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The Interface between Gender Mainstreaming and Information Communication Technology (ICT) in Selected African Countries

***Shikha Vyas-Doorgapersad[a], Christelle J Auriacombe[b],** [a,b]School of Public Management, Governance and Public Policy, College of Business and Economics, University of Johannesburg, South Africa.
***Corresponding Email: *a** svyas-doorgapersad@uj.ac.za, bchristellea@uj.ac.za

In Africa, e-government reform can be dated back to 1996 when the Information Society Initiative (AISA) was adopted at the Economic Commission for Africa (ECA). Thereafter, the Southern African Development Community (SADC) established an ICT task force that was mandated to evaluate the e-readiness of SADC member states (cf SADC, 2008) to use technology as an avenue for better collaboration between government and citizens. However, there are a number of obstacles to internet accessibility on the continent. This situation is particularly dire for women. The Mainstreaming Gender Equality (MGE) and Gendered/Technology as Culture approaches serve as theoretical underpinning. Both these research approaches are used as tools to identify gender gaps and to provide possible solutions to create equal opportunities for women in the ICT sector in Africa. The methodology is based on a desktop analysis, which entails a comprehensive literature study including official documents to conceptualise and contextualise the area of investigation. The methodological approach focuses on specific dimensions of unobtrusive research techniques, such as conceptual and document analysis. The findings explore whether incorporating gender mainstreaming and technology can be realised if African countries implement appropriate national ICT and gender policies. Building a gender-based, technologically progressive continent is not beyond reach. The future may see this African potential unfold. After closely

scrutinising available literature, articles and official reports, the authors deduced that policymakers need to conduct a gender analysis of country-specific ICT policies to identify specific gaps that require improvement.

Key words: *digital divide, information and communication technologies (ICTs), gender equality, gender mainstreaming, women empowerment.*
JEL Classification: *Z00*

Introduction

Different socio-economic and cultural variables determine the adoption and effective use of ICT (Zhao, 2013: 18). Notably, Zhao (2013: 18) argues that these variables create a digital divide, or more specifically a gender digital divide. The locus and focus here is to discuss the gender digital divide in certain African countries. To build on the literature, various feminist theories of technology were investigated, such as "technology as gender" (Wajcman, 2009) that examines how technology is developed and used, as well as how gender is constituted in terms of ICT utilisation (Zhao, 2013: 8) in a "social constructivist framework" (Berg, 1996). Wajcman (2010: 1) also demands that the focus should be "on the mutual shaping of gender and technology, in which technology is conceptualised as both a source and consequence of gender relations" (Wajcman, 2010: 1). To avoid both technological determinism and gender essentialism, these theories emphasise that the gender-technology relationship is fluid. They highlight how technical change processes can influence gender power relations and argue that feminist politics of technology play a key role in achieving gender equality (Wajcman, 2010: 1).

Although the "IT/ICT workforce is a fairly new professional sector in many developing countries, women occupy a minority of positions, and gender inequalities that are well established in many other sectors are being replicated in the IT/ICT industries" (cited in Vyas-Doorgapersad, 2014: 406). Vyas-Doorgapersad (2014: 406) highlights that, although ICT is recognised as a tool to promote gender equality and women's empowerment, "there is a 'gender divide' reflected in the lower number of women accessing and using ICT compared with men". Unless this gender divide is addressed, the situation could become even more critical and ICT may "exacerbate existing inequalities between women and men and create new forms of inequality" (Vyas-Doorgapersad, 2014: 406).

It seems to be a challenge to achieve gender equality in the ICT sector. Mandour (2009a: 11) emphasised that "theoretically, a large number of studies that analysed the relationship between ICT and gender have focused on illustrating the enormous set of positive aspects that ICT could generate for women as well as the various constraints that could hinder women from an effective use of such benefits. Empirically, however, the number of studies analysing the effects of ICT on gender is relatively meagre especially for those applied in developing countries". As a result, Marcelle (2000 in Mandour, 2009a: 11) states that some researchers have concluded that the empirical foundation for understanding the issue is still not fully formulated.

Access to the internet is a precondition for women to fully participate in all spheres of life (Global Information Society Watch, 2013). However, according to Hafkin and Huyer (2007: Internet Source) "the lack of statistical data on gender and ICTs makes it difficult to develop gender-sensitive ICT policies, plans and strategies. It seems to be especially challenging in developing countries where many governments do not collect ICT data – in particular sex disaggregated data – on a regular basis. Without such data, women's ICT use and needs remain invisible". Undeniably, this hampers the rightful achievement of women's rights.

