SCIENCE AND TECHNOLOGY

WHERE ARE WE?

Five emerging technologies will potentially transform society.

1. Genome Editing

Genome editing: A technique used to make specific and intentional additions, deletions, or alterations to genetic material. It could:

- prevent, treat, or cure medical conditions
- create unintended and unforeseen genetic changes in the population

2. Artificial Intelligence and Automation

Artificial intelligence (AI) could:

- produce smarter machines that perform more sophisticated tasks
- disrupt the job market by eliminating jobs and creating others with new skill requirements

While its use is expected to grow, AI that is as intelligent as a human is not expected to occur in the next 20 years.

3. Quantum Information Science

Quantum information science: uses the behavior of atoms or molecules to obtain and process information in ways that existing systems cannot. It could:

- drastically improve information acquisition, processing, and transmission

4. Brain/Augmented Reality

Brain-computer interfaces: systems that connect the human brain to an external device. Research is ongoing to create implantable versions that could, for example, compensate for vision loss or hearing impairment.

Augmented reality: superimposing a digital image onto a view of the real world through a device, such as a smartphone camera. It is a new trend in entertainment, education, and health care.

5. Cryptocurrencies and Blockchain

Cryptocurrencies: virtual currencies—digital representations of value that are not government-issued—that operate online and verify transactions using a public ledger called **blockchain**.

Cryptocurrencies offer:

- benefits such as anonymity and lower transaction costs
- drawbacks such as making it harder to detect money laundering and other financial crimes

Blockchain could:

- reshape financial services
- have more security vulnerabilities as quantum computing, an area of quantum information science, develops

WHAT ARE THE IMPLICATIONS?

Continued **debate, study, and evaluation** are needed in the public sector to consider the potential implications:

economic   ethical   privacy   safety   security   societal

GAO