and the barriers to ICT use they create for different groups of women (and men) – will depend on the social and political context. There are four separate, but inter-connected, barriers.

- **Material barriers:** Women and girls may not have the money necessary to access and use digital ICTs, either because of poverty and/or lack of control over own/household finances. For example, women may not be able to buy and maintain a mobile phone or a computer, or to afford internet access at home or in a cyber café.

- **Social and cultural barriers:** Women and girls may have less opportunities and choices to access and use digital ICTs. For example, they may have less time for ICT use because of domestic responsibilities, or male family members and discriminatory social norms and expectations more broadly may restrict their mobility or choice to use ICTs. Social barriers may also be less direct, as when boy preference within families/society leads girls to have less access to education than boys, higher illiteracy rates, and/or less opportunities to gain technology skills.

- **Psychological barriers:** Women and girls may have less confidence in their ability to use digital ICTs, or believe that they should not use them. For example, gender and other stereotypes may lead women and girls to think that ICTs are reserved for men or for elites, or to doubt their ability to learn new skills, or participate in new activities or the public domain.

- **Political and institutional barriers:** Women and girls may live in societies with limited institutional opportunities to access digital ICTs or to use them in ways that increase their voice and influence. Exclusionary informal/social norms may be one reason for this, but formal political institutions may also restrict women (and men's) ability to use ICTs to communicate with and influence government. This is further exacerbated when government does not respect civil and political liberties, in law or in practice. Ownership of media and technology by government or commercial/private firms may also entrench gender stereotypes and limit women's ability to use digital ICTs to challenge these.

Source: Adapted from Antonio and Tuffley (2014).

There is **less evidence on whether use of digital ICTs to increase their voice enables women and girls to have actual *influence* – individually or with others – over decision-making.** What evidence exists focuses mostly on women and girls having more influence over personal decisions, rather than decisions made by public bodies, officials and representatives. For example, some studies show digital ICTs can increase women's access to information and opportunities in ways that enable them to make more, and better-informed, decisions, such as in relation to safety, sexual and reproduction health, personal finances or education. There is also some evidence public agencies use digital ICTs to collect data on, better target and/or provide service

to women and girls. Importantly, however, this does not mean women and girls are able to actively influence services. **Few studies consider and report findings on whether use of digital ICTs increases women and girls' influence over government decisions**, including in ways that lead to improved rights and services.

In sum, the research indicates *some* women and girls in low- and middle-income countries actively use digital ICTs, including to exchange information and ideas with peers and the online community – but **women and girls (and also men) are either largely passive in their digital relationship with public officials**, or not present at all.[5]

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[5] It is possible that women are actively using digital ICTs to engage and influence government and that these activities have not been the subject of research. However, the studies that do look at how women interact with government through ICTs (e.g. Dé, 2006; Sreekumar, 2007) suggest it is more likely they are passive recipients of government information and messages than active communicators and influencers.

4 Evidence on whether digital ICTs increase women and girls' power and voice

The question of the digital divide in terms of gender is mostly identified in the literature as a barrier to be overcome with increased use of ICTs in rural areas [...] [it is] important that we consider the digital divide as a social phenomenon better addressed as a question of structure rather than as one of choice (Sreekumar, 2007: 872).

This section summarises the evidence on whether ICTs increase women's voice and participation in public life, and the reasons for this. As noted, we situate women's use of ICTs within an empowerment framework and consider what type of power women and girls build through their use, and the potential impact on their voice and civic/political participation. This includes consideration of the ways use of ICTs may disempower women and girls and extend others' control over them. In the main, studies do not set out or test the *conditions* under which women and girls use different ICTs and to what effect. Nevertheless, they do widely acknowledge ICTs are a mirror on society: **access to ICTs, how they are used and the impact this has is shaped by existing socioeconomic patterns, and particularly gender- and class-based exclusion.** These structural limitations on the empowerment potential of ICTs for women, and for particular groups of women, are discussed first because they place important qualifications on the more positive findings that follow.

Findings on the factors that limit the empowerment potential of digital ICTs

Whether digital ICTs empower women in practice depends on whether women can access and use them. Therefore, the key questions – and ones where more research is needed – are *which women* are able to access ICTs, under *which conditions* can they use them effectively and for *what purpose*? In sum, women and girls' use of digital ICTs need to be situated within their broader social, political and economic context.

Three structural limits on the empowerment potential of digital ICTs are highlighted in the material. First, studies look at how gender norms and relations can prevent women from accessing or using digital ICTs. Second, several authors highlight how harmful gender norms mean women's use of ICTs can *increase* their risk of violence and/or oppression. Third, researchers point to the diversity of women and how poverty and other forms of disadvantage can prevent particular groups of women from accessing or using ICTs. We take these in turn below.

Gendered social norms may hinder women's and girl's access to and use of digital ICTs

Several authors emphasise that access to digital ICTs does not mean their use (or that they are used in empowering ways). As Antonio and Tuffley (2014) argue, therefore, we must **examine women's use of ICT in terms of their opportunities and choices**. The authors focus on four factors, identified by Gil et al. (2010), that act as common (social and material) barriers to women's access to and use of ICTs: 'exclusion from technology education and design; limited free time; social norms favouring men; and financial and/or institutional constraints' (p.678).[6] **Women and girls may also be unable to use digital ICTs because of 'collateral cultural factors'**, that is 'cultural attitudes based in gender bias, and not the immediate gendered identification of technology use' (Hafkin, 2002: 5). For example, earlier curfew hours for girls at boarding schools Uganda were found to constrain their access to digital ICTs (ibid.), and a study of ICT use in Nigeria found women were excluded from use because policy and ICT systems do not consider their needs on the assumption that men can gain more benefits from ICT than women (Olatokun, 2009).

Discriminatory cultural values can also lead to more **practical or physical barriers to women's use of digital ICTs.** Cyber cafes may be in locations where women do not feel safe or that are not socially appropriate for women to visit alone. Other social barriers to women's use arise because women typically have a higher burden of domestic work and responsibility than men and so do not have as much free time to spend in cyber cafes. Still other social barriers arising from gender discrimination include higher illiteracy rates and lower levels of

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[6] Antonio and Tuffley (2014) also note that Van Dijk and Hacker's (2003) argument that access to digital resources is a multi-faceted phenomenon consisting of four factors that work to regulate access; psychological, material, skills and usage' (p.674).

education among women, which limits their ability to use computers. Material barriers revolve around the cost of internet access for women who may not have an independent source of income or parents prioritising access for sons over daughters (Dlodlo, 2009; Hafkin, 2002; Hafkin and Huyer, 2007; Intel, 2013; Kumar et al., 2010; USAID, 2013).

Women may be discouraged or expressly prevented from using technology – forming entrenched psychological barriers to their use. For example, in one survey in Afghanistan, over half of the women surveyed who said they did not have a mobile phone stated that getting permission from family members was a significant barrier (USAID, 2013). A survey of women in Egypt and India found 12% stated they did not access the internet more often because they did not think it was 'appropriate', and a further 8% (India) and 10% (Egypt) did not access it more often because 'family or friends would disapprove' (Intel, 2013: 55). Gendered attitudes may also mean that **women do not exploit their digital ICT skills fully, in spite of potential benefits in relation to e-governance, e-business and online banking.** Analysis of statistics from 11 Latin American countries suggests women are keener to use ICTs to access education opportunities than men but less eager to apply ICTs to business or to access public services and information (Hilbert, 2011).

