Why applied AI is good for business and the planet

Tractable

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Executive summary

Two years on from COVID-19 and businesses are struggling.

Unexpected spikes in consumer demand can give firms the opportunity to recover from the pandemic and defy market predictions.[1]

Unfortunately, supply chains are struggling to keep up. Bottlenecks in manufacturing and limitations in logistics capacity[2] mean businesses face lagging delivery times, stunting growth. Worse still, inflation[3] is driving up operational costs and workers hold the upper hand in a competitive labor market.[4]

Although acutely challenging, such difficulties are short-term blips in the economy while the world recovers from a global health emergency. Today's problems pale in comparison to the more existential issue that the world faces: sustainability.

Since the 1800s, our planet's average temperature has risen by 2.14˚F (1.19˚C)[5] and, according to scientists, the trajectory is clear. Runaway climate change will be disastrous. Climate-related disasters caused $210 billion in damages in 2020 alone.[6]

If current trends continue, the losses, both financial and human, will be worse. Heeding the warning, the international community has rallied and governments have pledged billions in funding.[7] However, more needs to be done.

In the private sector, investor[8] and customer[9] sentiments are clear. Senior leaders must lead the transition to a greener future and more sustainable business practices. But how? The rule book for green innovation is still being written and CEOs are unsure on how to balance environmentalism with business outcomes.[10]

The answer: 21st century business needs to be smarter.

AI, or artificial intelligence, can refer to smart assistants to self-driving cars and seamlessly automated software. Yet, the term is at risk of becoming an overused buzzword.

Instead, applied AI technology holds the key to helping companies transition to a more sustainable business model. Solutions-focused and available today at scale, applied AI offers senior business leaders unparalleled strategic insight into potential efficiencies and greener workflows.

In this white paper, we outline how applied AI technologies differ from existing AI solutions and explore how applied AI stands to help senior executives navigate this new commercial landscape.

We discuss a range of case studies of organizations using applied AI technologies to benefit people and the planet while profiting at the same time. We also describe the strengths and challenges of AI solutions and how senior leaders can balance scalability with ethical oversight to harness the full power of this new technology.

Read on to discover the next evolution in strategic business intelligence and see a glimpse of the sustainable future.

"Applied AI is to be celebrated. It can change the world in incredibly positive ways to benefit people, industry and the planet."

Razvan Ranca, CTO and Co-founder of Tractable

Introduction

2022's business environment

Businesses are under constant pressure to stay ahead and innovate. Shifting consumer preferences, uncertain markets, and dynamic political landscapes mean that constant adaptation is necessary to thrive. As a result, senior executives are always keen to foster operational resilience and strategic agility by creating efficiencies and refining processes.

