

# Policy Briefing

## Women, Power & Policymaking

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# Fourth Industrial Revolution: What's in it for African Women?

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## Executive summary

The world of work is undergoing a revolutionary change with advances in technology, artificial intelligence (AI) and the use of 'big data'. While there are emerging debates around Africa's role within this evolving technological context, very little attention is being paid to how African women fit into this process. This policy briefing provides a nuanced analysis of the opportunities, threats and challenges posed by the Fourth Industrial Revolution (4IR) for women in Africa. It shows that automation in productive sectors is placing women's employment at risk, as they are largely found in low-skill and routinised professions. Studies show that in specific female-dominated industries, technology will reduce jobs. The other misgiving in Africa is that the 4IR, like its antecedents, will further entrench gender inequalities. This is based on the observation that most women are unlikely

to benefit from technological advances, as they do not possess the skills to compete in the emerging knowledge economy. At the same time they are likely to experience the same improvements in the quality of life as everyone else. The briefing makes various recommendations, including building a policy framework to promote the education of girls in science and technology, and promoting female entrepreneurship in new opportunities, such as renewable energy and technology industries.

## Introduction

This policy briefing outlines how social inclusion and gender justice need to be integral parts of the emerging 4IR. Sub-Saharan Africa is one of two regions worldwide with relatively high rates of women participation in the labour force (around 60%).<sup>1</sup> Women in Africa, however, are usually found in unskilled positions in the lower rungs of the economy. For example, women occupy 40% of agricultural jobs in countries such as Ethiopia, Malawi, Niger, Nigeria, Tanzania and Uganda.<sup>2</sup> These are the very positions that are directly affected by increased automation. In Asia, a 2016 study by the International Labour Organization predicted that some nations could lose more than 80% of their garment, textile and apparel manufacturing jobs, as ‘sewbots’ replace humans in factories. These jobs are low skilled and low income, and dominated by women. In any case, according to the World Economic Forum’s most recent Global Gender Gap Report<sup>3</sup> it would take another 118 years for women to earn the same as men at current rates of convergence. The 4IR in its current form is thus entrenching gender inequalities. Without a concerted effort to undertake socially inclusive processes, the revolution will in many ways fail women, especially in Africa. It is therefore imperative to understand not only the challenges facing women but also the vast opportunities that technological advances provide.

## What is the Fourth Industrial Revolution?

The 4IR describes a fusion of advances in simulated intelligence or AI, automation, the ‘Internet of Things’, 3D printing, genetic engineering, quantum computing and other technologies.<sup>4</sup> The Inclusive Growth Forum<sup>5</sup> defines the 4IR ‘as the advent of “cyber-physical systems” involving entirely new capabilities for people and machines’, and goes on to posit that, ‘[w]hile these capabilities are reliant on the technologies and infrastructure of the

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1 Chen M, ‘Women and Employment in Africa: A Framework for Action’, Paper commissioned by the Danish Foreign Ministry for the Second Conference of the Africa Commission, 2008, <http://www.wiego.org/sites/default/files/publications/files/Chen-Women-Employment-Africa.pdf>, accessed 12 July 2019.

2 Christiaense L & L Demery, *Agriculture in Africa: Telling Myths from Facts. Directions in Development – Agriculture and Rural Development*. Washington DC: World Bank, 2018.

3 ILO (International Labour Organization), *Global Wage Report 2016/17: Wage Inequality in the Workplace*. Geneva: ILO, 2016.

4 Schwab K, *The Fourth Industrial Revolution*. Geneva: World Economic Forum, 2016.

5 Inclusive Growth Forum, ‘The Fourth Industrial Revolution Growth and Inequality’, <https://inclusivegrowthforum.org/the-fourth-industrial-revolution-economic-growth-and-inequality/>, accessed 14 April 2019.

Third Industrial Revolution, the [4IR] represents entirely new ways in which technology becomes embedded within societies and even our human bodies'. The world is therefore witnessing the unfolding of unprecedented changes in how societies are structured.

