OPPORTUNITY 6

SCOPE TRANSITIONAL

UNCERTAINTIES

Technology, Values

MEGATRENDS

Advanced Health and Nutrition

TRENDS

Artificial Intelligence
Genomics
Human–Machine
Personalised Medicine
Sensor Technologies

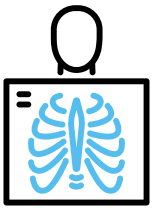
SECTORS IMPACTED

Agriculture & Food
Chemicals & Petrochemicals
Consumer Goods, Services & Retail
Cyber & Information Security
Data Science, AI & Machine Learning
Digital Goods & Services
Education
Financial Services & Investment
Government Services
Health & Healthcare
Insurance & Reinsurance
Materials & Biotechnology
Professional Services

What if the future of radiology was personalised?

THE POWER OF RADIO

Advances in imaging, genomics, and advanced machine intelligence enable personalised radiology, improving diagnoses, treatment, and public health policies on communicable and non-communicable diseases.



Radiology is set to be at the forefront of new avenues

for integrated diagnosis (the integration of radiology, pathology, and genetics)

WHY IT MATTERS TODAY

Global deaths from chronic diseases increased from 67% in 2010 to 74% in 2019,[282] and the World Health Organization projects that chronic diseases will cause 86% of deaths annually by 2050.[283] Effective prevention and management are crucial for enhancing health.

Medical imaging involves creating visual representations of the human body's structure and function.[284] It encompasses various technologies, such as X-ray, computed tomography (CT), magnetic resonance imaging, positron emission tomography, and ultrasound, essential for diagnosing and treating diseases.[285] While not all techniques – electroencephalogram and electrocardiogram, for example – create images, they all provide valuable data.[286] The worldwide market for diagnostic imaging was estimated to have had a value of $36.5 billion in 2023 with a CAGR of 4.2% between 2023 and 2033 forecast.[287]

The rise in chronic disease, together with lifestyle changes and ageing populations, has increased the demand for imaging examinations.[288] The global population aged 65 and over is expected to more than double by 2050, increasing from 761 million in 2021 to 1.6 billion.[289] However, there is a global shortfall in radiologists as well as limited training capacity, burnout, and gaps in subspecialisation.[290]

While still emerging, AI is expected to play a key role in radiology as in all other areas of medicine. For example, AI systems developed at the University of Adelaide can analyse CT scans to predict patients' probability of dying within the next five years. Trained on a sample of 16,000 images, the systems have been 69% accurate.[291]
A survey among European Society of Radiology's members shows that 67% of radiologists are already incorporating AI in clinical practice.[292]

With full sequencing of the human genome in 2022,[293] the expected proliferation of genomic data,[294] and the anticipated rapid growth of AI in the healthcare market (CAGR of 36.4% between 2024 and 2030),[295] radiology is set to be at the forefront of new avenues for integrated diagnosis (the integration of radiology, pathology, and genetics).[296]

OPPORTUNITY

Besides better imaging technologies driven by advances in diagnostic imaging techniques (X-ray, CT, ultrasound, etc.),[297] camera technologies,[298] and nanotechnology and evidenced in neuroimaging,[299] the integration of imaging data, genetic information, and advanced machine learning[300] allows personalised radiology to provide detailed insights into an individual's health. This integration improves the accuracy of diagnosis and treatment, and enables better public health policies and efficiencies of scale and scope, from symptoms to diagnosis.

