



OPPORTUNITY

33

SCOPE **WITHIN REACH**

UNCERTAINTIES

Technology, Collaboration

MEGATRENDS

Future humanity

TRENDS

Artificial Intelligence
Cross-sectoral Partnerships
Ideation, IP & Entrepreneurship
Mobilising Innovation
Open Data

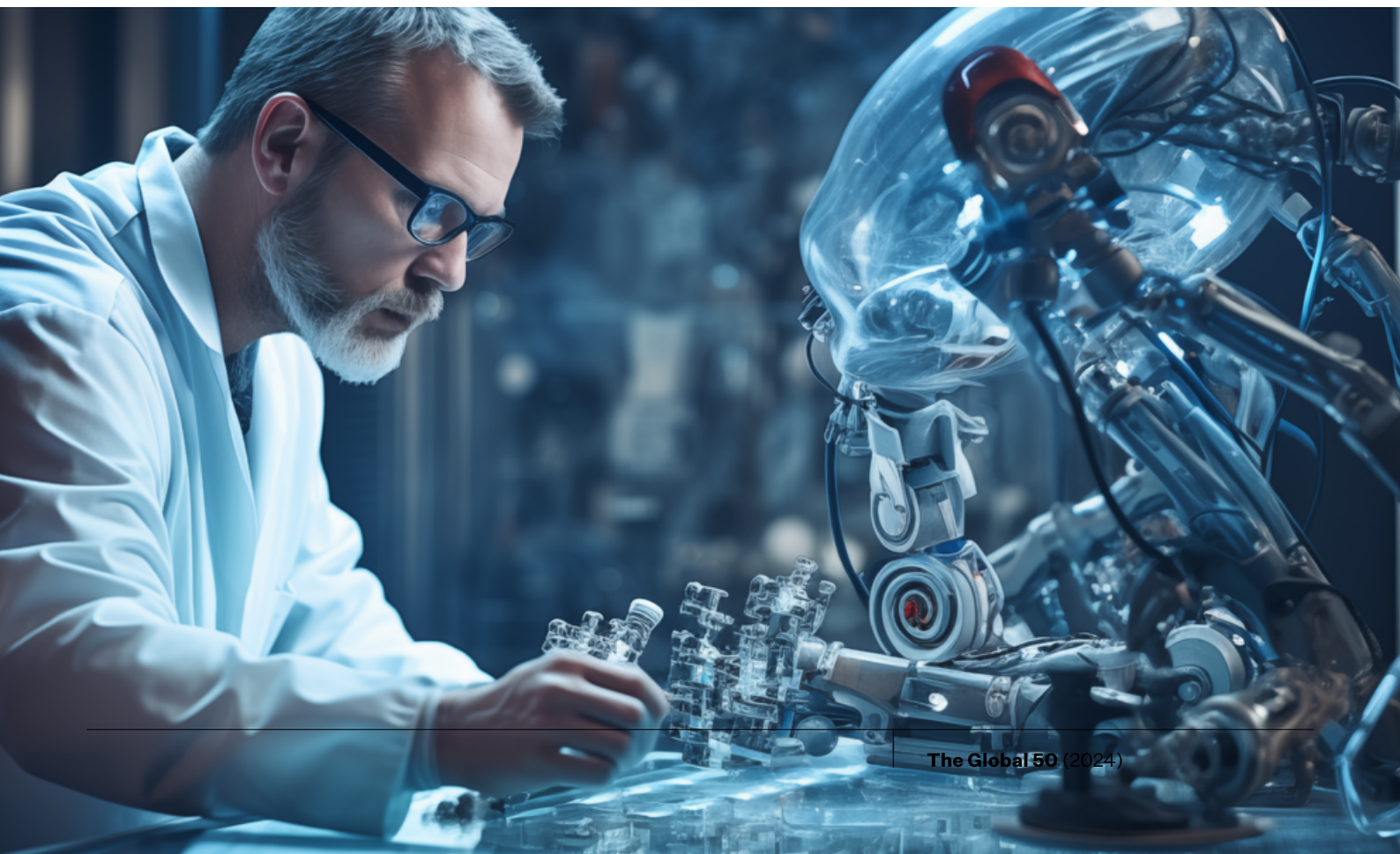
SECTORS IMPACTED

Agriculture & Food
Automotive, Aerospace & Aviation
Data Science, AI & Machine Learning
Education
Health & Healthcare
Materials & Biotechnology

What if the future of innovation goes back to basic (research)?

