

Embracing the AI Revolution

The Implications for Research and Education

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Artificial Intelligence

*The development and deployment of Computer Systems or Machines that can perform tasks requiring **Human-like Intelligence**, such as*

- (1) Learning**
- (2) Problem-Solving**
- (3) Decision-Making**

Artificial Intelligence: The Taxonomy

- *Single Task AI*
- *Agentic AI (Autonomously, make decisions, and pursue goals)*
- *Generative AI (ChatGPT 5, Gemini, Grok 4, Deepseek-R1)*
- *Artificial General Intelligence*
- *Superintelligence (Singularity, Intentionality)*

Generative AI

- *Generative AI (Gen AI) is a special type of AI that uses algorithms & models to create new content or novel ideas.*
- *This can include the creation of images, music, text, reports, or even entire virtual environments.*
- *– New content and knowledge.*
- *Recent highly popular examples of Gen AI are OpenAI's ChatGPT 5, Google's Gemini (Ultra, Pro, Flash & Nano) and Stability AI's Stable Diffusion; xAI's Grok 4*

Artificial General Intelligence

*A computer system or machine that will exhibit **ALL** human **Cognitive Capabilities** (reasoning, problem-solving, creativity, and social skills)*

Dangers and Risks of AI

- *Algorithmic bias: AI can reinforce societal inequalities.*
- *Data security risks: Vulnerable to breaches and misuse.*
- *Job displacement: Reduction of employment opportunities.*
- *Ethical misuse: AI could be used for manipulation or harm*
- *AI in the hands of bad actors (fake news, disinformation, misinformation, cybercrime)*
- *Hallucinations (wrong answers, fictitious references/citations)*
- *Widening of global inequality*
- *Data colonialism & Digital Imperialism*
- *Techno-Feudalism*
- *An AI-driven Arms Race*

AI Semiconductor Industry

- *Semiconductor Industry (Design and Fabrication)*
- *Building processors that power AI Systems*
- *CPUs, GPUs, NPUs*

Chips that power AI

- *Specifically ChatGPT & LLM in general*
- *The chip industry is dominated by TSMC and NVIDIA*

NVIDIA

- Producer of **chips that power** AI systems
- **Biggest company in the world (by Market Cap)**

● **NVIDIA** **US\$5.00 trillion**

(The first to reach that mark, **29/10/2025**)

● **Microsoft** **US\$4.03 trillion**

● **Apple** **US\$4.00 trillion**

Impact of AI on Jobs

AI won't replace employees, ***but***
employees who use AI will replace
those who don't!

Really? Is this always true?

