

Inside Our Approach To Investing In The Rise of AI and Automation

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- This Signal is on one of our Granny Shot themes, the Rise of AI/Automation. Our Head of Research, Tom Lee, rebalanced our Granny Shots last week. You can find the full list [here](#).
- We introduce some of the issues with evaluating and understanding AI and why it is very easy for folks to draw incorrect conclusions when assessing this strategic investing theme.
- We explain in detail our process for selecting and evaluating companies that are either suppliers or beneficiaries of the ongoing AI/Automation revolution.
- We provide five stocks that we believe will benefit from the rise of AI/Automation over an investment horizon of three to five years and discuss some of their AI/Automation achievements.

Alphabet CEO Sundar Pichai [believes](#) Artificial Intelligence (AI) will be more profound for humans than fire, electricity, or the internet. Many experts suspect he may very well be correct, but the history of Artificial Intelligence claims is also littered with the hyperbolic, exaggerations, and sometimes even the dubious. In 1986, T. Rozak complained in the *New Scientist* that "AI's record of barefaced public deception is unparalleled in the annals of academic study." This is why we have specific rules connected to other secular trends like changing global balances in labor supply to drive which companies we pick when thematically investing in the rise of AI and Automation.

Indeed, just in the way many companies try to get the benefit of ESG investment by "greenwashing," some companies undoubtedly find ways to work AI into their communications to benefit from the hype while not necessarily having the plan or wherewithal to deliver. Therefore, it is crucial to understand these prominent trends with a discerning and informed eye or with the help of our unique selection process. We want to introduce one of our key themes and provide some of the stocks we feel are using AI/Automation in a way that will be accretive to shareholders.



Source: Mary Evans Picture Library/Alamy

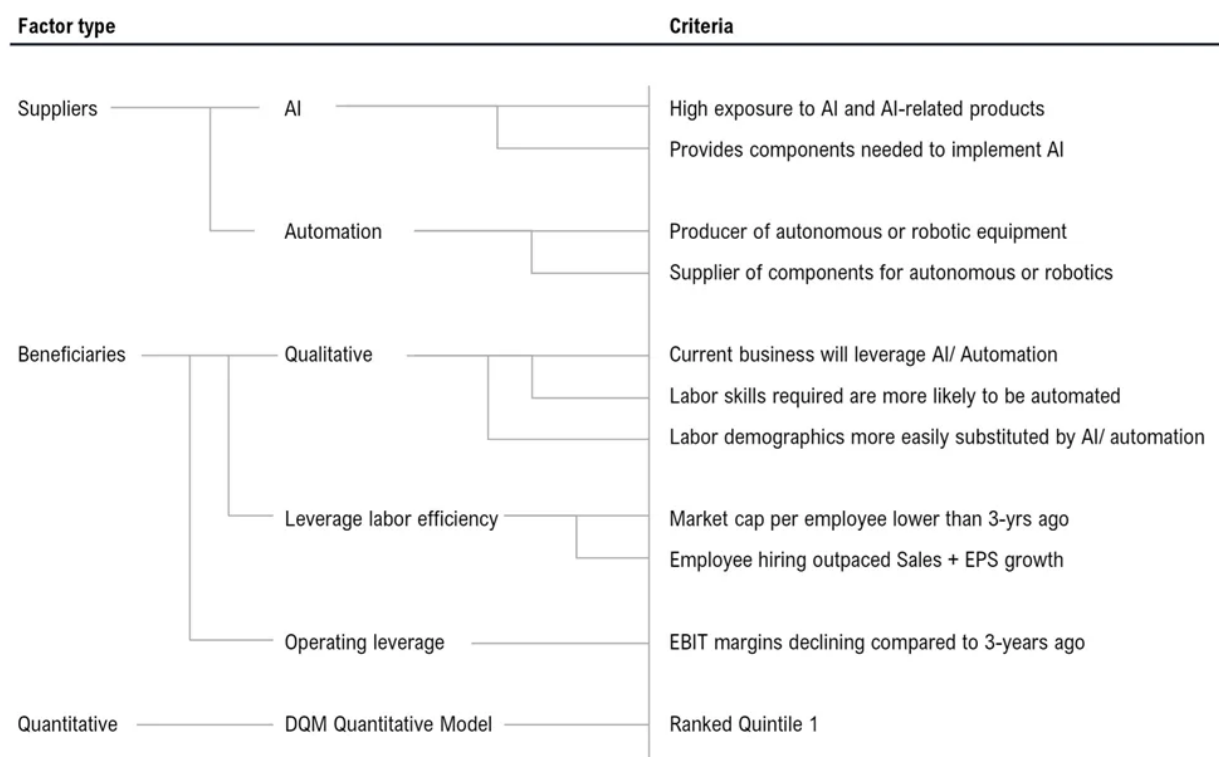
Sometimes, AI can play tricks on us, just like an Arabian stallion named [Hans](#) and his German trainer did around the turn of the century. He had a traveling exhibition where it seemed certain to many that his horse could successfully conduct arithmetic. The trainer would write math problems or ask *the square root of 16*. Hans, the horse, would reply with four taps to the amazement of crowds and even undiscerning experts. At the time, the theory of Charles Darwin was fashionable and discussed extensively. Pseudo-scientists connected Hans's seemingly impressive achievements to that profound theory that, like AI is today, was a shiny subject in the discourse of many folks who may have misunderstood it. In reality, the famous horse was reading cues from his trainer.

The story of Clever Hans is a cautionary tale because AI applications can sometimes be similarly deceptive to even discerning experts. Often, folks have made "Clever Hans" errors when evaluating AI applications' efficacy and supposed 'intelligence.' In other words, they attribute abilities of an artificial agent's prowess or functionality to the agent instead of to its surrounding environment. When the trainer was removed, Hans could no longer do arithmetic. Go figure.

Our Head of Quantitative Strategy, Adam Gould has seen AI affect the financial industry over his career. The research process, loan applications and trading algorithms have all been affected by AI. Check out Adam’s latest update to his [Quant Focus Clarity Through AI](#). Also, if you haven’t had a chance to catch his 2022 Outlook please see a replay available [here!](#)

