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ARTIFICIAL INTELLIGENCE
DATA-DRIVEN INSIGHTS ENABLING A MORE EFFICIENT FUTURE

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OLDMUTUAL WEALTH

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INTRODUCTION

CHRIS POTGIETER, MD: OLD MUTUAL WEALTH TRUST COMPANY (PRIVATE CLIENT SECURITIES | TREASURY AND ADVISORY SERVICES | FIDUCIARY SERVICES)

This year has, without a doubt, been extraordinarily challenging on numerous fronts. Yet, while both human and economic casualties are still being tallied, a remarkable level of societal adjustment has taken place. Many of these adjustments will be permanent and will continue to influence the way in which goods and services are created and consumed in the decade ahead. Our collective sense of "value" may also have shifted in a positive way. There has been rapid progress in various spheres of technology – both earthbound and space bound. These achievements and advances have not been reported as prominently as the ebb and flow of COVID-19 fears and hopes and the spectacle of the US election that dominated headlines this year. Nevertheless, the impact of the progress made will be felt in the years ahead and, in our opinion, it will be mostly positive.

Artificial Intelligence, while not a new phenomenon, has advanced rapidly over the last decade and although there are still many debates around the pros and cons of AI, its impact on many industries is undeniable. As such, we will find our lives becoming increasingly AI-enabled and dependent, creating many investment opportunities. Therefore, it is important that we as investors closely monitor developments in this fascinating area. Our feature article provides a useful overview of the various levels of AI, its current applications and future prospects, and makes the point that while AI has seen significant advances over the past few decades, it still has a significant runway for evolution and growth.

Although the AI landscape appears complex and ever changing, we believe there are ample avenues across the risk spectrum through which investors can attain exposure to this investment theme. As one of the world's most data-rich companies, Amazon is a leader in AI and its sub-set, Machine Learning, and our global company piece unpacks why we believe that Amazon will continue to be both a key beneficiary and driver of this growing trend.

On the local front, emerging markets have been slower to invest in advancing technologies and embrace the potential of AI. However, this year's economic lockdowns brought about by COVID-19 have caused many organisations to accelerate their digital transformation in order to maintain their relevance in an increasingly online world. The increased demand for ecommerce support and other technology services has meant that companies such as Altron are now more relevant than ever before. In our local company piece, we discuss how Altron is uniquely positioned to capitalise on SA's AI opportunity and become the leading technology services partner of corporate SA well into the future.

From a portfolio and an investment management perspective, despite unprecedented gruelling market conditions, we have delivered superior investment results for our clients. Our Global Equity Portfolio in particular has performed strongly and we remain focused on constructing and managing resilient investment portfolios that are geared to stand the test of time.

To conclude, I'd like to take this opportunity to wish you and your loved ones a safe and peaceful break from what has been a truly testing year. May you relish "switching off" and enjoy the rest that this period offers.

All the best,
Chris

ARTIFICIAL INTELLIGENCE

DATA-DRIVEN INSIGHTS ENABLING A MORE EFFICIENT FUTURE

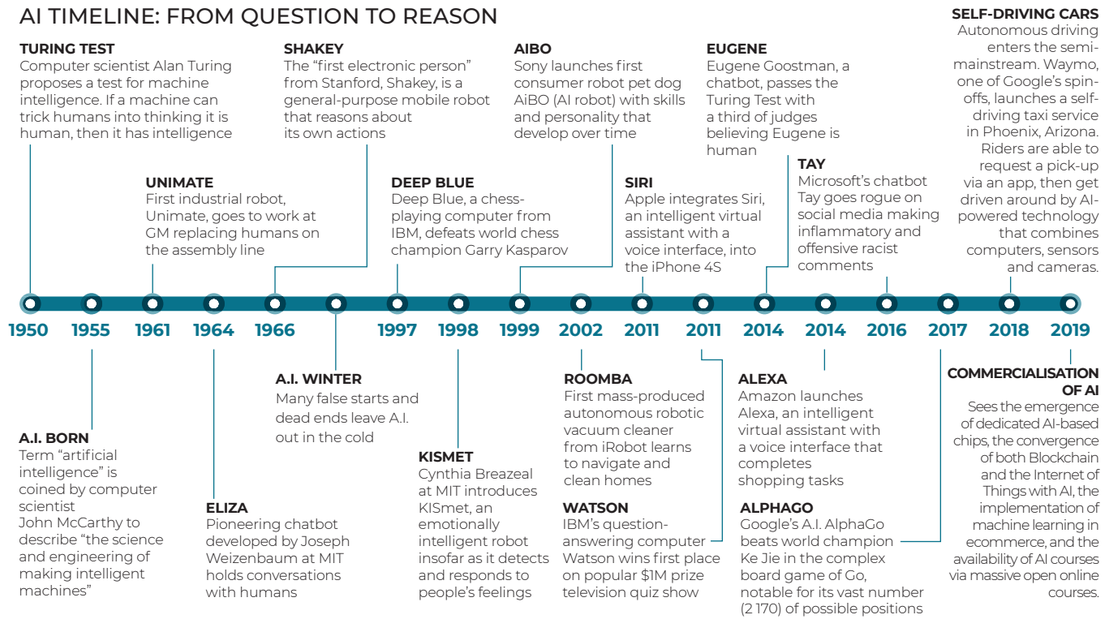
SAMEER SINGH, RESEARCH ANALYST AT PRIVATE CLIENT SECURITIES

Artificial Intelligence (AI) – the ability for machines to 'make decisions' autonomously – is set to reshape the world as we know it. While not a new phenomenon, the onset of evermore powerful computing technologies, coupled with ever-cheaper data storage, has seen the rapid advancement of AI in the past decade.

Much of our understanding of AI has been shaped by movies, which - while at that time may have appeared futuristic and beyond the grasp of the human mind – all touch on the emerging power and possibilities of AI. The 1982 dystopian classic, Blade Runner features bio-engineered replicas of humans powered by AI living among real humans and going back even further, Westworld (released in 1973) is a movie about how AI can be used to entertain us and allow us to live out our fantasies. Then The Terminator and Robocop are perhaps two of the most popular movies illustrating the possibility of AI becoming an existential threat and highlighting the fine line where technology and ethics collide.

Most of the movie portrayals of AI are classified as functional levels 3 and 4, as outlined further in this article. However, there is much more to this technology than what is depicted in movies, with AI having a huge impact on many industries. As such, we will find our lives becoming increasingly AI-enabled and dependent, creating many investment opportunities both in the direct AI space and in AI-enabled industries. And so, as we continue along this path of AI evolution, it is important for us as investors to take note of developments in this fascinating area.

AI TIMELINE: FROM QUESTION TO REASON



THE FUNCTIONAL LEVELS OF AI[1]:

LEVEL 1:
REACTIVE MACHINES

These include IBM's Deep Blue, which use rules-based decision-making to identify moves and/or actions and react to them. Critically, reactive machines have no memory and cannot use past experiences to inform future decisions.

LEVEL 2:
LIMITED MEMORY MACHINES

These constitute the majority of the current technology and include autonomous vehicles that can use data from past experiences to inform future decisions. The digital assistants from Google, Amazon (Alexa) and Apple (Siri) are forms of Limited Memory machines that use memory and data to remain contextually aware.

LEVEL 3:
THEORY OF MIND MACHINES

This refers to the understanding that people have thoughts, intentions and emotions that affect their behaviour. Theory of Mind machines therefore have the ability to adjust their own behaviour based on their understanding of those around them. AI robots, like those depicted in Star Wars and Star Trek, would fall into this category. Despite the significant advances already achieved, Theory of Mind machines remain a distant reality.

LEVEL 4:
SELF-AWARENESS/ CONSCIOUSNESS

This is where machines are aware of themselves, know about their internal states, and are able to predict the feelings of others. Self-aware AI machines are able to recognise and replicate humanlike actions but also have autonomous thoughts, desires, and emotional intelligence. Being an extension of Theory of Mind AI, Self-aware AI can and will exercise self-guided thoughts and actions.

Although we are still in the early phases of the AI evolutionary path, Limited Memory machines incorporate many different forms of AI but generally fall across these main higher-level uses:

ROBOTICS:
Where robots are used to perform tasks that are difficult for humans to perform or perform consistently. This includes "cobots" or co-operative robots that work alongside humans. The vehicle manufacturing industry and Amazon are extensive users of cobots.