Huyer and Sikoska (2003 in Jolly & Narayanaswamy, Undated: 7) argue that, thus far, ICTs have been designed and created within male-dominated environments. The fact that ICT policies are usually formulated by male policymakers has contributed to this divide (Huyer & Sikoska, 2003 in Jolly & Narayanaswamy, Undated: 7). Yet, when appropriately harnessed, ICTs also hold great potential for women's empowerment on an individual level (better self-esteem, increased confidence and more career opportunities), as well as on a collective level (better advocacy, lobbying and networking activities).

The article first contextualises the methodological and theoretical framework in terms of the research and data collection methods, as well as the underlying gender-oriented approaches. Hereafter, conceptual clarifications are provided for the terms utilised in the text. This is followed by a contextualisation of the interface between gender and ICT in Africa. Finally, the article offers policy recommendations to improve gender equality in the ICT sector in African countries.

Research Methodological and Theoretical Framework

As noted before, the article utilises a qualitative approach. To conceptualise and contextualise the area of investigation, a desktop analysis was conducted in terms of a comprehensive literature survey and official documents. Auriacombe and Schurink (2012: 149) highlight the

views of HesseBiber and Leavy (2006), quoting that "the appropriate selection of research methods should form part of a researcher's philosophical concerns, as well as his/her approach to knowledge-building". A qualitative research method is therefore utilised to promote a better understanding of the phenomenon under investigation in terms of a "broad, interpretive post-experimental, postmodern, feminist, and critical sensibility" (Schurink & Auriacombe, 2010: 436).

The methodological approach also focused on specific dimensions of unobtrusive research techniques, such as conceptual and document analysis. Generally, unobtrusive research techniques investigate social behaviour to remove bias and encourage conceptual analysis (Auriacombe, 2016; Jr & Peñol, 2018). Official documents, as well as a review of relevant literature and theories in the field of gender equality and ICT formed the basis of secondary sources for the conceptual analysis. Maxwell (2005 in Auriacombe, 2016: 7) states that conceptual analysis can be seen as a "system of concepts, assumptions, expectations, beliefs and theories informing the research and is generally regarded as an explanation proposed to reach a better understanding of the social reality/phenomena that is being investigated". Quoting Zongozzi and Wessels (2016), Auriacombe (2016: 8) states that, "conceptual analysis relies on scholarly literature and reflections on the interpretation and interrelationships of the various related concepts and variables that influence the phenomenon".

This article utilises MGE and the Gendered/Technology as Culture approaches together, aiming to create equal opportunities in the ICT sector. These approaches are discussed below:

Mainstreaming Gender Equality Approach

The mainstreaming gender equality approach underpins gender mainstreaming, where the term 'gender' refers to "a historically constructed asymmetrical relation between women and men. It transforms the 'women' question from a vertical special issue to a horizontal special concern and it encourages the development of new policy instruments" (Woodward 2003 in Shodhganga, Undated: 49). Jahan (1995 in Shodhganga, Undated: 51) makes a distinction between integrationist and transformative mainstreaming. While integrationist approaches aim to promote women's position within existing policy paradigms, transformative approaches involve reorienting and changing existing policy structures. Gender mainstreaming is a transformative approach, as it aims to alter existing social structures. The ultimate goal of gender mainstreaming is to achieve gender equality. This includes: "making a conscious effort to address gender disparities; and advocating gender equity at all levels" (Uganda Martyrs University 2010 in Vyas-Doorgapersad & Kinoti, 2015: 99).

Therefore, the gender mainstreaming approach "ensures that all gender issues are addressed and integrated in all levels of society, politics, and programmes" (in Nhlapo & Vyas-Doorgapersad, 2016: 169). With this approach, gender mainstreaming goals need to incorporate gender equality in ICT policies within the African context.

The Gendered/Technology as Culture Approach

Considering the gendered nature of technology, Wajcman (2009 in Zhao, 2013: 8) highlights that "because of the complexity of the relationship between women and technology, by the 1980s feminists' efforts shift from exploring women's access to technology to examining the very processes by which technology is developed and used, as well as those by which gender is constituted". Gajjala (2002 in Gurumurthy, 2004: 5) supports the Gendered/Technology as Culture approach, as it focuses on processes that can be negotiated and transformed. The relationship between gender and technology is seen as the core issue. Technology is understood to be "shaped by local histories, geographical conditions and everyday cultural practices..." (Gajjala 2002, in Gurumurthy, 2004: 5).

The United Nations (UN) Office of the Special Advisor on Gender Issues and Advancement of Women (2001: 1) suggests that "mainstreaming of a gender perspective in all types of activities (referred to as gender mainstreaming) is a globally accepted strategy for promoting gender equality". It also utilises the 'Technology as Culture' approach to assert Zhao's (2013: 7) view that "in mainstream science and technology studies, feminists believe that socio-technical relations exist not only in physical objects and institutions but also in symbols, language and identities". For Zhao (2013: 7), science and technology (sometimes called technoscience) entail "a notion of culture or material-semiotic practice". Hence, the Gendered/Technology as Culture approach "rejects the view that technology is inherently neutral or inherently masculine" (Gurumurthy, 2004: 5).