How We Select AI/Automation Investments in Our Thematic Portfolio

Figure: Automation/ AI stock list criteria
Per Fundstrat



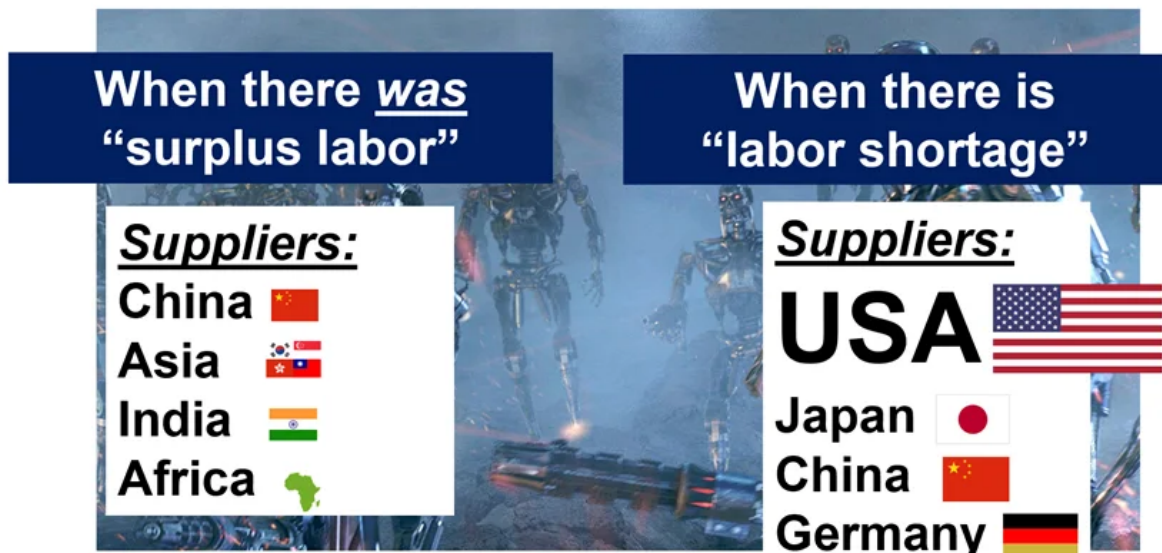
Source: Fundstrat

We have a complicated method for selecting AI investments that is both quantitative and qualitative. We find our informed framework is an excellent way to weed out firms that are economically benefitting from the rise of AI/Automation instead of those who merely attempt to get credit from using the buzzword.

The convergence of AI with other frontier technologies like quantum computing could result in massive economic gains beyond what is even currently imagined. Despite the cautionary tone in the introduction, the rise of AI/Automation is no longer up for debate. It has affected every industry and is even making its way into small businesses in a big way.

The ability for robot workers to work more efficiently and cost less than human labor in certain tasks has existed for a while. The latest gains in AI are occurring because of recent strides in the ability of machines to perform more complicated “thinking tasks” at levels comparable to human proficiency. The ability to self-correct along with advances in computing power and software have made it cheaper and more efficient to hire a [robot worker](#). There are specialized firms who help adapt robots to their needed task with software, and often, the robot is even paid on an hourly basis.

AUTOMATION: Labor Shortage *drives demand* for ‘automation’
‘Demand for automation driven by necessity’

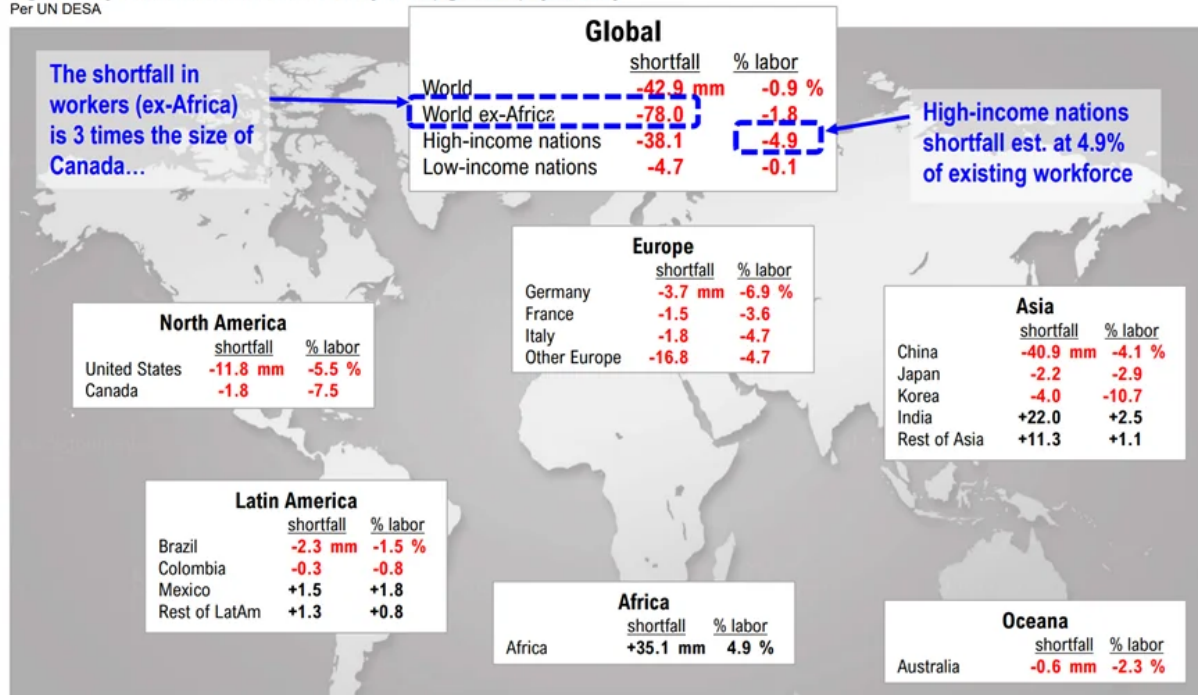


Source: FSI/Fundstrat

Alphabet (\$GOOG) has [robots](#) that sort trash at its offices, financial companies use AI to evaluate credit risk and reduce delinquency, AI is very useful in developing therapeutics and [predicting](#) the evolution of viruses, a Chinese insurance company uses computer vision to detect pantomimes for lying to reduce adverse selection, and Caesar’s Entertainment (\$CZR) uses AI to make informed marketing decisions based on guests’ spending patterns and preferences. 2021 was the strongest year ever for North American [robotic sales](#), a trend that is likely to continue. Even the [Work-From-Home](#) trend has affected automation; many machines can now be operated remotely as well. With improvements in communication and the ability for machines to self-diagnose, one worker can supervise multiple machines.

Whether through Siri or Alexa, we have all likely been introduced to AI directly in our lives and its limitations. So, the age of AI has arrived, but conducting a realistic assessment of investments in the area is still essential. Given the nature of these investments, they can have a lousy ROI if poorly managed or conceived. We believe a secular labor shortage will increase the demand for AI-driven automation solutions.