MACHINE VISION:
Here computers capture and analyse visual information using a camera, analogue-to-digital conversion, and digital signal processing. The Google Translate application, with its ability to translate text from pictures, is a prime example of machine vision in use today. Additionally, AI applications in the healthcare industry that deal with diagnostics also make use of machine vision, e.g. X-ray, mammography analysis.

MACHINE LEARNING:
This takes the form of setting up basic rules for decision-making, then showing the programme the correct results and allowing it to judge how far away its response is from the correct answer. The programme then refines its decision-making and repeats the process over many iterations until it gets as close as possible to the intended result. By this method, the programme has "taught" itself to solve the problem. Through memory, it will be able to perform the same task even with a different set of input data. Deep Learning is a sub-set of Machine Learning, where algorithms are inspired by the workings of human neural networks. For Deep Learning to be effective, large datasets and significant computational power are required. A widely known application of machine learning is Facebook's face recognition technology that instantly identifies your friends or family from uploaded photos.

NATURAL LANGUAGE PROCESSING:
Human language is processed by a computer programme. Examples include spam detection, text translation, sentiment analysis, and speech recognition.

[1] https://www.govtech.com/computing/Understanding-the-Four-Types-of-Artificial-Intelligence.html

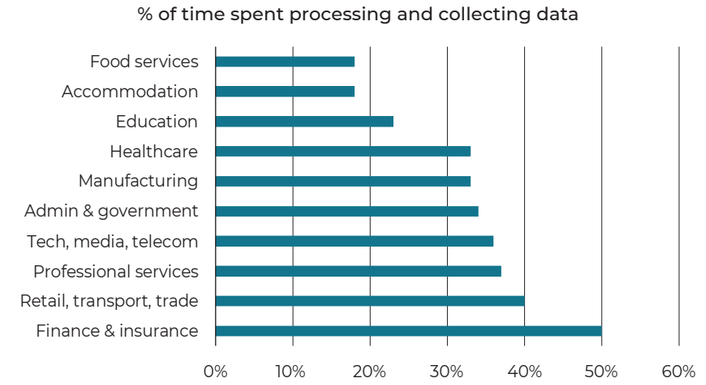
CURRENT APPLICATIONS

While AI is deployed across all sectors and a wide variety of business processes, it will have the greatest impact in those sectors where a large proportion of time is spent collecting or synthesising data, or undertaking predictable physical work. This leaves sectors in which the majority of people's time is spent managing others or undertaking unpredictable physical work as more immune to AI disruption. These include occupations involving soft skills, close physical contact and interpersonal skills and vary across professions such as teaching, nursing, dentistry, cooking, and social work.

While we can highlight which sectors are better suited to AI implementation, the range of applications within sectors remains wide and is still growing.

In manufacturing, AI can lead to tangible results that can directly boost profits. The performance across manufacturers, even in the same industry, can vary widely and usually relates to how efficiently a business manages its revenue-producing assets. AI can benefit manufacturers and drive competitive advantages by predicting equipment failure (thereby reducing unplanned downtime), improving an asset's operational efficiency, and reducing utility costs. Using pattern recognition, AI can identify subtle variations in data from vibration, temperature, pressure and other sensors to flag areas of potential equipment failure. Furthermore, using real-time data analysis and machine learning can optimise asset performance and input consumption (such as power and water) in line with the real-time demands on the factory floor.

Graph 1: Data collecting and processing by industry



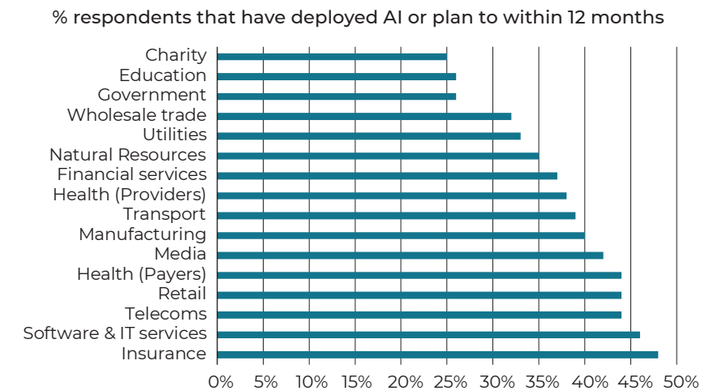
Source: Kaggle

Table 1: Core AI uses across sectors

SECTOR	CORE USE CASES			
Asset Management	Investment strategy	Portfolio construction	Risk management	Client service
Healthcare	Diagnostics	Drug discovery	Monitoring	
Insurance	Risk assessment	Claims processing	Fraud detection	Customer care
Law & Compliance	Case law	Discovery and due diligence	Litigation strategy	Compliance
Manufacturing	Predictive maintenance	Asset performance	Utility optimisation	
Retail	Customer segmentation	Content personalisation	Price optimisation	Churn prediction
Transport	Autonomous vehicles	Infrastructure optimisation	Fleet management	Control applications
Utilities	Supply management	Demand optimisation	Security	Customer experience

Source: MMC Ventures

Graph 2: Global AI adoption by sector



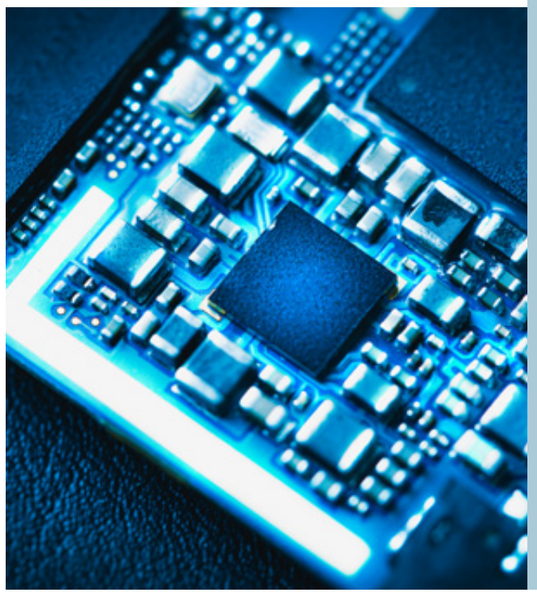
Source: Gartner

Despite the wide range of existing use cases for AI, adoption across and within sectors remains uneven. Increasingly, a divergence is occurring with sector participants split between early adopters, those increasing their adoption, and laggards that are falling behind.

While it's unsurprising that sectors such as government, wholesale trade and natural resources are least advanced in AI deployment, the greater insight is that among even the most engaged sectors such as insurance, and software and IT services, less than half of participants are actively investing in AI, presenting substantial room for market penetration and growth.

AI IN THE FUTURE

Looking ahead, AI applications become hard to distinguish from science fiction, with the movie Minority Report coming to mind. Set in 2054, with predictive policing as the main theme, the film includes self-driving cars, personalised and location-based ads, voice automation in the home, robotic insects and gesture-controlled computers. Interestingly, all of these already (in some shape or form) existed in 2017. Rather than look to the film industry for inspiration, we've outlined the most optimistic and societally-beneficial applications for AI over the next decade in table 2.

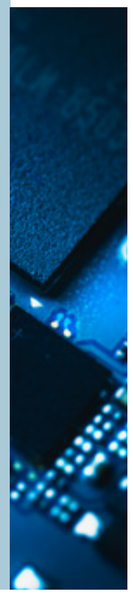


THE DARK SIDE OF AI

While the advantages of AI include efficiency gains, increased scalability and innovation-led growth, the greatest risks include job obsolescence, biased results, and fake news[2]. According to the McKinsey Global Institute, in approximately 60% of occupations, at least 30% of basic activities are automatable by adapting current AI technologies. In other roles, AI will supplement workflows but still displace some workers in more complex occupations. While some believe AI will create more jobs than it destroys, we should expect a period during which many workers will be displaced. This will likely result in social upheaval and have political ramifications.