Conceptual Clarifications

This section describes the main concepts utilised in this article, such as gender, gender mainstreaming, gender equality, women empowerment, information and communication technology and sustainable development.

Gender

According to Phillips (2005 in Vyas-Doorgapersad, 2017a: 144), the term 'gender' "refers to the roles and expectations attributed to men and women in a given society. However, it stands to reason that such roles are subject to change over time, place, and life stage". The *European Institute for Gender Equality* (2018a: 2) defines gender in a broader context and emphasises that "gender determines what is expected, allowed and valued in a women or a man in a given context…In most societies there are differences and inequalities between women and men in responsibilities assigned, activities undertaken, access to and control over resources, as well as decision-making opportunities…Gender is part of the broader socio-cultural context".

Gender mainstreaming

The **European Institute for Gender Equality (2018b: 1) states that gender mainstreaming** "has been embraced internationally as a strategy towards realising gender equality. It involves the integration of a gender perspective into the preparation, design, implementation, monitoring and evaluation of policies, regulatory measures and spending programmes, with a view to promoting equality between women and men, and combating discrimination". Therefore, gender mainstreaming can be considered as "the process of assessing the implications for women and men of any planned action, including legislation, policies or programmes, in all areas and at all levels… The ultimate goal is to achieve gender equality" (in United Nations Educational, Scientific and Cultural Organisation (UNESCO), 2003: 3).

Gender equality

The United Nations Development Programme (UNDP) document titled 'Gender Equality in Public Administration' (2014, in Vyas-Doorgapersad, 2017b: 169) identifies gender mainstreaming as "a strategy for making women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres". The ultimate goal is that women and men benefit equally at all levels and that inequality is not perpetuated. In other words, there should be gender equality.

Women's empowerment

Women's empowerment entails "autonomy or freedom of action" (Basu & Basu, 1991; Dyson & Moore, 1983; Jeejebhoy & Sathar, 2001). Hall (1992, in Shodhganga, Undated: 60) believes that "empowerment of women is a social process that neutralises women's oppressions…Women are under some traditional subordination and will continue to be if

women do not take decisive action on their own behalf…Women's empowerment will provide them equity and equal mindedness in the society…These are not accomplished at the expense of others, but in a mutually cooperative spirit wherever possible...Women's empowerment will result in traditional female values being more respected in society at large". As such, women's empowerment is a foundation for human liberation and collective empowerment. It will help balance male value hierarchies in current traditional and modern societies. Empowerment serves as an avenue to establish cooperation, which ultimately leads to the development of all people (Hall, 1992, in Shodhganga, Undated: 60).

Information and communication technology

Rodgers and Streluk (2002: 21) view ICT as "an 'umbrella' term used to define a communication device or application that operates through the use of technology as well as the internet". The authors go on to explain that the term encompasses a range of devices, such as television, cell-phones, "computers, network hardware and software as well as satellite systems, e-education, e-health, e-commerce and e-filling" (Rodgers & Streluk, 2002: 21). Hafkin (2009: 3) states that, from a government perspective, ICT refers to e-government reforms that are adopted "to promote more efficient and effective government; to facilitate the accessibility of government services, allow greater public access to information, and make governments more accountable to citizens". In Africa, e-government reform can be dated back to 1996 when the AISA was adopted at the ECA (Maseko, 2018: 19). Thereafter, SADC established an ICT task force that was mandated to evaluate the e-readiness of SADC member states (cf SADC, 2008) to use technology as an avenue for better collaboration between government and citizens.

Gender and ICT in Africa

Women in developing countries are an identified disadvantaged group that still experience barriers to internet access and usage. A 2012 study by Intel and Dalberg on women's access to the 'web' concludes that, "across the developing world, nearly 25% fewer women than men have access to the Internet [and] the gender gap soars to nearly 45% in sub-Saharan Africa" (World Wide Web Foundation, 2018: 2). As economies become more and more ICT-driven, women's access to, and use of ICTs is of growing importance and of particular concern in Africa. Despite an exponential growth in ICT penetration in Africa (Nyirenda-Jere & Biru, 2015; Muma, 2018), there remains a critical ICT gender gap (Africa for Results Initiative, Undated: 1).