Figure: Projected shortfall in labor force by 2028 (age 16-64) by country
Per UN DESA

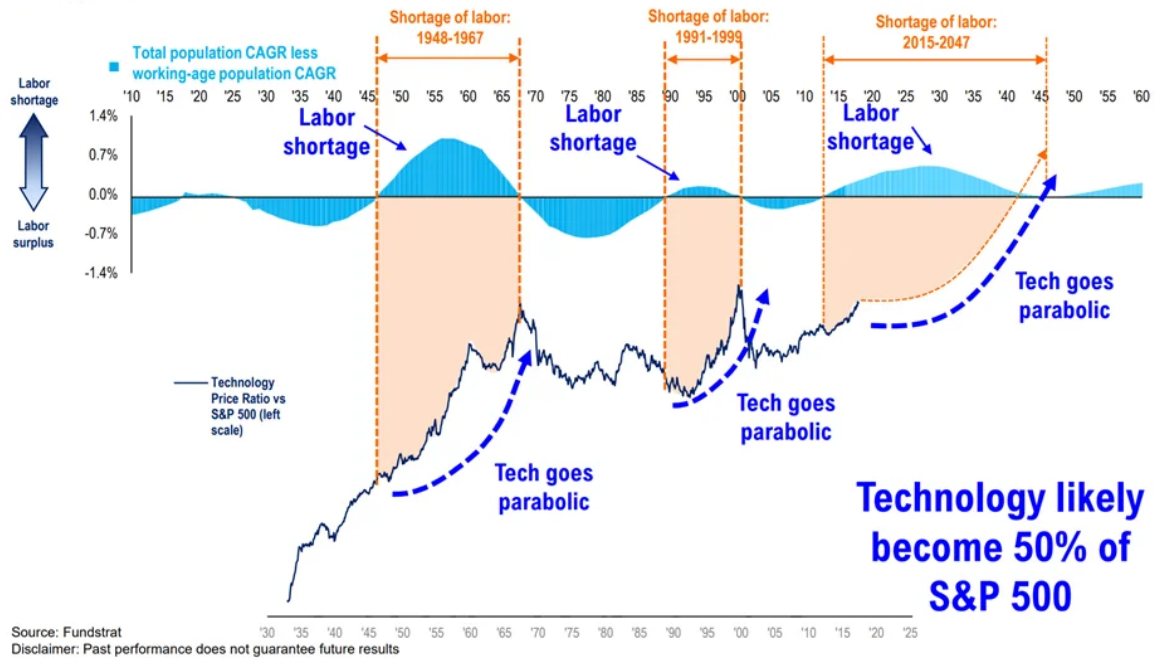


Source: Fundstrat/FSInsight

When we constructed our AI/Automation portfolio strategy, we divided the playing field into two parts:

AI/Automation Suppliers – for companies with either high exposure to AI/Automation-related products or that are the producer of the AI/Automation equipment or related components, including software. A lot of AI is software, and a lot of the investment in it is likely accounted for as an intangible. We have gotten to the point where AI and machine learning have become present in every industry, but that doesn't mean everyone will benefit equally from this prodigious trend.

Figure: Comparative relative performance of US Technology stocks during periods of US labor shortage
Since 1930-now



AI/Automation Beneficiaries – for the firms that could leverage AI/Automation and benefit from adopting it. More specifically, we reviewed the firms' earnings call transcripts to decide if the firms have already implemented or plan to implement AI/Automation in their daily operation. We performed our own industry/job function studies to determine if AI/Automation could replace some job functions within the industry. We also conducted quantitative analyses on the labor structures of firms and determined which firms have a more considerable potential of cost-saving by adopting AI/Automation.

Figure: Comparative forecasts of Total US population and age 16-64
Census bureau

	2020	2030E	Cumulative		
			Δ	Δ%	CAGR
US Population: Total	330,537,225	355,315,582	24,778,357	7.5%	0.73%
US Population: age 16-64	208,572,479	210,989,197	2,416,718	1.2%	0.12%
Shortfall analysis:					
Implied Pop (16-64) to match overall growth		224,207,884	15,635,405	7.5%	0.73%
Implied shortfall of Pop age 16-64		13,218,687			

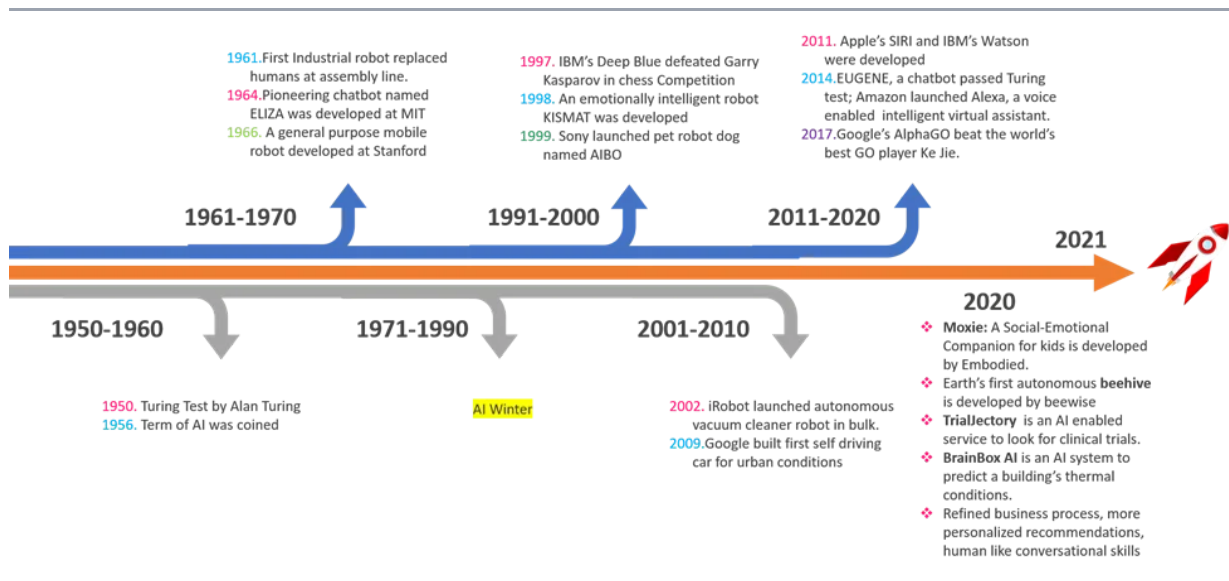
Participation rate (forecast)	63%
Implied Labor shortfall	8,327,773

8.3mm workers needed
 x \$50,000 labor parity/ year
 = \$415B “automation” capex/ year

Source: Fundstrat, US Census Bureau

Understanding Artificial Intelligence and Potential Economic Applications Requires Nuance