From mechanization on the farm and factory floor to the computing revolution in the city center office, technology drove workplace innovation across the 20th century.
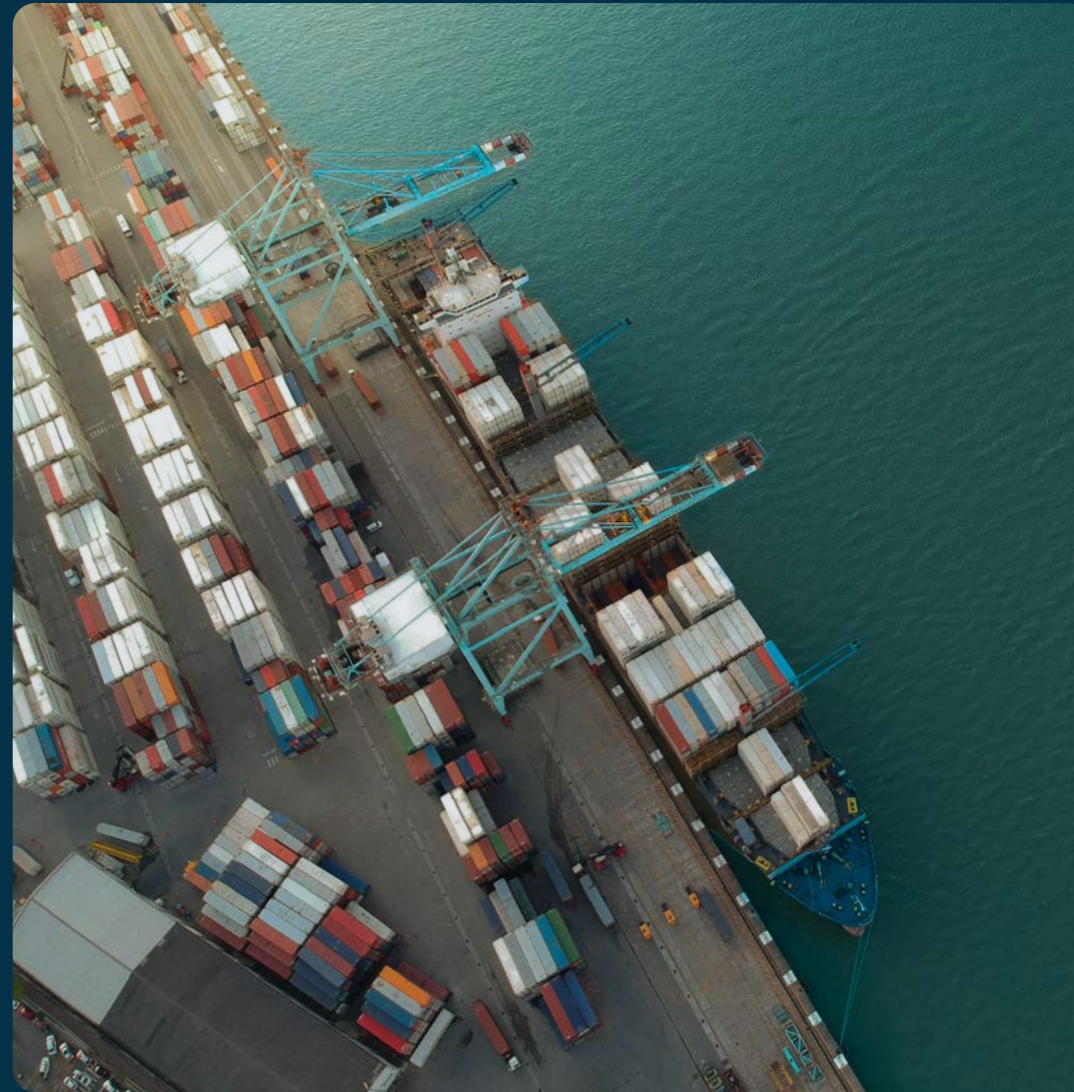
However, today in the 21st century, global economic factors are pushing the resilience of everyday firms to their limits. Most acutely, systemic upheaval within supply chains is causing havoc for businesses worldwide. Regional lockdowns have created extreme bottlenecks in manufacturing and production. As a result, everything from food processing capacities[11] and packaging materials[12] to vital tech components like semiconductors[13] are in short supply.

Worryingly, disruptions span the entire supply chain. Even as goods become ready for transport, logistics partners are unable to overcome shortages in available shipping containers[14] and trucking staff.[15] Businesses have to contend with mounting wait times and rising procurement costs, both of which eat into profit margins.

At the same time, inflation is squeezing the global economy. Although central banks are increasing interest rates[16] to limit the effects, unprecedented shifts in consumer demand continue to fuel rapid price rises.[17] Especially vulnerable sectors include the energy industry,[18] resulting in further soaring costs for businesses.

As national economies reopen post COVID-19 lockdowns, older employees have left the workforce, in some cases taking early retirement, leading to skilled labor shortages.[19] Younger workers, meanwhile, have leveraged their newfound value en masse to demand more competitive employment terms, in a phenomenon dubbed the Great Resignation.[20]

Firms must fill their vacancies with qualified talent if they are to recover from the pandemic and remain competitive in a challenging economy. Unfortunately, the skilled labor shortage is having a marked effect. Figures from the U.S. Bureau of Labor Statistics estimate that there were over 11 million live vacancies[21] in America as of March 2022. With similar labor shortages occurring across United Kingdom, Canada, Australia, and the EU,[22] businesses will continue to feel staffing pressures,

resulting in further global economic consequences.

Only a combination of ingenuity and technological transformation will help companies get ahead of their competition and equip their organizations with the tools to navigate today's market challenges. However, in recent years, a new focus is entering the discussion and disrupting businesses' strategic priorities: sustainability.

Humankind is increasingly confronting our impact on the planet. There is now a global awareness that we must find less harmful ways to do business by reducing our negative environmental practices at scale to save natural ecosystems.