The world of work is changing with the rapid increase in industrial Internet connectivity and automation. The greater use of robots in industrial production is placing many jobs at risk, especially in the manufacturing sector. One study estimates that up to 66% of all jobs in developing countries are at risk.<sup>6</sup> Even in relatively poor African countries, such as Angola and Ethiopia, current jobs, around 50% and 44% respectively, are susceptible to automation. It concludes that developing African countries will lose their cost advantage and potentially their ability to achieve rapid economic growth, by shifting workers to factory jobs.<sup>7</sup> This is because the 4IR is characterised by the development of disruptive technologies that are causing shifts in business and work models. The emergence of companies based on sharing economies, such as Uber and Lyft, is affecting traditional businesses, such as the taxi industry, while Airbnb is increasingly becoming more successful than many global hotel groups.<sup>8</sup> Jobs in these sectors are thus shifting and becoming fragmented in nature. Such changes in job patterns can lead to precariousness, especially for women. For instance, 'there is the risk that if work becomes more fragmented with competition for each new task, much of the progress made by women in retaining access to employment through paid maternity leave may disappear'.<sup>9</sup> In addition, across much of Africa women do not own assets, such as houses and cars, which would allow them to participate in these shared economies.<sup>10</sup> Patriarchal norms and practices have largely excluded women from ownership of productive assets, especially land.<sup>11</sup>

## The 4IR and women in Africa

### Opportunities

Technological advances in the 4IR create specific opportunities for and improvements in the quality of life of women across Africa. For example, in rural Africa technology is being used to afford women and children improved critical healthcare. In Ghana drones deliver

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6 Frey C, Osborne M & C Holmes, *Technology at Work v2.0: The Future is Not What it Used to Be, Citi GPS: Global Perspectives and Solutions*. Oxford: University of Oxford, 2016.

7 *Ibid.*

8 Jules TD (ed.), *The Global Educational Policy Environment in the Fourth Industrial Revolution: Gated, Regulated and Governed*. Bingley: Emerald Group Publishing Limited, 2017.

9 Howcroft D & J Rubery, *Gender Equality Prospects and the Fourth Industrial Revolution*, Policy Network, 29 April 2018, <https://policynetwork.org/opinions/essays/gender-equality-prospects-fourth-industrial-revolution/>, accessed 12 July 2019.

10 Chimedza TL, 'Women, precarity, and the political economy of the Fourth Industrial Revolution', *Buwa: A Journal on African Women's Experiences*, 9, 2018, pp. 96-101.

11 Chiweshe MK & S Bhatasara, 'Women in agriculture in contemporary Africa', in Yacon-Halisa O & T Falola (eds.), *The Palgrave Handbook of African Women's Studies*. Cham: Springer International Publishing AG, 2019.

yellow fever vaccines<sup>12</sup> and in general, advances in the biomedical field are expected to improve maternal health and access to clean water, among others.<sup>13</sup>

The Internet of Things (ie, increased connectivity of devices at home and in the office to the Internet) provides spaces for women to improve work-life balance through the ability to work from home with flexible working hours.<sup>14</sup> Connectivity, especially for professional women in urban Africa, will also allow access to multiple resources – such as mentoring and educational resources – that will help improve their skills and thus their marketability.

The care economy worldwide is driven by an ever-increasing elderly population, owing to improvements in the standard of living and healthcare. This sector will require advances to a level of complexity that AI has yet to reach.<sup>15</sup> In Africa, this sector currently involves unpaid work by women who, because of traditional norms, dominate the domestic sphere. There is a need to better understand this economic space and how women can leverage their presence to ensure they turn their labour into economic benefit. This will also require specific policy and legislative measures that support recognition of the care economy.

Studies show that if societies educate girls in science, technology, engineering, and mathematics (STEM) at a younger age and adequately prepare women to enter the workforce, the potential for overall economic growth and development is increased.<sup>16</sup> Governments and the private sector in Africa would be advised to initiate and improve existing programmes focused on young women in STEM. There are many examples of such programmes run by companies and agencies such as Google, Amazon, the US National Aeronautics and Space Administration and various universities. These programmes can be used as models for African states to build up women's participation in STEM. In South Africa there are also good examples of such programmes, such as Code for Cape Town,<sup>17</sup> described as 'a community of young women tech leaders'.

The fast-paced nature of technological development in micro-systems in the energy and communications sectors, for example, provides opportunities for the many parts of Africa that have largely operated outside traditional infrastructure patterns. Now, instead of requiring centralised electricity transmission grids, decentralised micro-grids (mostly solar power) can provide the necessary electricity for rural villages.<sup>18</sup> Yet micro-grids still require massive upfront investment. Governments must involve the private sector. For example,

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12 Asiedu KG, 'Drones are helping Ghana's mothers fight yellow fever', World Economic Forum, 1 May 2019, <https://www.weforum.org/agenda/2019/05/an-ambitious-drone-delivery-health-service-in-ghana-is-tackling-key-logistics-challenges>, accessed 7 May 2019.