The resulting **gender digital divide can reproduce or exacerbate pre-existing gender inequalities,** increasing women's economic exclusion and consolidating exclusionary social attitudes around gender. For example, research by Intel (2013) found repressive gender stereotypes can prevent women from using the internet, but that increasing use of the internet for a wide range of affairs means women without access risk becoming increasingly excluded from social and economic life. Antonio and Tuffley (2014) echo this concern: 'without careful planning, it is likely that ICTs will exacerbate differences between men and women as diffusion and use of ICTs and their benefits tend to follow existing contours of income and economic divides, with the poor being further marginalised or excluded' (p.676).

Commercialisation of digital ICTs and regulation of their use may be a barrier to women and girls' use of ICTs for personal or collective empowerment (Tagny, 2013). If ICTs are not designed, implemented and monitored to promote equality, and if they are unprotected from private sector interests, they are likely to worsen social inequality between men and women, as well as between rich women and poor women (Jensen, 2006). As Newsom and Lengel (2012) conclude, 'The technology of the web carries a number of patriarchal and male connotations that function as gatekeeping barriers for information flow' (p.33). Gurumurthy and Chami (2014) describe how the 'control of the Internet by big business has also seen the normalisation of violent sexual imagery in online cultural products' (p.38) and call for laws and policies that recognise and work to prevent violence against women online. Therefore, while ICTs may provide new channels for women's voice, expressions are vulnerable to manipulation by the media, which tends to reflect existing social norms and attitudes.

ICTs can diminish women's power and make them more vulnerable to violence

Regressive and patriarchal groups can use digital ICTs as a tool to subordinate women. Cases from Pakistan demonstrate how ICTs have been used to 'violate, harass, threaten, subjugate or dishonour women' (Sarwari et al., 2013: 187). The increasingly widespread use of mobile phones and the internet has increased women's vulnerability to public character assassination, which is especially dangerous in societies where women who are dishonoured face extreme risks to their security, including honour killing (ibid.).

Women and girls may also face increased risk of control and violence when they use digital ICTs. By taking advantage of new technology, women and girls may be seen as transgressing gender norms, threatening men's position and power in the family or society. Where ICTs give women access to means of private communication, they may lead to men's control and surveillance over women. A study by Intel (2013) found men to express several concerns about use of the internet by their wives or daughters, including about loss of control, their safety online and in internet cafes and access to pornography, and that paying for women's internet use was not a good use of household resources. Survey data from six West African countries (Benin, Burkina Faso, Cameroon, Mali, Mauritania and Senegal) in 2006 also found men often 'feel threatened' by women's use of mobile phones or the internet as they perceive this to be 'inappropriate' for women and 'destabilising to relationships' (Hafkin and Huyer, 2007: 31). Likewise, a study in Zambia found that, while women reported social and economic benefits from using mobile phones, their spouses often reacted

negatively, causing conflict, and traditional gender power differences were contested but often ultimately reinforced (Wakunuma, 2012). This highlights the point that women's empowerment is multidimensional and does not necessarily lead to positive sum gains for women: an increase in power in one domain of a woman's life may undermine her power in others.) A study in Cambodia found men to have used GPS and spyware devices to secretly monitor and spy on their female partner (APC and Hivos, 2013).

Strangers can also commit violence against women and girls online or remotely. While digital technologies and social media provide some anonymity and protection from oppressive social attitudes and practical obstacles to communication, online female activists can still be attacked virtually and physically for their use of digital media. Newly coined terms such as 'cyber stalking' and 'sexting', and also 'trolling', indicate ways in which digital ICTs pose new dangers to women (Sandler, 2013: 8). A 2013 report by the UN Working Group on Discrimination against Women in Law and Public Life highlighted how women who participate in public debate through the internet risk being harassed. For example, women who have a well-known profile online, such as bloggers, journalists, activists and leaders, can experience online abuse and threats to their right to self-expression – such as the case of a human rights defender subjected to an anonymous online campaign calling for her gang rape (Moolman, 2013).

Where women are seen to pose a challenge to traditionally male-dominated subjects, the risk of backlash is particularly high. For instance, as a result of raising money for videos that explored 'female character stereotypes throughout the history of the gaming industry', one woman, Anita Sarkeesian, was subjected to a vicious online hate campaign. Moolman (2013) argues 'the normalisation of violent behaviour and the culture that tolerates violence against women – such as that exercised against Sarkeesian – mimic trends offline' (p.39). Digital technology and media exist in a gendered space and are influenced by the same social, political and economic structures that maintain gender inequalities. Gendered social norms may hinder women and girl's access to and use of digital ICTs.

Elite women may benefit most from digital ICTs, and lack of access may marginalise poor women further

Gender is not necessarily the most significant factor in determining a woman's access to digital ICTs. Factors such as income, location, age, occupation and education level may be as, if not more, important. Norris (2000, in Torenli, 2006) explains there are two types of division that feed in to the digital divide, **the social divide and the democratic divide:** 'The social divide concerns the gap between the information rich and the information poor in the nation, and the democratic divide emphasizes the difference between those who do or do not use Internet resources to engage and participate in public life' (p.437). As a result, well-educated and elite women mostly use and benefit from ICTs – so increased ICTs usage is likely to promote their interests rather than the needs and voices of poor, marginalised and/or uneducated women, which may go unheard (Torenli, 2006). The material, social and psychological barriers to digital ICT use that arise from disadvantage, identified by Antonio and Tuffley (2014) and others, apply to men as well as women. However, intersecting forms of discrimination and disadvantage mean the social and financial/material barriers to women using ICTs outlined above – illiteracy, domestic workload and responsibilities, conservative male attitudes, lack of money or control of money – are accentuated for poor women.

This point stresses **the diversity of women's experience and the risk that the benefits of digital ICTs will be captured by a narrow strata of elite women**, leading to greater inequalities between different groups of women. As Torenli (2006) argues, 'socioeconomic inequality grows when the information elite strengthens its position and also when those groups who are living on the margins of society become excluded from communications and socioeconomic life' (p.444). Globally, the critique of the benefits of globalisation and technological advance has been led largely by environmental and women's groups, which have argued technology does not benefit all equally and instead can exacerbate or create new inequalities (Mitter and Rowbotham, 2000).

Findings on how women and girls' use of digital ICTs increases their power and voice

The literature on gender and ICTs therefore highlights several barriers and limitations to women's use of digital ICTs and to their potential to strengthen their voice and influence. Just as digital ICTs present new

opportunities for women to express themselves, share their opinions and lobby on issues important to them, all other social actors can also use them to strengthen their public voice and their political or economic interests. In these circumstances, 'nonparticipation would imply further social exclusion as the internet becomes the dominant domain of the public sphere as well as the site of governmental action and service delivery. Computer illiteracy may emerge as a structural disadvantage like illiteracy' (Sreekumar, 2007: 884). This means that, **even if (some) women's access and use of digital ICTs increases, if inequality in access and use also increases overall the net effect on women's voice and influence could be negative.** Further, as Sreekumar (2007) argues based on a study of cyber kiosks in rural India, participation in the information society is not simply a 'matter of choice' (p.871). Even if they do not determine women's actions, prevailing structures and institutions do shape whether they can take advantage of new opportunities.

