

Chapter 7

Navigating Emerging Challenges in Robotics and Artificial Intelligence in Africa

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ABSTRACT

Artificial intelligence (AI) and robotics are becoming more popular globally, which makes Africa a potential hub for innovation and development in these fields. However, for the full benefits of these technologies to be realized, it is vital to understand and deal with the unique challenges and barriers that make it hard for them to be used and integrated in Africa. This chapter presents an overview of the current state of robotics and AI in Africa and explores the challenges associated with their adoption, including infrastructure limitations, inadequate technical expertise, and ethical considerations. It further discusses potential strategies for overcoming these challenges, such as investment in infrastructure and education, international collaboration, and the development of ethical frameworks for AI. Finally, the chapter suggests some future directions for continued attention and investment in the responsible and equitable development of AI and robotics in Africa to benefit stagnant and slow-growing African economies.

INTRODUCTION

In the past few years, the robotics and artificial intelligence (AI) fields have grown and changed uniquely and impacted many industries and sectors worldwide (Bhagwan & Evans, 2023). These technologies can potentially revolutionize how we live and work, creating new opportunities for economic growth and development. However, as with any new technology, there are problems to solve, especially in places like Africa that are still developing (Ade-Ibijola & Okonkwo, 2023; Kamau & Ilamoya, n.d.). Even though the continent is quickly adopting new technologies, significant problems still make it hard for robots and AI to be widely used and integrated. In this situation, it is essential to figure out how to deal with

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the problems and use the benefits of these technologies to support long-term growth and social progress (Nyholm, 2023; Shafik, 2024). Using a desktop research approach, this chapter critically engages the AI literature in order to examine some of the new problems that have arisen with the emergence of robotics and AI use in Africa and possible ways to solve them.

Before engaging the substantive issues for this chapter it important to provide a snapshot of the geography of the African continent. Africa is a continent that has 54 countries with an area of 30,370,000 km² and 1.4 billion individuals as of 2021, making 18% of the biosphere's people, subdivided into five major regions, like Northern Africa (with countries like Libya, Egypt, North Sudan, Algeria, Morocco, and Tunisia as demonstrated in Figure 1) inhabiting the northerly region of Africa. The most densely inhabited subregion of Africa is East Africa, with approximately 456 million people. There are two dependencies, and 18 countries which use the Swahili language as their eastern community language, with the majority practicing Islam and Christianity (Bainomugisha et al., 2023; Wang et al., 2023). These countries are Kenya, Madagascar, Mauritius, Zimbabwe, Malawi, Zambia, Comoros, Eritrea, Ethiopia, Djibouti, Mozambique, Uganda, Tanzania, Burundi, South Sudan, Somalia, Seychelles, and Rwanda, as demonstrated in Figure 2 as of the world atlas. Tanzania, Rwanda, South Sudan, Ethiopia, and Kenya are the fastest-growing nations due to AI and robotic involvement in economic and social well-being (Ruttkamp-Bloem, 2023).

Figure 1. North African countries



West Africa comprises of one dependency and 16 countries (Benin, Sierra Leone, Togo, Niger, Mali, Senegal, Nigeria, Mauritania, Cabo Verde, Guinea-Bissau, Burkina Faso, Ivory Coast, Guinea, Ghana, Gambia, Liberia), with Nigeria being the largest with the largest capital city. In this region, Burkina Faso, Niger, and Mali are landlocked countries; the geographical positions of these countries are illustrated in Figure 3. On the other hand, middle Africa is situated in the middle of Africa with nations like Sao Tome and Principe, Cameroon, the Democratic Republic of the Congo, Equatorial Guinea, Congo, the Central African Republic, Chad, Gabon, Angola, and South Africa situated in the southern part of the continent has countries South Africa, Eswatini, Botswana, Namibia, and Lesotho in Figure 4 and Figure 5, respectively.

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