The root of the problem appears to be that women also have unequal access to income and education, which hampers ICT access and usage. Several diverse factors further contribute to gender inequality in the use of ICT in the African context and require attention. For example, it has been shown that "most rural women do not find computer-related ICTs (computers, e-mail and the internet) particularly relevant or sufficiently useful to their immediate survival needs…In some cases, these women are unaware of the possibilities of computer-related ICTs" (Macueve, Mandlate, Ginger, Gaster & Macome, 2009: 29). Furthermore, women are less likely than men to reap the benefits of ICTs in sub-Saharan Africa, where the number of female-headed rural households varies between 50% and 80%. The reason for this state of affairs is because many men migrate to the urban centres seeking employment, leaving their wives behind to cope with running the households (Muller, 2009: 44). This is a double-edged sword in itself. Notably, contributing factors such as stereotyping, societal mindsets, language barriers and educational and employment opportunities allow and promote male domination and access to technology and technological devices. Table 1 below covers ICT-related gender inequality in all African countries.

Table 1: A comparison of gender and ICT in West,[1] East,[2] South,[3] North and Central African countries

Countries	**Status of gender equality in ICT**
Algeria	In 2011, The United Nations International Children's Emergency Fund (UNICEF) compiled a document on the gender profile in the Middle East and North Africa (MENA countries) that includes Algeria. Under the key indicators on the situation of girls and women and the use of ICT, there is no information on the percentage "of young women (15-24) who used a computer or internet during the last 12 months" (UNICEF, 2011: 6).
Angola	There are no explicit references to ICT access to promote gender equality or the empowerment of women and girls (WikiEducator, Undated: 8-9).
Benin	The reason for a lack of gender involvement in the information and technology sector is the shortage of educational resources (refer http://www.infodev.org).
Botswana	There are no explicit references to gender equality or women's empowerment in the national ICT policy (Isaacs, 2007a: 7). The ICT sector is a male-dominated industry. A quick survey of government and private organisations in the country shows that males dominate most high-value and -income jobs in the ICT sector (Churu, 2012: 2).
Burkina Faso	Polled internet users were mainly men (68.7%) (Fall, 2007: 7).

Burundi	The country installed fibre-optic broadband infrastructure in 2012 hoping to solve "gender problems through the use of ICTs" (WordPress.com, 2014: 1).
Cameroon	The government has started training women in the field of digital literacy and the use of ICT. However, there is still a "need to expand on them to make visible progress on empowering women through ICT" (World Wide Web Foundation, 2018: 2).
Cape Verde, Côte d'Ivoire, Ghana and Senegal	Women are not only excluded from equal socio-economic opportunities, but also from the benefits offered by ICT – including access to new technologies and a place in the information society (Fraser-Moleketi & Senghor, Undated: 25).
Central African Republic	The internet connectivity is very low (under 0.5/100) (http://wisat.org/) and this has gender implications.
Chad	The National Broadband Plan aims to develop training centres to provide ICT education and training to women and girls. The country aims to outline administrative and fiscal measures to achieve ICT gender equality (Andreasson, 2015: 38).
Congo-Brazzaville, Democratic Republic of the Congo, Ivory Coast, Niger	In 2017, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) (UNESCO, 2017: 1) organised a regional conference for Francophone Africa on gender mainstreaming in ICT policies and programs.
Comoros	The goal of the country programme for the period 2008-2012 emphasised "gender mainstreaming" (United Nations Children Fund (UNICEF), 2007: 8). A follow-up study is required to assess the implementation of the programme.
Djibouti	A document prepared by UNICEF (Undated: 7) shows no information under the following targets: The percentage (%) of young women (15-24) who used a computer during the last 12 months; and the percentage of young women (15-24) who used the internet during the last 12 months, as per gender disaggregated data.
Egypt	There is an "existing gender inequality between men and women, such that the implementation of ICT in the society exerts, and sometimes

