AI: the Ultimate Disruptor

DISCOVER HOW AI IS TRANSFORMING THE WORLD

THEMATICA REPORT

Contents

See the bigger picture

Stockhouse, in conjunction with The Market Herald, is proud to launch the latest issue of our Thematic insights investor report with nearly 30 years of experience of providing detailed information to the investor community to help uncover trends that drive the global economy forward.

We unite a diverse community of investors to enable informed decision-making through learning, research and discussion. Our reports offer individuals from all backgrounds the ability to access education, vital financial tools and content as well as contribute to meaningful conversations about complex topics in the markets.

We strive to provide you with monthly reports filled with insightful analysis that goes beyond traditional metrics. We believe investors should have an understanding of underlying trends, industries, and innovations that shape our world and is crucial for empowering you to make informed investment decisions.

OVERVIEW

Investors buy into AI's world-changing potential

AI is changing the world – literally. Indeed, it is doing so in ways in which we (the creators of AI) only partially understand.

Artificial intelligence is becoming as endemic in our economy (and our lives) as computers and smartphones. Its potency is eerily reminiscent of the discovery of nuclear fission. And this combination is already making some of the leading experts in AI nervous.

The scientist who has been dubbed "the Godfather of AI"[1] recently quit his position as director of Google's AI research to warn humanity about the need to go slow in developing the power of AI.

In May of this year, Geoffrey Hinton told PBS that artificial intelligence represents a potential "existential threat"[2] to humanity. Is Hinton overstating the danger here?

AlphaZero is a chess-playing AI designed by Google's "DeepMind" AI laboratory. Unlike previous chess-playing AIs, AlphaZero was not pre-programmed with human chess-playing wisdom and knowledge. It was allowed to teach itself.

In *four hours*, AlphaZero had mastered chess to the point that it was able to beat the reigning world-champion, Stockfish 8 (another AI whose chess mastery was derived from human programming) in a 100-match tournament.

AlphaZero was undefeated, winning or drawing every match against Stockfish 8. AlphaZero has moved on to other games. The student is now the master. Pretty humbling for us lowly humans.

Artificial intelligence has literally infinite potential to reshape our world. Already, across all industries, AI is active in:[3]

- 11% of all HR departments
- 8% of production
- 5% of marketing/sales
- 10% of product and service of development
- 19% of risk management
- 19% of service operations
- 21% of corporate finance and strategy
- 9% of supply chain management

That's quite impressive – for a technology still in its infancy.[4]

As AI matures, it has evolved now into two distinct branches: "generative AI" and machine-learning (or "traditional AI"). The distinction?

Traditional AI excels at pattern recognition and performing specific tasks, such as problem solving and process optimization. Traditional AI **analyzes**.

Generative AI "can be thought of as the next generation of artificial intelligence."[5] It has the capacity to create new patterns, including text and other forms of content. It **synthesizes**.

As human beings, we tend to analyze (break things down) better than we synthesize (put things together). Thus, traditional AI has emerged before generative AI.

Both traditional and generative AI have unlimited potential. As an investor, how do you even begin to wrap your head around something this huge? How about bite-sized pieces?

That's the approach that we're taking with Thematica. This edition will present three specific niches of AI development to investors that we see as having a major impact on the global economy – as well as offering investment opportunities.

1. AI in technology
2. AI in healthcare
3. AI in mining

In all three of these sectors, AI is emerging as a game-changer. Similarly, it is destined to transform many (most?) other sectors of our economy.

Artificial intelligence will change the world. Along the way, there will undoubtedly be a multitude of investment opportunities. But we should probably avoid letting AI control our missile defense systems.

CHAPTER ONE

AI's advances in technology have only just begun

Not surprisingly, the emergence of AI is seen most profoundly with respect to technology itself. In fact, AI is already so pervasive in the world of tech that attempting to encapsulate or summarize its applications here is virtually impossible.

AI is rapidly improving the functionality of most electronics-based hardware, primarily through machine-learning applications. From smartphones to drones, AI is at the forefront of next-generation product development.

Beyond that, AI is being adopted in the semiconductor industry itself[6]. By incorporating the machine-learning properties of AI into semiconductors, **the same computer chips can** *improve* **in performance over time** – as these chips "learn" to perform tasks more efficiently.

This will not only make AI much faster, but it will also potentially make it much smarter. That has some people very concerned, including the person dubbed "the Godfather of AI".

Geoffrey Hinton left Google as its director of AI Research out of his desire to warn the general public about the potential "threat" of high-end AI.

Hinton's concerns are primarily centered on three issues:[7]

1) AI already "thinks" better than human beings.

2) AI processes and stores information more efficiently than the human brain.

3) AI's learning algorithm works better than the "learning algorithm" of the human brain.

Consider these three factors in combination.

AI is already (much) smarter than us – as demonstrated in such applications as playing chess. It processes information better, stores information better, and learns better than us.

In other words, in the eyes of the Godfather of AI, the "intelligence gap" between AI and humanity will inevitably increase at an exponential rate.

It took Alpha Zero only four hours to dwarf 1,500 years of accumulated human "wisdom" on how to play chess. How insignificant will the human brain be (in comparison) once AI entities are thousands of times smarter?

However, AI-based advances in hardware are only one facet of the impact of artificial intelligence on technology. AI is also being engineered into virtually an infinite number of software platforms – to improve the functionality of software much like AI can improve the functionality of hardware.

Fintech, infotech and many other categories of software applications can be improved not just incrementally, but by orders of magnitude using artificial intelligence.

In fintech, AI is already generating additional efficiencies in assessing mortgage applications, life insurance applications, and other data-processing functions previously performed by human beings.

In infotech, AI's superiority in data processing is being channeled into industries across the economic spectrum.

In retail, AI is being developed to improve e-commerce and marketing[8] (from one end of the

industry). At the other end, it is also being developed to improve customer analytics,[9] including "theft protection systems" (that are becoming an increasingly important retail priority).

In the world of video entertainment, AI has the potential to transform virtually every aspect of the industry, from technical production all the way through to acting and writing, as well.

AI-based innovations are enhancing and improving video quality in addition to the advances of 5G technology. AI is also being introduced to reduce bandwidth and conserve energy[10] while streaming, to enable consumers to efficiently stream this next generation of even more lifelike video.

Meanwhile, generative AI is being seen as increasingly viable for everything from writing the content for video productions to CGI-produced (and AI-driven) "actors" performing in these productions.

Generative AI, however, is not without its controversy. From a humanitarian and economic perspective, many people are asking whether AI should be allowed to usurp human labour in the realm of creative activities.
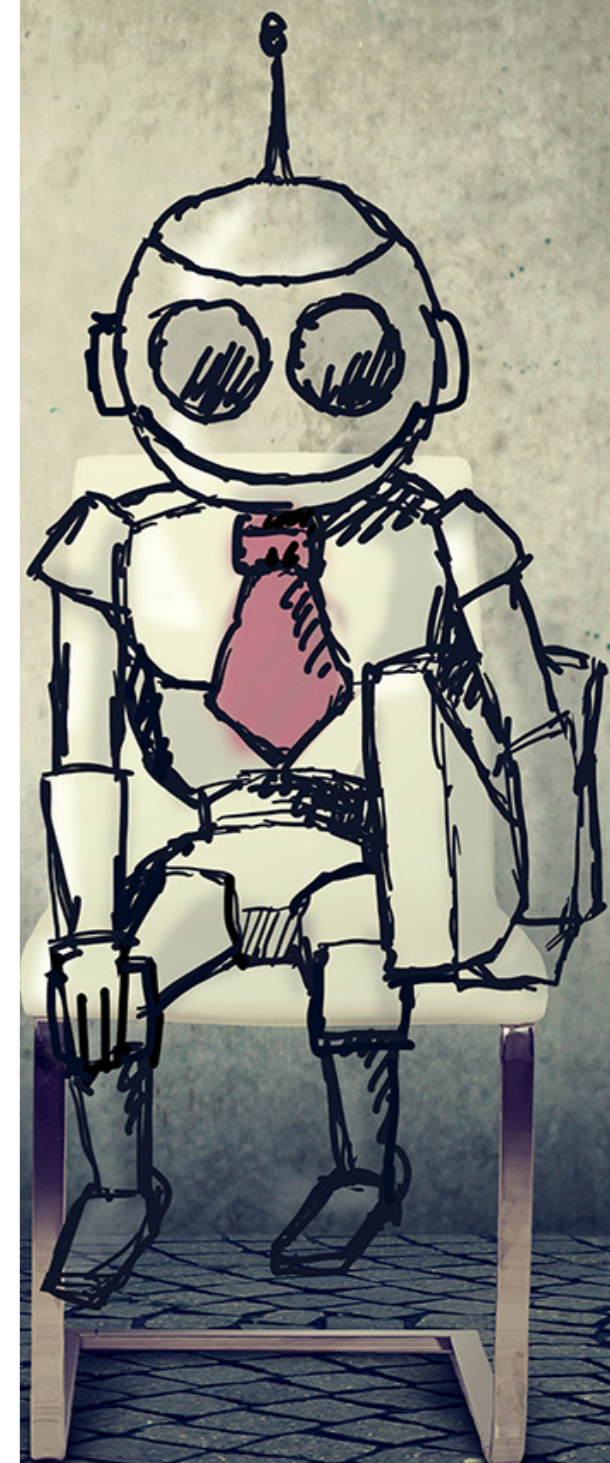
CHAPTER ONE

AI's advances in technology have only ... cont.

AI is being used to create musical

compositions,[11] all the way up to symphonies. Human-assisted AI applications such as ChatGPT[12] can not only answer questions and perform a multitude of everyday tasks, they can even write compositions according to supplied parameters.

This already has educators concerned, as increasing numbers of students get Chat GPT to **write their assignments** – and largely nullify the learning process attached to such exercises.

On the other side of this debate, a number of leading economic and media voices are assuring us that AI will *not* replace video

editors[13], data analysts[14] and other professionals; and that students should be allowed to freely use ChatGPT[15].

The nexus of these viewpoints is that AI cannot replace human creativity[16].