At the same time, there is empirical evidence that, in some circumstances, digital ICTs *can* **increase the power of women and girls, and through this their ability to express their views, interests and preferences.** They can do this in seven main ways: through increases in women and girls' self-confidence and/or critical consciousness; their impact on gendered social norms and relations; increases in women's social status; increases in women's independence; new economic opportunities; provision of new resources for communication and public engagement; and as catalysts for collective action. Only the last two – digital ICTs as new channels for communication and for collective action – relate directly to women's expression of voice and potential influence. However, the other five outcomes are also important because they increase women's (psychological, social and material) capabilities and therefore provide a potential foundation for women's voice and participation in public life.

Use of digital ICTs to increase women and girls' self-confidence

The process of learning to use digital ICTs can increase women and girls' self-confidence and enable them to reflect critically on traditional gender roles and their role in a global society (i.e. increased power within). This is especially true when training enables women to overcome psychological barriers to using ICTs.

Building the 'power within' is a precondition for women and girls to have voice and influence over their own lives, in their families and within public life. Extensive research by Intel (2013) found **digital ICT training often leads to improved self-confidence in women,** far more than in men. A number of studies reviewed in the Intel report concluded that formal skills training helps women overcome the psychological barriers they may face to ICT use. For example, Said Rabayah's (2010) study of an ICT training programme for rural women in Palestine found it had improved the self-confidence of 96% of those surveyed. Participants described the training course as giving them 'the chance to prove ourselves and our abilities to be modern, open minded, and […] that we can catch up with something that used to be dominated by men' (p.11).

The use of digital ICT can support women and girls' individuality and reflexivity. The sports and development organisation Women Win uses digital storytelling workshops to help build the leadership skills of adolescent girls from different developing countries. The process of constructing narratives of their lives, the factors that have influenced it, and how they have influenced others, encourages the girls to reflect on their own pathways to leadership – with the intention of supporting both the girls' personal transformation and enabling them to influence others by sharing their stories (Wijnen and Wildschut, 2015). Similarly, the Women's Net Digital Stories project enables women to make a short film about their lives that they can then share publicly as an advocacy and campaign tool (Antonio and Tuffley, 2014).

Using ICTs to access digital and social media has also been found to facilitate users' understanding of themselves as individuals, as units separate from other people (e.g. their parents or husband) (Gurumurthy, 2013: 27). Where gender norms and/or political repression hinder self-expression, the internet can provide a space for women and girls to become 'public-political subjects' (ibid.: 27). As Antonio and Tuffley (2014) describe, social networking sites can support women to express themselves more freely, enabling them to communicate beyond the social norms where they live and thus reflect on their position within global society. This can be seen, as Antonio and Tuffley report, in the action of an Iranian woman who posted a picture of herself not wearing a headscarf on Facebook with the hashtag #mystealthyfreedom. The picture provoked a significant online response, with more than 230,000 people expressing their support. However, as Ensor (2014)

reports, the campaign has also prompted a conservative backlash, including two rallies by men and women demanding government action in Tehran and abusive messages posted on the website.

Digital ICT may be an effective tool for **increasing women's and girls' political consciousness** by enabling them to access different sources of information and ideas and facilitating their ability to express their own ideas and react to information they access. For example, in Cape Town, a local governance project encourages girls to use social networking sites and videos to engage with local authorities on access to public transport and employment (Lewis et al., 2013). Another example is in Mysore, India, where young women working as telecentre operators 'exchange updates on public information on a simple chat-based network, also meeting periodically for collectively deliberating on their public roles' (Gurumurthy and Chami, 2014: 29). Examples such as these suggest interaction with peers through online networks can encourage girls to become more engaged as citizens (ibid.).

Media presentations of women in non-traditional roles **can be emancipatory,** and use of digital ICTs can expose women, girls and their communities to alternative representations of women and gender roles. This can progressively change social attitudes towards women and girls, and their own personal aspirations (i.e. increased power within). However, particularly in the context of the expansion of entertainment channels, harmful gender representation of women is a common concern in many countries, though not necessarily for the same reasons. The representation of women in online media **may also reinforce negative gender stereotypes** and be a form of exploitation and/or oppression (Gurumurthy et al., 2012). No systematic research on whether or not access to, and use of, digital ICT was more likely to challenge or compound negative gender stereotypes was found.

Traditional broadcast media has been associated with changing social norms, although even with this older technology the evidence is still mostly anecdotal. For example, in India, increased access to cable television has been associated (though no causal relationship shown) with significant increases in 'women's reported autonomy, decreases in the reported acceptability of wife beating, and decreases in reported son preference. Female school enrollment also increased, along with increased birth spacing' (Klugman et al., 2014: 41). The empowerment potential of media, particularly in the context of the expansion of entertainment channels and mediums, depends on the content of the programmes being broadcast (and therefore who is controlling content, regulating it, etc.). For example, improvements in women's empowerment associated with watching television were found to be greater in Bangladesh, where talk shows discuss current issues, than they were in Egypt (Kabeer, 2011, in Klugman et al., 2014).

Marcelle (2002) argues women's active involvement in the creation of television programmes is important for improved representations of women, challenges to gender stereotypes and the creation of role models. **Digital ICTs and media present new opportunities for women and girls to create content but, in doing so, they compete with others who use ICTs and who may generate negative images of women** and girls. They also do so in the context of a commercial marketplace and patterns of ownership of online media and platforms that may limit their control over their content and its use (Gurumurthy, 2013).

Digital ICT skills and use can increase women's social status

Learning new ICT skills and the use and ownership of ICTs can increase women's social status (i.e. increased power to/over). More than half of the women surveyed in the ICT training programme in Palestine felt the **training course had increased their social status,** although the women saw the gaining of ICT skills as the goal and did not appear to use them to access information (Said Rabayah, 2010). Likewise, a review of an e-governance programme in India, E-Seva, found women involved in running information kiosks had more status within their family. The women were trained in use of ICTs and the e-governance system, with both the skills and paid employment contributing to their improved social status (Karan and Raj Mathur, 2010). This is an example of digital ICTs leading women to gain new material and social resources and power, which have the *potential* to support their voice and control.

Mobile phone ownership can also be a symbol of social status. As a study in Malawi reports, the act of a woman offering a mobile phone to another person to borrow can be a demonstration of their power. The authors concluded that 'mobile cellular phones are used for establishing, stabilizing, as well as transforming identities in society and communities' (Mpazanje and Chigona, 2012: 5).

However, digital ICT training and use as a means to develop the self-confidence and power of women and girls presupposes they are able to access these opportunities. **Use of technology is gendered in many cultures and this can produce entrenched psychological barrier to women's use. Women may be discouraged from using it and/or doubt their ability to learn to do so** (Marcelle, 2002) – an example of how women may believe and not challenge ('internalise') negative gender stereotypes. For example, a case study of women living in a village in South Africa describes how they often chose not to engage in technology because it did not fit with their idea of femininity; they considered anything held to be difficult to be a male domain (Dlodlo, 2009).

Digital ICTs can increase women and girl's independence and freedom

Use of digital ICTs may increase women's independence and freedom, and as such the ability to pursue activities of their own choosing, including those outside their traditional gender roles (i.e. increased power to). For example, studies in Uganda (Kivunike et al., 2009) and Nigeria (Olatokun, 2009) found women used digital ICTs for their own purposes and this ability to choose gave them increased confidence and a sense of self-esteem and wellbeing, as well as an opportunity to achieve their personal goals.