AI Impact on Jobs

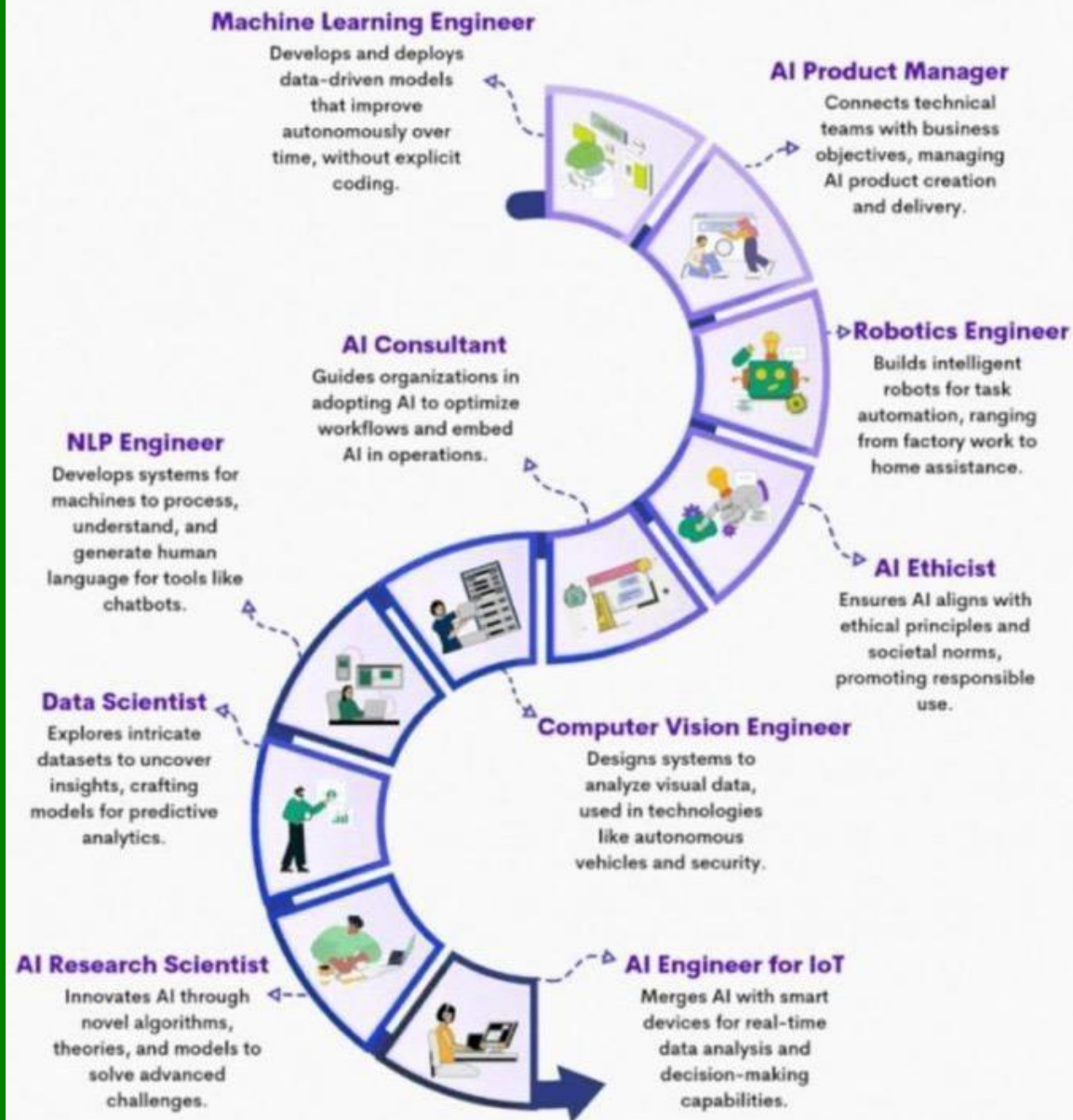
1. **THREE CATEGORIES**

- *Job displacement (Job Losses)*
- *Job modification (Human Augmentation)*
- *Creation of NEW Jobs*