Yes, AI can compose music. But musical composition is an inherently mathematical process centered on creating patterns of musical notes. We would expect any form of advanced AI to be capable of such tasks.

On the other hand, most other manifestations of human creativity are decidedly non-mathematical – meaning that AI has no advantages here.

AI can write a novel. But will it ever be capable of writing a *great* novel?

Human creative inspiration is not linear. The human mind has consistently shown the capacity to generate large leaps in innovation – advances in human creativity and ingenuity that can only be ascribed to "human intuition".

AI can think better than human beings. But will it ever acquire the capacity to intuit?

Such reasoning can be construed as a powerful argument *against* allowing AI to do too much of our "thinking" for us. If, ultimately, the human mind is still required for our major advances in science and technology, then it behooves us to

not allow ourselves to be dumbed-down by over-reliance on artificial intelligence.

On a practical basis, it is likely impossible to prevent increasing reliance upon AI through an ever-expanding number of technology-based applications. In some areas, unambiguous benefits are allowing such growth.

Conversely, there are strong arguments and reasons why AI should be introduced (and used) in other areas of our society/economy in a more gradual manner – with much greater thought and care.

For investors, there are an abundance of "unambiguous" opportunities for AI in technology.

Improving hardware and software functionality are, in general terms, important and necessary goals for our economic development. But we must also heed the long-term consequences of over-reliance upon such AI-based tools.

Back in the days of mechanical cash registers (and before the widespread use of calculators), retail clerks had very strong arithmetic skills. Through practice, they could instantly calculate the "change" for customers (who all paid in cash at that time).

Today, hand a retail clerk some paper currency that requires the clerk to calculate the change on that payment, and you can expect a delay

of anywhere from a few seconds to nearly a minute as that same clerk tries to perform simple arithmetic.

In a recent survey of 53 Chicago-area schools[17], **not a single student** was competent in mathematics "at grade level." ChatGPT is not going to help in fixing this issue.

For investors, this means we could see various governments applying the brakes to expanded use of generative AI – for what are not (directly) market- or economic-related factors.

AI in technology has unlimited economic potential.

Given this reality, investors might want to focus their AI-in-technology investing on lower-end advances of AI in areas such as fintech and data processing (traditional AI), while approaching generative AI investment opportunities with more caution.

Computer scientist Geoffrey Hinton in 2015
AP Photo / Noah Berger
https://www.smithsonianmag.com

INSIGHTS

Thematica Survey:
What investors told us …

What do you think is the most important when it comes to AI technology development?

1. ChatGPT/Alexa/Siri

2. Biometric security
(facial recognition)

3. Code generation for technology
(website or video game creation)

4. Self-driving vehicles
(Tesla, Rivian, etc.)

5. Image/Video editing and generation
(deepfakes, AI-generated art and video)

6. Predictive capabilities
(text, traffic, product suggestions)

What advances do you think AI will help with in the metals and mining industry?

35%
INCREASED EFFICIENCY IN MINE DESIGN AND PLANNING

29%
IMPROVED EFFICIENCY IN RESOURCE SURVEYING

23%
IMPROVING THE RESOURCE EXTRACTION PROCESS

7%
ENVIRONMENTAL SUSTAINABILITY

5%
AI CANNOT HELP IN THE METALS AND MINING INDUSTRY

INSIGHTS

Reported exposure to generative AI tools

Individuals spanning various regions, industries, and seniority levels report their active utilization of generative AI tools. Per cent of respondents, by industry.

Advanced industries

Business, legal, and professional services

Consumer goods/retail

Energy and materials

Financial services

Healthcare, pharma and medical products

Technology, media, and telecom

- 🔴 Have tried at least once
- 🟠 Regular use for work
- ⬛ Regular use outside of work
- 🟠 Don't know
- ⬜ No exposure
- ⬜ Regular use outside of work and outside of work

Note: Figures may not sum to 100%, because of rounding. In Asia–Pacific, n = 164; in Europe, n = 515; in North America, n = 392; in Greater China (includes Hong Kong and Taiwan), n = 337; and in developing markets (includes India, Latin America, and Middle East and North Africa), n = 276. For advanced industries (includes automotive and assembly, aerospace and defense, advanced electronics, and semiconductors), n = 96; for business, legal, and professional services, n = 215; for consumer goods and retail, n = 128; for energy and materials, n = 96; for financial services, n = 248; for healthcare, pharma, and medical products, n = 130; and for technology, media, and telecom, n = 244. For C-suite respondents, n = 541; for senior managers, n = 437; and for middle managers, n = 339. For respondents born in 1964 or earlier, n = 143; for respondents born between 1965 and 1980, n = 268; and for respondents born between 1981 and 1996, n = 80. Age details were not available for all respondents. For respondents identifying as men, n = 1,025; for respondents identifying as women, n = 156. The survey sample also included respondents who identified as "nonbinary" or "other" but not a large enough number to be statistically meaningful.

Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

The state of AI in 2023: Generative AI's breakout year – https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-AIs-breakout-year

CHAPTER TWO

Saving lives and money through AI developments in healthcare

As noted in our previous section, it's hard to define where "AI in technology" ends, and AI in other industries begins. However, AI is expected to have such a profound impact on the enormous healthcare sector that we felt "AI in healthcare" required a section of its own.

A Thematica graphic endeavours to measure the impact of AI in healthcare in different ways. AI impacts virtually every branch of healthcare, including:

1. Chronic care management
2. Self-care/prevention/wellness
3. Triage and diagnosis
4. Diagnostics
5. Clinical decision support
6. Care delivery

AI has the potential to contribute to healthcare in different ways: improving population-health management, improving operations, and strengthening innovation.

However, the degree by which AI will impact various niches of the healthcare industry varies tremendously. AI is seen as reducing human labour requirements by only 2-4 percent in fields such as chiropractic, dentistry and psychiatry.

At the other end of the spectrum, AI is predicted (by McKinsey[18]) as having an enormous labour-saving impact on:

- Medical equipment preparers (48%)
- Medical assistants (32%)
- Occupational health & safety technicians (30%)
- Pharmacy, laboratory and clinic technicians (29%)
- Occupational therapy assistants (26%)
- Optometrists (26%)

This might not be seen as "good news" for those individuals working as medical equipment preparers, medical assistants or occupational health and safety technicians. But for healthcare administrators – desperate for cost efficiencies because of strained budgets – such AI-based innovations have enormous appeal.

Another important angle on AI in healthcare is nursing. With chronic staffing shortages in nursing and "burnout" at epidemic levels[19] among this profession, nurses might

Areas of impact for AI in healthcare

AI has already begun making significant strides in the field of healthcare. The illustration below showcases instances of current AI solutions across six fundamental domains directly influencing patient care, alongside three key aspects of the healthcare value chain poised for further enhancement through AI scaling.

CHRONIC CARE MANAGEMENT   SELF-CARE/ PREVENTION/ WELLNESS   TRIAGE AND DIAGNOSIS   DIAGNOSTICS   CLINICAL DECISION SUPPORT   CARE DELIVERY

Improving population-health management   Improving operations   Strengthening innovation

Healthcare occupation and share of hours (percent)

Source: McKinsey Global Institute. Selected European countries: France, Germany, Hungary, Italy, Portugal, Sweden, UK.

Source: (TOP) Transforming healthcare with AI: The impact on the workforce and organizations – https://www.mckinsey.com/industries/healthcare/our-insights/transforming-healthcare-with-ai
(BOTTOM) Transforming healthcare with AI: The impact on the workforce and organizations – https://www.mckinsey.com/industries/healthcare/our-insights/transforming-healthcare-with-ai

CHAPTER TWO

Saving lives and money through AI … cont.

likely welcome the 5-10% labour savings potential from AI (depending on the particular nursing niche).

That roughly covers *what* AI can do in terms of advancing the healthcare industry. This still leaves *how* AI can/will impact healthcare.

A March 2020 article[20] from McKinsey & Company lays out the parameters here:

"What do we mean by AI in healthcare? In this report we include applications that affect care delivery, including both how existing tasks are *performed* and how they are *disrupted* by changing healthcare needs or the processes required to address them. We also include applications that enhance and improve healthcare delivery, from day-to-day operational improvement in healthcare organizations to population-health management and the world of healthcare innovation."

McKinsey also defines the need for innovation:

"Healthcare spending is simply not keeping up. Without major structural and transformational change, healthcare systems will struggle to remain sustainable. Health systems also need a larger workforce, but although the global economy could create 40 million new health-sector jobs by 2030, there is still a projected shortfall of 9.9 million physicians, nurses and midwives globally over the same period, according to the World Health Organization."

If AI can fill the void of a nearly 10 million worker shortfall in the global healthcare industry, then AI won't simply be easing strained healthcare budgets – it will also save lives.

Interestingly, while McKinsey sees as much as 35% of healthcare labour as "potentially automatable" (through AI), McKinsey views healthcare as "one of the sectors with the **lowest** overall potential for automation"

In specific terms, AI in healthcare is expected to:

a) Lead to better care outcomes

b) Improve the productivity and efficiency of care delivery

c) Improve the day-to-day life of healthcare practitioners (raising staff morale and improving retention)

How can this information on AI in healthcare be of use to investors?

First and foremost, investors can use this data to identify the particular niches in healthcare where AI-based innovations have the most revenue-producing (or cost-saving) potential.

Generally, we see the greatest efficiencies (in percentage terms) occurring with respect to the various "technicians," "therapists" and "assistants" who are currently required to perform a vast number of relatively mundane tasks.

Thus, public companies targeting laboratory, hospital, and clinic operations, or various forms of occupational and physical therapy would appear to have considerable blue-sky potential.

CHAPTER TWO

Saving lives and money ... cont.

At the same time, investors might also want to look closely at the potential of AI in high-end healthcare applications.

McKinsey estimates AI can reduce labour by as much as **15% for optometrists and 12% for physicians and surgeons**. With billings for physicians and surgeons (in particular) representing among the most-expensive healthcare costs, there would seem to be substantial revenue potential for AI-based applications in physician and surgeon services.

Another factor weighing in favor of AI-in-healthcare investments is the high level of motivation for governments and healthcare institutions to embrace AI technology aggressively.