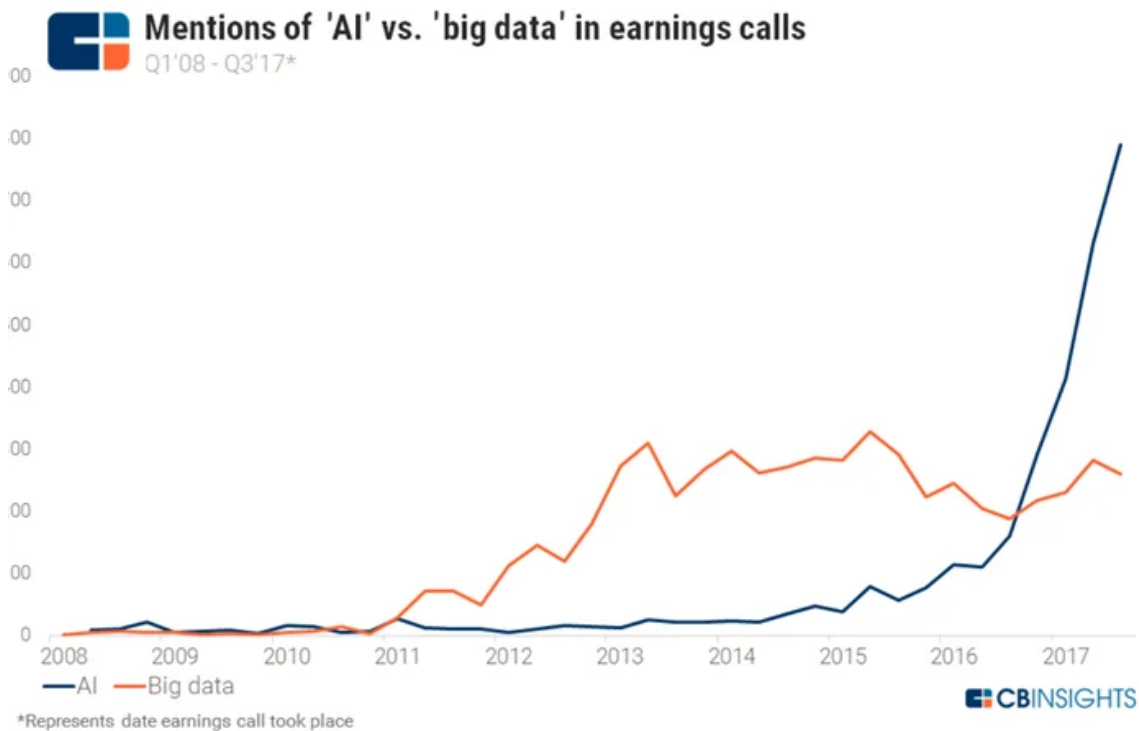
Alan Turing, the father of computer science whose work helped shorten the Second World War, is also a primary early contributor to what is now called the field of Artificial Intelligence (AI). This field has subsequently become incredibly consequential for the world in general and, by proxy, the world of investing. It has become a ubiquitous term affecting so many aspects of life that it can sometimes be challenging to define. We want to get beyond the buzzword and to this incredible emerging technological constellation's commercial application and future potential.



Source: <https://connectjaya.com/ai-timeline/>

The inaugural program to first play a complete chess match with a human was designed by Mr. Turing in 1951. Shortly after that, another early forefather of the AI field named Arthur Samuel built a checkers playing program with self-improving features. While Samuel was an avid checkers player, the program he made soon came to beat him routinely.

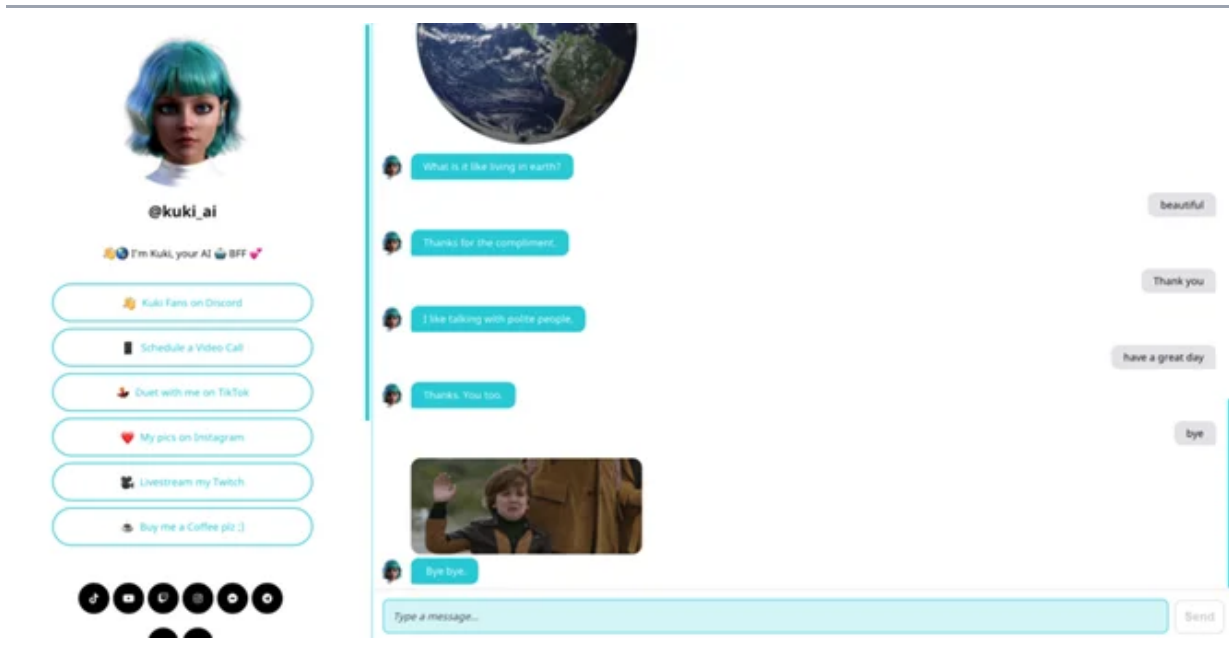
This outcome illustrated an essential feature of artificial intelligence that Hollywood indeed ran with: the capabilities of an artificial agent aren't bound by the designer's capabilities. The movies *Terminator* and *The Matrix* present bleak realities where this concept is taken to its extreme. As we'll try to explain, the truth is a bit more complex. When dealing with the potential accretive impact of AI investments, nuance and careful consideration of projects are essential. This is especially true when people use the term on earnings calls with increasing frequency.



Play Chess When You Invest, Not Checkers

However, let's examine the more complicated game of chess to help disavow you of the fictionalized portrayal of AI most are probably familiar with. Chess is a very complex game. Legal moves on a chessboard clock in at about half the number of atoms in the observed universe. If you include illegal moves, it exceeds the known atoms in the universe. For all practical purposes, the number of possible games is essentially infinite. AI chess programs first began beating humans (that weren't good at chess) in the 1970s, but the task of beating a Grand Master was elusive. That feat would finally come on May 11, 1997, when a computer built by IBM named DeepBlue beat famed chess master Gary Kasparov in tournament format.

Like so much in AI, the numbers can be perplexing, and humans not versed in the primary discourse of AI may misunderstand the capabilities of AI when they are measured. It seems scary that a computer can beat the best our kind offers at a highly complex game with incalculable possibilities. One could fear that *Skynet* is just around the corner. The thing is, the feat seems superhuman, but the programs doing it still pale in comparison to the human brain. An excellent way to measure progress is to see how sophisticated computers are in answering questions pretending to be a human or Turing's *Imitation Game*. The prestigious [Loebner Prize](#) does just this. An analysis of the conversations shows that while they might pass muster for baseline tasks, they still aren't operating near a human level and can only have simple conversations.