	exacerbates, the same divide in the ICT usage patterns between men and women" (Badran, Undated: 1).
Eritrea and Western Sahara	As was the case in 2013 "these are the only African territories without direct access to a fibre data cable" and there is "no mention of a national ICT plan for Western Sahara" (oAfrica, 2018: 2).
Ethiopia	There are at least six gender-based constraints to women's use of ICT: Literacy and education; language; domestic responsibilities and therefore lack of time; geographical location of facilities; poor content; and socio-cultural norms (Geldof, 2011: 4).
Gabon	The government realises that new approaches are needed to address the challenges of unbalanced growth and unequal socio-economic opportunity. In 2010, it implemented a new economic vision. Known as the '*Plan Stratégique Gabon Émergent*' (PSGE), it identifies the 'digital economy', and ICT-enabled industries and service sectors as critical growth areas to create jobs (refer World Bank, 2015: 2).
Gambia	Due to inequalities, women and girls have been excluded from participating actively in the country's development process. Overall, gender responsiveness in Gambia is low (The Republic of Gambia: Ministry of Finance and Economic Affairs, 2012: 112).
Guinea	Women represent less than 10% of internet users (UN Conference on Trade and Development: Information Economy Report, 2006: 169).
Kenya	Women, who constitute more than half of the population, continue to lag behind in their use of technology. An increasing number of women are unable to benefit from Kenya's development (World Wide Web Foundation, 2016: 1).
Libya	Only in 2018, "Ibtikar, the first Libyan social innovation competition specifically for women was held that aims to promote gender equality, empowerment and social and economic development in the country through equipping women with ICT skills" (Libya Herald, 2018: 1).
Liberia	Men serve as the model for organising societal information and ICT and the role of women to facilitate social, political and economic development (Republic of Liberia, Agenda for Transformation: Steps towards Liberia's Rising 2030, Undated: 126).
Lesotho	Women's participation in ICT activities is very low and basic (Gender Links, Undated: 2).
Madagascar	There are no explicit references to using ICT in forwarding gender equality and/or women's empowerment (World Bank, 2007: 7).

Malawi	A survey conducted in 2014 shows that "households' access to ICTs in Malawi are still very limited and there are great disparities between urban and rural, as well as between men and women" (Klason, 2016: 14).
Mali	Only in 2016, "the Filles & NTIC- Girls in ICTs (FITIC) initiative was launched by Impact Hub and UN Women. It aimed to foster a better integration of women and girls in ICTs" (Hayibor, 2016: 1). Hence, reducing the gender digital divide.
Mauritius	Only in 2016, the African Leadership University (ALU 2018: 1) "joined forces with Women in Technology Mauritius and Girls in Technology Mauritius, to launch the island's chapter of Women in Tech Africa" (Hayibor, 2016: 1) to fill gaps of the gender digital divide.
Mauritania	Women have a one in three chance (less than men) of benefiting from the African information society (Biztech Africa, 2012).
Morocco	To face the challenges imposed by globalisation, the Moroccan government has set up a new digital strategic agenda for 2015-2020. Although gender is not explicitly listed as a strategic goal, it is a cross-cutting issue (Roumate, 2016: 1).
Mozambique	The entire rural population is largely excluded from ICT, and women have less access than men. This is mainly due to the high illiteracy rate among rural women, but also partly because cultural values consign technology and innovative initiatives to men's sphere of influence (Van den Bergh-Collier, 2007: 59).
Namibia	There is a continuing gap between women and men entering into and advancing in science, technology and innovation, which leads to a gender gap in "high-tech" business creation and innovative activities (Newaka, 2015: 1).
Nigeria	There are no libraries or information centres in rural areas (Jorge, 2002) for both men and women to access technology-based knowledge. Through the national IT Policy Document, gender issues are "not addressed in a way that shows an understanding of power imbalances and gender relations. It makes no attempt to show an understanding or appreciation of gender issues" (Olatokun, 2008: 12).
Rwanda	Delivering a keynote address at the 2017 Transformation Africa Summit, Rwanda's first lady, Jeannette Kagame, emphasised ICT as a tool for true gender empowerment and equality (Government of the Republic of Rwanda, 2017: 1). Furthermore, she called for joint efforts to ensure that women and girls are put at the heart of ICT revolution (Government of the

	Republic of Rwanda, 2017: 1).
Sao Tome and Principe	Despite constitutional guarantees and other laws, an analysis of the country's gender situation exposes that gender inequities directly affect men and women (International Monetary Fund (IMF), 2014: 55).
Seychelles	To date, no official national gender policy has been adopted. The Management and Information Systems Division (MISD) helps provide gender-disaggregated data on a national level; however, it is unable to provide analytical data on specific issues relating to gender in organisations (UN, Undated: 21-22).
Sierra Leone	ICT infrastructure is in dire need of reform (World Bank, 2005).
Somalia	The global statistics from International Telecommunication Union (ITU) depict unequal access to technology between men and women, and there are no statistics for Somaliland or Somalia (Oumer, 2017: 1). In terms of gender inequality in the ICT sector, "Women's underrepresentation and lack of access in the ICT Sector is a global issue and it is no different in Somaliland" (Haween, 2017: 1).
South Africa	The low representation of women in the ICT sector's leadership and general workforce is of growing concern (Mamabolo, 2016: 1).
Sudan	Due to long-standing cultural factors and traditions, female participation in public life (including education) and as part of the country's workforce remains fairly low (Hamdy, 2007: 8).
Swaziland	With reference to ICT, there is no explicit mention of gender equality and women's empowerment (Isaacs, 2007b: 7).
Tanzania	No studies have been conducted to identify the information needs of women in Tanzania and whether women are able to access ICT (Kayoka, 2005: 7).
Togo	The country has no official ICT policy in place (Agyeman-Duahl, 2007: 4).
Tunisia	In 2011, the country decided to pursue "a sustained policy of developing and promoting ICT" (ITU News Magazine, 2011: 1). However, further research by Ben Hassine (in Webb, 2016: 3) highlights that "even gender-sensitive ICT policy on its own does not ensure equally beneficial use".
Uganda	Existing gender structures have been dented. Although patriarchy is stressed, the adoption of technologies such as mobile phones has transformed gender relations to some extent. Although underlying gender structures have been fractured, the beneficial impact of ICT remains limited (Madanda, 2010: 1).
Zambia	ICT users are found largely in urban areas and are mostly men. Due to a