ICTs may also **increase women's ability to control how they use their time,** as Mpazanje and Chigona (2012) report from Malawi, where '[mobile phones] enabled the women to fulfil their social obligations at low costs compared to being physically present at a given locality'. ICTs thus may reduce the time burden of traditional female responsibilities, and women may be able to pursue education, work or other activities that can be important enablers of their power and voice. In this respect, digital ICTs do not necessarily challenge gendered power relations directly, but may enable women to expand the scope of their activities.

A further example of ICTs affording women greater independence is provided in a survey of women in Bolivia, Egypt, India and Kenya. This found **women felt safer and more independent owning a mobile phone** (GSMA, 2010). Similarly, a programme in Pakistan overcame initial resistance from parents to girls using mobile phones for educational purposes as families realised and appreciated that having a mobile phone meant they were always within reach (ibid.). This shows how using ICTs can give girls greater autonomy without having to change social norms that require girls to always be supervised by their family.

The UN Educational, Scientific and Cultural Organization's (UNESCO's) Women in Africa Portal has examples of small-scale pilot projects where digital **ICT-enabled communities of practice,** based around open education resources, can 'be a stepping stone for female teachers greater autonomy and agency within the public education system' (IT for Change, 2013, also Gurumurthy and Chami, 2014).

Greater economic opportunities through using digital ICTs

Using digital ICTs can also be a way for women to access new opportunities in the public sphere, in particular in enterprise, in ways that give them greater control over their own lives (i.e. increased power to). Economic power may increase women's voice and influence directly, improving their decision-making power in the household, but can also be an important building block for women to have more voice in civic and political life.[7]

Digital ICTs can enable women to work around patriarchal social norms in order to start or improve their micro-enterprises (Srivastava and Manzar, 2013). Buskens and Webb (2014) find, for example, that women having access to a mobile phone can help them get around restrictions to their freedom that limit their economic opportunities, as was the case for Muslim women in Nigeria who were able to 'to have direct links with their business partners without compromising their purdah status' (p.49). Likewise, Jacobsen (2011) notes how women in several African countries use mobile phones for business communication and also to communicate with their families – and that this gives them more control over their working day as they are able to manage familial and business tasks more easily. In Lethem, Guyana, a small weaver's society used the internet to sell its handmade hammocks online. Its commercial success has, however, challenged existing gender and social relations and the women entrepreneurs have experienced resistance to their work (Nath,

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[7] See also the main literature review for this project, which examines the evidence on whether women's access to economic assets and the labour market increases their voice, leadership and influence over decision-making (Domingo et al., 2015).

2001). Again, this shows the multidimensional nature of empowerment (and disempowerment) and the non-linear pathways through which change can occur. For example, the women's economic venture may have not been successful but *may* have provided new (material, psychological, financial) resources important for future empowerment. It is also possible that, in the short terms, they were subjected to increased control and/or violence from their husbands (see also Domingo et al., 2015).

Access to information provided through digital ICTs has the potential to increase women's power in the market place. Digital ICTs may give women access to services that alter information asymmetries between women entrepreneurs and their competitors and/or improve communication them and their clients. For example, a programme run by the Mikocheni Research Institute in Tanzania enabled women farmers to use mobile phones to negotiate with buyers directly. The programme found that, through greater opportunities to get a fair price for their produce, women gained much more 'self-confidence to the extent where they opened their own weekly market' (Gurumurthy and Chami, 2014: 17). A similar project in Nairobi used mobile phones to connect women selling vegetables in urban slums to smallholder vegetable producers. A messaging service enabled women to buy in bulk in advance at a cheaper price, also guaranteeing a market for the vegetable producers. While this demonstrates how digital ICTs can help women entrepreneurs have greater control over their enterprise, the owner of the messaging service has control of the technology and can manage it according to their interests rather than the users' (ibid.). ICTs may also provide new channels through which women may be co-opted by others. More generally, digital tools and services that facilitate business are often not gender-specific or owned by women, but instead by a commercial provider. They are therefore shaped by existing economic and social structures, which may perpetuate rather than change gender inequalities in the market place.

Digital ICTs can also enable businesswomen to manage their banking and access other business services more easily and in ways that give them greater personal decision-making power. The use of mobile banking technology has rapidly increased in developing countries, but evidence on its impact on women's opportunities and influence is mixed (Gurumurthy and Chami, 2014). Women's use of M-Pesa, a mobile phone-based banking service in Kenya and Tanzania, has been found to increase their control over savings and household expenditure, increase their financial security, reduce some of their business costs and increase their profits. However, M-Pesa is not necessarily pro-women or pro-poor but is simply a tool reducing transaction costs and negative impacts have been found, such as having less control over the standard of goods bought remotely through M-Pesa (ibid.).

In Indonesia, a mobile subscription information services, Nokia Life Tools, partnered with an NGO to provide women entrepreneurs with up-to-date news about changes in economic and business trends, which they struggle to otherwise follow owing to a lack of time (Gurumurthy and Chami, 2014). This is an example of how ICT can facilitate information flows to women who cannot access it as easily as others, often because of gender inequality. Whether commercial services improve the economic position of women overall depends on whether the price they pay for the service is less than their economic gain from the information.

Digital ICT as a new resource for communication and public engagement

Gaining both skills and access to digital ICTs can provide women and girls with alternative channels for self-expression and engagement in the public and political sphere, regardless of their physical location and if they experience gender-based constraints on their voice locally (i.e. increased power to). Similarly, digital ICTs can be effective tools for spreading campaign messages widely and efficiently.

Some studies describe how digital ICTs can break boundaries between public and private spheres, **providing new opportunities for women's public and political participation.** As Gurumurthy et al. (2012) comment, women can use ICTs to express themselves anonymously, which is important if their freedom of speech is limited. For example, some young Iranian women, who would not ordinarily participate in public media, use blogs and other digital platforms to share their views publically (Gurumurthy and Chami, 2014).

Some authors also emphasise the need to **consider the authenticity of online political activity** in assessing whether it enhances women's individual or collective voice. Recent anti-corruption campaigns in India, for example, demonstrate how the middle class can use digital ICTs for campaigning, but structural social inequalities were not addressed (Gurumurthy, 2013). Achieving greater gender equality is a 'wider social-

institutional struggle' (ibid.: 29). Marginalised users may lack resources, as well as the expertise or skills (e.g. such as political negotiation), to promote their presence online (Gurumurthy, 2013; Gurumurthy and Chami, 2014).

ICTs as catalysts for collective action and political mobilisation

Digital media and the internet can provide new forms of communication and engagement for women that make networking easier, increase their social capital and facilitate the creation/growth of women's movements, including feminist movements. They are particularly useful for connecting geographically dispersed women, both within countries but also through building transnational movements. They are also tools for building solidarity between women locally. Sharing ideas and information online can also improve offline mobilisation (i.e. increased power with).