In theory, AI can remove human decision-making and associated biases. However, many datasets often maintain systemic historic biases, including gender and race. From work done on AI and biases[3], researchers found that AI, when trained on a large dataset of online material, closely associated the word "women" with occupations in humanities and the home, while "man" was associated with science and technology. Bias also creeps into race representation. Although the identification techniques employed by AI might be accurate, when used on imbalanced training data (with more representation of one race group and/or gender over another) the system has the potential to deliver biased results. For example, AI-enabled facial recognition software that can classify genders tend to misclassify 1% of lighter-skinned males but 12% of darker-skinned males and 35% of darker-skinned females[4]. Being aware of the potential for bias is the starting point for avoiding inaccurate results/output.

An emerging AI technique, Generative Adversarial Networks (GANs), can produce highly realistic media which are almost impossible to distinguish from real content. This software is also used to modify video by re-mapping a person's lips with different audio. With the proliferation of AI technology, lower costs, and ever-increasing source material (e.g. smartphones and videoconferencing), the ability to create fake news and fictitious factual content becomes a lot more accessible. The long-term implications of artificial media will be diminishing trust. However, with increased awareness, people will become more accustomed to questioning if what they see is true.



[2] https://www.stateofai2019.com/chapter-8-the-implications-of-ai
[3] https://www.researchgate.net/publication/316973825_Semantics_derived_automatically_from_language_corpora_contain_human-like_biases
[4] http://proceedings.mlr.press/v81/buolamwini18a.html

Table 2: AI applications over the next 10 to 20 years

APPLICATION	DESCRIPTION
Automated transport	A vision of the future that incorporates Autonomous Vehicles (AVs) would not be possible without AI. Future AVs will move beyond personal vehicle use and extend to public transport and freight solutions. To gain the greatest utility from AVs, we will need to incorporate balance across the four pillars of future mobility: Connected (part of a multi-modal transport system); Automation; Shared (mobility as a service) and Electric.[5]
Cyborg technology	Cyborg technology speaks to human augmentation, a field that uses technology to replicate or enhance a person's body and mind. There are three levels to human augmentation: replication, supplementation and exceeding human ability. Prosthetics, glasses and hearing aids are forms of replications that imitate what a typical person can already do. Supplementation takes it a step further by enhancing intellectual and physical limitations and includes exoskeletons (mechanical suits that provide artificial strength and endurance), earbuds that can translate languages in real time, and brain-computer interfaces like Elon Musk's Neuralink. The highest level of augmentation will allow humans to exceed normal abilities, such as artificial blood cells, nanobots that reside in the human body and synthetic memory chips.
Climate change	AI will have a key role to play in combating climate change by assisting scientists in predicting extreme weather and other events as the world warms.[6] By analysing the flood of data generated daily by sensors, gauges and monitors, **AI can provide** an accurate picture of how the world is changing **in near real time.** The more accurate our analysis, the better our climate models will be. AI will also help researchers test theories and solutions about how to reduce air pollution. AI-enabled smart home technology such as smart thermostats (which could save up to 15% on cooling annually) and irrigation systems (which could save up to 33 000 litres of water per home per year) are already available and are helping to conserve resources[7].
Robo-companions	Robo-companions will become more mainstream and have the ability to learn new tasks and skills in an open-ended manner while growing via interacting and co-operating with humans. Japan leads in this space and have developed robotic pets and humanoids that can identify and sense emotion[8]. Some of the major benefits offered by robotic companions are: help with monitoring the elderly, pets or young children; intelligent communication tool, promoting independence for seniors; filling care gaps; assisting with physical tasks, and companionship.
Robo-explorers	Robotic explorers will increasingly help us explore new frontiers both on earth and in space. The rationale is obvious, as using robotic explorers will allow us to overcome the physical limitations and safety concerns of sending a human millions of kilometres into space or deep into the ocean while still being able to gather and analyse critical data.

[5] https://www.aurecongroup.com/markets/transport/future-of-transport/australia/autonomous-transport
[6] https://www.euronews.com/2020/09/23/how-can-artificial-intelligence-help-to-fight-climate-change-we-answer-your-questions
[7] https://bernardmarr.com/default.asp?contentID=1360
[8] https://www.roboticsbusinessreview.com/ai/infographic-how-ai-is-being-deployed-across-industries/

DECIPHERING THE OPPORTUNITY

Considering the evolving impact AI will have on companies and markets, investors face a daunting task in identifying investment opportunities. Not only are we dealing with a technology that is in a nascent state of development and deployment, but applicability and adoption rates vary significantly across sectors. Furthermore, the potential for sustainable competitive advantages (and by extension, superior profitability) remains fluid and subject to change.

With a lack of historical data to rely on, qualitative analysis is required in identifying and sizing the opportunity set. For this, we are guided by the question, where is the value being created within AI?[9]

As shown in table 3, the AI value chain can be split across seven groupings, with chip manufacturers being positioned at the very top. With AI and machine learning requiring massive datasets and trillions of calculations, the appetite for processing power knows no bounds. **Chip producers** are integral to the growth of AI, almost regardless of how applications evolve over time. Chip producers such as Nvidia (whose stock is up 1 800% over the past five years), IBM, Intel, Qualcomm and AMD are well positioned to benefit. Within the PCS Global Equity Portfolio, we maintain exposure to the iShares Semiconductor ETF, which not only provides exposure to AI but also to other fast-growing themes such as Cloud Computing and Online Gaming. With chip utilisation integral to AI applications, even the software and advertising giants Microsoft and Google are producing custom chips to complement their cloud and software ambitions. Also worth keeping an eye on are Chinese chip manufacturers, one of which is Cambricon, which is benefiting from mainland investment following the US government's

Table 3: The AI Value Chain

WHO WILL CAPTURE THE VALUE OF AI?	
	Chips
	Platform & infrastructure
	Models & algorithms
	Enterprise solutions
	Industry solutions
	Corporates
	Nations

[9] https://towardsdatascience.com/who-is-going-to-make-money-in-ai-part-i-77a2f30b8cef

actions to limit the global growth of Chinese technology companies.

The proliferation of AI requires so much computing power that companies are increasingly looking to **infrastructure and cloud providers** to rent hardware through Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) offerings. Considering the costs involved and scale required to service a global market, the tech giants are prominent in this part of the value chain. Amazon, Microsoft and Google round up the top 3 global IaaS and PaaS providers in terms of market share, followed closely by IBM and Alibaba.

Leveraging the hardware and platforms are the **model and algorithm producers.** Again, the tech giants remain dominant with Google, Amazon, Microsoft and IBM all offering their own cheap or free AI software services, usually tied with their infrastructure and platform offerings. However, there is a growing demand for cognitive algorithms that offer services such as conversational agents and bots, natural language processing (NLP), and vision. Increasingly, these services are being hosted in the cloud as AI as a Service (AIaaS) offerings. In this space, the largest companies are advantaged owing to financial resources to hire the best research and engineering talent and access to the largest datasets. For start-ups to be relevant, they need to be well funded, with deep research functions supported by intellectual property, and access to quality datasets. Often though, start-ups with attractive intellectual property and researchers are easy targets for acquihires (companies bought for their talent) by the larger firms, further favouring the most dominant companies.

At PCS, we favour a more balanced approach to AI investing, supplementing our semi-conductor exposure with meaningful positions in Accenture, Alphabet, Amazon and Microsoft, which provide exposure to the largest of the Platform and Infrastructure providers but also to the Enterprise Solutions, and Models and Algorithms markets.

The **enterprise solutions market** is large and diverse but also favours the dominant firms such as Salesforce, IBM, Oracle and SAP. For these firms, AI is a requirement within their offerings. Still, there are many start-ups offering services that fill the gaps left by the incumbents and in some cases are even disrupting them. There are many use cases in the enterprise market ranging from recruitment to marketing to cybersecurity. Owing to the complexity of enterprise-wide AI implementation, some start-ups specialise in creating tools that make AI deployment and management easier. The key for start-ups will be their ability to solve and scale solutions to meet real-world enterprise needs. However, much like the algorithms space, the most promising applications and tools will be acquired by the larger players should they present a meaningful threat.