	lack of gender disaggregated data, it is difficult to state how many women are internet or mobile phone subscribers or users, but it is generally agreed that the number is biased towards men (Wakunuma, 2006: 418).
Zimbabwe	The National Gender Policy acknowledges a need to bring women up to the same level as men in terms of access to ICT. However, no current or comparative statistics are available on the use of ICT by men or women in Zimbabwe. Undeniably, this information is crucial in addressing the gendered digital divide (Jena, 2015: 1).

Sources: West Africa: Vyas-Doorgapersad, 2014; East Africa: Vyas-Doorgapersad and Kithatu, 2017; Southern Africa: Vyas-Doorgapersad, 2018; Central and North Africa: Authors used secondary sources that are acknowledged under the references.

Certain findings in Table 1 above are somewhat dated, as new investigations have not been launched since. However, recent holistic studies of gender issues on the African continent indicate little improvement in gender mainstreaming in the ICT sector. For example, a study conducted by Deen-Swarray, Gillwald, Morrell and Khan (2012: 43) in 12 African countries reveals that: "…women and men are not equally able to access and use ICTs [and] women generally have less access to ICTs".

A study conducted by Michael (2016, in Vyas-Doorgapersad, 2018: 5) highlights "a lack of coherent research practice to analyse gender disparities in ICTs across human levels of interaction". The UNDP (2005 in Mandour, 2009b: 9) emphasises that, "unless this gender digital divide is specifically addressed, there is a risk that ICT may exacerbate existing inequalities between women and men and create new forms of inequality". However, Mandour (2009b) goes on to make the valid point that "if the gender dimensions of ICT – in terms of access and use, capacity-building opportunities, employment and potential for empowerment – are explicitly identified and addressed, ICT can become a powerful catalyst for political and social empowerment of women, and the promotion of gender equality".

Policy Recommendations

Based on the review of available literature, this article proposes the following policy suggestions. It is imperative to:

- Create training opportunities for both men and women regarding information and communication technologies.
- Create job opportunities for both men and women in the ICT sector.

- Implement gender equality in employment equity within organisations with ICT components.
- Incorporate ICT in educational programmes at school level, so that both boys and girls become familiar with technological devices from a young age.
- Incorporate gender mainstreaming in ICT policies at a national level.
- Enhance advocacy to support gender mainstreaming in the ICT sector and in ICT-related jobs.
- Create a diversified organisational culture to accommodate women in ICT-related portfolios.

The above policy recommendations are aligned with the GMA with regard to the gender dimensions of ICT "access and use, capacity-building opportunities, employment and potential for empowerment". Researchers in the field agree that ICT can be a "powerful catalyst for political and social empowerment of women, and the promotion of gender equality" (Sandys, 2005: 3). In turn, the Gendered/Technology as Culture approach "understands gender and technology as cultural processes which can be negotiated and transformed" (Gurumurthy, 2004: 5).

Deen-Swarray and Moyo (2013: Internet Source) highlight that, "…to a large extent, gender inequities in access to and use of ICTs cannot be addressed through ICT policies per se but require policy interventions in other areas that would allow women and girls to enjoy the benefits of ICTs equally. This would include policies and programmes that incentivise the education of girls, which in turn will increase the income that women have to spend on ICT services. Partnerships could be created to provide vocational and ICT skills training for women entrepreneurs to address the educational gap and increase their earning potential"

Concluding Remarks

The issue of gender mainstreaming in the ICT sector is a matter of continuous debate. At a micro-level, the contemporary, global societal mindset must be changed to ensure that women gain full access to technological devices. Importantly, the organisational culture needs to be more diverse and women must be appointed in ICT-based positions. At a macro-level, all countries must formulate individual ICT policies that incorporate gender issues and concerns. Due to its patriarchal heritage, it may take time to advance the notion of women empowerment in Africa. However, incorporating gender mainstreaming and technology can be realised if African countries implement appropriate national ICT and gender policies. It must be acknowledged that the lack of updated statistics and gender-based disaggregated data

in the African ICT sector limits appropriate interventions to mainstream gender in policy making. Building a gender-based, technologically progressive continent is not beyond reach. The future may see this African potential unfold. Future research should be engaged in to compare gender-based ICT policies and statistics of different African countries as well as with selected other developmental countries for example BRICS or Asian countries.