2 **WHAT NEEDS TO BE DONE**

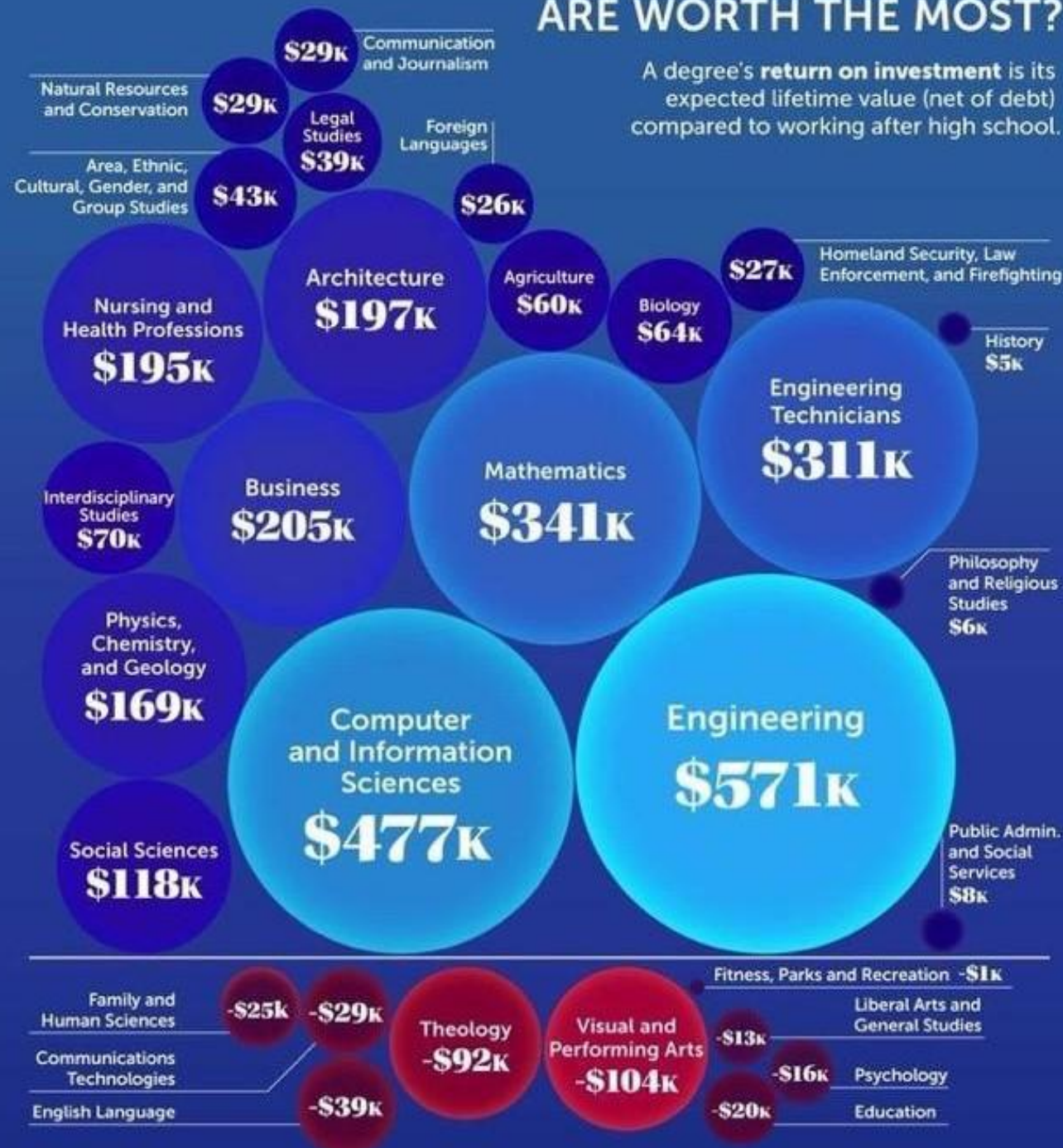
- *Reskilling job losers*
- *Reskilling & preparation for modified jobs*
- *New skills, capabilities & competencies to take advantage of NEW jobs*
- *Continuous reskilling/education as AI evolves*

Careers In AI



ARE WORTH THE MOST?