The opportunity is great for vertical solutions providers (VSPs) to either contribute to or disrupt existing organisations. VSPs are companies that provide industry-specific applications to customers in a specific vertical market such as manufacturing, healthcare, retailing, or financial services. For firms to succeed in this space, they will need to have access to large and proprietary training datasets, deep sector-specific knowledge,

strong AI talent, and capital to fund rapid growth. Having a well-developed go-to-market plan and path to growing return on investment will be meaningful differentiators.

For **corporates,** they can either buy AI solutions or develop their own capabilities. With data being the fuel for AI and machine learning, those with large datasets maintain the greatest ability to improve their customer experience, save costs, lower prices, drive revenues and sell better products and services. Here again, AI will likely benefit the larger players at the expense of the smaller companies.

Countries also face the prospect of growth via AI or, alternatively, face disruption and displacement. In this race China is aiming to become a world leader by 2030. The country also maintains high mobile penetration across its population with a weak consumer privacy environment. Taken together, this structural advantage has enabled them to become leaders in AI sectors such as security and facial recognition. Europe's focus on data privacy regulation could put them at a disadvantage despite talks of large investments in AI. Even with large AI budget allocations, most nations collaborate with the largest corporates, such as Google, to implement their AI goals, which raises the question, Who will benefit most from the value created by these initiatives? Finally, with high skills and funding requirements, those companies and countries that control AI technology and data will leap ahead – leaving lower-skilled and less-financially resourced countries as targets for AI displacement.

SYNTHESISING THE DATA

It is clear that while AI has seen immense growth over the past few decades, it still has a significant runway for evolution and growth. Owing to a confluence of factors, most notably the proliferation of computing and digitalisation, we live in an increasingly data-led and data-fed world. Over time, industry and society are recognising AI's rise in prominence as a response to the opportunities and challenges presented by the growing digitalisation drive.

Although the AI landscape appears complex and ever changing, we believe there are ample avenues across the risk spectrum through which one can attain exposure to this theme. In addition to those already discussed, some of our other AI-exposed holdings include Danaher, Disney, Facebook, Honeywell International and Visa, which sit across many levels of the value chain, providing both corporates and consumers with AI-enabled products and solutions. Considering the innumerable applications and varied stakeholders within the AI ecosystem, rather than asking how to attain exposure to AI, soon we will be wondering which sectors will not be exposed to or be disrupted by AI.

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VICTOR MUPUNGA, RESEARCH ANALYST AT PRIVATE CLIENT SECURITIES

If the assertion that "data is the new oil" is indeed true, then it is reasonable to think of Amazon as the modern-day Standard Oil Company, the world's largest oil refinery in the late 1800s. Unflatteringly, if one continues with that line of thought, then Amazon's billionaire founder and CEO, Jeff Bezos, can be thought of as the 21st century John D. Rockefeller – Standard Oil's founder, a man who was "reviled as a villain, applauded as an innovator, but universally recognised as one of the most powerful and richest men in history."

DATA RICH

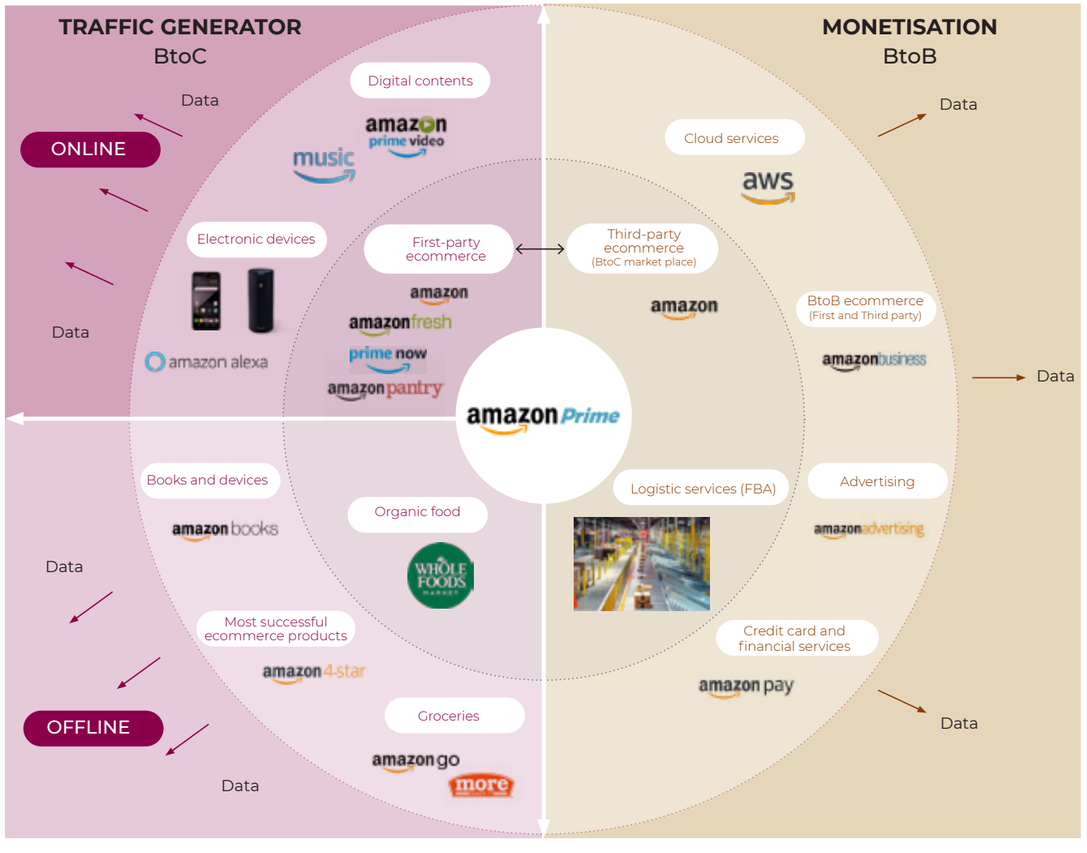
Amazon is arguably the most data-rich company in the world and so naturally, it is a leader in Artificial Intelligence (AI) and its sub-set, Machine Learning. From its early days in the 1990s selling books online, Amazon has always leveraged user data to build superior algorithms that recommend what customers should purchase next. With scale, years of development and an expansion into millions of other product lines, the company's Machine Learning capabilities have become more refined. Today, determining consumers' next purchase or activity permeates every aspect of our digital lives, and indeed across all of Amazon's operations.

TWO SIDES OF THE SAME COIN

The accompanying image depicting Amazon's ecosystem highlights how complementary its seemingly diverse businesses actually are. The business-to-consumer (BtoC) operations generate significant traffic and therefore data for Amazon. In many cases, these businesses have low margins and are loss making (e.g. Music, Prime Video), but importantly, they are repeat businesses where convenience is paramount. Customers therefore always come back and are willing to divulge a lot of their information in exchange for added convenience.

On the other end of the spectrum are Amazon's business-to-business (BtoB) operations, which include high-margin, profitable businesses

AMAZON'S ECOSYSTEM



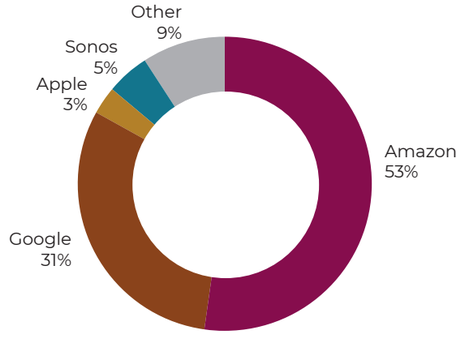
Source: Société Générale

that generate substantial free cash flow. These include Amazon Web Services, third-party retailing and advertising. When combined, Amazon's BtoC and BtoB operations are complementary, with the latter monetising the traffic and data from the former.

THE TIE THAT BINDS

At the centre of Amazon's ecosystem lies Amazon Prime – a paid subscription service that gives the group unparalleled scale. With over 150 million Prime members, it is estimated that 82% of US households subscribe to this service. Interestingly, the average Prime member spends around US$1 400 per year on Amazon, more than two and half times the spend of a non-member. Furthermore, Amazon shipped and delivered four times more parcels in 2019 than in the prior year, highlighting that Prime members (who enjoy free same-day delivery) are both increasing their average spend and frequency. This data reservoir is indeed Amazon's oil and will continue to fuel the group's AI capabilities across all of their existing businesses and future endeavours.