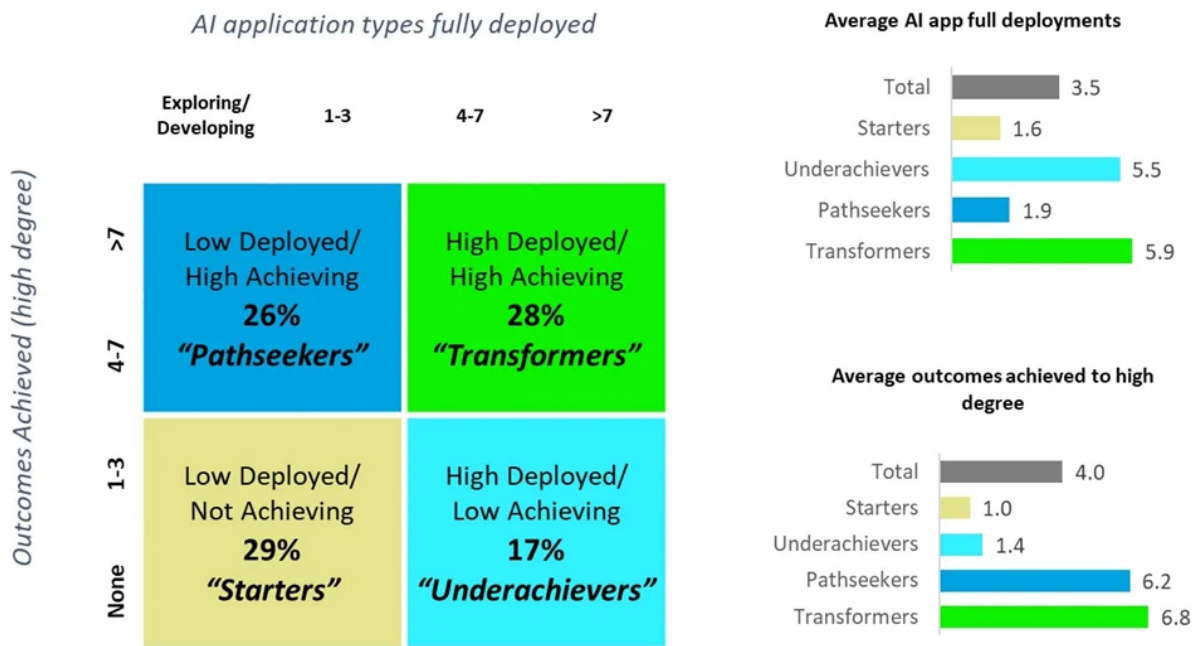


Source: <https://www.gopichandrakesan.com/ai-chatbot-meet-kuki-ai-a-five-time-loebner-prize-winner/>

Want to play chess when you invest? Then you should check out the advanced tools available to you through our Head of Global Portfolio Strategy, Brian Rauscher. Both our new [Dunks](#) product and [FSI Sector Allocation](#) are informed by time-tested quantitative models. Check out Brian's 2022 Outlook [here](#).

AI programs decompose and simplify tasks. For example, they create micro-worlds with specific rules that are much less complex than the actual world we inhabit. Therefore, they can conduct tasks like chess and checkers with seeming ease, but it's not intelligence but their speed that enables them to beat a human.

Though they can't possibly conduct a full *game-tree* for a chess match, they can use heuristics to gain an edge over their human competitors that can only consider three moves a second, compared to their much faster level of consideration. It's not intelligence; it's specialization and brute computational force. Computers are not as handy with most tasks, and the victory doesn't mean you'll be plugged into the Matrix anytime soon. After all, it was in 1997, and while AI has entered our daily life since then, it is primarily a sometimes bumbling and sometimes helpful presence, not an evil domineering one. At least so far. Knock on wood.



Source: 'State of AI in the Enterprise' Fourth Edition: Becoming an AI-fueled Organization A Survey from the Deloitte AI Institute, October 2021

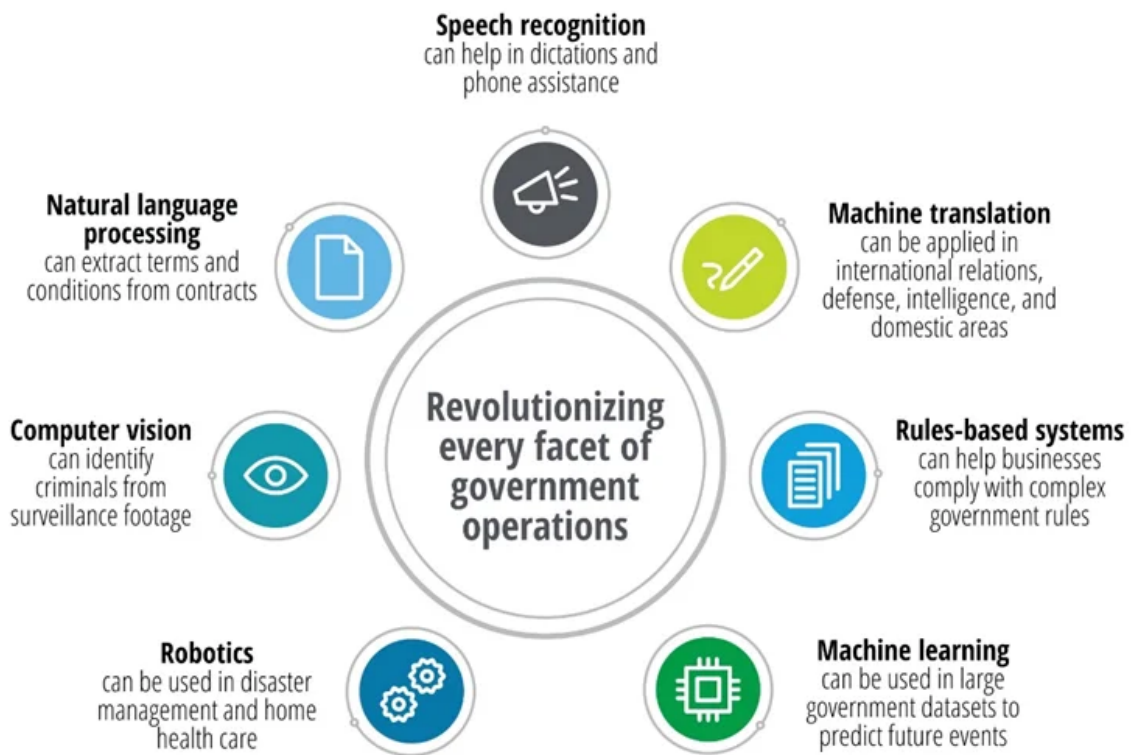
The lesson here is understanding why AI is working and whether it's an optimal use from a shareholder's perspective. Evaluating AI and Automation through the lens of accretion to shareholders is vital. Remember that just because a company says they're innovatively using AI doesn't mean they are. AI/Automation investment returns can exceed the cost of capital significantly, but it doesn't mean they will. Further, large investments in AI can take years to pay off, and the stock price may not properly value those investments on day one. Make sure they're not peddling fluff where there should be substance. Headline-grabbing AI achievements aren't always what they seem, as we've tried to impart, so it's better to use a method like we use to conduct data-driven portfolio selection to assess the economic impact and resilience of AI and automation strategies.