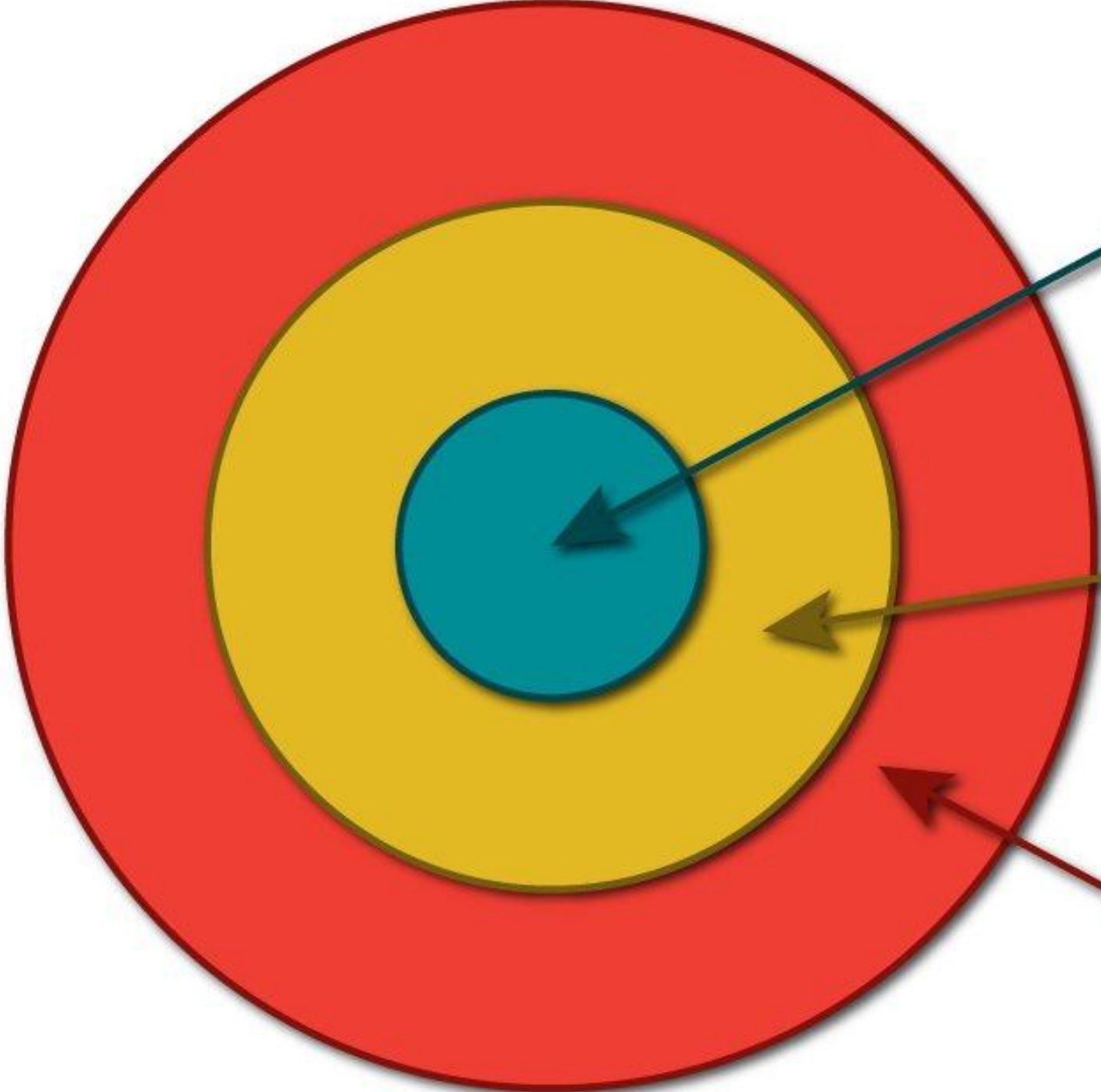
A degree's **return on investment** is its expected lifetime value (net of debt) compared to working after high school.



The Emphasis

- *Employability (not **long-term** employment)*
- *Entrepreneurship → Capacity to **CREATE** jobs, companies & industries*
- *Human Capital Developers (e.g. **Universities**) must **TRACK** and **MEASURE** these two*

How to Embrace AI in Africa



Circle of Control

Circle of Influence

Circle of Concern

*However, We Must Not Put
the Cart Before the Horse*

Enabling **Africa to Embrace AI**

- *Awareness*
- *Basic Infrastructure*
- *Energy*
- *Digital Infrastructure*
- ***Compute Infrastructure***
- ***Data***
- *Financial resources*
- *Talent and Expertise*

Enabling **Africa to Embrace AI** (cont.)

- *AI Governance and Regulations*
- *AI Ecosystem*
- *Organisational Preparedness*
- *Right Mindset*
- *Basic Education and Literacy*

Why Focus on Africa?

Why Leverage Continental Integration & Unity?

- *Amount of **energy** required*
- *The necessary **financial resources***
- *The required **talent***

United Africa -- the Numbers

We are part of the **Global South (the Global Majority)**: 6.6 billion people (out of 8 billion)

1.4 billion people.