Graph 1: US smart home speaker market share



Source: Voicebotai

HELLO ALEXA

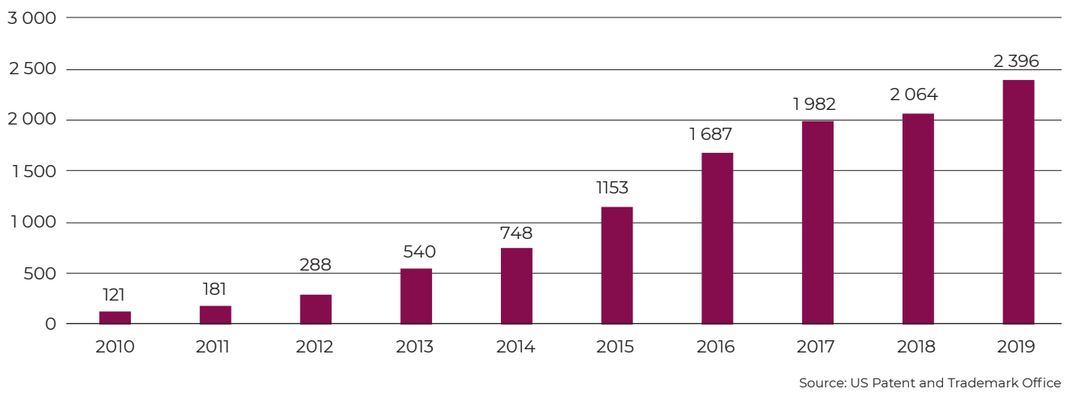
For retail consumers, Amazon's AI-driven digital assistant, Alexa, is undoubtedly the poster child for Machine Learning. The voice-activated Alexa powers Amazon's smart devices, with the most well-known being the home speaker, Echo. Furthermore, there are now hundreds of consumer products available with Alexa built in, from PCs to headphones and cars.

Despite launching just five years ago, there are more than 100 million Alexa-enabled smart home devices installed globally. Initially, Alexa provided routine services such as reading out news, weather and traffic updates, but as the number of connected home devices has grown, so too has Alexa's skill set. Today, Alexa can perform over 100 000 different skills. Tedious tasks such as vacuuming and restocking the fridge can now be done via voice prompts to an Echo device, thanks to smart connected appliances. In a commercial context, Alexa's skill set in carrying out voice searches has grown in importance to Amazon.

The retail opportunity for Amazon within voice search is significant. Unlike desktop and mobile browser searches, where the onus is on users to sift through results and find answers to their questions, with voice search, Alexa takes the cognitive load from customers and provides a result based on Alexa's AI. For instance, voice shopping through Alexa for groceries orders products from Amazon's subsidiary, Whole Foods, at a discount for Prime members, further highlighting the synergies across the group's operations. According to Comscore, an analytics company, approximately half of all searches in the US are now voice based and Amazon is well placed to benefit from this trend.

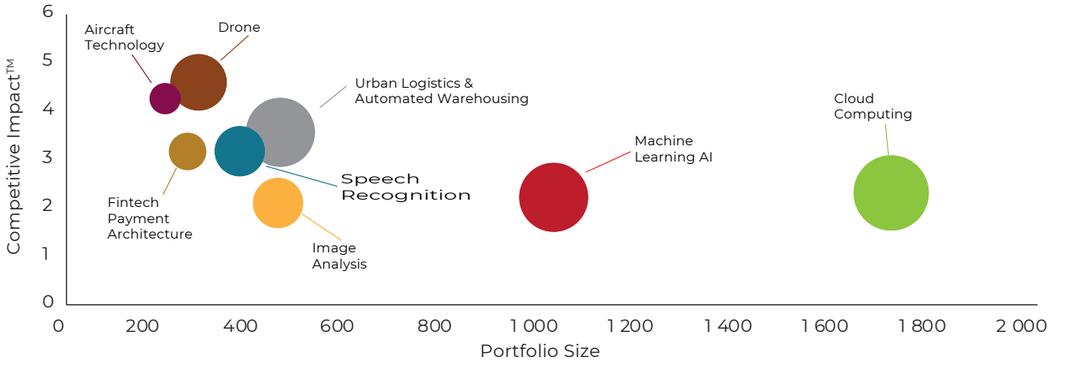
Amazon has previously disclosed that it has over 10 000 engineers working exclusively on Alexa's AI. Since its launch, Alexa has improved its ability to recognise voice and tone, interpret language within context and respond with appropriate answers or questions. This efficiency is made possible by the tens of billions of daily interactions that consumers have with Alexa in eight different languages, which affords Alexa the opportunity to learn. Amazon aggregates all these interactions on Amazon Web Services (AWS), its cloud platform, and uses the Deep Learning computational resources that platform provides. In our view, this positions Alexa to maintain its leadership in utilising Machine Learning to meet customer needs, conceivably before customers themselves realise the need.

Graph 2: Annual patents granted to Amazon



Source: US Patent and Trademark Office

Graph 3: Amazon's patents technology fields



Sources: Patent Sight; Forbes

AMAZON: PRIMED TO DOMINATE

DEMOCRATISING AI

Amazon's most profitable, and possibly most innovative, segment is AWS. Since its inception in 2006, AWS has popularised cloud computing, built the most developer-friendly platform and hung on to its front runner status with a market share of over 30%. One such innovation on AWS is SageMaker, a pre-packed toolset and service that allows companies to easily build, train and deploy Machine Learning models within their businesses. SageMaker essentially removes the complexity inherent in companies adopting AI and provides them with a step-by-step guide that can be executed quickly and at a lower cost.

For example, within medical radiography, practitioners spend considerable time analysing scans and comparing them to other medical images to detect anomalies. SageMaker assists physicians by aggregating raw data from millions of cases, generating an extensive library and building algorithms that compare any image against an extensive dataset. In some cases, the predictive analytics within SageMaker even suggest a diagnosis based on the algorithm's analysis, which is faster and more accurate. Notably, SageMaker can be used across multiple industries for processes such as fraud detection and product launch forecasting. SageMaker can also be used within sports for performance prediction as it can process player statistics under certain conditions and provide recommendations on how an individual player and team can improve. As more data is fed into the models and the algorithms are refined, the predictive success rate improves. With thousands of AWS customers across the size and industry spectrum using SageMaker to build AI models, Amazon has effectively democratised AI.

PATENT GROWTH

Over the last decade, Amazon has invested significantly in generating and securing novel ideas. In 2019 alone, the group registered close to 2 400 patents with the US patent and trademark office. Judging by the amount invested in research and development and the number of patents registered, Amazon is one of the most innovative companies in the world. Unsurprisingly, a large share of registered patents relates to AI.

Some of the more intriguing patents include one that allows Alexa to recognise a range of user characteristics, including accent or emotional and health status by changes in the user's voice. Another relates to AI-driven facial recognition, specifically in store cameras that can pick up and interpret customers' facial expressions. For example, the technology would recognise when a customer looks confused and it would then notify a store attendant, who will come and assist before the customer requests for assistance. On the surface, these appear to be great innovations that will make consumers' lives easier. However, on closer scrutiny, such patents expose some of the negative aspects that AI presents.

Privacy experts point to the intrusion and discriminatory advertising that could result due to Alexa being able to identify users' ethnicity or emotional state at a point in time. In-store, smart fitting rooms that identify your facial expressions could tailor their digital signage displays to ensure that you purchase a particular product without the user consenting to the use of their data, which in this case is a facial expression. Given the contention concerning data that users willingly divulge, involuntarily collected data, such as someone sneezing while at home, will only be more contentious. These are just some of the ethical hurdles that widespread AI usage will have to navigate over the coming years.

WELL POSITIONED FOR THE POSSIBILITIES

As with all nascent technology, the full extent to which AI, and more specifically Machine Learning will be a part of our daily lives is yet to be fully known. However, all indications point to Amazon being a key beneficiary and driver of this growing trend. The group's massive data reserve, expansive yet complementary operations and focus on surpassing customers' ever-changing needs, set it apart as a company that will dominate in an AI-enabled world.