RESEARCH 101

Advanced machine intelligence accelerates basic research and enhances its translation into applied research and tangible societal benefits, making nations around the world engines of innovation and productivity.





WHY IT MATTERS TODAY

Since 1981, gross domestic spending on research and development (R&D) in Organisation for Economic Co-operation and Development (OECD) member countries has hovered at just under 3% of gross domestic product (GDP).⁶⁹⁴ In the 10 years prior to the COVID-19 pandemic, it was business R&D spending in the OECD that drove 75% of overall R&D growth.⁶⁹⁵ In contrast, R&D spending in higher education – where basic research takes place – rose by only 1%.⁶⁹⁶ The International Monetary Fund (IMF) estimates that a 10% increase in domestic research raises productivity by around 0.3%.⁶⁹⁷

From Einstein's Theory of Relativity underpinning GPS, to mRNA technology for vaccines, today's technologies descend from decades of basic scientific research.⁶⁹⁸ Basic scientific research is a key driver of innovation and productivity.⁶⁹⁹ Declining R&D investment in Australia, especially in basic research, hampers innovation, necessitating increased funding to match international levels.⁷⁰⁰ In the United States, science agencies are approaching their lowest funding levels in 25 years.⁷⁰¹ Some 40% of projects funded by the European Research Council in 2007–2014 influenced European patents, with life sciences, physical sciences, and engineering influencing patents the most. While 50% of these patents are owned by private companies, universities and research organisations also hold significant shares, indicating a strong academia–industry linkage in innovation.⁷⁰²

Support for basic and creative research is a basis for innovation and thus a key driver of long-term prosperity.⁷⁰³ The most innovative economies engage with key players from both private and public sectors, encompassing start-ups, research universities, and innovation clusters along with R&D spending.

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Advanced machine intelligence transforms basic research by enhancing efficiency and facilitating its transition into applied research that focuses on the key challenges that we face today and into the future.

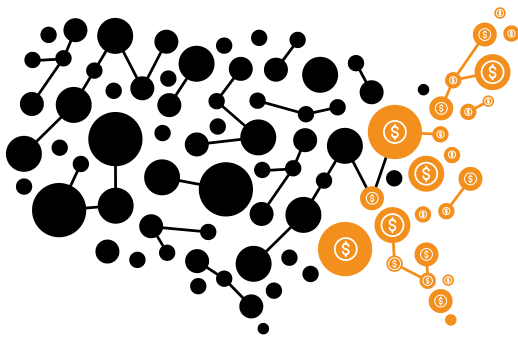
As advanced machine intelligence automates routine research tasks, funds can be redirected and employees reskilled to focus on basic research. Technological advances, for example in materials science are reducing the costs of research tools such as large particle colliders⁷⁰⁴ and next-generation microscopes and telescopes⁷⁰⁵ thereby enabling new research to be conducted in a non-traditional way. Combined with open science and an open mindset to integrate complex insights from diverse sources and collaboration across academia, industry, and government,⁷⁰⁶ basic research can more rapidly produce scientific discoveries and translate them into applications for the benefit of society. Advanced machine intelligence can further assist discovery in fundamental science by helping design experiments, interpret data, and identify insights.⁷⁰⁷

BENEFITS

The basis for future breakthroughs is sustained, and long-term progress continues to advance in areas such as healthcare, renewable energy, transportation, infrastructure, and public policy. There is economic growth and educational advancement.

RISKS

International diffusion of basic research findings makes countries hesitate to increase, let alone approve, spending on basic research, limiting shared social progress. Data misuse and lack of transparency impact on individuals, organisations, and society, generating false outcomes and conclusions.



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