GDP USD 3.4 Trillion

Global Africa 2.2 billion people; USD 5 Trillion

21st Century Pan-Africanism

Driven by

1) Transformational Technologies

2) Entrepreneurship

3) Technocratic Leadership based on merit

4) Inclusive Development and Shared Prosperity



Revolutionizing Agriculture



Transforming Healthcare



Enhancing Financial Services



Personalizing Education



Improving Public Services



AI Systems for Agriculture

- *Precision Farming*
- *Crop Monitoring and Disease Detection*
- *Automated Machinery*
- *Yield Prediction and Analysis*
- *Livestock Management*

AI for Infrastructure Development

- *Smart traffic management*
- *Predictive maintenance*
- *Automated construction*
- *Energy efficiency optimisation*
- *Damage detection*

AI Systems for Mining

- *Predictive equipment maintenance*
- *Mineral exploration and mapping*
- *Autonomous drilling and hauling*
- *Ore grade analysis*
- *Safety monitoring and hazard detection*

Concluding Remarks

***The AI Revolution demands
a Writing Culture***

***Africans must contribute to
AI Thought Leadership***



SPRINGER NATURE
Sustainable Development Goals Series

SDG: 9
Industry, Innovation and Infrastructure

An aerial photograph of a modern architectural complex, possibly a university or research center, situated on a peninsula or near a large body of water. The buildings are multi-story and feature curved, organic shapes. A road with several lanes curves around the buildings. A small boat is visible on the water in the foreground.

Arthur Guseni Oliver Mutambara

Deploying Artificial Intelligence to Achieve the UN Sustainable Development Goals