ALTRON

LEADING CORPORATE SA'S AI-ENABLED FUTURE

TASNEEM SAMODIEN, RESEARCH ANALYST AT PRIVATE CLIENT SECURITIES

ALTRON: LEADING CORPORATE SA'S AI-ENABLED FUTURE

While developed markets are pioneering the transition to an AI-enabled future, emerging markets have been slower to invest in advancing technologies and are now beginning to realise the risk of being left behind. In response to the global digital transformation underway, South African president Cyril Ramaphosa established a Commission on the Fourth Industrial Revolution tasked with identifying relevant policies, strategies and action plans that will assist SA to successfully transition to a technologically enabled economy.

The Commission has its work cut out for it, as SA battles with a sub-standard education system, inadequate technological infrastructure in rural areas and constrained fiscal capacity. Government's inability to adequately invest in SA's digital transformation means that private companies and institutions are sorely needed to fill this gap and maintain SA's relevance as we compete for investment globally. In addition to maintaining global competitiveness, digital transformation and AI integration is a critical component of potential economic growth. Accenture recently reported that AI could add 1% to SA's economic growth rate over the next 15 years, meaning that the SA economy could double in size five years earlier with AI integration[1].

THE LOCAL LANDSCAPE

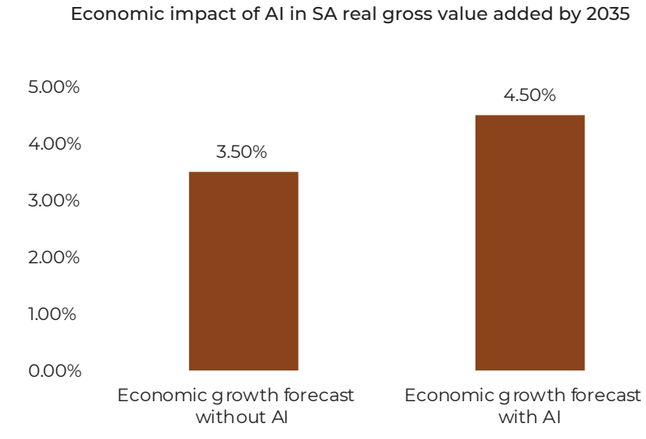
Fortunately, many surveys report that SA corporates are taking this challenge on board. A survey published by Microsoft and Ernst & Young in 2019 found that 46% of SA companies were piloting AI applications, including chatbots, robotic process automation and advanced analytics. In addition, according to a recent survey published by Accenture, 78% of SA executives indicated that AI would be used to improve their organisation's competitiveness. To date, investment in AI in SA has not been insignificant, with US$1.6bn invested over the past decade[2]. Yet, despite the quantum of investment, digital transformation has been slow by global standards, with global AI investment reaching US$28.4bn in 2019[3].

This year's economic lockdowns brought about by COVID-19 have caused many organisations to accelerate their digital transformation in order to maintain their relevance in an increasingly online world. The increased demand for ecommerce support and other technology services has meant that companies such as Allied Electronics Corp (Altron) are now more relevant than ever before. Given that Altron is regarded as SA's top data partner, the company is uniquely positioned to capitalise on this opportunity.

ALTRON – RISING FROM THE ASHES

Altron, however, has not always been the data leader it is today and many businesses could learn a few lessons from its rise, fall and recovery. The group, formerly known as Allied Electric, was founded in 1965 to service telecommunication operators. Over time, the group grew to include power supplies, transformers, electronics and later information and communication technologies. By 2007, the group was valued at R15bn. However, the group's founder was succeeded by a new executive team and what followed was a slow destruction of capital. By 2016, Allied Electric's market value hit a low of R1.7bn. Many investors lost faith in the group's ability to allocate capital due to strategic missteps by management, which included taking on too much debt and poor quality, ill-timed acquisitions. A capital injection from an active investor in 2016 and the subsequent appointment of a new CEO a year later laid the foundation for a new direction.

Graph 1: Economic impact on AI in SA



Source: Accenture, Artificial Intelligence - Is South Africa ready?

[1] https://www.accenture.com/_acnmedia/pdf-107/accenture-ai-south-africa-ready.pdf
[2] https://businesstech.co.za/news/enterprise/322505/how-ai-is-being-used-in-south-africa/
[3] https://www.globenewswire.com/news-release/2020/06/04/2043624/0/en/Global-Artificial-Intelligence-Market-Report-2020-to-2030-COVID-19-Growth-and-Change.html

Mteto Nyati, upon taking the helm as CEO, immediately set about a turnaround strategy. New directors joined the board (many with experience in technology industries), capital was raised, debt was reduced, non-core businesses were disposed of and a new strategy centred on new growth areas (i.e. cloud services, internet of things, data analytics and cyber-security) was put in motion. This new direction, albeit drastic and bold, yielded the desired results as profitability improved relatively quickly and Altron's share price has more than doubled since April 2017.

While the group still carries some legacy businesses that will likely be sold off or spun out, it has built market-leading data and Machine Learning capabilities that allow it to provide end-to-end technology solutions and partner with clients on their digital transformations. In light of Altron's new strategy, the group re-segmented into four focus areas: Digital Transformation, Smart IoT, Healthtech & Fintech and Managed Services.

THE OPPORTUNITY TO GENERATE SMART DATA

According to Altron's data and AI experts, poor quality data remains the greatest inhibitor to AI adoption in SA. AI's efficacy improves the more it is refined by the right information. Therefore, at the heart of AI is data, but not any data, smart data. In reality, there is a significant disconnect between the possibilities presented by AI and the operational readiness of most businesses' data. Given that Altron has been implementing data management solutions for over 25 years, this is perhaps its greatest opportunity and never before has this service been in greater demand. Altron helps clients unlock the potential of their data through their solutions and platforms that are able to extract data from anywhere, consolidate it, clean it and, importantly, secure it. Furthermore, Altron's data experts assist companies in selecting the right tools for analysis and visualising data to obtain meaningful information.

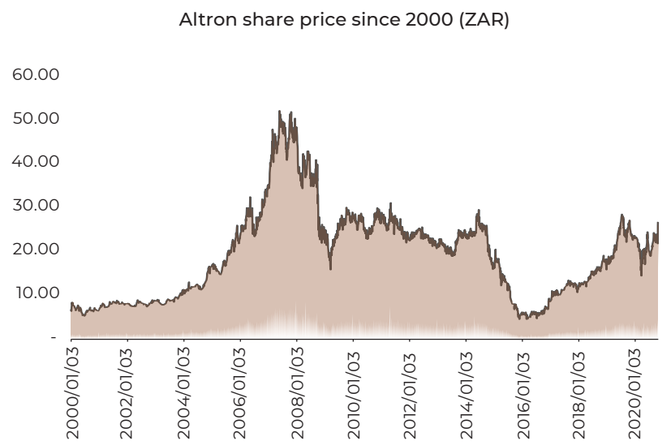
ALTRON'S AI ACCELERATORS

One of Altron's best performing AI solutions is its Routine Bot, which automates repetitive human tasks. For more complex tasks, the Learning Bot is able to understand data, analyse results and make a decision. For those companies who are still exploring the use of AI, Altron has also developed a low-cost, introductory AI system, AI-in-a-Box, which trains AI models and assists clients in assessing whether to commit additional capital in the future. Importantly, beyond AI introductory solutions, Altron is hard at work building solutions for industries that have not yet embraced digital transformation. In SA, two key industries stand out, physical retail and manufacturing.

The COVID-19 pandemic has accelerated ecommerce penetration globally and Statista now forecasts SA ecommerce penetration to reach 50% by 2024[4]. As a result, physical stores have to compete with digital retailers to attract customers by improving the customer experience. Altron's Managed Solutions division has developed a smart trolley prototype that will allow shoppers to skip the dreaded long checkout queues that are a key pain point of physical stores. Equipped with a tablet that allows a user to set up a profile and upload banking details, the invoice will automatically update as items are added or removed from the cart. The user can "check out" via the tablet and move on to the next store.