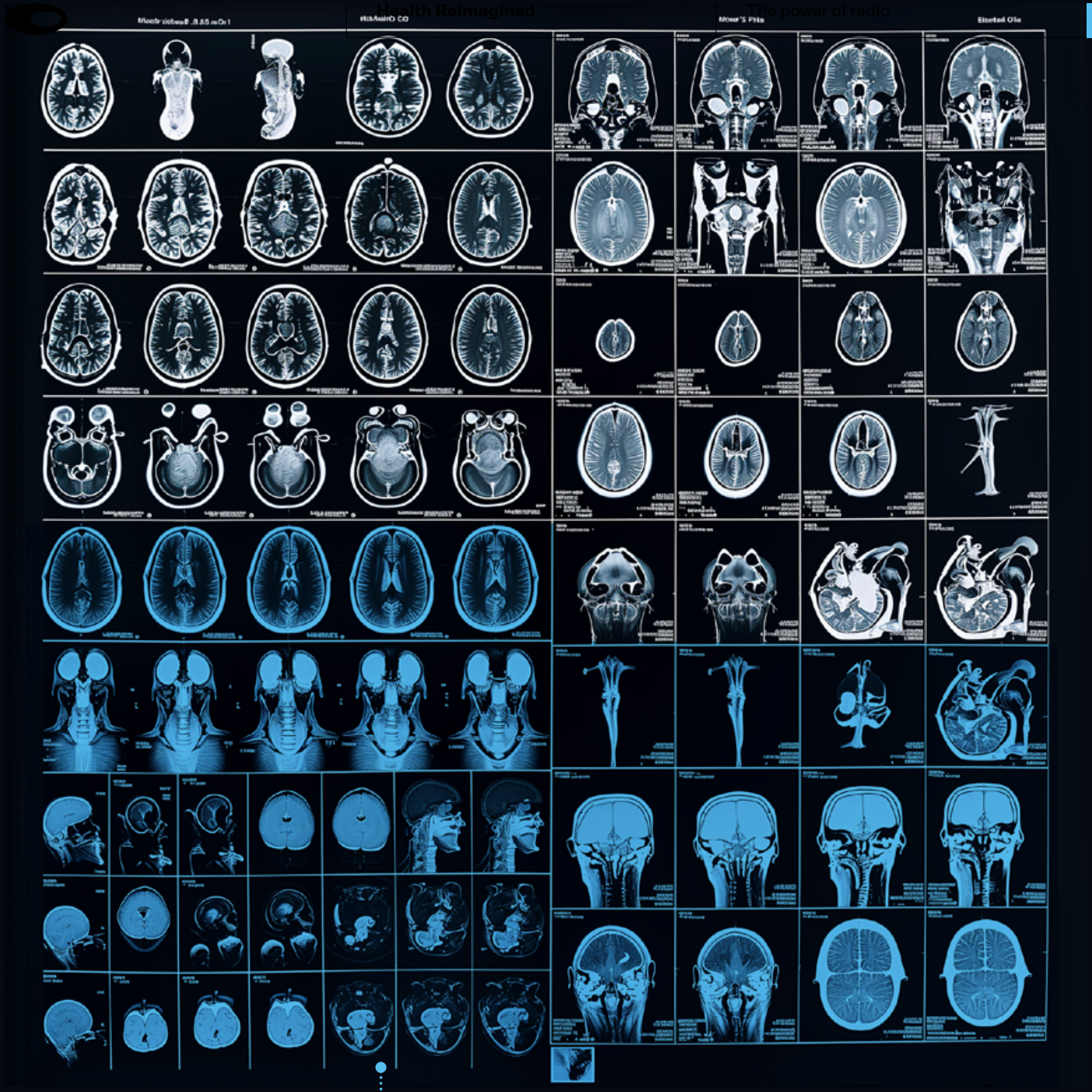
The integration eventually leads to the automation of reporting, highlighting key aspects for further analysis and shifting the radiologists' main focus from reading images and extracting anomalies to analysing anomalies and making connections, supporting clinical decisions.

BENEFITS

Personalised radiology improves treatment, facilitates the development of improved public health policies, and allows greater efficiencies in the process of diagnosis.

RISKS

Besides the usual concerns regarding data privacy and confidentiality in healthcare, over-reliance on advanced machine learning could overlook exceptions and anomalies, potentially increasing health risks for patients. Moreover, the complexity of combining high-quality medical images with genetic markers and information might restrict implementation and benefits to wealthier nations.



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