Enablers, Drivers and Strategic Framework

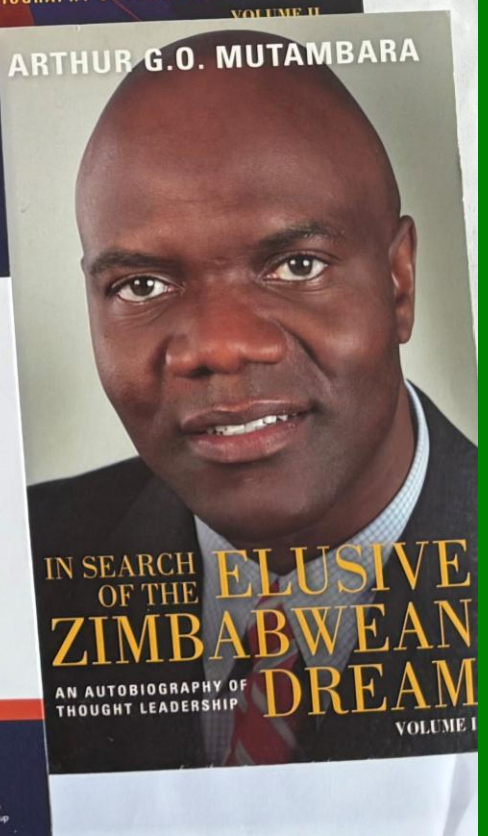
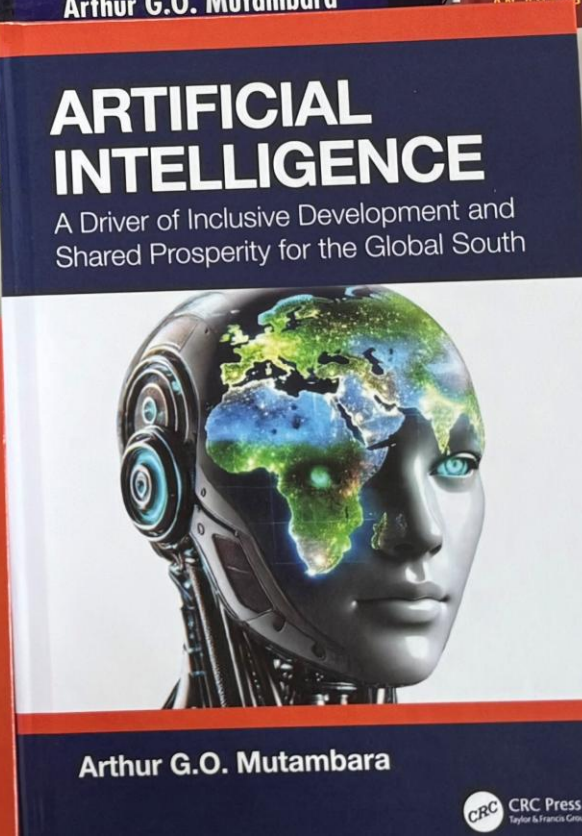
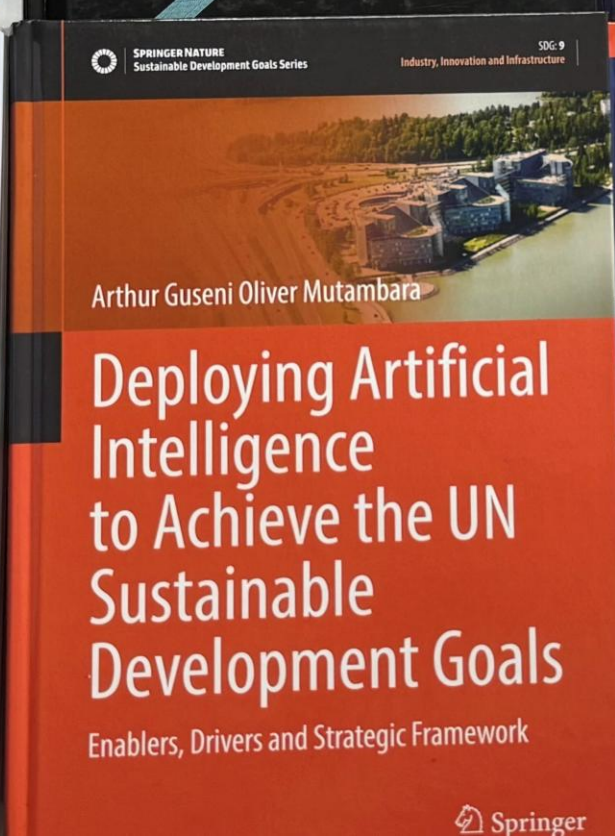
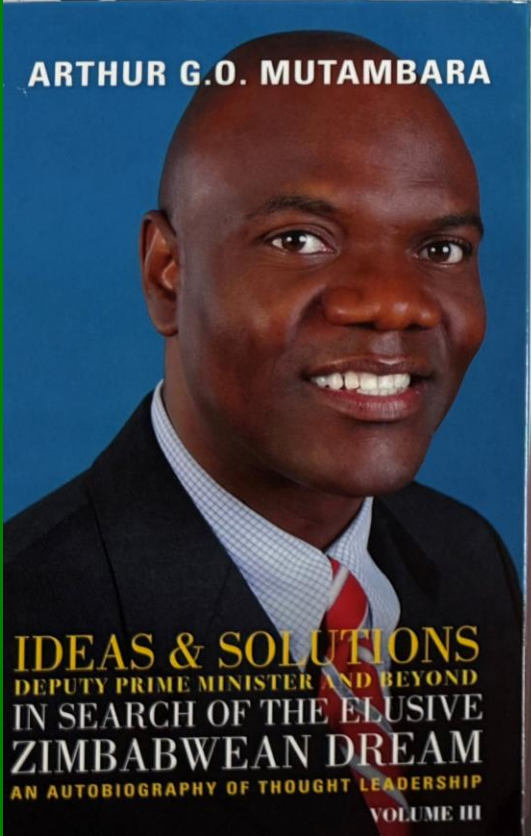
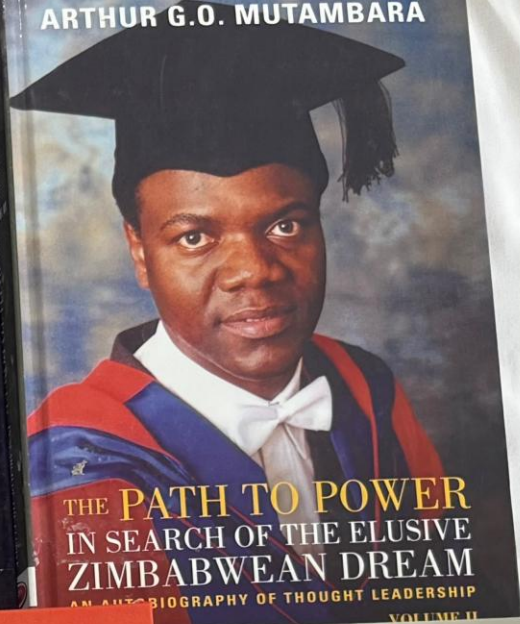
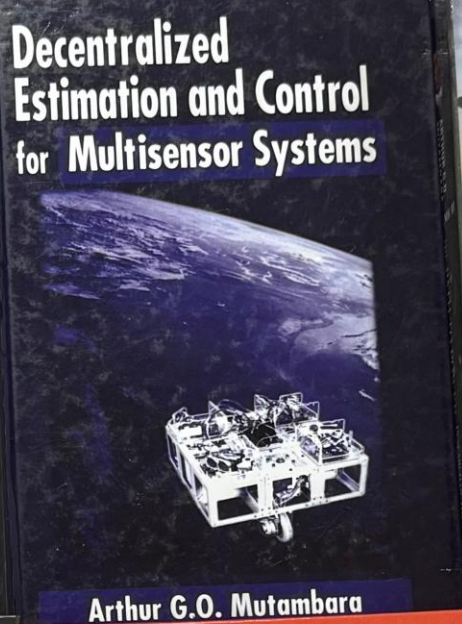
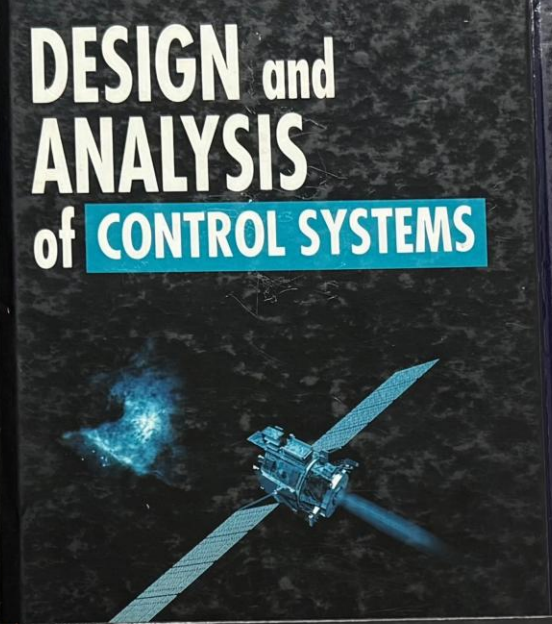
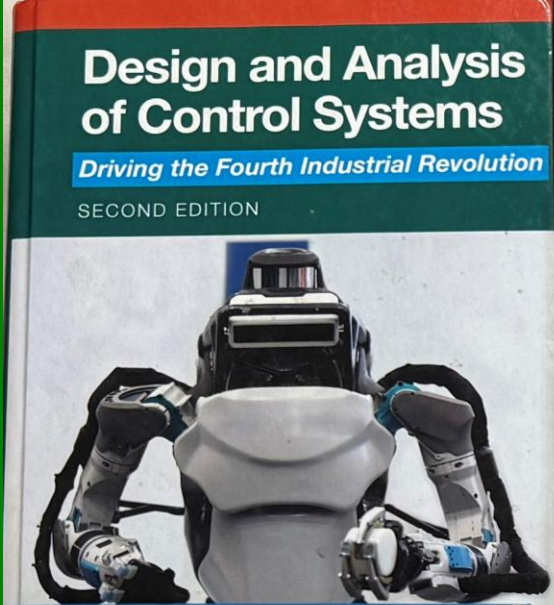
 Springer

ARTIFICIAL INTELLIGENCE

A Driver of Inclusive Development and
Shared Prosperity for the Global South



Arthur G.O. Mutambara



We must write

It is Publish or Perish

*We need **both***

A Writing Culture

&

*A **Reading Culture***

Concluding Remarks

Embracing the AI Revolution

Will Rise or Fall on Leadership

- *Political Leadership*
- *Economic Leadership*
- *Business Leadership*
- *Civic Society Leadership*
- *Academic Leadership*
- *Leadership in Building THINGS (not just consuming)*
- *Leadership in Adopting and Creating AI*

Embracing AI in Africa is not a
Nice-to-Have

It is an existential matter
(Adopt AI or Die)

Research and Education

Cannot be business as usual

Thank You