With serious budget constraints (today) and large predicted shortfalls for healthcare workers (tomorrow), healthcare administrators will be perhaps the most-motivated adopters of AI-based innovations.

Another important dynamic for investors is the speed at which these AI-in-healthcare applications can/will be incorporated into the healthcare industry. Here, McKinsey sees "three phases of scaling AI in healthcare."

Phase I: "the low-hanging fruit of routine, repetitive and largely administrative tasks, which absorb significant time of doctors and nurses" (including various imaging specialties).

Phase II: "AI solutions that support the shift from hospital-based to home-based care." This includes a broad-array of AI applications such as: remote monitoring, AI-powered alerting systems, virtual assistants, NLP (natural language processing) solutions in both the hospital and home setting, as well as greater use of AI in oncology, cardiology and neurology.

Phase III: "more AI solutions in clinical practice based on evidence from clinical trials". For more advanced

applications of AI in healthcare, such technology will face rigorous regulatory scrutiny – in the form of formal clinical trials. This likely means several additional years for such AI-based innovations to reach the market.

This guidance from McKinsey will not only aid investors in deciding which AI-in-healthcare applications to target first with their investing. It also provides some useful insights on where investors should be looking for opportunities.

Healthcare investors may also want to delve into the insights from Deloitte's 2023 Global Health Care Outlook,[21] starting with its headline concluding, "The pandemic that changed everything":

"The COVID-19 pandemic permanently changed global health care – from accelerating the adoption of new technology and care delivery models to increasing the focus on sustainability and resiliency."

Even without the COVID pandemic, adoption of AI technology in healthcare was destined to be a major economic (and investment) trend. *With* the pandemic, developing and adopting AI-based innovations in healthcare now has an exclamation point attached to it.

INSIGHTS

Thematica Survey: What investors told us ...

Does the rapid progression and integration of AI into everyday life give you any cause for concern?

52%

Somewhat concerned

22%	**13%**	**7%**	**5%**
VERY CONCERNED	NEUTRAL	NOT WORRIED AT ALL	SOMEWHAT UNCONCERNED

What industries would you like to see more AI growth?

49%	**11%**	**10%**	**8%**	**8%**
HEALTHCARE	CYBERSECURITY	AGRICULTURE	ENERGY	FINANCE

What obstacles or difficulties do you anticipate will arise as AI use becomes more prevalent within the healthcare sector?

51%	**17%**
DATA PRIVACY CONCERNS	REGULATORY HURDLES

20%	**12%**
LACK OF TRAINING	COST OF IMPLEMENTATION
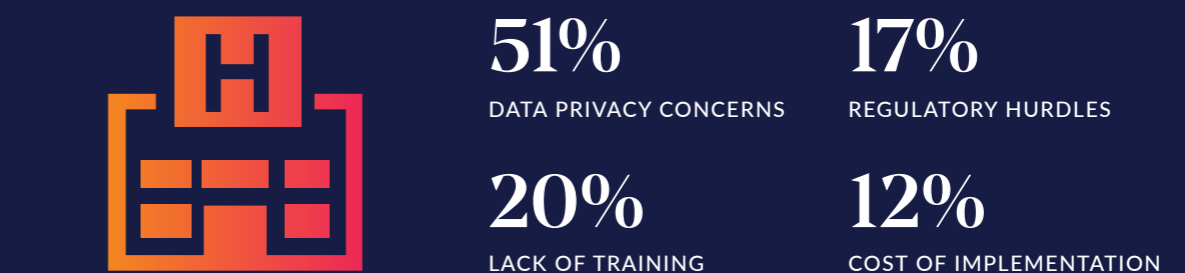
CHAPTER THREE

Artificial intelligence's benefits outweigh the costs in mining industry

The use of artificial intelligence in the mining industry is an informative illustration of the emergence of AI in two respects.

To begin with, it shows how many established industries that are *not* generally viewed as users of cutting-edge technology (like mining) are embracing AI – in numerous facets of the industry.

A June 2023[22] article from *Mining Digital* identified 10 ways in which the use of artificial intelligence is reshaping the mining industry.

1. Autonomous vehicles
2. Decision support systems
3. Ore sorting
4. Robotics
5. Safety and risk assessments
6. Predictive maintenance
7. Exploration
8. Environmental data
9. Energy optimization
10. Predicting supply chain disruptions

One of the things notable about this list of AI-based mining innovations is that most of these AI-in-mining applications will not take away any human jobs, at least not directly.

While using AI for autonomous vehicles, robotics and exploration could (will?) replace some human labour, these other AI mining innovations are all about improving the efficiency or safety of mining operations.

Making mining more efficient could actually *increase* employment opportunities in the mining sector by allowing ore deposits that were not previously economically viable to go into production – or remain in production for additional years.

Looking at these AI-based innovations in order, the use of **autonomous vehicles** in mining offers obvious advantages beyond mere gains in efficiency. Autonomous vehicles can be used to access areas of mine operations where safety concerns prohibit the use of human miners.

Many large underground mines don't run out of ore, they simply use up all the ore that can be safely accessed through the use of human labour. Autonomous vehicles allow access to (in particular) deeper ore deposits where temperature or other environmental constraints make it unsafe to use human labour.

As *Mining Digital* observes, Japan's multi-industry giant, **Komatsu** (OTC:KMTUF), is already aggressively integrating[23] these AI-powered vehicles into its mining operations.

CHAPTER THREE

Artificial intelligence's benefits outweigh ... cont.

Using AI in **decision support systems** can improve mining operations in various ways, from improving worker safety to increasing operational efficiency and reducing waste. **Anglo American** (OTC:AAUKF) is an example of a mining company already using AI in its decision support systems to improve efficiency[24].

Using an AI-based **ore sorting** system can significantly improve the efficiency of a mining operation through more effective real-time screening of waste rock from mineralized ore. Reduced processing of waste rock improves overall recoveries and thus increases profit margins.

Brazilian giant, **Vale** (NYSE:VALE), has been using AI in its ore sorting since 2020 as a means of increasing mine efficiency *and* reducing its carbon footprint.[25]

The increasing use of **robotics** in mining is not only because of the general trend in our economy towards greater automation. Through the introduction of new electric mining tools[26], mining robots can mine ore deposits that were previously inaccessible (to human miners).

Using AI for better **safety and risk assessments** will save lives and improve efficiency in the mining industry. This is because there is also a significant *economic* cost to deaths and serious injuries suffered by mining employees.

"**Predictive maintenance**" is a more subtle AI-based mining innovation. This innovation cannot only reduce equipment failures and improve worker safety, it can increase efficiency in mine planning.

AI-based applications can be a tool for mining **exploration** in various ways. This includes more efficiently analyzing large databases, improving the identification of mining targets, and then supplying AI-powered insights in both areas.

Here, it is not just mining multinationals that are taking advantage of the use of AI in mining exploration. Vancouver-based Emperor Metals Inc. (CSE:AUOZ) (OTC:EMAUF) is one of the first junior exploration companies to actively incorporate AI into its mining exploration.

Using AI to assess **environmental data** can improve the efficiency and optimization of such analytics.

Such improved analytics could impact mining operations through expediting regulatory approval of projects with favourable environmental assessments. Alternately, such AI-based assessments could curtail further development (at an early stage) where such analytics are deemed unfavourable.

Using AI to improve **energy optimization** in mining can identify additional energy-saving opportunities, thus improving

overall operational efficiency. In turn, making mining more energy-efficient reduces carbon footprints (from the perspective of governments) and makes companies more ESG-friendly (from the perspective of investors).

Predicting supply chain disruptions is more of a Big Picture innovation for AI in mining. A 2021 McKinsey report detailed a number of general ways in which AI can improve supply-chain management[27].

In mining, such AI-powered analytics could be used to forecast overall demand levels (in particular metals markets) as well as optimizing inventory and production levels – in line with demand estimates.

This illustrates how broadly AI can/will impact even industries (such as mining) that are viewed as more conventional, low-tech industries. But also note how *quickly* AI-based innovations are evolving in the mining industry.

An August 2019[28] article from Forbes, which also surveyed AI-based opportunities in mining, saw (at that time) AI being used as a tool merely for better mining exploration and mine planning as well as in next-generation autonomous vehicles.

In other words, there is no reason to view the AI advances above as a comprehensive menu of how artificial intelligence can positively impact the mining industry. Rather, this is just a 2023 snapshot of how

far and how fast the use of AI in mining has already evolved.

The evolution of AI in mining (unlike some industries) seems to present a long list of clear benefits, with few AI-related costs – such as loss of employment.

Combine this with the fact AI innovations in mining are being used to a) improve environmental assessments, b) increase energy efficiency, and c) generally reduce the carbon footprint of mining. These are all politically and socially desirable goals in addition to offering economic benefits.

For investors, this means that incorporating AI into the mining industry is unlikely to face any pushback from either governments or regulators. This should mean clear sailing for the growth of artificial intelligence in the mining industry.

CHAPTER FOUR

Top companies in Canada developing AI

Artificial intelligence companies are popping up all over the world, including those in Canada. The companies listed below are all actively engaged in artificial intelligence and are listed in alphabetical order.

TSX:GIB.A, NYSE:GIB

CGI Inc.

MARKET CAP
$28.2 BILLION

CEO
GEORGE SCHINDLER

INFORMATION TECHNOLOGY SERVICES

- The company has more than four decades of experience working with clients around the world
- The CGI Constitution enables consultants and professionals to have the opportunity to participate in the life and development of their company
- CGI Group has been recognized by Forbes as one of the best management consulting firms and among America's best management consulting firms

CGI delivers an end-to-end portfolio of capabilities ranging from strategic IT and business consulting to systems integration, managed IT and business process services and intellectual property solutions.

The company works with clients through a local relationship model in tandem with a global delivery network that helps clients digitally transform their organizations and accelerate results.

CGI Group provides end-to-end services ranging from business consulting, managed IT outsourcing and business process services to advanced analytics, artificial intelligence and cloud and hybrid IT.

Notably, the end-to-end services model provides industry experience with actionable insights, a co-creation approach and synergistic business connections.