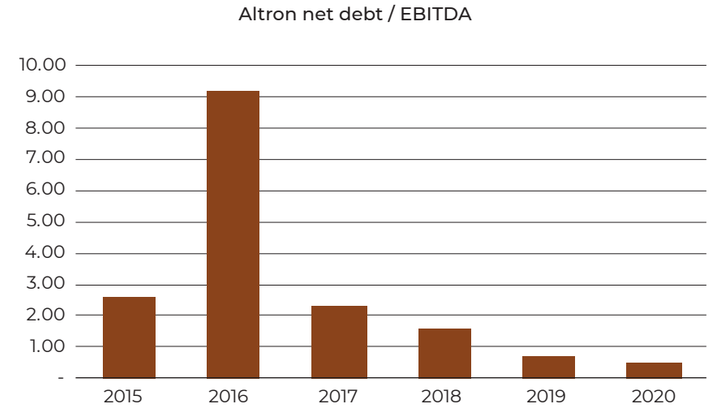
Altron recently demonstrated how manufacturers can use AI to enhance efficiencies. Manufacturing equipment settings were optimised using AI and a production Machine Learning solution in order to reduce waste. The manufacturer in the case study was able to reduce waste by 2%, which resulted in a 10% margin improvement. This is but one of the many ways in which AI is able to improve the efficiencies of traditional manufacturing facilities.

Graph 2: Altron share price on the JSE since 2000

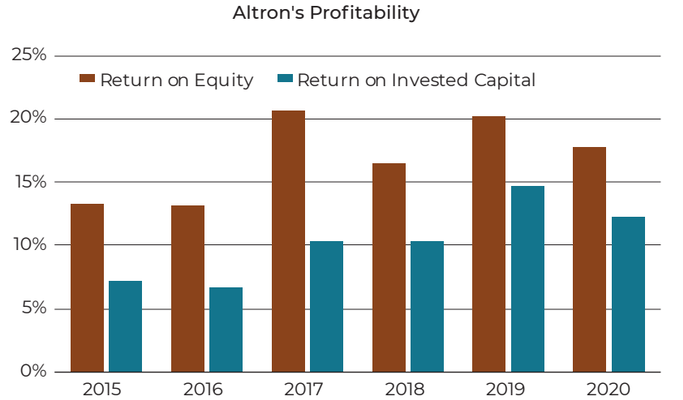


[4] https://www.statista.com/outlook/243/112/ecommerce/south-africa#market-revenue

Graph 3: Altron net debt / EBITDA has improved



Graph 4: Return on Equity and Invested Capital steadily improving



Source: Altron financial results presentations

Please note: Return on equity, calculated as net income as a percentage of total equity, measures how effectively management is using a company's assets to generate a profit.
Return on invested capital, calculated as net income as a percentage of equity and long-term debt, assesses a company's efficiency at allocating capital to profitable investments.
Net debt is defined as long-term debt less cash and short-term investments. EBITDA refers to earnings before interest, tax, depreciation and amortisation. The net debt-to-EBITDA ratio indicates how many years it would take for a company to pay back its debt if net debt and EBITDA are held constant.

BRIDGING THE SKILLS GAP

According to a 2020 report published by the World Economic Forum, less than 30% of SA's labour force has digital skills[7]. Coding algorithms, automating processes and analysing data require the understanding of complex mathematics, computer and data science – all critical future-fit skills that SA is in dire shortage of. While Altron has invested in bursary and training programmes in order to appropriately skill their teams, their clients experience the same scarcity of skills inhibiting digital transformation. Altron has a number of short-term solutions to address this challenge. Corporates can outsource their IT functions to Altron or Altron outsources their employees to clients on a part-time or contingent basis. Furthermore, Altron assists with digital training and upskilling.

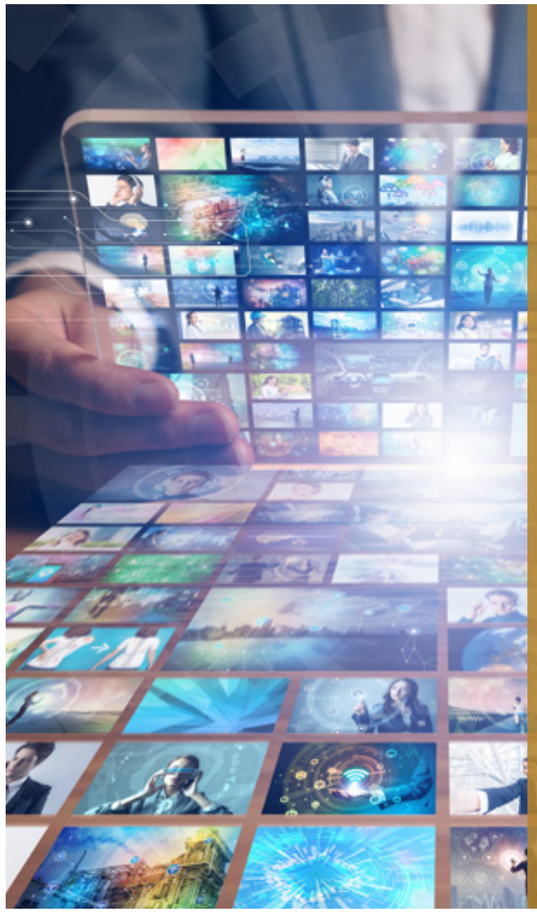
SA'S AI OPPORTUNITY IN ALTRON

According to multiple surveys conducted on corporate SA, many organisations have started embracing the potential of AI. However, the uptake has been sluggish and significant investment is required to catch up to developed markets. Having operated in SA for more than five decades, Altron is in the unique position to partner (as opposed to compete) with leading global technology firms such as Microsoft and Amazon to bring these new technologies to SA and the rest of Africa. We believe that Altron has the expertise, experience and partnerships to capitalise on SA's AI opportunity and become the leading technology services partner of corporate SA in the future.

UNEARTHING QUALITY INFORMATION

WITH ARTIFICIAL INTELLIGENCE

HYWEL GEORGE, DIRECTOR OF INVESTMENTS
OLD MUTUAL INVESTMENT GROUP



The rise of artificial intelligence (AI) has the potential to be one of the most significant developments in human history. Today's machines are already getting better at interpreting data, recognising patterns, and finding more efficient ways to carry out tasks. And leading tech companies are hard at work on new breakthroughs that could dwarf what's been accomplished so far. AI involves the use of algorithms that guide machine behaviour to solve problems in a way that is smart or humanlike. Within the broader category of AI, there are also a range of specialised sub-categories, namely machine learning, neural networks and deep learning.

This begs the question, How big is the opportunity? While there's no universally standardised means of measuring the value of the AI market or its potential, there are estimates that suggest significant value will be created directly and indirectly with the technology. A report from PricewaterhouseCoopers (PwC) estimates that artificial intelligence technology will lead to improvements in labour productivity, product value, and consumption that will go on to create US$15.7trn in global annual gross domestic product (GDP) by 2030. There is no shortage of businesses that stand to benefit from the advancement of AI technology. However, developing AI technology is capital and resource intensive, and the evolution of advanced deep-learning systems hinges on access to large amounts of clean data.

Nearly all industries are analysing the potential of artificial intelligence and machine learning, with many seeking to identify AI experts to help lead the way. At Old Mutual Investment Group (OMIG), we have been busy evaluating and implementing AI within our investment business over the past two years.

AI SOLUTIONS AND INVESTMENT PROFESSIONALS AT OMIG

What we do as investment professionals is constantly rearrange and interrogate data in order to find actionable and profitable insights on behalf of our clients. Even though machine-based learning is often associated with quantitative managers, it has become a big part of investing for fundamental active managers as well. It is a competitive advantage where managers and analysts could not possibly pay optimal attention to all the news that would impact their decision-making about a share. Machines free up time for investment professionals to understand the bigger picture and those profitable insights we are looking for, and thereby drawing deeper insights.

Many investment houses are now exploring and implementing AI technologies, investigating a variety of digital services to extract insights from raw data. Billions of images and documents are now available online for training computers to spot patterns. Advances in graphical processing units make it easier to sift through vast datasets quickly and accurately.

AI is sometimes seen as a threat. However, it's a disruptor that pushes us to do things better and more efficiently. Investment professionals whose jobs are said will be replaced by AI, need not fear, in my view. Their jobs will not disappear but evolve for those who embrace the change by training for future skill sets. At OMIG, we are actively working with machines, freeing investment professionals up to be more innovative and have more time to clearly understand client needs.

