The Role of Artificial Intelligence in Future Technology
An Essay Based on Immanuel Wallerstein's World-System Theory

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1 Introduction

According to Wallerstein's World-system theory, the world is divided into three main parts in the hierarchy: Core, periphery and semi-periphery. The core nations are wealthy and are advanced in technology, the periphery nations are poor, less developed nations that are providing raw materials and cheap labor, and semi-periphery nations fall in between[1]. The core nations race against each other to become the next hegemonic power and expand their influence whilst periphery and semi-periphery nations try to move up on the hierarchy[2]. Differences between these three main parts makes them have different technological needs and aims.

This essay aims to explain the potential role of artificial intelligence in future technology for each of three main parts (Core, semi-periphery and periphery). With every main part, current needs of the nations/regions and government agendas are taken into consideration. The essay expands with a general take on the role of artificial intelligence in worlds changing technologies.

2 Main Parts

2.1 Core Nations

In the modern age, rival core nations compete each other for technological supremacy, which includes but not limited to AI. An example of this is the race between the USA and China. Both nations have national AI strategies and investments[3][4]. The US Congressional Research Service, releasing their research on AI, showing their intentions of using AI in their military[5]. In the US companies like Figure and Nvidia are paving the way for humanoid robots and generative AI[6][7]. In the future, the US could try to integrate these advancements into their army by using humanoid robots that dynamically adapt

to situations without need for human intervention, enhancing defence systems. These AI powered robots could also be used in our daily tasks, such as cleaning robots working when the designated environment is cluttered or chef robots cooking meals based on individual preferences, so that people can have more time for themselves.

China, on the other hand, has made a significant impact on facial recognition and smart city technologies[8]. With their "New Generation AI Development Plan" (2017)[3], China aims to lead the world in visual and voice recognition, industrial robots and unmanned driving with the use of AI[3][4]. With unmanned driving technologies getting advanced with AI, cities implement real-time adjusted traffic lights, AI determined coordination for medical emergency deliveries and so on.

Another core region to take into consideration is the European Union. The EU is rolling out the "NextGenerationEU" plan for large-scale financial support to public investments and areas such as green and digital projects, spending almost €800 billion euros. Making investments in clean technologies, digitalization of public administration, sustainable transportation and so on[9]. To implement these changes more efficiently, AI must be used in these areas. Newer technologies equipped with AI ought to be implemented in buildings to reduce energy consumption, public transports to have more efficient routes, and improve the current state of renewable energy generators with automated maintenance and AI powered optimization.

2.2 Semi-Periphery Nations

Whilst core nations race against each other, semi-periphery nations try to leverage AI technologies strategically to advance their positions in the global hierarchy. While core nations lead the way in AI innovations, semi-periphery nations are trying to catch up and adapt to newer technologies. An interesting case for a Semi-Periphery nation is Türkiye.

Türkiye has a strategic location acting as a bridge between Asia and Europe. With their unique location, they can try to leverage the AI innovations of both continents. Turkish government released their "National Artificial Intelligence Strategy 2021-2025" (2021), aiming for AI expenditures to reach 15% of total R&D expenditure and strengthening the digital infrastructure and data ecosystems by developing sectoral cloud platforms, improving access to high-quality data and technical infrastructure such as high-performance computing, data storage.[10]

With these investments and their private sector, Türkiye can enhance their locally needed technological improvements with AI. Improving automation and quality control, optimizing the supply chain in their manufacturing, since the manufacturing industry makes %19.5 of their GDP.[11]

2.3 Periphery Nations

While different regions of the world have peripheral nations, this essay will specifically refer to Sub-Saharan countries. Sub-Saharan Africa had a population of 1.106 billion people in 2019 — a 117.77% increase from 1990.[12] According to the current path forecast, it will grow further by %77.38 to 1.962 billion in 2043.[13] With this increase in population and people employed in agriculture making %52.6 of population in 2021[13], these nations are in dire need to improve their agriculture technologies. Another factor to consider with this projection is the need for better education, with ages between 0-16 making up a big percentage in these countries.

According to UN data, only %53.5 of urban and %13.3 of rural population were using safely managed drinking water[13][14] and only %23.5 of urban and %19.4 of rural population were using safely managed sanitation in 2021[14][15]. With these numbers, Sub-Saharan nations urgently need to focus on implementing modern technologies regarding safe water access. Using AI in their water distribution systems on agriculture lands for times of drought. These nations also leverage smarter farming technologies for resource management, using automated and optimized systems adapted to environmental and climatic changes.

3 Further Discussions

The world is heading in a direction where chatbots are more involved in our lives. With more companies founded and technological advancements made in Large Language Models (LLM), websites could have easier to use appointment systems, better and faster help services for users. In the future, when reliable medical-based LLMs are created, doctors could use chatbots for faster diagnosis helping more patients in shorter time and provide health care to more people.

Another big concern in our world is climate change. Google's DeepMind AI has been used to make better weather models, help scientists track and better understand the effects of climate change on ecosystems and biodiversity.[16] AI can be used to significantly improve the efficiency of nuclear power plants by integrating machine learning algorithms and advanced data analysis, plants can optimize operations and improve safety measures. For instance, AI systems can analyze large amounts of data in real time, identifying anomalies and predicting maintenance needs.[17] This makes AI an important piece in green energy technologies and the climate change.

4 Conclusion

Every nation has a different take on technology. While some nations use technological advancements on their armies, some use it to improve their industries, and others to meet the basic needs. The thing that is common for all nations is AI's importance in the world's and its technological future. Every nation with hope for tomorrow must use it to its full potential based on their current needs.

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