CGI Group has recently integrated military logistics and asset management systems in a planetary-scale metaverse. According to the company, the MCPIC pilot builds on the company's track record of implementing cutting-edge technology in federal clients' mission space.

The integration demonstrated how the Marine Corps can achieve enhanced visualization, real-time monitoring, simulation capabilities, and predictive analytics that will augment training and education, as well as operational efficiency.

CONTACT US

https://www.cgi.com/en

TECHNOLOGY

CGI Group is an information technology company that provides strategic IT and business consulting to systems integration, managed IT and business process services and intellectual property solutions.

"We're running full-speed ahead, driving next-generation technologies from the lab and into the field at the speed of mission. Our latest success represents a significant step forward in unlocking the full potential of digital technologies and their application to military operations and training,"

CGI SENIOR VICE PRESIDENT OF DEFENSE, INTELLIGENCE AND SPACE, **HORACE BLACKMAN**

TECHNOLOGY

Descartes Systems Group is focused on logistics and supply chain management business processes. It is engaged in providing on-demand, SaaS solutions focused on improving logistics-intensive businesses.

"The Global Logistics Network (GLN) continues to help shippers, carriers and logistics services providers meet challenges facing their logistics and supply chain operations. As our customers succeed, they trust us to invest in GLN's technologies to power logistics and supply chains into the future."

CEO, **EDWARD J. RYAN**

TSX:DSG, NDAQ:DSGX

Descartes System Group

MARKET CAP
$8.45 BILLION

CEO
EDWARD J. RYAN

SOFTWARE APPLICATION

- A leader in providing software-as-a-service (SaaS) solutions for logistics-intensive businesses
- Has a proven total growth model that is supported by an acquisition strategy
- Boasts a high-recurring revenue profile while delivering profitable growth and free cash flow generation

Descartes System Group is a multi-modal and neutral logistics network company backed by cloud-based software applications and data content.

The company allows customers to use its modular and SaaS solutions to route, track and improve the safety, performance and compliance of a wide range of solutions including delivery resources; plan, allocate and execute shipments; rate, audit and pay transportation invoices; access global trade data; file customs and security documents for imports and exports; and complete other logistics processes.

The company's solutions are: routing, mobile and telematics; transportation management; e-commerce, shipping and fulfillment; global trade intelligence; broker and forwarder enterprise systems; and customs and regulatory compliance

Descartes has completed 29 acquisitions since 2015 for a total of US$1.1 billion. M&A activity is a disciplined approach for the company that allows it to focus on complementary technologies, industry consolidation and close adjacencies across logistics.

Some of its recent acquisitions include GroundCLoud, which it acquired for $138 million in February 2023. GroundCloud is a final-mile logistics automation company. The company also acquired XPS in June 2022 for $65 million, which provides cloud-based multi-carrier parcel shipping solutions.

CONTACT US

info@descartes.com
https://www.descartes.com

DESCARTES™

TSX:DCBO, NDAQ:DCBO

Docebo Inc.

MARKET CAP
$1.77 BILLION

CEO
CLAUDIO ERBA

SOFTWARE APPLICATION

- Is uniquely positioned in the fastest-growing segment of enterprise learning
- Delivering powerful all-purpose enterprise learning solutions for multi-use case environments
- Boasts robust ARR growth and increasing free cash flow generation

Founded in 2005, Docebo initially launched as an open-source model that was installed directly on customer servers. In 2012, the company made the transition to a cloud-based SaaS platform model.

The Docebo platform is a learning management system that can facilitate training for employees, partners, and customers. In line with this, the platform can support formal, social and mobile learning.

In August, Docebo notched a partnership with Google Cloud on generative AI, where the company anticipates leveraging Google Cloud's generative AI services with its own AI development roadmap. The goal is to commercialize innovative solutions that transform the delivery of personalized learning at scale.

In its Q2 2023 financial results, Docebo reported revenue of $43.6 million, an increase of 25 per cent from the same period in 2022.

The company also reported that its platform is now used by 3,591 customers, up from 3,106 customers at the end of June 30, 2022.

Some of Docebo's new customers include another Big 5 U.S.-based global technology leader, which will support multiple use cases including a large external audience. The company also notched a large provincial government agency in Ontario as a customer that will use Docebo's AI-powered global search and content creation capabilities.

CONTACT US

https://www.docebo.com/

docebo®

TECHNOLOGY

Docebo provides a learning platform with a foundation in AI and innovation. It is engaged in redefining the way enterprises leverage technology to create and manage content and deliver training.

"We are thrilled to partner with Google Cloud and hold this exciting hackathon. This event marks a significant milestone in the integration of AI into learning technology solutions, and Docebo is excited to see what innovative solutions the hackathon teams will produce."

CEO, **CLAUDIO ERBA**

TECHNOLOGY

Kinaxis designs, develops, markets and sells supply chain planning software and solutions. The company offers a range of solutions, including applications, platforms, and app warehouses.

"We take pride in working with industry leaders like Volvo Cars and playing a role in their commitment to creating safe, innovative vehicles that strive to do better for the planet. We're excited to work together in helping them continue to deliver their premium customer experience."

KINAXIS EXECUTIVE VP OF GLOBAL FIELD SALES, **CLAIRE RYCHLEWSKI**

TSX:KXS, OTC:KXSCF

Kinaxis Inc.

MARKET CAP
$3.92 BILLION

CEO
JOHN SICARD

SOFTWARE APPLICATION

- Boasts a highly differentiated cloud platform that leverages an entirely unique concurrency technique
- Acknowledged as a market leader with several early stage growth initiatives
- Has a predictable financial model with strong growth and recurring revenue and profitability that enables it to build a business with a sustainability focus

At its core, Kinaxis provides cloud-based subscription software that enables its customers to analyze and make decisions across their supply chain operations. It combines human intelligence with artificial intelligence and concurrent planning to enable companies to plan for the future, monitor risks and opportunities, and respond in real time.

Kinaxis provides its solutions to a wide range of industries, including aerospace and defense; automotive; consumer products; high-tech and electronics; industrial; life sciences; logistics service providers; and retail.

Notably, the company's RapidResponse platform is the only platform currently capable of powering true concurrent planning through its Cognitive Network Graph. The SaaS platform is purpose-built for planning that leverages its Cognitive Network Graph. Customers can use the

RapidResponse platform to run one or more supply chain planning applications and associated core planning algorithms. Customers can also build their own custom apps and algorithms on Rapid Response and connect external systems and algorithms.

In October 2023, the company announced its platform will be used by Volvo Cars, which will enable Volvo Cars' supply chain professionals to make faster and more accurate decisions.

CONTACT US

ir@kinaxis.com
https://www.kinaxis.com/en

TSE:OTEX, NDAQ:OTEX

OpenText Corporation

MARKET CAP
$12.77 BILLION

CEO
MARK BARRENECHEA

SOFTWARE APPLICATION

- Has a track record of double-digit total revenue growth, which has led to accelerated cloud growth
- Notches market share gains through information automation transformations, cloud adoption and AI
- Is strategic with its mergers and acquisitions

OpenText enables organizations to optimize their digital supply chains through the OpenText Cloud platform.

The company has expanded into a global market leader for information management.

Notably, the company's content services solutions include content collaboration and intelligent capture to records management, collaboration, e-signatures and archiving, which are available off-cloud on a cloud provider of the customer's choice.

OpenText's Content Solutions allow customers to capture data from paper, electronic files and other sources and transfer it into digital content that is delivered directly into content management solutions and business processes. Its services assist industries such as legal, automotive, banking, healthcare, life sciences, the public sector and oil and gas.

In October 2023, OpenText released the latest version of its Cloud Editions (CE) 23.5, which includes OpenText Aviator artificial intelligence capabilities. The platform assists organizations in acting on data, making smarter decisions and evolving with intelligent tools that learn over time.

OpenText Aviator for Business includes OpenText IT Operations Aviator; OpenText DevOps Aviator; OpenText Content Aviator; OpenText Experience Aviator; OpenText Cybersecurity Aviator; and OpenText Business Network Aviator.

CONTACT US

https://www.opentext.com/

TECHNOLOGY

OpenText is an information management company that provides software and services. The company offers a portfolio of Information Management solutions in the OpenText Cloud, enabling organizations to optimize digital supply chains.

"OpenText has been developing AI capabilities for over a decade, and OpenText Aviators is an AI breakthrough for customers. OpenText Aviator will help customers massively increase productivity through new conversation interfaces leveraging Information management data sets and language models."

CEO, **MARK BARRENECHEA**

DID YOU KNOW...

Top 10 uses of artificial intelligence in mining

AI is revolutionizing daily mining operations by analyzing vast data volumes and delivering digital solutions, fostering speed and safety enhancements.

1 Autonomous vehicles

Autonomous vehicles enhance mining safety by avoiding potentially hazardous areas.

3 Ore sorting

AI sorting systems identify valuable minerals in real-time, enhancing recovery rates and cutting processing costs.

2 Decision support systems

AI aids decision-making, offering benefits such as improved worker safety, streamlined processes, cost reduction, and increased sustainability with reduced waste.

4 Robotics

Automation is on the rise with advanced electric mining tools that can access hard-to-reach areas.

5 Safety and risk assessments

AI assesses and alerts potential mine site risks, revolutionizing operations for enhanced efficiency and safety.

7 Exploration

AI aids mining exploration by analyzing vast data to pinpoint on-site targets, offering efficient time and cost benefits.

9 Energy optimization

Applying AI and advanced technologies to enhance energy efficiency in the mining sector involves data analysis to identify energy-saving opportunities, ultimately boosting overall efficiency.

6 Predictive maintenance

AI predictive maintenance models assess asset status, predict failures from usage trends, enhancing on-site safety and enabling proactive planning.

8 Environmental data

AI in mining mitigates environmental impact and on-site risks through rapid and efficient data analysis. It identifies optimization opportunities and assesses environmental effects.

10 Predicting supply chain disruptions

In 2021, McKinsey stressed [1] AI-driven supply chain solutions as potent tools for industry challenges, utilizing AI models to forecast future supply chain data, including demand and inventory optimization.