13 USAID, 'Maternal Health Strategy 2014–2020: Toward Ending Preventable Maternal Mortality', <https://www.mchip.net/sites/default/files/mchipfiles/USAID%20MH%20Strategy%20Apr.22.14.pdf>, accessed 9 July 2019.

14 Future of Work Institute, *The Benefits of Flexible Working Arrangements: A Future of Work Report*, August 2012, <https://www.bc.edu/content/dam/files/centers/cwf/individuals/pdf/benefitsCEOFlex.pdf>, accessed 17 April 2019.

15 Durano M, 'Globalisation and the future of women's work', *Buwa: A Journal on African Women's Experiences*, 9, 2018, pp. 11–17.

16 Moore B, 'The Fourth Industrial Revolution: What it means for women', Connected Women of Influence, <https://connectedwomenofinfluence.com/the-fourth-industrial-revolution-what-it-means-for-women/>, accessed 7 March 2019.

17 See Code 4 CT, <https://code4ct.com/>, accessed 12 July 2019.

18 Harvey R, 'Damned If You Dam: Tanzania's Energy Dilemmas', SAIIA (South African Institute of International Affairs) Occasional Paper, 281, June 2018, <https://saiia.org.za/research/damned-if-you-dam-tanzanias-energy-dilemmas/>, accessed 1 June 2019.

mobile telephone companies may be encouraged to invest in such systems to power their cell phone towers in remote areas.

There are also opportunities related to retraining programmes for women who lose jobs to automation. These programmes should be focused on emerging industries such as renewable energy, and focus on supporting entrepreneurial initiatives by women, especially in rural areas.

Countries such as South Africa have appointed commissions on the 4IR, mainly as a response to the World Economic Forum 2018 report,<sup>19</sup> which emphasises the need to become 'future-ready'. In the South African case, gender was not central in setting up the commission but there is scope to advocate for gender mainstreaming in its work.

## Threats

The 'gig economy'<sup>20</sup> that has emerged out of the 4IR poses a serious threat to the small gains women have made in industries across Africa. Over time women have gained rights such as maternity leave, pensions and equal pay in some industries. These protections will be lost, as Bhatasara and Chirimambowa argue: 'Even though people working in this virtual economy have been described by fancy names such as "micro-entrepreneurs", "gigs", "contractors", and "freelancers", the evidence points to a story of turmoil and super-exploitation of workers.'<sup>21</sup>

It is also important to note that most women in Africa are employed in industries such as agriculture where such protections and rights are absent. In many ways, they are already involved in flexible, low-paying and task-specific jobs that offer little protection for workers. The 4IR thus does not provide any promise of improvement for women in low-skilled professions. These jobs are also at risk of automation, as noted earlier, thus further increasing women's vulnerability.

The use of big data, computer algorithms and AI provides a false sense of fairness in how people are treated in terms of accessing credit, having their productivity measured and even being hired for a job.<sup>22</sup> The assumption is that computer programmes are bias free and algorithms can reduce the influence of gender, race, age or any other factors that may affect how people are evaluated. However, algorithms are programmed by humans and as such have inbuilt gender bias in their language, indicators and measurements,

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19 World Economic Forum, *The Global Competitiveness Report 2018*, <http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf>, accessed 1 June 2019.

20 A gig economy is a free market system in which temporary positions are common and organisations contract with independent workers for short-term engagements. The term 'gig' is slang for 'a job for a specified period of time' and is typically used in referring to musicians. See WhatIs.com, 'Gig economy', <https://whatis.techtarget.com/definition/gig-economy>, accessed 8 July 2019.

21 Bhatasara S & TC Chirimambowa, 'The gender and labour question in the future of work discourses in Southern Africa', *Buwa: A Journal on African Women's Experiences*, 9, 2018, pp. 23-28.

22 Williams BA, Brooks CF & Y Shmargad, 'How algorithms discriminate based on data they lack: Challenges, solutions, and policy implications', *Journal of Information Policy*, 8, 2018, pp. 78-115.

which in many ways perpetuate inequalities.<sup>23</sup> For example, algorithms that measure the productivity of workers may not take into account historical, cultural and social factors such as work-life imbalances that women have to deal with in patriarchal societies.