Artificial Intelligence and Automation is Perplexing, Let's Break Down Commercial Applications

The actual discipline of Artificial Intelligence is more akin to Philosophy than Science Fiction. It wrestles with some of the most complex and deep questions humanity considers. Is immortality of consciousness possible? What does it mean to be intelligent? Is human reasoning and consciousness unique or easily replicable? Will computers ever be 'aware,' and if so, how will they meld with their social human counterparts? These are all critical questions for great minds to consider, but for investing, you have to consider who is using AI in a way that will boost their share price. Look at how AI revolutionizes government functions; imagine what it can do for faster, leaner private enterprises.

FIGURE 3

Different types of AI can be used for different government problems



Source: Deloitte analysis.

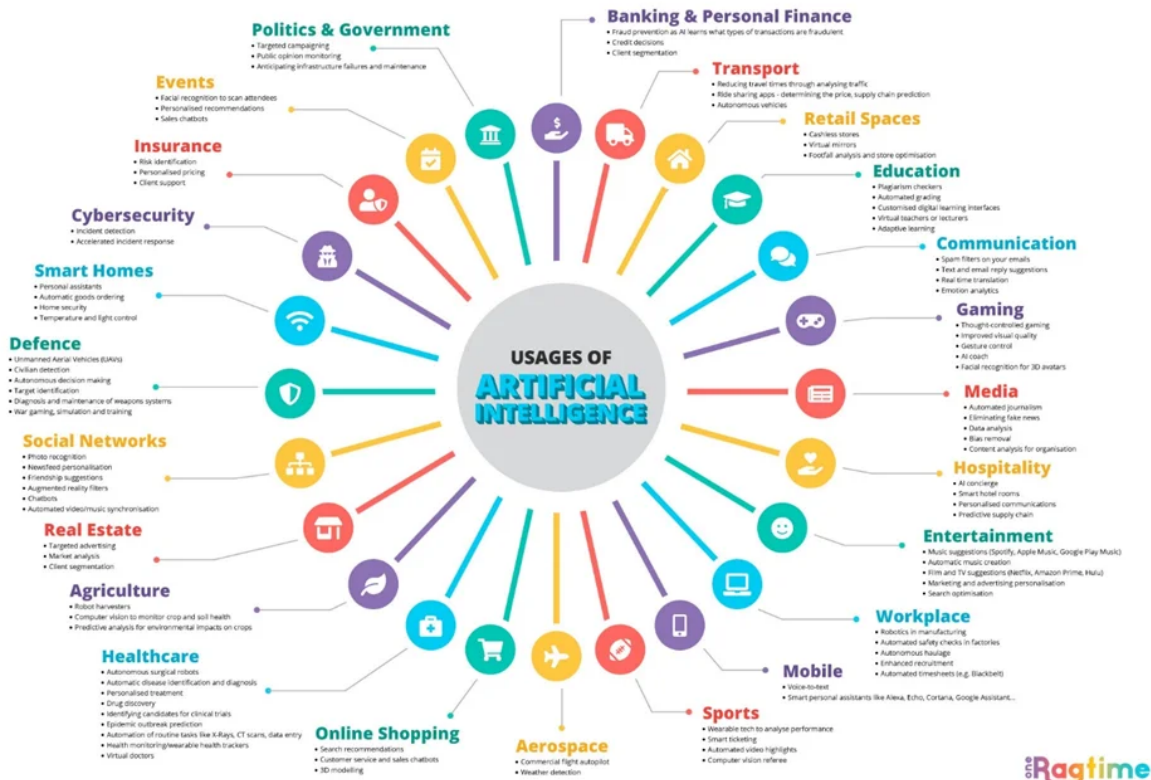
Deloitte Insights | deloitte.com/insights

Do you have a tactical investing horizon? Maybe you're a trader and three to five years sounds like a lifetime to you. Our Head of Technical Strategy, Mark Newton, provides industry-leading technical analysis. Check out his recent technical updates on [Granny Shots](#). His 2022 outlook is [here](#).

AI and Automation also have to be considered within the context of their convergence with other technologies. Cloud computing, the Industrial Internet of Things, Autonomous Driving, Wearables, the Metaverse, and Advanced Manufacturing are all colliding with AI and Automation at different speeds. As we mentioned, it is also simultaneously filtering down into small businesses, and we expect the tight labor market, both short-term and the secular shortage, to drive adoption. We've selected five AI/Automation beneficiaries that we think will perform well from this secular trend over the next three to five years.

First, let's discuss some of the critical currents and economic trends that we believe are relevant to AI. This is essential when picking who will win from their AI/Automation investments. Remember, many of these companies have high P/E multiples, so trying to deduce where current trends will take us in the future is always rough and inherently not dependable. Nonetheless, we believe our process-driven approach is of great assistance in this task. We believe considering the following points is essential when thinking about investing in AI.

1. The convergence of AI and robotics is profound and will unlock vast stores of productivity in our economy by lowering labor costs directly and by leveraging their human employee counterparts to do other tasks. Manufacturing will be and is being revolutionized by this. We see demand in the early stages.
2. AI costs are going down. Improvements in computational resources – both in availability and in speed, have allowed AI models to be trained at increasingly faster rates. Further, the expanding base of knowledge in the area acts as a multiplier – the more advancements occur, the faster new advancements can be made. There is a vast market opportunity and potential for growth.
3. Spending on AI applications and AI software can be immensely accretive because it increases productivity and can reduce costs, sometimes substantially. However, investments and companies should ALWAYS be evaluated on a case-by-case basis.
4. AI Software will likely increase demand for AI hardware and other tangential products and services. Cutting-edge projects will take time to pan out. Right now, real financial gains are being made with machine learning and other 'old news' AI functions.
5. The future impact of AI and its interactions with human labor is unclear. The author of the [paper](#) from 2013 that was often cited as saying AI will replace 47% of jobs, said his work didn't even come close to supporting this widely cited conclusion. It measured how many jobs were *potentially* susceptible. How human societies respond to and regulate AI, given the profound ethical consequences and considerations, is unclear.