CHAPTER FIVE

Small-cap companies developing AI

As AI continues to expand, so too are the companies that are leveraging the technology. With that in mind, here are 10 emerging companies that are leveraging AI either by developing it or implementing the technology into their solutions. The companies below are listed in alphabetical order.

CSE

Top 25 companies listed on the CSE
Featured by highest market cap

TICKER	COMPANY NAME†	MARKET CAP† (CAD)	52 WEEK LOW†	52 WEEK HIGH†	SHARES OUTSTANDING
SCPE	Scope Carbon Corp.	$68,250,000.00	$1.10	$2.35	39,000,000
DPRO	Draganfly Inc	$36,395,699.00	$0.65	$3.30	43,850,240
PKK	Tenet Fintech Group Inc.	$31,584,230.00	$0.10	$1.25	116,978,700
AIAI	NetraMark Holdings Inc	$25,926,958.00	$0.15	$0.60	65,637,870
AICO	Generative AI Solutions Corp.	$24,321,016.00	$0.15	$1.38	71,532,400
IDK	ThreeD Capital Inc.	$20,829,864.00	$0.18	$0.51	52,074,660
TRUE	Treatment.com International Inc.	$19,665,708.00	$0.10	$1.50	37,105,110
NTAR	Nextech3d.ai Corp.	$17,795,261.00	$0.14	$1.31	109,509,300
RAIL	Railtown Ai Technologies Inc.	$16,488,367.00	$0.07	$0.29	91,602,040
VSBY	VSBLTY Groupe Technologies Corp.	$15,032,370.00	$0.05	$0.26	332,885,300
MYCO	Mydecine Innovations Group Inc.	$14,387,310.00	$0.14	$0.20	90,414,920
ARWY	ARway.ai Corporation	$11,786,222.00	$0.35	$2.95	26,786,870
VST	Victory Square Technologies Inc.	$11,751,684.00	$0.11	$0.20	97,930,700
RYAH	RYAH Group Inc.	$11,203,280.00	$0.02	$0.03	448,131,400
AIG	Genesis AI Corp.	$9,415,940.00	$0.02	$0.26	60,535,740
CGN	Cognetivity Neurosciences Ltd.	$9,301,804.00	$0.11	$0.37	88,588,610
TELI	Telescope Innovations Corp.	$9,123,146.00	$0.13	$0.31	53,665,570
SCYB	Scryb Inc.	$8,995,444.00	$0.03	$0.17	257,012,700
AIML	AI/ML Innovations Inc.	$8,809,136.00	$0.05	$0.28	62,922,400
DSAI	DeepSpatial Inc.	$8,648,224.00	$0.04	$0.10	108,102,800
MRBL	Marble Financial Inc.	$8,219,304.00	$0.04	$0.09	182,651,200
UDOC	UniDoc Health Corp.	$8,208,270.00	$0.54	$1.25	13,680,450
ANON	Anonymous Intelligence Company	$7,582,660.00	$0.04	$0.27	108,323,800
PMED	Predictmedix Ai Inc.	$7,392,365.00	$0.03	$0.16	147,847,300
AUOZ	Emperor Metals Inc.	$5,541,738.00	$0.06	$0.21	48,189,030

†10.25.2023. All Companies listed report earnings. Source: Refinitiv, https://www.refinitiv.com/

TSX

Top 25 companies listed on the TSX

Featured by highest market cap

TICKER	COMPANY NAME†	MARKET CAP† (CAD)	52 WEEK LOW†	52 WEEK HIGH†	SHARES OUTSTANDING
SHOP	Shopify Inc.	$62,186,990,000	$38.77	$93.83	1,282,470,000
T	TELUS Corporation	$32,541,700,000	$21.16	$29.43	1,454,438,000
GIB.A	CGI Inc.	$27,728,440,000	$105.88	$142.31	209,038,200
OTEX	OpenText Corporation	$12,099,476,619	$35.16	$57.96	271,227,900
DSG	The Descartes Systems Group	$8,394,619,000	$87.03	$109.92	85,021,610
ATS	ATS Corporation	$4,817,403,000	$40.75	$64.80	98,889,880
CLS	Celestica Inc.	$4,188,985,000	$14.15	$37.58	119,352,600
KXS	Kinaxis Inc.	$3,849,427,000	$131.85	$191.80	28,495,710
BB	Blackberry Limited	$2,801,792,000	$4.31	$7.82	583,684,400
TIXT	TELUS International (Cda) Inc.	$2,341,999,736	$8.30	$36.19	273,598,100
DCBO	Docebo Inc.	$1,695,596,000	$31.66	$62.95	31,887,950
MDA	MDA Ltd.	$1,374,831,000	$5.59	$12.66	119,567,700
CVO	Coveo Solutions Inc.	$1,069,763,000	$5.12	$12.16	103,023,800
HUT	Hut 8 Mining Corp.	$710,278,600	$1.08	$5.98	221,721,700
PRL	Propel Holdings Inc.	$267,833,800	$6.50	$10.00	34,325,320
HTL	Hamilton Thorne Ltd.	$222,598,500	$1.05	$1.73	151,823,700
DTOL	D2L Inc.	$184,646,300	$5.08	$11.23	26,267,130
XTRA	Xtract One Technologies Inc.	$145,405,800	$0.44	$1.24	198,348,600
ILLM	illumin Holdings Inc.	$79,410,760	$1.48	$2.72	51,684,240
STCK	Stack Capital Group Inc.	$66,993,000	$5.15	$8.30	9,015,050
MCB	McCoy Global Inc.	$41,685,870	$0.92	$1.75	26,954,940
GRID	Tantalus Systems Holding Inc.	$32,045,870	$0.68	$1.29	44,595,940
VQS	VIQ Solutions Inc.	$8,137,840	$0.18	$1.00	40,518,140
BBTV.DB	BBTV Holdings Inc.	$5,485,260	$3.50	$27.00	15,239,040
FDGE	Farmers Edge Inc.	$4,221,600	$0.09	$0.53	42,038,550

†10.26.2023. All Companies listed report earnings. Source: Refinitiv, https://www.refinitiv.com/

TSX-V

Top 25 companies listed on the TSX-V

Featured by highest market cap

TICKER	COMPANY NAME†	MARKET CAP† (CAD)	52 WEEK LOW†	52 WEEK HIGH†	SHARES OUTSTANDING
PTK	POET Technologies Inc.	$114,933,800	$3.26	$8.31	40,684,550
OSS	OneSoft Solutions Inc.	$81,760,940	$0.38	$0.85	122,031,300
OKAI	EvokAI Creative Labs Inc.	$79,857,676	$0.75	$2.15	76,054,930
PINK	Perimeter Medical Imaging AI	$67,211,360	$0.97	$2.05	65,025,740
EQ	EQ Inc.	$54,159,783	$0.63	$1.37	69,435,620
ADK	Diagnos Inc.	$33,340,022	$0.17	$0.59	72,478,310
FOBI	Fobi AI Inc.	$30,463,422	$0.16	$0.64	174,076,700
GSI	Gatekeeper Systems Inc.	$29,432,928	$0.20	$0.50	91,977,900
SATO	SATO Technologies Corp	$29,035,784	$0.11	$0.55	72,589,460
WISH	Wishpond Technologies Ltd.	$26,940,560	$0.50	$0.86	53,881,120
DM	Datametrex Ai Limited	$24,203,082	$0.05	$0.17	403,384,700
SCAN	Liberty Defense Holdings, Ltd.	$20,407,380	$0.13	$0.32	127,100,500
MCLD	mCloud Technologies Corp.	$12,332,500	$0.37	$2.06	16,259,610
NOW	NowVertical Group Inc.	$11,456,462	$0.21	$0.85	44,063,317
STER	Steer Technologies Inc.	$9,970,850	$0.06	$0.65	132,944,600
ALY	AnalytixInsight Inc.	$9,645,174	$0.08	$0.45	96,451,740
AUTO	Carbeeza Inc.	$9,150,580	$0.09	$0.25	70,143,120
NXO	Nexoptic Technology Corp.	$8,784,800	$0.03	$0.16	195,217,700
PLRB	Pluribus Technologies Corp.	$7,964,420	$0.45	$2.13	15,960,250
AISX	Aisix Solutions Inc.	$7,756,643	$0.02	$0.13	96,958,037
AIVC	AI Artificial Intelligence Ventures Inc.	$7,686,108	$0.02	$0.37	32,025,450
RLV.H	Relevium Technologies Inc.	$6,589,847	$0.02	$0.02	329,492,300
WIN	Windfall Geotek Inc.	$5,343,830	$0.04	$0.13	133,595,600
INEO	INEO Tech Corp.	$4,939,600	$0.04	$0.18	76,143,710
INSP	Inspire Semiconductor Holdings Inc.	4,814,197	$0.05	$0.25	60,177,464

†10.25.2023. All Companies listed report earnings. Source: Refinitiv, https://www.refinitiv.com/

DeepSpatial's platform enables organizations and enterprises to visualize data and make decisions by unlocking the power of geospatial analysis using patented artificial intelligence and deep learning algorithms.

"The agricultural industry is an important vertical for DeepSpatial, not only for revenue–generating reasons and the overall growth trajectory of the company but also for the positioning of one of our technologies on a global scale. We are extremely proud to have the opportunity to make a pivotal difference in the agricultural industry on this kind of scale."

CEO, **DR. RAHUL KUSHWAH**

CSE:DSAI, OTC:DSAIF

DeepSpatial Inc.

MARKET CAP
$7 MILLION CAD

CEO
DR. RAHUL KUSHWAH

ARTIFICIAL INTELLIGENCE

- DeepSpatial is on a mission to build a leading GeoAI platform for decision-makers in industries across the globe
- The company's platform helps organizations and enterprises to visualize data and make smarter decisions by unlocking the power of geospatial analysis
- Its client base ranges from Fortune 500 companies to government organizations all around the world

DeepSpatial prioritizes its global GeoAI platform, which aids industries in decision-making through data visualization, strategy recommendations, outcome prediction, and ongoing result analysis.