Some studies show **ICTs enable women to network more easily and build a sense of solidarity locally and internationally** (Gurumurthy et al., 2012). For example, during the 2009 military coup in Honduras, local feminist movement Feministas en Resistencia recorded crimes committed against them by the military and shared them on YouTube. This fostered support for their cause in other Latin American countries, where women's groups demonstrated their solidarity through protests and lobbying (ibid.). The process around the Fourth UN Conference on Women in Beijing in 1995 showed how the internet can also be used to mobilise women worldwide (Wanasundera, 2006). (A current twitter campaign is advocating for a Fifth World Conference on Women using the hashtag #Beijing20.) Likewise, women's movements and NGOs using the internet to assist in preparing and following up on world conferences, such as the World Social Forum in Porto Alegre, have also demonstrated the value of ICTs in strengthening women's global networks (Bonder, 2002).

A more recent example has been the use of social media during the Arab Uprising. By providing platforms for communication requiring fewer resources than mainstream media channels (and where men have less direct access over women's entry/use), social networking sites enabled women's movements to mobilise more easily (Al-Rawi, 2014). Prior to Arab Uprising events, offline feminist movements existed but had little influence, lacking an effective way of raising their issues in Arab mainstream media. In this context, social networking sites function as 'alternative media channels', and can be seen to create more space for discussion and exchange and to thus strengthen democracy (ibid.: 1150).

Women outside the Arab region are also using digital ICTs in campaigning and advocacy work. The Women of Uganda Network used an SMS campaign to promote citizen participation in 16 Days of Activism against Gender-based Violence. A network of young Africans, Si Jeunesse Savait, based in the Democratic Republic of Congo, use blogging, Twitter, radio and internet to encourage women to support their campaigns (Mudavanhu and Radloff, 2013). However, Newson and Lengel (2012) also caution that **existing patriarchal structures restrain online spaces,** even if they provide a space for the voices of marginalised groups. Social media provides an 'impetus if not the means for altering hegemony' as control over the content is 'watered down, altered, and taken out of context' and so loses power to other social forces (p.33).

Note also **the literature frequently mentions radio as an avenue for women's voice, and this may be more accessible for** than newer technologies. For example, Asiedu (2012) notes that the majority of women in Sub-Saharan Africa live in rural areas, are poor and have limited literacy. Radio is likely to be easier for them to access and use because it can broadcast programmes that have been made locally and are in local languages. Radio is also relatively cheap and can be used while doing other activities and so may be a more effective tool for women to increase their power and knowledge. Likewise, a study of women's organisations in Turkey noted that women's organisations generally do not use digital technology, in part because many Turkish women lack ICT access and skills (Torenli, 2006). Although some of the larger organisations have email lists and forums, even the most popular group, Women's Committee, only has 335 members. Torenli (2006) concludes 'an increase in links, connections and bandwidth does not equate with an increase in information, communication and activity. Content on the web is obviously useful. However, the Women's Information Network of the DGSPW [Directorate General on the Status and Problems of Women] basically serves academic and statistical needs' (p.17). This suggests that **until poorer women are able to use ICTs, they are of limited use for mobilising a broad spectrum of women to campaign on women's issues**.

5 Evidence on whether women and girls' use of ICTs advances gender equity

This section examines the evidence on whether women have been able not only to use ICTs to amplify their voice, individually or collectively, but also to increase their influence over the private and public decisions that affect their lives – and, where possible, the reasons for this. Few studies take this additional step of looking at whether and how women and girls' use of digital ICTs enables them to advance their interests in the public spheres and/or whether this increases gender equality. The **findings on the relationship between digital ICT use and women and girls' influence over decision-making** are of three main types. The first two relate to women having more personal control and decision-making power, with the potential that this improves outcomes for women and girls. It is only studies that look at how women (mostly elite) use digital ICTs to interact, mobilise and lobby that examine women's engagement with public decision-making directly. Even here, there is no systematic research on whether digital ICTs increase the effectiveness of women's collective action, as shown by their achievement of objectives (e.g. changes in rights, policy, services or social norms).

1. Women and girls access information through digital ICTs, which enables them to make **more informed personal decisions.** This can, in some cases, lead to better outcomes (e.g. improved safety, health).
2. **Government/public sector use of digital ICTs,** to collect data and provide information about services, improves services for women (noting that this may improve gender equity but does not necessarily signify women's empowerment or influence). Depending on the nature of the data collected, e-governance may improve services for a community as a whole, or for women specifically.
3. Women and girls use digital ICTs to interact with each other, to collect and share data and to participate in the public sphere. Through these activities, **women can collectively influence government decisions** about allocation/provision of rights, resources and services.

The evidence base on the relationship between digital ICTs and women's influence is much smaller than that on how they can contribute to women's voice and public participation. Overall, beyond the impact of digital ICTs on women and girls' personal decision-making and opportunities, there is limited evidence on how women have used ICTs to influence government and public decision-making, including in ways that advance gender equity. Authors who analyse the exclusion of (different groups of) women from digital ICT in terms of their gender and/or other socioeconomic characteristics are emphasising structural barriers to access. But **when women have access to digital ICTs, social, economic and political structures influence how they use ICTs, for what purposes and to what effect. This analysis is weak in the literature;** authors do not examine whether and why women's increased voice and participation through access to digital ICTs leads them to have more power within public decision-making processes.

Digital ICTs can enable women and girls to make better-informed decisions

Studies report that digital ICTs can provide women and girls with the basic inputs for enhanced decision-making power, such as new information, learning opportunities and technical/practical skills. Women and girls' ability to make more, and better-informed, decisions has been found to increase their control over their finances, their safety and their health. Examples include:

- To help women **manage and control their own money,** a women's education programme in Afghanistan, run by the Women's Annex Foundation, teaches young women and children how to use Bitcoin (a digital currency and software-based online payment system). Some of the women are paid in Bitcoin for articles and blogs they write, with the intention being that they decide how they spend their earnings (Antonio and Tuffley, 2014).
- A study of e-governance programme E-Seva in India found under half of the women who worked in the ICT kiosks used information they gained to inform decisions they made in their personal lives. However, overall the study found information gained through access to ICT can improve women's understanding of

government programmes and processes, even when they have limited literacy skills (Karan and Raj Mathur, 2010). A survey conducted by Intel (2013) also found that, in India, of the women surveyed, '49 percent of women sought information on accessing government services and 54 percent sought information on financial services and banking' (p.32).

- Cultural taboos in some countries can make it difficult for girls to **access information about sexual and reproductive health rights.** In Kenya, the Aunty Jane Hotline fills this gap by using an interactive voice recording service to provide confidential and reliable information on sexual and reproductive health (Gurumurthy and Chami, 2014). Similarly, a multi-country survey reported that women ICT users often use the internet to access information on health services and value being able to access health information anonymously (Intel, 2013).

- In a multi-country survey, **women reported that they sought online information about education more frequently than about other subjects,** using the internet for 'research related to their studies, finding scholarships and grants, and doing online coursework' (Intel, 2013: 32).

- The same research found that **how individual women use the internet changes over time.** Women who had been using the internet for a longer period of time use the internet 'for their job, to help with studies and education, and to find information they are looking for'. In contrast, new users were more likely to only use the internet for entertainment. This suggests that, the longer women have been internet users, the more aware they are of different ways they can use it to benefit their lives (Intel, 2013: 73).