WILL AI REPLACE HUMAN CAPITAL ALTOGETHER?

The answer is not as simple as people sometimes think. While many types of AI are being researched, the Theory of Mind AI is the next level of AI systems for innovation that the asset management industry can apply. A Theory of Mind level AI will be able to better understand the entities it's interacting with by discerning needs, emotions, beliefs and thought processes. While artificial emotional intelligence is already a budding industry and an area of interest for leading AI researchers, achieving a Theory of Mind level of AI will require development in other branches of AI as well. This is because to truly understand human needs, AI machines will have to perceive humans as individuals whose minds can be shaped by multiple factors, essentially "understanding" humans.

Considering investment research – a field that requires both expert comprehension from humans from a variety of data sources, and quantitative analysis and risk management techniques to execute comprehensive fund strategies – this is a field primed to capitalise on AI technology. The answer would lie in an optimal utilisation of the resources available – humans plus AI – in extracting quality information from raw data.

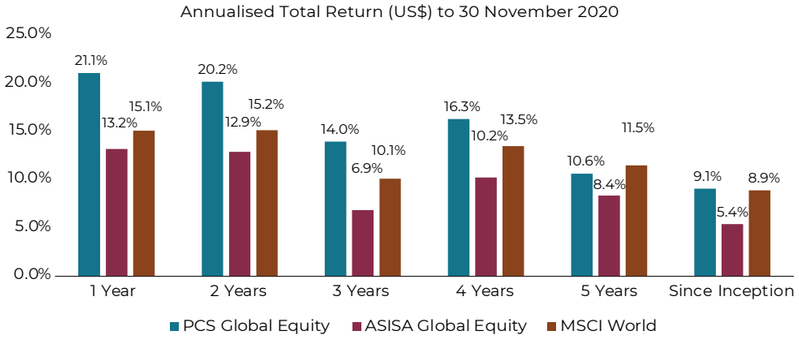
UNEARTHING QUALITY INFORMATION FROM RAW DATA

A quantitative investor has access to real-time information, but organised data is not always readily available, and it needs to be analysed for intelligent tradeable ideas. The availability of new datasets, methods of analysis and more sophisticated computing has led to the growth in big data and the growth in machine learning.

The changes to the investment landscape will be profound. Big data can give an edge to quant managers who are willing to adapt and learn about new data and analysis methods. Machines can help quickly analyse news feeds, tweets; process earnings statements and websites; and trade on these instantaneously. Big data and machine-learning strategies are already eroding some of the advantage of fundamental analysts, equity long-short managers and macro investors, and systematic strategies will increasingly adopt machine-learning tools and methods.

INVEST TODAY IN THE THEMES THAT WILL DRIVE TOMORROW

The Old Mutual Wealth PCS Global Equity Portfolio recently achieved its six-year milestone. This concentrated, yet well-diversified share portfolio is comfortably outperforming both its benchmark (MSCI World Index) and the ASISA Global Equity General unit trust peer group average over various time periods. The portfolio is invested in high-quality, superior companies. Its exposure to both fast-growing and extremely profitable technology businesses as well as defensive businesses has placed the portfolio in a strong position to navigate the current environment – it balances both defensive and growth opportunities.



All performance figures shown above, with the exception of the MSCI World Index, are net of fees.

Source: Old Mutual Wealth Private Client Securities

INVEST TODAY IN THE THEMES THAT WILL DRIVE TOMORROW

STAYING THE COURSE

It has long been stated that in order to be successful, investors need to manage their emotions and maintain perspective. If there were ever a year that put investors to the test in this regard, 2020 was certainly it! Within the space of just one month, global equities fell over 30%. After bottoming on 23 March, the market has subsequently returned over 50%. So panicking and exiting the market in March would have been the worst decision an investor could have made.

At PCS, our philosophy and process circumvents the ability to be swayed by short-term noise. A simple philosophy of buying quality businesses that are able to stand the test of time, and not overpaying for those businesses, is the key to our approach. Perhaps the most difficult aspect, however, is being patient and this really resides with investors.

With the exception of a few minor reweights, we did not make a single wholesale change to the PCS Global Equity Portfolio through the period of the hard economic lockdowns, heightened market volatility, and economic uncertainty. On the back of this decision, the PCS Global Equity Portfolio continues to perform exceptionally well, in both relative and absolute terms.

CURRENT POSITIONING

The portfolio is positioned to benefit from a number of long-term secular trends.

- The global economy is increasingly transitioning into an asset-light economy dominated by technology-enabled platform companies. These companies have increasingly large networks, entrenching their market positions. On the back of their asset-light business models, they are exceptionally profitable. Examples include Visa, Microsoft and Amazon.
- It is often said that innovation happens at the intersection of two different disciplines. Many discretionary businesses are adopting technology solutions to reinvent themselves. Nike, Starbucks and Disney are three great examples of this. All three have been long-term holdings in the PCS Global Equity Portfolio.
- The current global demographic trend is good news for many medically inclined businesses. Medical expenses increase significantly post the age of 65 and while an ageing population is not good for economic growth, it is a tailwind for the medical businesses in the PCS Global Equity Portfolio, which include Johnson & Johnson, Medtronic and Danaher.
- Consumer staple businesses have held up well in the recent economic turmoil. Given the defensive attributes of these businesses, we have increased the portfolio's exposure to this sector. L'Oréal, Reckitt Benckiser and Diageo are three such companies currently in the portfolio.
- A number of exchange traded funds (ETFs) are also included in the portfolio in order to gain exposure to specific longer-term trends. These include semi-conductor and biotechnology businesses.

LOOKING AHEAD

Much has been written about the global equity market's disconnect with economic reality. The simple reminder one needs is that the market is not fully reflective of the economy. Many of the smaller businesses that are struggling are not publicly listed, while many of the large businesses that have benefited from economic shutdowns are listed. Alongside this, there are many parts of the equity market that have underperformed given their economic reality. As Microsoft CEO Satya Nadella says, "We've seen two years' worth of digital transformation in two months."

In the current environment, investors need to ensure that their portfolios are carefully constructed to include well-diversified companies providing exposure to a number of long-term drivers. The next key step would be to remain patient as investment performance does not occur linearly.

THE AUTHORS

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Sameer joined PCS in March 2016 and was previously employed as an investment analyst at Old Mutual Multi-Managers, where he was responsible for absolute return and fixed interest asset class and asset manager research. Prior to that, he was a trainee investment analyst at SYm|mETRY Multi-Managers. Sameer holds a Bachelor of Commerce degree in Business Management from UNISA.

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Victor joined PCS in 2016 and was previously employed as an investment analyst at Maestro Investment Management, where in addition to equity research, he was responsible for managing a number of private client equity portfolios on a discretionary basis and managing the client relationships. Prior to that, he was a fund accountant at Investment Data Services where he prepared and reviewed valuations and accounting records of hedge funds. Victor graduated from the University of Cape Town with a Bachelor of Business Science (Hons) in Finance in 2007. He is also a CFA Charterholder.

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After graduating with a Postgraduate Diploma in Accounting in 2015, Tasneem joined the Old Mutual Chartered Accountant Training Programme in 2016. During the subsequent three years, she worked within various businesses in the Old Mutual Group, gaining valuable experience in functional areas such as internal audit, risk management, finance, group planning and investment analysis. In 2018, she was placed within Private Client Securities, first in the Finance team to assist with the annual financial statements and then in the Research and Investment team to assist with investment portfolio reviews. Tasneem successfully completed her articles at the end of 2018 and is a qualified Chartered Accountant (SA).

Hywel George

Director of Investments
Old Mutual Investment
Group

Hywel is responsible for the delivery of market leading investment performance to Old Mutual Investment Group's clients. With over 30 years of experience in institutional, retail, and private client asset management in Europe and the Middle East, he has held leadership positions in Goldman Sachs, Morgan Stanley, Mercury Asset Management, and others. Hywel also serves on the Board of Directors of Old Mutual Investment Group (Pty) Ltd, Old Mutual Customised Solutions (Pty) Ltd, Futuregrowth Asset Management (Pty) Ltd and Marriott Asset Management (Pty) Ltd.

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WEALTH