Its core level solutions include:

- **Supply chain optimization**, delivers service level agreement (SLA) order processing and vehicle allocation to coordinate the shortest delivery SLAs for multiple products

- **Inventory management optimization**, enables food and beverage clients who want to increase profitability and expand their consumer base

- **Market development and expansion**, supporting a 25-year-old CPG brand in enhancing its market understanding, potential, and coverage

- **Agri-farm management**, leveraging its expertise in boosting crop yield and farmer income for a government agriculture department's AI-based advanced agriculture platform.

Earlier in the year, DeepSpatial announced a $1.5 m government contract in the agriculture industry. Through the Geospatial platform, government bodies will conduct and validate crop-cutting experiments, on-field surveys, and other key processes for farmland activities in Uttarakhand, India.

CONTACT US

https://www.deepspatial.ai/

DEEPSPATIAL

CSE:AUOZ, OTC:EMAUF

Emperor Metals Inc.

MARKET CAP
$3 MILLION CAD

CEO
JOHN FLOREK

ARTIFICIAL INTELLIGENCE | GOLD

- Emperor Metals management has a history for successfully growing resource deposits, involved with M&A and received several awards
- Emperor is growing its flagship project's resources by using AI, its wealth of experience to refine drill targets and is hitting good results on its maiden drilling program
- AI and machine learning expedited resource expansion modeling for the high-grade Duquesne West Gold Project.

Emperor Metals is advancing the Duquesne West Gold Project in the prime mining district of Rouyn-Noranda, Quebec, surrounded by producing mines, offering M&A and production prospects.

Having a historical 43-101 resource estimate done in 2011 of 727,000 oz of Au at 5.42 g/t with an average thickness of 5.71 metres enabled Emperor to develop the first AI 3D and geological model to illuminate the significant resource expansion opportunity of this existing high-grade, thick, underground gold mine.

In September, the company revealed drilling results from its maiden summer drilling campaign at the property, noting 5,000 metres of the planned 8,000-plus metres had been completed. Most of the drilling assays have yet to be released.

Successfully hitting on the first two drill holes DQ23-01 hit 11.7 metres of 5.63 g/t Au at resource expansion target, which is double the average thickness and higher than the resources average grade. DQ 23-02 hit a new zone of 27 metres of 1.6 g/t Au and ended in mineralization which was drilled further to potentially extend this new zone. This new zone presents another production scenario for bulk tonnage mining.

Emperor Metals is advancing its resource expansion potential through open pit modeling and drilling, potentially enabling fast production, quick ROI, and attracting interest from local mining companies.

CONTACT US

https://emperormetals.com/

EMPEROR METALS

Emperor Metals is a gold exploration company focused on developing the resource potential of the Duquesne West Gold project in the prolific Timmins, Kirkland Lake and Rouyn-Noranda districts in Québec.

"Having successfully hit resource expansion targets on the first two holes, we have confirmed our ability to grow this resource deposit and see even more potential for resource expansion. We are working on new open pit and bulk tonnage mining models that could present multiple production opportunities. We believe this will become a profitable mine."

DIRECTOR, **ALEX HORSLEY**

TECHNOLOGY

HIVE Digital Technologies Ltd is a Canada-based data centre company that is also building HIVE Cloud, an enterprise-class service offering affordable compute for demanding applications, including AI training and inference.

"The team has done an amazing job, and we're rapidly learning and advancing this business. We're quite bullish on the GPU cloud market, which we see as one of those rare opportunities which only come along every few decades. The demand is growing quickly."

CEO, AYDIN KILIC

TSXV:HIVE, NASDAQ:HIVE

HIVE Digital Technologies Ltd.

MARKET CAP
$368 MILLION

CEO
AYDIN KILIC

SOFTWARE APPLICATION | BLOCKCHAIN

- Has fleets of high-end industrial graphic processing units (GPUs) that will make the company well-positioned to support the growing AI and HPC market
- Its operations are in cool and politically stable jurisdictions including Canada, Sweden and Iceland
- Boasts industry-leading expertise in building, maintaining and operating digital infrastructure

HIVE Digital Technologies provides infrastructure for emerging technologies, with a focus on exporting efficient, clean and renewably sourced computing power to its customers around the world.

The company builds and operates data centres in North America and Europe, specifically in Canada, Sweden and Iceland. Its hardware powers cutting-edge projects ranging from Web3 and AI to high performance computing (HPI).

HIVE Digital Technologies operates 38,000 commercial-grade NVIDIA GPUs powered by renewable energy.

In Canada, the company operates a 30 MW data centre in Lachute, Quebec, as well as a 70 MW data centre in New Brunswick with access to renewable energy at low costs.

Over in Sweden, HIVE operates a 32 MW facility and has a greenhouse under development. Energy from the Boden facility will heat a 90,000 square foot greenhouse with completion estimated for Q3 2024.

Meanwhile the company has been operating in Iceland since 2017 and currently has 10 MW in operation.

In August, HIVE provided an update on the expansion of its AI and HPC infrastructure offering into North America, noting it will be based in Canada with the first servers coming online in September. It will also receive an enterprise grade networking equipment that will upgrade its servers in Sweden.

CONTACT US

hivedigitaltechnologies.com/

H I V E

TSXV:INEO, OTC:INEO

INEO Tech Corp.

MARKET CAP
$3 MILLION

CEO
KYLE HALL

IOT & AI TECHNOLOGY

- INEO Tech Corp. is the new face of retail media through its integrated digital advertising, analytics and loss prevention system
- Has patented The Welcoming System, which is rolling out to large major retailers across North America
- INEO is poised for significant revenue growth throughout 2024 as it continues to expand its footprint with U.S. retailers

INEO Tech has developed The Welcoming System, a digital advertising and analytics solution for retailers. The system is an integrated digital advertising display and Electronic Article Surveillance (EAS) theft protection pedestal that is placed at the entrance of retail stores. Combined with theft protection and digital signage, the patented technology offers the exclusive ability to display advertising at the front entrance where all customer traffic is able to see the on-screen messaging.

The system also provides advertisers with data analytics for each retail store on the INEO Media Network where advertisers partner with the company and their respective retail partners to access customer segmentation data from store foot traffic. This allows for customized, targeted advertising for each store.

Advertising targets customer demographics like age and gender at each location.

In April 2023, the company announced the successful deployment of Welcoming Systems into more than 70 retail store locations across 18 states for its major retail partners. INEO also estimates the INEO Media Network to currently exceed several million people per month in foot traffic at the installed locations for these retail partners.

Moving forward, the company stated it has more retail partnerships on the way, which will contribute to its rapid growth of sales.

CONTACT US

https://ineosolutionsinc.com/

INEO

TECHNOLOGY

INEO Tech is a provider of location-based digital advertising, analytics and loss prevention solutions for retailers. The company has more than 70 systems deployed in 18 U.S. states and is rolling out more systems with large retailers in the coming months.

"INEO remains aggressive in expanding its network of systems and expects to share new customer agreements and updates in the coming quarters. Our systems are installed in attractive retail stores, and we are actively working with our major retail partners to continue with rapid expansion and increasing the number of ad placements on the network."

CEO, KYLE HALL

TECHNOLOGY

Liberty Defense provides multi-technology security solutions for concealed weapons detection in high volume foot traffic areas and locations requiring enhanced security such as airports, stadiums and schools.

"The ability for HEXWAVE to detect a broader spectrum of threats and its mobility (have) made it very attractive in a variety of screening applications like prisons, courthouses, airports, hospitals, stadiums and government facilities."

CEO, **BILL FRAIN**

TSXV:SCAN, OTC:LDDFF

Liberty Defense Holdings Ltd.

MARKET CAP
$22 MILLION CAD

CEO
BILL FRAIN

INNOVATIVE SECURITY APPLICATIONS

- Protecting communities and offering peace of mind through its security detection solutions that are engineered and manufactured in the US
- Sold multiple HEXWAVE units for initial testing to the Los Alamos National Laboratory – the same facility featured in the "Oppenheimer" movie
- Has been awarded a grant from the TSA and DHS for advancing its technology

Liberty Defense Holdings is focused on developing technologies for security detection, including its HEXWAVE technology that screens for concealed metallic and non-metallic weapons and other threats. The technology uses millimetre, advanced 3D imaging as well as AI for enhanced security, which can process people in all types of venues.

HEXAVE allows for rapid, automated people screening using a high throughput and contactless walkthrough portal.

Some of the system's features include:

- Improving operations with no divesting of items such as keys, wallets, cell phones, jackets, etc.
- Delivering automatic threat detections for go/no-go decisions using AI and deep learning algorithms
- Allowing for over-the-air software updates to keep ahead of threats

- Integrating smart IoT functionality for connectivity to existing security systems
- Providing indoor and outdoor coverage, enabling standoff detection
- In support of a layered defense strategy, Liberty Defense will showcase its HEXWAVE system at a NATO Scoping Trial and Limited User Assessment in October. The demonstration will feature continuous, contactless high-throughput screening without the need to pause, remove items like cell phones, keys, and wallets, and more.

CONTACT US

https://libertydefense.com/

CSE:NTAR, OTC:NEXCF

Nextech3D.ai

MARKET CAP
$40 MILLION

CEO
EVAN GAPPELBERG

CONSUMER CYCLICAL | SPECIALTY RETAIL

- Nextech3D.ai provides AI-powered 3D solutions for the $5.5 trillion e-commerce industry
- The company's products include patented AI-based technology for 3D model creation and 2D to 3D conversion
- Its AI technology has landed it as a preferred 3D model supplier for Amazon and other enterprise companies, representing a massive growth opportunity

Nextech3D.ai's focus is on developing 3D WebAR photorealistic models for sites such as Amazon and other online retailers.

The company also develops and acquires disruptive AI technologies that then get out to shareholders as standalone public companies. This allows Nextech3D.ai to issue stock dividends to shareholders while also maintaining ownership in the public spinout without dilution.

They have spun out companies ARway (CSE:ARWY, OTC:ARWYF), a spatial computing platform and Toggle3D.ai (CSE:TGGL, OTC:TGGLF), an AI-powered 3D design studio that aims to compete with Adobe. Nextech3D.ai holds a 49 per cent interest in ARway with 13 million shares and it also holds a 44 per cent stake in Toggle3D.ai with 13 million shares.