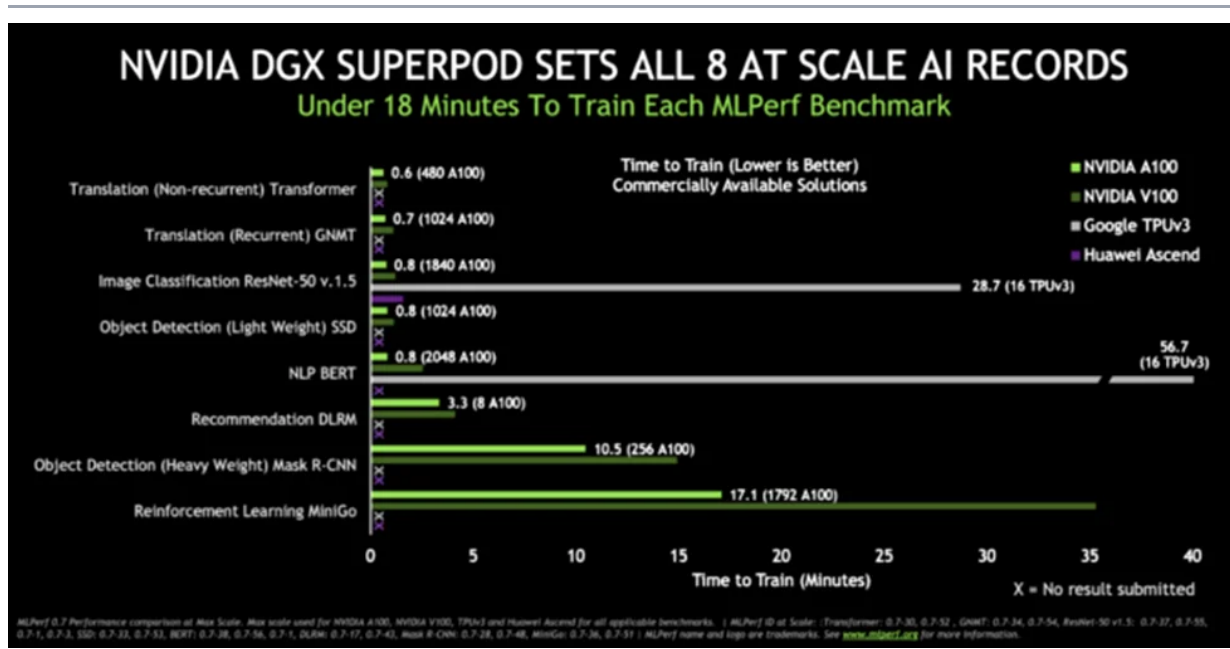


Source: <https://www.oneragtime.com/24-industries-disrupted-by-ai-infographic/>

Our Five Artificial Intelligence Picks: Companies Playing Chess

Nvidia (\$NVDA)

Probably more than any company, Nvidia has become synonymous with AI. It's no longer trading with a high correlation to crypto and has long since outgrown its days as a gaming company. The company is a leader in both AI hardware and software. We called Nvidia the "Cisco Kid" when we covered it in this column months ago, and despite the recent mega-cap weakness, it has still not let us down. This company's market-cap is now larger than Meta (\$FB). We expect it to remain in the top market-cap club as its extensive and dominant AI prowess continues to create opportunities for its shareholders. AI could be analogous to our minds, and the hardware needed to run it, or computers, could be considered our brains. Nvidia's GPU chip is the brain of the artificial intelligence revolution. This product has also democratized AI research at other firms and fuels AI progress.

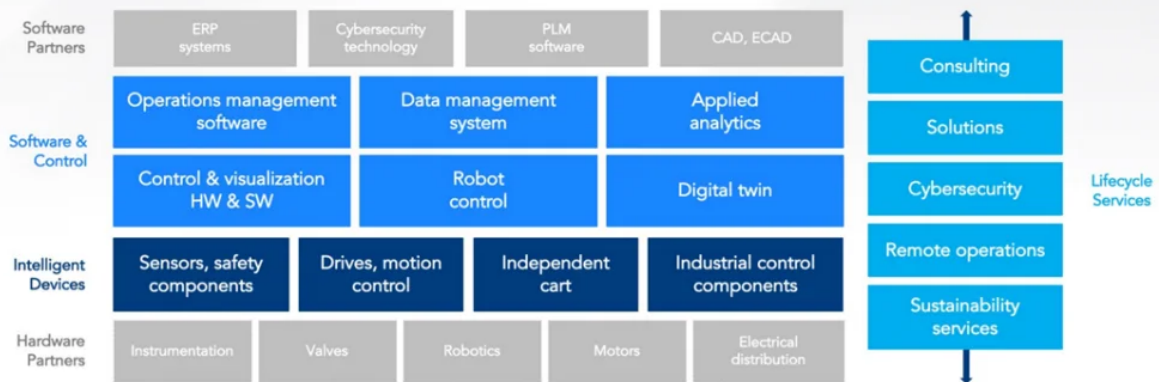


Source: Company Blog

Rockwell Automation (\$ROK)

This company is the clear leader in automating industrial processes and offers a comprehensive suite of services. The company operates directly at the convergence of the immaterial side of AI with the physical side: AI-powered machines. It provides everything from software and sensors to control systems and safety technology. It has a diversified customer base in over 100 countries. We believe this company is uniquely positioned to benefit from the secular global labor shortage as more and more companies turn to them to automate advanced processes. Rockwell is also nicely poised to benefit from the Biden Administration's goals of a resurgent manufacturing sector in the US.

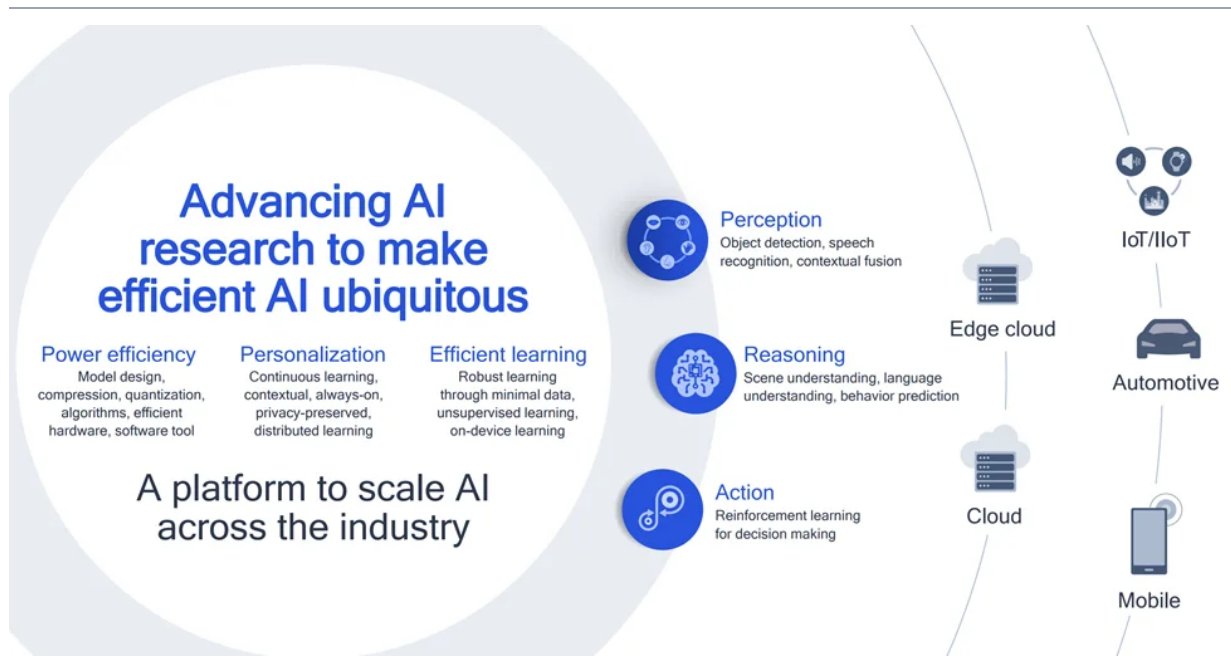
Building blocks of the Industrial Automation & Information market