While Africa is rapidly urbanising, almost 60%<sup>24</sup> of the population still live in rural areas. In most countries, women form the majority of these rural populations, which are still not connected to the Internet. Access to the Internet is hampered by the fact that most parts of rural Africa did not benefit from earlier industrial revolutions, including investment in infrastructure such as roads and electrical grids that can facilitate Internet accessibility. As noted above, there are opportunities for the development of micro-grid alternatives in rural areas, but there must be incentives for large investment for this to take place. As such, for the majority of girls attending rural schools, access to many technological advances will remain a farfetched dream.

A survey of the most promising future jobs shows that they will rely heavily on the STEM skillset, yet 'it is estimated that only one in six African graduates across the continent are in STEM and that the continent has a gap of about 1 000 000 researchers based on international best practice'.<sup>25</sup> Research has shown that fewer girls than boys take STEM subjects in Africa.<sup>26</sup> This means that gender disparities will likely be entrenched as women are excluded from the emerging STEM-dominated job market.

Patriarchal systems in post-colonial African culture have evolved somewhat in the face of growing feminist and rights-based challenges, but remain largely entrenched within the state and traditional governance systems. This creates multiple vulnerabilities for women, including gender-based violence and exclusion from land ownership.<sup>27</sup> Technological advances in Africa have not been met by a change in socio-cultural systems, which underpin women's exclusion and gender disparities.<sup>28</sup> The danger is that the new technologies will entrench these patriarchal inequalities, as women still lack access to resources such as land, technology and credit. Previous industrialisation processes in Africa largely reproduced women's exclusion from the workspace and led to their being relegated to low-paying jobs and the unpaid care economy. Bhatasara and Chirimambowa conclude that the 4IR is most likely to perpetuate the structural nature of inequality.<sup>29</sup> While the number of women moving into senior positions and earning good salaries is increasing, on a broader scale, the historical and cultural gendered inequalities are likely to persist.

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23 Williamson-Lee J, 'How machines inherit their creators' biases', *Medium*, 9 July 2018, <https://medium.com/coinmonks/ai-doesnt-have-to-be-conscious-to-be-harmful-385d143bd311>, accessed 9 July 2019.

24 FAO (Food and Agriculture Organization), *Leaving No One Behind: Empowering Africa's Rural Women for Zero Hunger and Shared Prosperity*, <https://reliefweb.int/sites/reliefweb.int/files/resources/CA1506EN.pdf>, accessed 23 April 2019.

25 Kanza ES, 'In Africa, girls will lead the Fourth Industrial Revolution', *World Economic Forum*, 8 March 2016, <https://www.weforum.org/agenda/2016/03/in-africa-girls-will-lead-the-fourth-industrial-revolution/>, accessed 22 April 2019.

26 Sichangi MW, 'Why are girls and women under-represented in science-related fields in Africa?', *Global Partnership for Education*, 10 February 2017, <https://www.globalpartnership.org/blog/why-are-girls-and-women-under-represented-science-related-fields-africa>, accessed 1 May 2019.

27 Tyagi R, 'Understanding postcolonial feminism in relation with postcolonial and feminist theories', *International Journal of Language and Linguistics*, 1, 2, 2014, pp. 45-50.

28 Chimedza TL, *op. cit.*

29 Bhatasara S & TC Chirimambowa, *op. cit.*

# Policy recommendations

States should take the following steps to maximise women's inclusion in the economic benefits of the 4IR:

- Implement robust policy frameworks for social inclusion programmes in education to train more young women in science, technology, engineering and mathematics.
- Initiate retraining programmes focused on increasing the presence of women entrepreneurs in renewable energy industries, especially in rural areas.
- Roll out industrialisation programmes that promote women's advancement through a variety of affirmative action programmes across sectors. These would include special funds to promote female entrepreneurship in STEM-related industries.
- Set up 4IR commissions with a key objective being to mainstream gender in the industrial policies of African countries.
- Realign labour laws and policies to the new realities of work to ensure workers are protected from the negative impacts of the 4IR.
- Provide safety nets for workers who lose their jobs to automation.

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## Cover image

Young African woman working on her laptop at university in Bamako, Mali (Getty Images)

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