In August, the company reported its six-month revenue was up 157 per cent compared with the same period

last year, while its Q2 revenue was up 155 per cent when compared with the same time in 2022. Nextech3D.ai has been busy with its 3D models after delivering more than 50,000 of the models, which led to the company's revenue increase in its most recent financial results.

The company said it plans to remain committed to providing its services to clients, including Amazon, while also embracing advanced generative AI technology to keep up with trends in the e-commerce sector.

CONTACT US

https://www.nextechar.com/

TECHNOLOGY

Nextech3D.ai leverages proprietary artificial intelligence to create 3D models and experiences and also acquires disruptive technologies to spin them out as individual public companies once they have been commercialized.

"The accelerating demand for our 3D models is a testament to our Generative AI innovation. Nextech3D. AI remains determined to provide exceptional services to its growing client list, including the e-commerce giant Amazon, while embracing advanced AI technology to stay ahead in the ever-evolving e-commerce landscape."

CEO, **EVAN GAPPELBERG**

TECHNOLOGY

NexOptic Technology a Canadian-based technology company focused on developing artificial intelligence and imaging products that enhance how images are either captured, processed and/or experienced.

"The bandwidth savings achieved by NexCompress are impressive, and we are confident that our technology can help streaming services reduce their data usage, energy consumption and ultimately save money."

CEO, **PAUL MCKENZIE**

TSXV:NXO, OTC:NXOPF

NexOptic Technology Corp.

MARKET CAP
$8 MILLION

CEO
PAUL MCKENZIE

ELECTRONIC COMPONENTS

- Developing a strong IP fortification strategy, with seven key patents granted and nine pending, which can enable up to 60 per cent bandwidth reduction for video applications
- Has strong partnerships with Fortune 500 companies with co-operative marketing and sales efforts
- Highly scalable business with cutting-edge technology at the forefront

NexOptic Technology has a vision of becoming an industry leader of AI solutions for video applications that substantially reduce bandwidth while conserving energy in one of the world's fastest growing industries – video streaming.

As it currently stands, the company is focused on its NexCompress and Aliis technologies.

The NexCompress solution creates smaller file sizes without compromising the quality of the visual content. This means that users can enjoy the same level of visual fidelity with lower bit rates that are up to 60 per cent smaller.

Meanwhile the company's Aliis technology solution processes raw images and video in real time, working pixel-by-pixel to uniquely perfect characteristics such as resolution, lighting, sharpness and contrast. It can also be paired with other AI applications for supercharged performance.

Impressively, the Aliis technology learns from real-world data and implements its knowledge into an optimized algorithm. It can also be embedded and licensed into any application by OEMs, ODMs and Tier 1 and integrated service providers.

In September, NexOptic Technology revealed it is getting closer to commercialization thanks to a partnership with Pristine Surgical LLC. Its AI technology is being licensed for use into Pristine's single-use endoscopic visualization platform.

CONTACT US

https://nexoptic.com/

NexOptic
A Better View

TSXV:PVT, OTC:PVTRF

Pivotree Inc.

MARKET CAP
$58.02 MILLION

CEO
BILL DI NARDO

INFORMATION TECHNOLOGY SERVICES

- Focused on helping businesses move towards frictionless commerce by driving the adoption, design, development and implementation of frictionless commerce solution
- Aims to be the leading product and services company for frictionless commerce solutions in North America
- Leveraging enabling technologies such as IoT, machine learning, augmented reality, virtual reality and cloud transformation

Pivotree has headquarters in Toronto and builds and manages digital platforms in commerce, data management and supply chain for more than 250 major retail and branded manufacturers globally.

The company's offerings include digital solutions, managed and professional services that provide customers with frictionless end-to-end solutions to manage complex digital commerce platforms, along with ongoing support from strategic planning through platform selection, deployment and hosting, to data and supply chain management.

Pivotree's data management solutions aim to eliminate friction in the data value chain by accelerating product onboarding in days, not weeks; improving product quality; minimizing product returns; boosting digital channel sales revenue; and eliminating growing technical debt among others.

Meanwhile, the company's commerce solutions include strategic consulting and ongoing support. Through the solution, the company provides a momentum-building plan that brings new functionality, revenue growth and business success.

Pivotree's supply chain management solutions provide leading order management and warehouse management solutions that are fully integrated, secure and flexible enough to grow with the market and meet your customers' demands.

CONTACT US

https://www.pivotree.com/

pivotree

TECHNOLOGY

The company offers a portfolio of digital solutions, managed and professional services to customers with frictionless end-to-end solutions to manage digital commerce platforms and support from strategic planning.

"We are encouraged by the momentum we're seeing in products through the leading indicators of pipeline growth and year-to-date ARR bookings, which grew 17 per cent year-over-year and more than 100 per cent over the last quarter. At the same time, we are highly focused and committed to delivering profitability."

CEO, **BILL DI NARDO**

TECHNOLOGY

TECHNOLOGY

SuperBuzz is the first AI company to specialize in marketing technology. Using advanced natural language processing models, SuperBuzz creates content designed for scaling marketing campaigns.

VIQ Solutions offers a comprehensive solution suite that delivers intelligent automation, enhanced with human review, to drive transformation in the way content is captured, secured and repurposed into actionable information.

> "We built our business on the philosophy that every company deserves to build their brand online. SuperBuzz gives small businesses a chance to share their voice."
>
> CEO, **LIRAN BRENNER,**

| TSXV:SPZ |

SuperBuzz Inc.

| TSX:VQS, OTC:VQSSF |

VIQ Solutions Inc.

MARKET CAP	CEO
$1.3 MILLION	LIRAN BRENNER

MARKET CAP	CEO
$11.32 MILLION	SEBASTIEN PARE

> "Every day we see validation that the technology we have built is producing a highly usable document for consumption by commercial clients or to improve the productivity of our internal ProEdit solution. The value of our workflow solution, NetScribe, is proven by our latest cost reductions which are a result of the consolidation of resources."
>
> CHIEF OPERATING OFFICER, **SUSAN SUMNER,**

MARKETING TECHNOLOGY

- Implementing a three-pronged strategy for future growth, including partnerships, white labeling and acquiring multi-asset companies
- Its AI increases the average click through rate (CTR) on marketing campaigns by three times
- Data show that SuperBuzz's AI enhances marketing capabilities and surpasses human-level quality

SOFTWARE APPLICATION

- Disrupting outdated transcription services models and continuing to develop AI and machine learning-driven solutions
- Is pursuing organic growth and accretive mergers and acquisitions, while also increasing revenue and profit through investments in operational infrastructure
- Shifting revenue base to higher quality, more predictable recurring SaaS and AI revenue model

SuperBuzz is the only GPT-3 company currently listed on the TSX Venture Exchange. The company provides marketers with automation technology, content creation tools, and seamless campaign management.

Through its technology, the company assists marketers with creating content and advertising that enhances and surpasses human-level quality.

SuperBuzz's AI technology analyzes billions of data points based on content, products and user behaviour. From there, it is able to generate AI-enhanced images and taglines for marketing campaigns. It can also be implemented across a large network and adjusted to drive sales and increase engagement.

Additionally, the company was named the best marketing automation software for 2023 by Tekpon Partners.

SuperBuzz has also entered into a partnership with a top-tier marketing agency to accelerate its online marketing and sales initiatives. The partnership is intended to increase SuperBuzz's presence in the digital marketplace, drive brand recognition and boost sales.

Some key highlights of the partnership include enhanced digital presence, streamlined online sales and data-driven strategies.

The collaboration will also allow SuperBuzz to tailor its marketing campaigns to meet customer preferences and demand, ensuring a more personalized shopping experience.

CONTACT US

https://www.superbuzz.io/

SuperBuzz

VIQ Solutions provides AI-driven digital voice and video capture technology and transcription services. The company offers record high-quality audio, speech-to-text transcription, and collaborations with colleagues on important documentation.

The company's services deliver faster and more accurate content and protect information. Through its services, the company supports a wide range of industries, including:

Legal courts : VIQ has solution deployments in thousands of courtrooms in more than 25 countries and more than 30 years of experience creating transcripts for legal matters with speed, accuracy and reliability.

Law firms: The company enables legal case preparation and reduces complexity and costs with secure, accurate evidence documentation and management.

Criminal justice: VIQ's innovative solutions enable law enforcement officials and public safety agencies to easily capture interviews and transform evidence into transcripts, even in the most challenging environments.

Insurance: VIQ offers a unique combination of technologies and services that provides comprehensive resolutions for claims and cases.

Government: The company has more than 26 years of experience providing transcription services of public official records and confidential recordings for government institutions and political constituencies.

CONTACT US

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VIQ

INSIGHTS

The demand for AI-related talent is evolving, and the workforce impact of AI is anticipated to be significant

Over the next three years, service operations stand as the sole function where the majority of respondents anticipate a reduction in workforce size because of the implementation of generative AI. Per cent of respondents.[1]

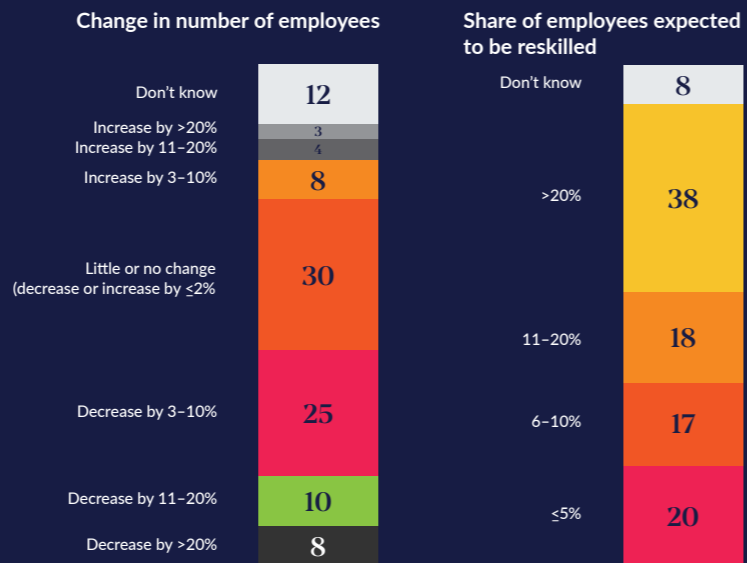|	DECREASE	LITTLE OR NO CHANGE	INCREASE	DON'T KNOW
Product and/or service development	30	35	20	15
Risk	31	37	20	12
Strategy and corporate finance	37	28	25	10
Marketing and sales	39	33	17	12
Manufacturing	40	33	12	15
HR	41	30	17	11
Supply chain management	45	32	14	9
Service operations	54	23	12	10

When examining the expected impact of generative AI, it's noteworthy that, among various organizational functions, service operations stand out as the only one where most respondents foresee a reduction in workforce size. This aligns with recent research findings. Although generative AI has broadened our perception of automatable work activities (from 50% to 60-70%), it doesn't mean complete role automation.