REFERENCES

Africa for Results Initiative. Undated. Empowering Women in Technology: Lessons from a Successful Woman Entrepreneur in Kenya. http://www.africaportal.org/documents/17095/Case_study_10.pdf. Date of access: 01 February 2018.

Auriacombe, C.J. 2016. Towards the construction of unobtrusive research techniques: Critical considerations when conducting a literature analysis. *African Journal of Public Affairs*, 9(4): 1-19.

Auriacombe, C.J. & Schurink, E. 2012. Conceptualising qualitative research through a spiral of meaning-making. *Administratio Publica*, 20(3):144-169.

Basu, A.M. & Basu, K. 1991. Women's Economic Roles and Child Survival: The Case of India. *Health Transition Review*, 1(1): 1-20.

Berg, A-J. 1996. Digital Feminism. Doctoral thesis. Trondheim: Norwegian University of Science and Technology.

Deen-Swarray, M., Gillwald, A., Morrell, A. & Khan, S. 2012. Lifting the Veil on ICT Gender Indicators in Africa. http://www.researchictafrica.net/publications/Evidence_for_ICT_Policy_Action/Policy_Paper_13_-_Lifting_the_veil_on_gender_ICT_indicators_in_Africa.pdf. Date of access: 02 March 2018.

Deen-Swarray, M. & Moyo, M. 2013. Accessing Telecommunications Infrastructure in Africa: A Gender Perspective. http://www.giswatch.org/sites/default/files/accesing_infrastructure_gisw13.pdf. Date of access: 4 October 2017.

Dyson, T. & Moore, M. 1983. On Kinship Structure, Female Autonomy, and Demographic Behaviour in India. *Population and Development Review* 9(1):35-60.

European Institute for Gender Equality. 2018a. Concepts and definitions. http:// eige.europa.eu/gender-mainstreaming/concepts-and-definitions. Date of access: 11 September 2018.

European Institute for Gender Equality. 2018b. What is Gender Mainstreaming. http://eige.europa.eu/gender-mainstreaming/what-is-gender-mainstreaming. Date of access: 11 September 2018.

Global Information Society Watch. 2013. Women's Rights, Gender and ICT. http://giswatch.org/sites/default/files/gisw13_chapters.pdf. Date of access: 12 September 2018.

Government of the Republic of Rwanda (GoR). 2017. African Women Leaders Pledge to Bridge the Gender Digital Divide. Kigali: GoR.

Gurumurthy, A. 2004. Gender and ICTs. http://www. bridge.ids.ac.uk/sites/bridge.ids.ac.uk/files/reports/CEP-ICTs-OR.pdf. Date of access: 12 June 2016.

Hafkin, J. N. 2009. E-government in Africa: An Overview of Progress Made and Challenges Ahead. http://unpan1.un.org/intradoc/ groups/un/documents/un/unpan034002.pdf. Date of access: 06 August 2016.

Hafkin, N.J. & Huyer, S. 2007. Women and Gender in ICT Statistics and Indicators for Development. http://itidjournal.org/itid/article/viewFile/254/124. Date of access: 12 September 2018.

Jejeebhoy, S.J. & Sathar, Z.A. 200). Women's Autonomy in India and Pakistan: the Influence of Religion and Region. *Population and Development Review*, 27(4): 687-712.

Jolly, S. & Narayanaswamy, L. Undate). Gender and ICTs: Supporting Resources Collection. Bridge: Institute of Development Studies, pp. 1-49.

Jr, B. A. Z., & Peñol, C. A. Z. (2018). Social Interactive Behavioral Problems of Social Studies Students of Cabiao National High School. Studies, 4(2), 102-114.

Macueve, G., Mandlate, J., Ginger, L., Gaster P. & Macome, E. 2009. Women's use of information and communication technologies in Mozambique: a tool for empowerment? In A. Buskens and A. Webb (Eds.), *African Women and ICTs: Investigating Technology, Gender and Empowerment, pp. 21-32*. London: Zed Books.

Mandour, D.A. 2009a. SRC/CIDA *Research Program on Gender and Work: Working Papers Series*. Egypt, Cairo: Social Research Center, pp.1-53.