- The Literacy Promotion through Mobile Phones project in Pakistan used mobile phones with a pre-loaded literacy programme on the sim-card. The project was found to **increase literacy skills, which enabled women 'greater control over their everyday lives** and [meant they] were more likely to participate in support groups' (Gurumurthy and Chami, 2014: 23).[8]

- HarassMaps in Cairo and Mumbai are digital tools through which women can **share incidents of harassment anonymously online or by a mobile device.** These incidents are plotted on online maps, enabling women to use them to make decisions about safe spaces. Hollaback! is another forum used to report and discuss experiences of public harassment, in use in 70 cities across 24 countries. Users of Hollaback! also describe how discussing their experience led them to object to public harassment where they had previously been more accepting of it (Klugman et al., 2014).

- An association of rural women's organisations in Togo, the Togo Union des Groupements des Femmes, has used mobile phones to create '**dispersed learning networks' for property rights education'** (Gurumurthy and Chami, 2014: 18).

Online tools and information are not necessarily empowering; rather, it is about how women use data and information. If women do not, or cannot, use this data to make informed decisions and/or press for changes, for example to challenge social acceptance of, or lack of policy response to, violence against women, then the technology has not contributed to an improvement in women's voice and influence.

Governments can use digital ICTs to improve services for women and girls

Governments are increasingly using digital ICTs to interact with citizens around public services and/or to provide these services to them. Examples of ways that e-government or e-governance, as these activities are known, can improve access to information, rights and services for women include:

- ICTs can provide ways of delivering public services that overcome some of the barriers to access women face, such as physical distance and restrictions imposed by their families. For example, in Indonesia, the Aceh Besar initiative used mobile phones to help midwives working in isolated communities be supported by obstetrician- gynaecologists elsewhere (Gurumuthy and Chami, 2014). ICTs can be used to collect data to **improve the targeting of services.** For example, in Brazil the Programa Mae Paulistana aims to coordinate all the necessary care services for pregnant women. The programme found that using data to

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[8] However, studies also report that, while development interventions have been successful in providing more equipment to schools, many projects have struggled to transform this into improved learning outcomes because, for example, high dropout rates of poor rural girls have prevented the benefits of ICT being realised (Gurumurthy and Chami, 2014).

- monitor and coordinate health provision resulted in the proportion of pregnant women who made all six recommended prenatal visits increasing from 10% to 80% (Gurumuthy and Chami, 2014).

- In a participatory mapping project in urban townships in South Africa, girls and boys identified spaces where they felt either safe or unsafe. Government then used the data to **create new safe spaces** where adolescent girls could meet to socialise in safety (Klugman et al., 2014).

- While connecting to broadband internet is not possible for many women in developing countries, there are opportunities for public infrastructure to give women greater opportunities to access services and information (Gurumurthy, 2013). For example, Gurumurthy et al. (2012) report that, in some parts of Mongolia, women can **file complaints directly with the Family Courts** at IT kiosks supported by government.

- In Latin America, **telecentres** – places where the public can access computers, the internet and online services – are widespread and largely considered positive examples of how the internet can democratise and facilitate women's participation in the public arena. Together with community radio, telecentres have been found to be important for 'building a sense of community identity, and increasing citizen consciousness, and participation in defense of people's rights and interests' (Bonder, 2002: 8). ICTs can help address some of the structural causes of gender inequality, such as the denial of **land rights.** In the Philippines, for example, the digitisation of public records required the renting of natural resources to be recorded as 'co-ownership or co-stewardship' between husband and wife (Gurumurthy and Chami, 2014: 17).

While some studies provide examples of how e-governance can improve access to, and efficiency of, public services, Dé (2006) also notes that **these systems do not necessarily consider gender.** For example, Dé describes how e-government systems in India 'tend to provide services that are deemed important to the supply side designers. Participatory approaches to design are few and so the systems tend to reflect the priorities of the administration rather than that of the citizens' (p.16). Gurumurthy et al. (2012) also describe how an overemphasis on the business model can undermine the potential of ICT-enabled telecentres to improve service delivery to marginalised citizens, such as the Common Service Centre Scheme in India. Information and services delivered using ICTs may also be irrelevant to the poor (including women) if the intended users lack the necessary ICT infrastructure and capabilities or users are not able to influence purpose and design (Sundararajan, 2006).

E-government activities can provide women and girls with better information, services and access to government. However, **whether e-government empowers women in practice depends on whether activities and tools are designed and implemented in ways that address the barriers women face and, crucially, whether women are able to actively use them**. *If* these conditions are met, it is possible that e-governance can advance gender equity, either directly or by women gaining access to new resources and capabilities that increase their power and control.

Women's use of digital ICTs to collectively influence public decision-making

E-governance implies greater interaction between the state and citizens – but the flow of information may be in one direction only. Public sector agencies may use digital ICT platforms and systems to collect information about citizens and/or to inform them of entitlements and services, but not provide feedback mechanisms. The important point is that two-way interaction with government not only requires that citizens are able to participate and exercise voice but also that government has incentives or capacity to listen and respond. Otherwise, women may be able to make more informed personal decisions or access more/better services but not have an opportunity to actively influence these policy and services. As a new channel between government and women, we found **little evidence of individual women being active communicators or influencers** rather than recipients of government information or of information controlled by commercial interests. Some studies find women are able to use digital ICTs and media to exchange information, network and **mobilise** *collectively* **to influence government policy and services**.[9] Even so, there is much less evidence of these types of outcomes than there is of digital ICTs as a platform for women's voice. Influence is difficult to observe

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[9] Women, and particularly poor women, face greater barriers to associational life, but closed political systems and unresponsive government may mean men, particularly poor men, also have few opportunities to influence public policy.

directly and proxies, such as whether women achieve their stated goals, must be used instead. Nevertheless, more research is needed on the relationship between women and girls' voice and influence under different conditions.

Examples that studies provide on how ICTs have supported women's individual and collective action and public influence include:

- An evaluation of a training programme in Indonesia found rural women who gained ICT skills were asked to participate in public meetings and assist the local elites with public tasks requiring ICT skills. These skills therefore improved women's position in society and gave them greater access to public affairs and a **stronger negotiating position in village policies**, although they also had a greater burden of work (Jahaj, 2013).

- Some authors find ownership and control to be important to women gaining power to influence public affairs through ICTs. For example, where **women have control over ICTs** – such as where they run their own telecentres or use community radio to strengthen solidarity and raise awareness of issues – this may improve their use of ICTs for political and social change (Gurumurthy, 2013).

- Increased knowledge gained through digital ICTs can **support women's leadership.** For example, the training of indigenous women leaders in Bolivia in ICT skills is thought to have contributed to an increased number of women gaining political positions. A study of the training project attributed this to software such as Skype enabling indigenous women to communicate with each other more easily and cheaply, which increased their confidence, and their use of online platforms to broadcast their messages more widely. When one of these local leaders took up a national leadership position, she took forward demands and concerns of local women leaders and they were subsequently addressed (Wamala, 2012).

- Digital technology can be a tool for documenting and widely sharing evidence of discrimination or violation of women's rights, which was previously difficult to prove. In China, graphic images of violence against women taken on mobile phones have been used by women to stir online outrage and to **seek justice** – such as in the case of the forced abortion performed on Shaanxi resident, Feng Jianmei, in June 2012, and the 2013 ruling that granted divorce and custody to Kim Lee on the grounds of domestic violence (Locket and Pin, 2013).