Survey participants foresee AI making substantial changes to their organizations' workforces. Participants anticipate the effects of AI adoption to impact their organizations' workforce within the next three years

Per cent of respondents.[1]

Over the next three years, survey respondents foresee AI reshaping various job roles. They anticipate a higher percentage of employees undergoing reskilling rather than job separations. Nearly 40% of respondents with AI adoption plans envision over 20% of their workforce undergoing reskilling, while 8% expect a workforce reduction exceeding 20%.

Note: Figures may not sum to 100%, because of rounding.
[1]Respondents were asked about only the business functions in which they said their organizations have adopted AI.

Change in number of employees

Don't know	12
Increase by >20%	3
Increase by 11–20%	4
Increase by 3–10%	8
Little or no change (decrease or increase by ≤2%)	30
Decrease by 3–10%	25
Decrease by 11–20%	10
Decrease by >20%	8

Share of employees expected to be reskilled

Don't know	8
>20%	38
11–20%	18
6–10%	17
≤5%	20

Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023
The state of AI in 2023: Generative AI's breakout year – https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-AIs-breakout-year

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INTERVIEW

As an investor, how do you begin to wrap your head around something as huge as AI?

Coreena Robertson   Kevin Matsui

AI: THE ULTIMATE DISRUPTOR

DISCOVER HOW AI IS TRANSFORMING THE WORLD.

THEMATICA
The Market Herald

This month's investor report, "AI the ultimate disruptor" presents three specific niches of AI development in technology, healthcare and mining. We sat down with AI expert Kevin Matsui, managing director from the University of Guelph's Centre for Advancing Responsible and Ethical Artificial Intelligence. He discusses AI in mining and healthcare as well as where we are in the AI adoption and growth cycle.

SUMMARY

A potent tool, a great opportunity and a huge responsibility

As we stated at the beginning of this report, artificial intelligence is going to change the world – dramatically.

As we stated at the beginning of this report, artificial intelligence is going to change the world – dramatically.

The parallel with the invention of nuclear fission is worth reconsidering. Nuclear weapons have the potential to wipe out all life on this planet. Conversely, nuclear power is increasingly seen as the only energy source that can make global CO2 emission targets attainable.

The lesson here seems to be that, used responsibly, the power of nuclear fission can benefit humanity. So, too, with AI.

None less than the Godfather of AI has labeled artificial intelligence a (potential) "existential" threat to humanity. Also, refer back to the excerpt from McKinsey's 2020 article on AI in healthcare[29].

After projecting that AI could "automate" (replace) as much as 35 per cent of human labour in healthcare, McKinsey observed that this was *one of the* **lowest**

percentages of labour that could be replaced by AI automation (versus other industries).

Could any economy survive having 35% of its jobs or more eliminated over a relatively short horizon? Would any society tolerate such a horrific economic policy?

Allowed to run wild, AI could cause the most severe economic depression (and social chaos) in history, and that's not even among the worst-case scenarios of out-of-control artificial intelligence.

Once again, Stockhouse investors seem to have their fingers on the pulse of this subject. In our recent survey on AI, 74 per cent of respondents were either "very" or "somewhat concerned" about the rapid progression and integration of AI.

At the opposite end of the pendulum, AI is a tool of almost unlimited potential – because it can *do* almost anything.

How do investors capitalize responsibly on such a proverbial "two-edged sword"? This is a question that is currently being pondered by many Stockhouse investors.

When asked about investment opportunities that are centered on AI, only 24% of respondents currently saw "some" or "many opportunities" here.

We observe this as well. Searches for "AI stocks" typically yield lists of multinational large-caps. With a couple of exceptions (such as Alphabet itself) AI can have only a modest impact on their overall operations.

Translation: very little leverage to AI.

Perhaps a better way to locate AI-based investment opportunities is to look first at *sectors* that can greatly benefit from AI, rather than simply searching for AI-centric companies?

We've offered a couple of suggestions.

With AI in healthcare, yes, the potential for significant labour elimination is through AI-based innovations. But healthcare is projected to be facing a major shortfall of workers. AI's potential to be a workhorse is welcome here.

Similarly, the COVID pandemic exposed the strain on healthcare budgets. And COVID policies significantly added to those budget strains. We need the additional economic efficiencies that AI can generate in healthcare.

Stockhouse investors agree. Healthcare topped their list of industries where they would like to see more AI growth – with 49% of respondents singling out this industry.

Then there is AI in mining.

Here, little potential seems to exist for AI to take away the jobs of people. Instead, AI-based innovations are poised to do jobs that either human beings can't do or are simply too dangerous.

Meanwhile, other AI innovations in mining can help to optimize mining operations, increase energy efficiency, and perhaps even help to make mining operations more environmentally friendly. Again, we see a sector where AI's projected impact seems to be unambiguously positive.

Where AI can offer "win-win" solutions (such as in healthcare and mining), the likelihood of any political or regulatory pushback impeding the development of AI is much less.

Undoubtedly, development of AI (and investing in AI) is also a win-win proposition in other sectors of the economy.

Opportunities to invest in purely AI-based companies might be rare, at present. But *everyone* is looking to use artificial intelligence. Investors can search their favourite sectors for strong investment prospects that are also making significant commitments to AI-based innovations.

Artificial intelligence is a potent tool that can greatly benefit humanity, if it's used responsibly. AI is a great investment opportunity, but one where investors will need to do considerable due diligence to identify the best candidates.
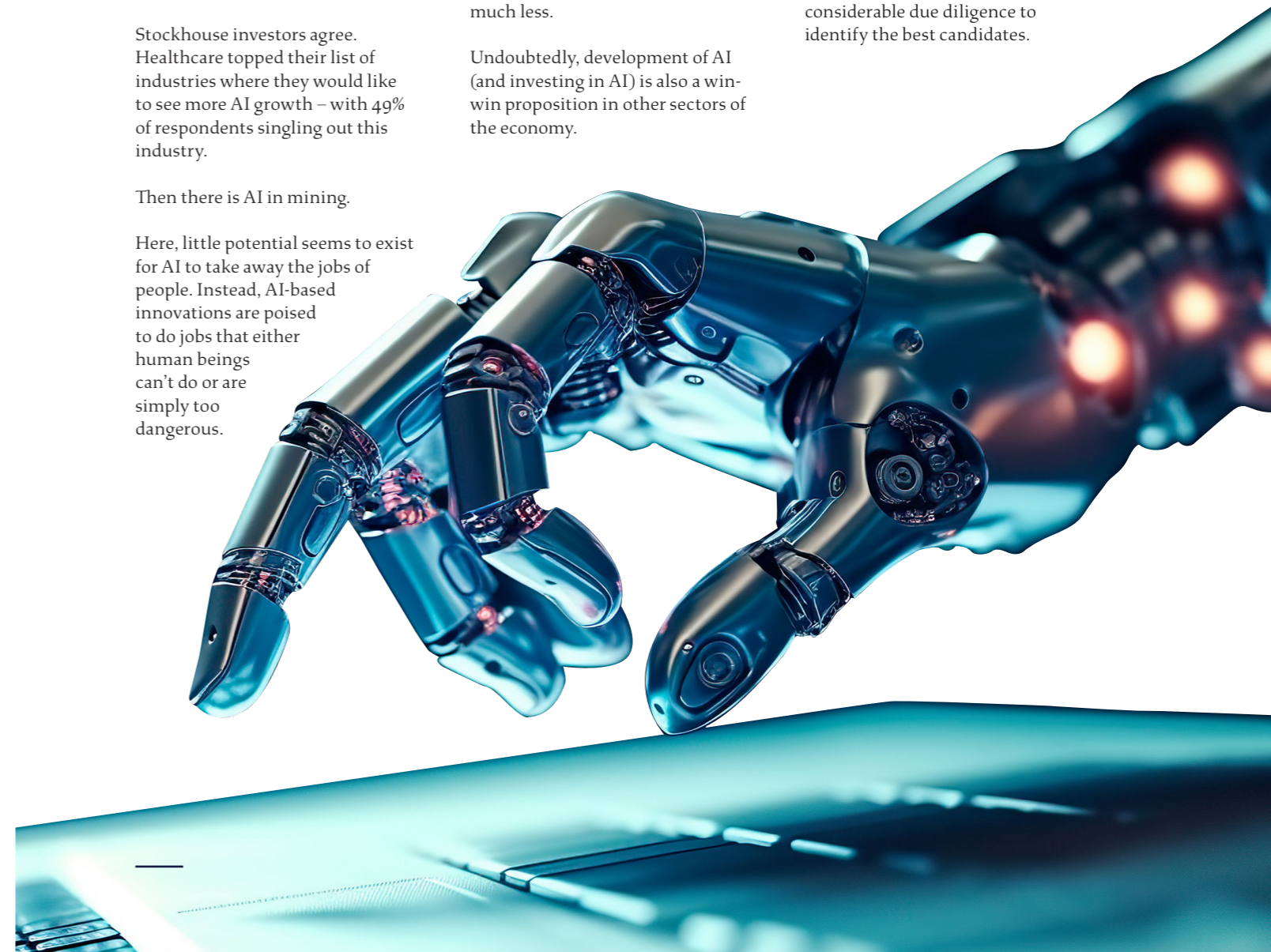
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