Mandour, D.F. 2009b. Impact of ICT on Gender Gap in Egypt. http:// www1.aucegypt.edu/src/wsite1/pdfs/rewebsite_cida/Dina_No4.pdf. Date of access: 03 March 2018.

Maseko, N. 201). The use of alternative service delivery mechanisms within the City of Johannesburg Metropolitan Municipality. Unpublished mini-dissertation. Auckland Park: University of Johannesburg.

Muller, J. 2009. Considering ICT use when energy access is not secured: a case study from rural South Africa. In A. Buskens and A. Webb (Eds.), *African Women and ICTs: Investigating Technology, Gender and Empowerment*, pp. 33-43. London: Zed Books.

Muma, E. C. (2018). Transformative Constitutionalism in Post-Colonial Africa: A Framework for Democracy and Human Rights Protection. International Journal of Emerging Trends in Social Sciences, 3(1), 29-45.

Nhlapo, T.M.S. & Vyas-Doorgapersad, S. 2016. Human Resource Provisioning Strategy for gender equality within the Department of Correctional Services. *Administratio Publica*, 24 (3):166-182.

Nyirenda-Jere T. & Biru T. 2015. Internet Development and Internet Governance in Africa. Internet Society. http://www.internetsociety.org/sites/default/files/Internet%20development%20and%20Internet%20governance%20in%20Africa.pdf. Date of access: 02 March 2018.

Rodgers, A. & Streluk, A. (2002). *ICT: Key Stage 1*. London: Nelson, pp. 1-127.

Sandys, E. 2005. *Gender Equality and Empowerment of Women Through ICT*. New York: Division for the Advancement of Women, pp. 1-36.

Schurink, E. & Auriacombe, C.J 2010. Theory development: Enhancing the quality of the case study as research strategy in qualitative research. *Journal of Public Administration*, 45(3): 435-455.

Shodhganga (A reservoir of Indian Theses). Undated. Gender mainstreaming: approaches and initiatives: an overview.

http://shodhganga.inflibnet.ac.in/bitstream/10603/30547/11/11 _chapter3.pdf. Date of access: 12 September 2018.

South African Development Community (SADC). 2008. *E*-Government in Africa Progress Made and Challenges Ahead. http://unpan/.un.org/intradx/groups/public/documents/un/unpan/033663.pdf. Date of access: 17 July 2016.

United Nations Educational, Scientific and Cultural Organisation (UNESCO). 2003. UNESCO's Gender Mainstreaming Implementation Framework. http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/BSP/GENDER/PDF/1.%20Baseline%20Definitions%20of%20key%20gender-related%20concepts.pdf. Date of access: 10 September 2018.

UN Office of the Special Advisor on Gender Issues and Advancement of Women. 2001. Gender Mainstreaming: Strategy for Promoting Gender Equality. http://www.un.org/womenwatch/osagi/pdf/factsheet1.pdf. Date of access: 09 August 2017.

Vyas-Doorgapersad, S. 2014. Gender, ICT and Millennium Development Goals for Sustainable Development in West Africa. *Mediterranean Journal of Social Sciences*, 5(21): 405-415.

Vyas-Doorgapersad, S. & Kinoti, A. 2015. Gender-based Public Procurement Practices in Kenya and South Africa. *African Journal of Public Affairs*, 8 (3): 96-109.

Vyas-Doorgapersad, S. 2017a. Workplace spirituality for improved productivity: a gendered perspective. *International Journal of Social Sciences and Humanity Studies*, 9(2): 143-156.

Vyas-Doorgapersad, S. 2017b. Gender mainstreaming in local economic development processes: A South African perspective. *International Journal of Economics and Finance Studies*, 9(2): 167-180.

Vyas-Doorgapersad, S. & Kithatu-Kiwekete, A. 201). Gender and ICT in East and West Africa for Sustainable Development Goals: A Comparative Study. *International Journal of eBusiness and eGovernment Studies*, 9(1): 24-38.

Vyas-Doorgapersad, S. 2018. Gender and Information and Communication Technology (ICT) in Southern Africa to Promote the Sustainable Development Goals (SDGs). *Administratio Publica*, 26(2):7-22.

Wajcman, J. 2009. Feminist Theories of Technology. *Cambridge Journal of Economics,* 1-10. doi:10.1093/cje/ben057.

Wajcman, J. 2010. Feminist Theories of Technology. Cambridge Journal of Economics, 34(1), pp. 143-152.

World Wide Web Foundation. 2018. Narrowing Cameroon's Gender Gap: Reasons for Hope. http://webfoundation.org/2015/10/narrowing-cameroons-gender-gap-reasons-for-hope/. Date of access: 03 March 2018.

Zhao, Y. 2013. The Gender Digital Divide. Master Dissertation. Lund University: School of Economics and Management.