- Turkish women's organisations have also successfully used ICTs to document sexual abuse and violence against women (Torenli, 2006). Elite Turkish women's organisations and academics have subsequently used the information to **engage with public administrators** on this issue. The women who are the subjects of the data have not been involved in using the data, for example using it to seek justice/change their situation, which highlights that some women may be passive recipients of benefits of ICTs even while others are using the same technology to challenge unfair power relations.

- Digital ICTs can also be effective tools for women to **campaign collectively on gender-based issues** and the literature provides numerous examples of this. For example, an Iraqi women's group, Wadi, has been documented using online tools, films and television to campaign for an anti-female genital mutilation/cutting (FGM/C) law. The organisation trained female activists to use multimedia tools to engage with rural women on this issue, as well as to promote their cause through public media and gather evidence of FGM being practised. Wadi's concerted efforts to draw public attention to FGM/C led to the Kurdish regional government enacting new local laws that make the practice of FGM/C a criminal offence (Chua, 2013).

- Domestic workers in Jamaica, the majority of whom are female, also used ICTs to campaign for the adoption of International Labour Organization (ILO) Convention 189. The ratification of the convention was predicted to improve household workers' wages and working conditions and the workers' experience of using ICT in campaigning may have increased their political power and so strengthened future influence in public decision-making (Dunn and Dunn, 2013).

- Social media can be used to collect data as well as to promote messages and to campaign. For example, a Peruvian movement aiming to provoke government action on sexual harassment used social media networks to both raise the issue in the media and academia and gather data on crimes. This **combination of online public campaigning with data collection** was effective at getting government commitment to

address sexual harassment (Bossio and Bossio, 2013). Other, similar, examples include a campaign to keep a women's shelter open in Cape Town (Mudavanhu and Radloff, 2013).

Several authors recognise the **limitations of online campaigning** and emphasise that digital media alone cannot provide women with all the necessary skills for successful political engagement. Digital ICTs can provide new opportunities for women to express themselves but **engaging publically and politically online does not guarantee power. And, even when women are active online, they may struggle to have presence and influence offline.** As the experience of a women's organisation, Likhaan, in the Philippines shows, public visibility is only a first step in creating significant political impact (Gurumurthy et al., 2012). A study of Likhaan describes how the organisation tried to generate public support for a reproductive health law by sharing experiences of women and girls via an online magazine. While sharing the stories was found to be empowering for the individuals involved, there was no evidence the magazine influenced relevant policymakers or was promoted by mainstream media (ibid.). Women's ability to use ICTs to shape state policy and programmes is informed by the extent to which 'ICT mediates in the relations between civil society and the state' more broadly (Bonder, 2002: 12).

Examples of women's inability to translate voice into influence highlights that **influence is a factor not just of women having a voice but, critically, also of the nature of that voice, of women's movements and of the broader environment in which they operate.** For example, in a study of women's coalitions in Egypt and Jordan, Tadros (2014) found their success was informed by factors such as whether they had built a broad base and developed mechanisms to create internal consensus and manage conflict, and whether coalition members had an established relationship. She also found the more successful coalitions worked in political and strategic ways, often collaboratively with government, and their informal relations and use of private negotiation and influence was more important than traditional advocacy tactics.[10] Also in Egypt, Hassanin (2013) found women to widely use social media to campaign and express their views on women issues, but the movement lacks clear policy solutions and demands and does not have the physical presence needed to successfully promote its ideas (Hassanin, 2013). Despite wide recognition of women's active role in the Arab Uprising, both traditional and social media note there has been little gendered revolution or gender-based social change (Newson and Lengel, 2012) – and in countries such as Egypt, where women's demand for equality was not guaranteed by the new constitution, there has been significant regression in women's position.

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[10] For a fuller discussion of the evidence on the relationship between women's social activism and their voice and influence, see the main report/evidence review for this project (Domingo et al., 2015).

6 Recommendations for supporting women and girls' power, voice and influence through digital ICTs

What does the empirical evidence tell us about the types of interventions most likely to enable women and girls to use digital ICTs in ways that increase their voice *and* their influence? There are eight key messages:

1. If they are to empower women, digital ICT programmes must address gender- and class-based barriers to women's access. The potential benefits of ICTs for women's voice and influence are premised on women being able to access and use them. Numerous structural factors can limit whether women use ICTs and how they use them, such as social barriers that mean women may not have the literacy skills they need, material barriers that mean they may not have the money to buy or use ICT devices (or may not have control over their own or household finances) and psychological barriers that may mean women believe they should not or are unable to learn digital ICT skills. Attention must also be paid to whether access to ICTs decreases women's burden of work or rather adds additional tasks to their existing traditional duties. For example, women in Indonesia who were trained in ICT skills gained greater status in their village but were also asked to take on administrative tasks for the local elites (Jahaj, 2013). All programming therefore needs to include gender and political economy analysis in its design and implementation and be situated within broader political and socioeconomic context.

2. Women and girls can be *active* conveyors of ideas and information through their use of digital ICTs or *passive* recipients of information. The distinction has clear significance for assumptions about whether and how ICTs will increase women and girls' voice and influence over decision-making. If ICT programmes are to increase voice and influence, they need to understand and design interventions that increase not only women's access to information (e.g. through e-government, access to ICTs) but also their communication and engagement with others through digital ICTs. For example, an initiative in South Africa used an online platform to encourage girls to engage with policy-makers over public spaces where they felt safe (Klugman et al., 2014). The literature suggests it is wrong to assume access to digital ICTs will result in women using ICTs for economic, educational and political purposes. For example, Intel (2013) found that, initially, women are more likely to use the internet for entertainment than education. Therefore, additional guidance on the potential benefits ICTs can bring to women, as well as incentives to take these opportunities, are important.

Access to digital ICTs can empower women economically, but this does not necessarily translate into greater social or political power. While women having greater economic opportunities through their use of digital ICTs is valuable in itself, programmes need politically informed design if women are to use economic empowerment as a stepping stone to increased presence and influence in the social and political spheres as well. Policy and programmes concerning ICTs need to look beyond technical and economic factors to see the potential positive and negative impact of ICTs on society, culture, and politics (Gurumurthy et al., 2012). This could involve a government's department for ICT incorporating gender concerns into its work and the ministry for women paying attention to the impact of ICT on gender relations (ibid.).

3. There is no automatic relationship between women having more 'power within' and 'power to', on the one hand, and their having more 'power with' and 'power over', on the other. Influence is a factor not just of women having a voice but, critically, also of the nature of that voice, of women's movements and of the broader environment in which they operate. Digital ICT training and use can provide women and girls with the skills, confidence and opportunities for their increased voice, as ICT training for female leaders in Bolivia showed (Wamala, 2012). These are important building blocks to voice and influence. But increasing the power of individual women will not necessarily translate into the collective action needed to challenge gender inequality unless programmes explicitly build support for this into their design.

4. More research is needed on when and how digital ICTs contribute to women's mobilisation around particular issues that is effective in enabling them to project their views and interests in ways that influence decision-makers. While there are examples of how women have used digital ICTs to strengthen their campaigns, there are many other factors influencing the political weight of women's voice. It is important, therefore, to view ICT as a tool alongside other considerations, such as the particular issue and who has an interest in it, the strategic choices of women's groups and the political context in which they are working. For example, during the Arab Uprising, women's movements used digital ICTs effectively to express their views but online campaigning alone was not sufficient to significantly change gender relations (Newson and Lengel, 2012). It is important here to also consider the extent to which there is solidarity of elite women with poor women's everyday interests, and the circumstances in which government is more likely to be responsive to online campaigning or where collaboration with government and informal negotiation and influence may be more effective than traditional advocacy, or need to be used in tandem with it (Tadros, 2014).