Source: Company Investor Day Presentation

Qualcomm (\$QCOM)

Though Qualcomm is perhaps best known for its mobile-oriented chips business, it is a monster in the world of Artificial Intelligence. It has been behind many innovations that enable AI to play a constructive commercial role in its convergence with mobile phones. Though the company has recently been removed from our Granny Shots portfolio, it is still in our AI/Automation thematic portfolio. We expect it to benefit immensely from this massive technological trend over the next 3-5 years. We're encouraged by the company's steady capital commitment to AI R&D and expect much of it to likely be accretive for shareholders over the investment horizon. The company has made inroads in neural networks as well.



Source: Company Presentation

Intuitive Surgical (\$ISRG)

We have been talking about how AI can sometimes fumble complicated tasks, which is true, but also changing quickly. This company takes automation to one of the most advanced and delicate tasks a human being performs. This company is a glimpse into a better future for the Healthcare sector empowered by Artificial Intelligence and automation. The company's flagship Da Vinci surgical system makes surgery less invasive, with lower costs and better outcomes. The system is well-proven and has conducted over 10 million procedures to date. This company is downright futuristic and is an excellent example of the horizons being made available by the progress of AI and Automation in a universally helpful way and reduces burgeoning healthcare expenses. \$ISRG is on our newest *Dunks* stock list and in our AI/Automation portfolio.

	Intuitive Ecosystem	In 2021
Systems	Design, develop, and produce world-class platforms – da Vinci X, Xi, SP and Ion	6,800+ da Vinci, Ion combined installs to date
Instruments and Accessories	150+ 4th generation instruments & accessories supporting surgical procedures	8 I&A product launches
Regulatory	Nearly 70 representative clinical uses for da Vinci systems	3 ongoing IDE clinical trials
Training / Genesis	Continuously improving care team training and OR consulting	4,500+ trained surgeons; 1,600+ Genesis engagements
Clinical evidence resources	Support and evaluation of clinical database - da Vinci database at 29,000+ articles	3,000+ peer-reviewed articles
Sales and services competencies	Intuitive products in 60+ countries globally	38 countries with a system placement
Market development	Enable surgeon collaboration, market education and payor education	5 new reimbursements
Academics and surgical societies	Substantive collaboration with medical societies on computer-aided intervention	252 society sponsored fellow in-person training events in the U.S.
Economic validation	Real-world evidence of lowered total cost of care for providers	30%+ growth in hospitals engaged in custom hospital analytics
Digital and data	Help care providers harness their data to drive quadruple aim improvements	My Intuitive App launch US, Japan, EU

Source: Company Reports

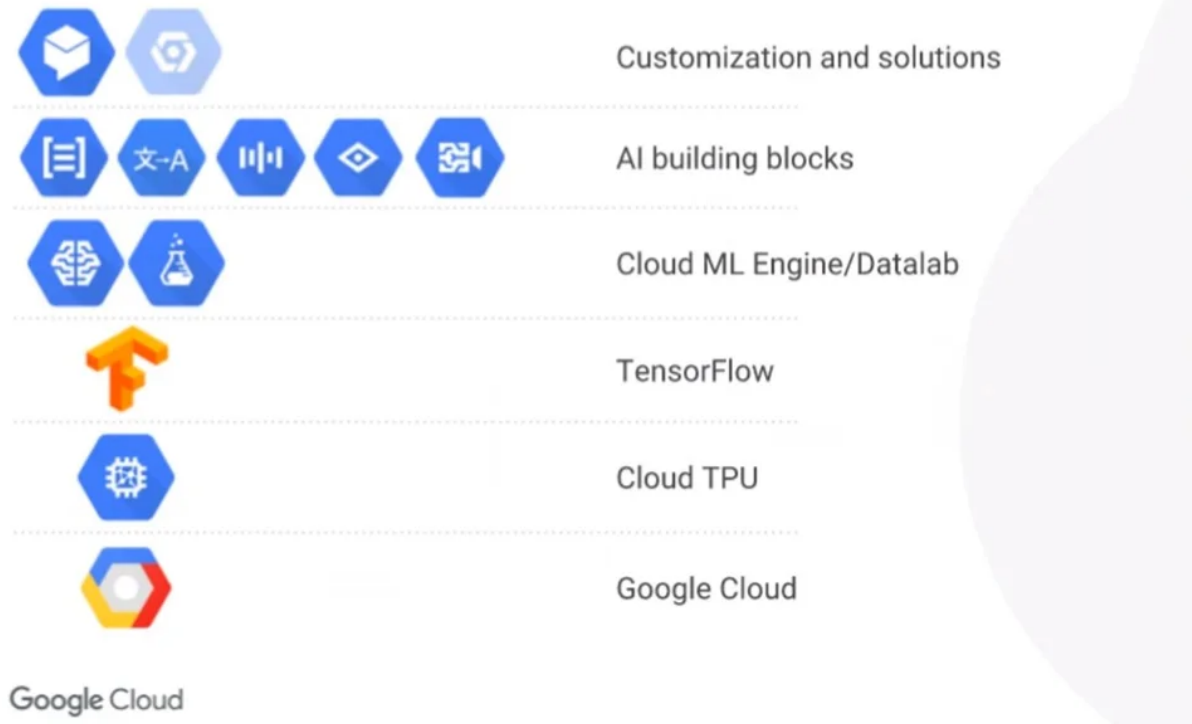
Alphabet (\$GOOGL)

The recent earnings faceplant of Meta (\$FB) is an excellent example of the limitations of AI. Some might have expected us to include Meta because of its big headline-grabbing announcement that it was building an AI supercomputer. When Apple cut off the data it needed for its advertisements, it was not in a good position and had its most extensive one-day loss ever.

On the other hand, Alphabet uses AI in ways every day that affect our lives and have helped democratize information. Of the \$700 billion or so that comprised global ad revenue in 2021, Alphabet took over \$250 billion of this. Recent earnings showed enduring strength, and the way this company has used AI has made it one of the most successful companies in history.

Alphabet does this because it has reams and reams of value to train its AI and has also been investing in the area since its inception. Alphabet also has its own AI subsidiary, DeepMind, responsible for some awe-inspiring AI breakthroughs. Recently, it introduced [AlphaCode AI](#), which can competitively write code to respond to problems. AI isn't just coming for unionized factory workers! Alphabet is one of the most prominent investors in AI, and we expect those investments to be accretive to shareholders over the investment horizon of the portfolio.

Google Cloud AI technology stack



Source: Alphabet

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