focus

The Power of
Compounding
Knowledge

We are privileged to live in an era of extraordinary progress. Although modern humans have existed for around 300,000 years, most advancements in life expectancy, education, and living standards have occurred in just the last 300, around 0.1% of our time as a species. Progress has been driven by our ability to record, share, utilise, and build upon knowledge. Today, artificial intelligence (AI) is adding a new layer of capability, with the potential to supercharge innovation and productivity and unlock even greater potential across the global economy.

FORSYTH BARR

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Rise above the noise

This year investors have faced a barrage of headlines—trade wars, geopolitical instability, populist politics, and policy uncertainty. Sitting here today, with global equity markets back near record highs, most investors are feeling more comfortable than they did back in April when markets plunged in response to President Trump's escalating tariff announcements.

Disconcerting headlines and market volatility, however, will come again and many investors will feel unsettled when they do. When that happens, it's important to step back and consider the big picture beyond the noise. We are living in a period of extraordinary human progress, and that arc of progress may be accelerating.

For investors, this progress creates opportunities: innovation drives productivity and new business opportunities, which in turn supports companies' earnings growth and long-term wealth creation.

Human knowledge: A compounding asset

"If I have seen further, it is by standing upon the shoulders of giants."

Sir Isaac Newton

The world's economic engine is built not just on labour and capital, but on accumulated knowledge, a resource that grows and compounds over time. Each generation builds upon the work of the last, producing an exponential effect.

Around 90% of the world's scientific output has been produced since 1900.

Scientific and technical knowledge now doubles every 10–12 years, and even faster in fields like genomics and computing.

Since 1900, global GDP per capita has increased nearly 7-fold, compared to a 3-fold rise (only 0.1% per year) over the prior 300,000 years.

GLOBAL AVERAGE GDP PER CAPITA OVER THE LONG RUN
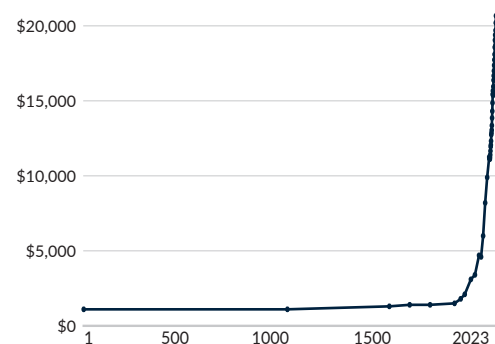
Source: Our World in Data

This growth has driven tangible improvements for billions of people around the world. Life expectancy globally has risen from 46 years in 1950 to over 73, and more than 80 in New Zealand. Over the same period, extreme poverty has fallen from around 60–65% of the global population to under 10%, while literacy rates have surged from 52% to over 86%.
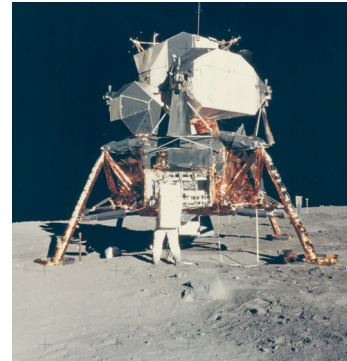
1903

1936

1969

c. 300,000 years → 33 years → 33 years

The exponential rise in knowledge is a relatively recent phenomenon built on our ability to preserve, share, and build on ideas:

Writing (c.3000 BCE): Enabled the preservation of ideas beyond oral communication. For millennia, however, literacy was limited to elites.

The Printing Press (c.1440): Gutenberg's innovation radically expanded the distribution and access to knowledge. Books became cheaper, Europe's literacy surged, and the Scientific and Industrial Revolutions followed.

Mass Education (19–20th centuries): Public education democratised knowledge. Literacy became widespread, creating a skilled workforce capable of applying and advancing ideas.

The Digital Age (20th–21st centuries): Digital technologies — the silicon chip, the internet, smartphones, connected devices, cloud technology — have enabled the capture, processing, and dissemination of vast amounts of information and data.

Artificial Intelligence: The next step in human advancement?

The volume of data generated has exploded. Today's digital world produces an estimated 120 zettabytes each year, with the total data stored globally doubling every two years. AI enables us to harness this information in ways previously unimaginable.

AI has the potential to deliver productivity improvements across the economy by automating routine tasks, allowing workers to focus on higher-value work that drives economic growth. It could also accelerate the rate of innovation, reducing the time and cost of research and development.

As digital tools, including AI, become cheaper and more widespread, more people and organisations — including small businesses and developing economies, not just big companies and rich countries — can participate in and benefit from their use.

Most people struggle to grasp the magnitude of extremely large numbers. 120 zettabytes or 120,000,000,000,000,000,000,000 bytes is an almost inconceivable volume of data. It's roughly equivalent to the information contained in 120 quadrillion books.

To put that into perspective:

- Stacking those books would form a tower 20,000 times the distance from Earth to the Sun.
- The stack would stretch 500 times beyond Pluto.
- And it would extend well past the outer edge of our solar system.

This scale highlights just how vast the global data footprint has become, far beyond what most people can truly appreciate.

Examples of real-world AI applications

Healthcare
Enhances diagnostic accuracy (e.g. medical imaging, pathology) and accelerates drug discovery by analysing masses of biomedical data.

Retail
Delivers personalised recommendations, while optimising a retailer's pricing and inventory.

Finance
Improves fraud detection, risk modelling, and portfolio optimisation, while enhancing customer service through intelligent virtual assistants and chatbots.

Logistics and supply chain
Provides efficiencies through demand forecasting, route optimisation, and inventory control.

Legal Services
Automate the review of large volumes of legal documents and assist with contract drafting.

Manufacturing
Supports predictive maintenance by monitoring equipment and anticipating failures, reducing downtime. Improves quality control by detecting defects in real time.

Education
Enables adaptive learning with content tailored to each student's learning pace and style.

Agriculture
Powers precision farming by using sensor and satellite data to optimise irrigation, fertiliser, and pest control, improving yields while reducing the environmental impact.

A rising tide for investors

We are still in the early days of AI. There are many unanswered questions around its future impact: who the winners (and losers) will be; where will the most significant innovations take place; which sectors will be transformed; how quickly productivity gains will emerge, and will these be concentrated in certain industries or broad based?

The initial focus for both businesses and investors has been the build out of physical AI infrastructure including data centres, semiconductors, and power systems.

Questions are growing as to the broader impact. Sectors such as healthcare, financial services, agriculture, education, and logistics could be reshaped by AI tools. Companies with strong AI adoption could gain competitive advantages in cost savings and an improved customer experience.

For investors, picking winners from new technologies is challenging. Even when it's clear an industry is going to change the world it's hard early on to identify who the winners will be. (At the peak of the internet boom in 2000 the largest internet companies were AOL and Yahoo!. AOL faded into obscurity, while Yahoo! was eventually sold off for parts.) Not every company riding the AI wave will deliver positive long-term returns.

The big picture, however, is that knowledge is humanity's most powerful asset, and it compounds over time, with each generation building on the achievement of those before. Now, with the rise of AI, we have tools to further accelerate that process. The lift in human potential will generate innovation, productivity gains, and greater economic activity (often in ways we cannot yet imagine) that should provide benefits throughout society and across investors' portfolios.

If at any time you want to discuss investment options and opportunities, your Forsyth Barr Investment Adviser is available to provide you advice and assistance.

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