5. Whether e-government empowers women in practice depends on how activities and tools are designed and implemented and, crucially, whether women are able to actively use them. Women appear to be more passive recipients of government information through these activities, rather than actively influencing them or engaging in local decision or policy-making. E-government activities can provide women and girls with better information, services and access to government, especially on socially sensitive issues, such as sexual health services that can be accessed more discreetly digitally. For e-governance to have a differential impact on women and girls than on men and boys, it is important for women to have some control over how services are provided. The E-Seva programme in India showed benefits for women because women were trained in managing the ICT kiosks and had an important role in facilitating the system (Karan and Raj Mathur, 2010).

6. Programmes need to consider whether digital ICTs can increase women's insecurity and/or risk of violence. Women's access to and use of digital ICTs may result in confrontation and conflict between women and others in their offline and online community, including family members and regressive groups that feel threatened by women's increased access to information and communication. Women's use of ICTs, especially if advocating around gender-based issues, is likely to challenge existing gender-based power relations and so programmes must anticipate the backlash women may experience as a result. For example, a study in Zambia found women's husbands often reacted negatively to their use of mobile phones, perceiving it as a challenge to their authority (Wakunuma, 2012). Programmes therefore need to be alert to the possible dangers women face online and offline from using ICTs to express themselves publicly and access new opportunities independently. Doing so involves respecting the 'do no harm' principle and, when women's access to ICTs may increase their power in one domain of their life but lessen it in others, identifying strategies to manage and mitigate empowerment trade-offs.

7. Laws and policy governing internet use must be gender-aware and should protect users from violence and harassment. In particular, definitions of harm must be expanded to recognise the severity of crimes such as cyber stalking, trolling, online sexual exploitation and other violations (Gurumurthy and Chami, 2014). Programmes should also be aware of the commodification of ICTs and the internet by private sector interests that shape the information and services available and the cost of using ICTs to communicate. Programmes could promote women's cooperatives to **run 'not-for-profit ICT infrastructure' that promotes locally relevant information and services,** and pro-poor licensing schemes could be developed for local wireless networks (ibid.).

8. To raise the quality of research into women's use of digital ICTs, sex-disaggregated data based on standardised indicators that relate to policy goals are needed. This would make possible better measurement of change and impact in this area. Studies of ICT development programmes should also be more systematic, detailing assumptions and using rigorous research methodology to test hypotheses and substantiate conclusions (Gurumurthy and Chami, 2014). This is important for gaining a more detailed understanding of when and how women use ICTs to increase their voice and influence.

It is important to take on board that women and girl's empowerment, whether through use of digital ICTs or other resources, is multidimensional and non-linear. The use of digital ICTs may therefore empower women in some areas of their life while reducing their power in others – as when women have more public voice but are subjected to increased violence. The digital divide also means digital ICTs may increase the power of *some*

women while reducing the power of others. For programming to be better informed by learning on the conditions under which (different groups of) women and girls are able to use digital ICTs to increase their power, voice and influence, there is a need for more research grounded in established social and political theory, including development and gender studies. Ultimately, it is important to recognise that, while ICTs are always changing, so too are gender norms, and that the interaction between the two is therefore in constant flux (Marcelle, 2002). As Gurumurthy et al. (2006) advocate, this means that policies and programmes that attempt to use ICTs to increase women's voice and influence must be acutely aware of the socio-political environment in which they work, and be flexible and adaptive, constantly learning and responding to the complex and rapidly changing global information society.

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Appendix 1: Glossary of key terms

Communication: the sending, receiving or exchange of information.

Digital information and communication technology: relates specifically communication using data/information that is created or accessed through computers. Digital ICT is differentiated from earlier analogue and print forms of information and communication technologies.

E-governance: 'government agencies use of ICTs to more efficiently deliver services and transform its relations with citizens, business and other arms of government' (Guida and Crow, 2009: 283).

E-government: 'the delivery of services via network technology to citizens, business and government agencies' (Guida and Crow, 2009: 283).

Information technology: application of computers and telecommunications to store, retrieve and transmit and manipulate data.[11]

Information and communication technologies: any communication device or application (involving both hardware and software), including radio, television, internet and telephony.[12]

Media: means of mass communication – e.g. television, radio, newspapers or internet. There is overlap between ICT and media, in that they refer to similar channels for communication. However, media also explicitly includes consideration of who is controlling the means of communication and the information that is distributed through it.

> **Broadcast media:** model of mass communication-based one-way message from one to many, traditionally through radio waves, e.g. radio and television.
>
> **Digital media:** mass communication through digital formats (i.e. those that can be read by computers), as opposed to print or analogue formats.
>
> **Social media:** many-to-many model of communication and interaction through digital ICT technology, in particular websites that allow users to create, share or exchange content.

Mobile communication: portable communication devices using wireless connections, such as mobile/cell phones.

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[11] http://searchdatacenter.techtarget.com/definition/IT

[12] http://searchcio.techtarget.com/definition/ICT-information-and-communications-technology-or-technologies

Appendix 2: Literature collection and analysis methods

Literature identification

Search of academic databases. The search strings for the larger review of the literature for this project included terms to identify academic articles on support to women and girls' leadership and their use of ICTs. Synonyms in the string included 'knowledge exchange' OR 'information sharing' OR 'technolog*' OR 'ICT' OR 'information and communication technology' OR 'mobile phone*'. Delimiters were also applied, such as 'women' and 'girls' and 'middle-income' and 'low-income' country. Full details of this stage of the literature search can be found in the 'Women Voice and Leadership in Decision-Making Learning and Evidence Project: Search Protocol', which is available on request.

Snowballing and expert recommendations. Active advice on relevant literature was sought from key experts, and by looking at the reference lists of those publications. Information was also requested from the UK Department for International Development (DFID) and from NGOs through the Women's Political Participation Group of the Gender and Development Network.

Capturing the grey literature: This was particularly relevant given the focus on development programmes, and involved targeted searches of institutional websites (NGOs, donor websites, women's organisations) and using internet search engines such as Google. Search strings included:

"gender, digital, technology, women, empowerment"

"gender and social media, equality"

"gender and social media, development"

"gender, women, development, ICT"

"gender, development, internet, technology"

"gender, development, social media, digital"

Time spent searching for grey literature was capped at two days, consistent with overall resource allocation to the project.

Literature analysis prioritisation

In total, 101 studies/reports were identified, including both academic and grey literature (mostly programme evaluations and reviews but also policy material). All studies were entered into a database, reviewed and coded according to the following categories: year, country focus, keyword, source of document, type of document, methods, quality of evidence and key concepts.

Studies were also coded for relevance. There were three categories (relevant, possibly relevant and not relevant). The criteria for relevance were direct consideration of our research questions (what factors enable/constrain women and girls' leadership; what are the outcomes of women and girls' leadership), and transparent research design/methods. We also included important secondary reviews and theoretical/conceptual pieces.

Only the studies assessed to be relevant were read, a total of 56 studies. Material was extracted and synthesised based according to the main sections of our report.

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