As business leaders turn once more to innovative workarounds at this crucial juncture, we must ask ourselves, what is the true cost of innovation?

There were over

11 million

live vacancies in the US
as of March 2022[21]

Climate events cost

$210 billion

in damages in 2020[25]

21st century sustainability challenges

Before we can determine the cost of innovation, we first must consider how we have arrived at our current state. If we're to address the climate crisis effectively, we must first learn from our mistakes and identify new ways to grow our economy for the benefit of the planet.

We've arrived at our current situation because our consumption of coal, oil, and natural gas catapulted the scale of production in the 1800s, making goods and services cheaper worldwide. Globalization made the process even more efficient, lifting people out of poverty[23] and raising international living standards markedly in more recent decades.

But there's always been a catch. The negative impact on our environment since the Industrial Revolution has dramatically altered our planet's environmental composition. While carbon-based innovation has repeatedly provided short-term business gain, the long-term effects are exceptionally damaging.

Since the 1800s, our planet's average temperature has risen by 2.14˚F (1.19˚C).[24] Although a seemingly small temperature increase at over two degrees, the frequency and severity of climate disasters has intensified as a consequence. Climate events cost $210 billion in damages[25] in 2020 alone, along with incalculable human distress and loss. If humanity can't find a better way to grow economically in the future, then the results could be even more dire.

Global leadership has already taken significant steps to decouple our economy from carbon consumption. Signed in 2015, the Paris Agreement[26] formally recognized the substantial effort needed to combat the climate crisis. Also known as the Paris Accord, the Paris Agreement is a legally binding international treaty on climate change covering mitigation, adaptation, and finance.

Adopted by nearly every nation, the three primary goals of the Paris Accord include:

- **Reducing global greenhouse gas emissions**
Limit the global temperature increase to no more than 3.6˚F above pre-industrial levels (also known as the Net-Zero 2050 Initiative).

- **Increasing adaptations**
Minimize the adverse impacts of climate change, foster climate resilience, and lower greenhouse gas emissions, all without threatening food production.

- **Standardizing finance flows**
Establishing a pathway toward lower greenhouse gas emissions and climate resilience via equitable financing arrangements.

The financial costs of the Paris Agreement are significant. Implementing the recommendations is not without economic risk, especially in the face of energy supply volatility. However, opportunities for new business growth, global equality, and responsible stewardship of the Earth represent pivotal issues that businesses can help address in the future.
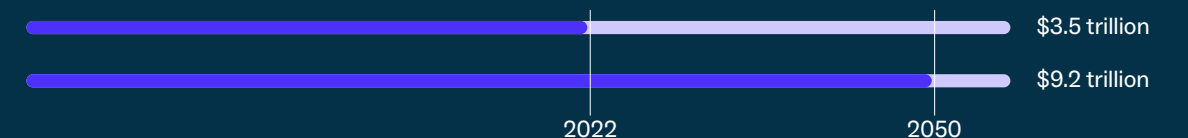
The Paris Accord at a glance

$ **Costs:**

It costs 9.2 trillion dollars globally in physical assets to achieve net-zero emissions by 2050.

3.5 trillion dollars more than today.

$3.5 trillion

$9.2 trillion

2022   2050

⚡ **Risks:**

Energy supply volatility

⊕ **Opportunities:**

01 Preventing the build-up of physical climate risks
02 Reducing catastrophic impacts of climate change
03 Business growth opportunities as decarbonization creates efficiencies
04 Opens markets for low-emission products and services

More recently, the world reaffirmed its agreement to maintain global temperatures below 2.7˚F during COP 26[27] in Glasgow and steer the world clear of the critical 3.6˚F threshold. Outcomes from the conference included commitments to new financing pledges for green technology investments.

Ironically, technologies and climate change initiatives designed to support sustainability can generate a larger material footprint than carbon consumption, harming the environment in other ways. A 2020 World Bank Group report[28] cautioned that clean energy technologies required the use of more critical materials than today's fossil-fuel-based electricity infrastructure. For example, building solar panels, wind turbines, and energy storage batteries places an even higher demand on precious minerals.

Therefore, transitioning to clean energy sources alone doesn't fully mitigate our environmental impact (at least in the short term). Instead, businesses must identify other viable, scalable technology alternatives to lessen their environmental impact.

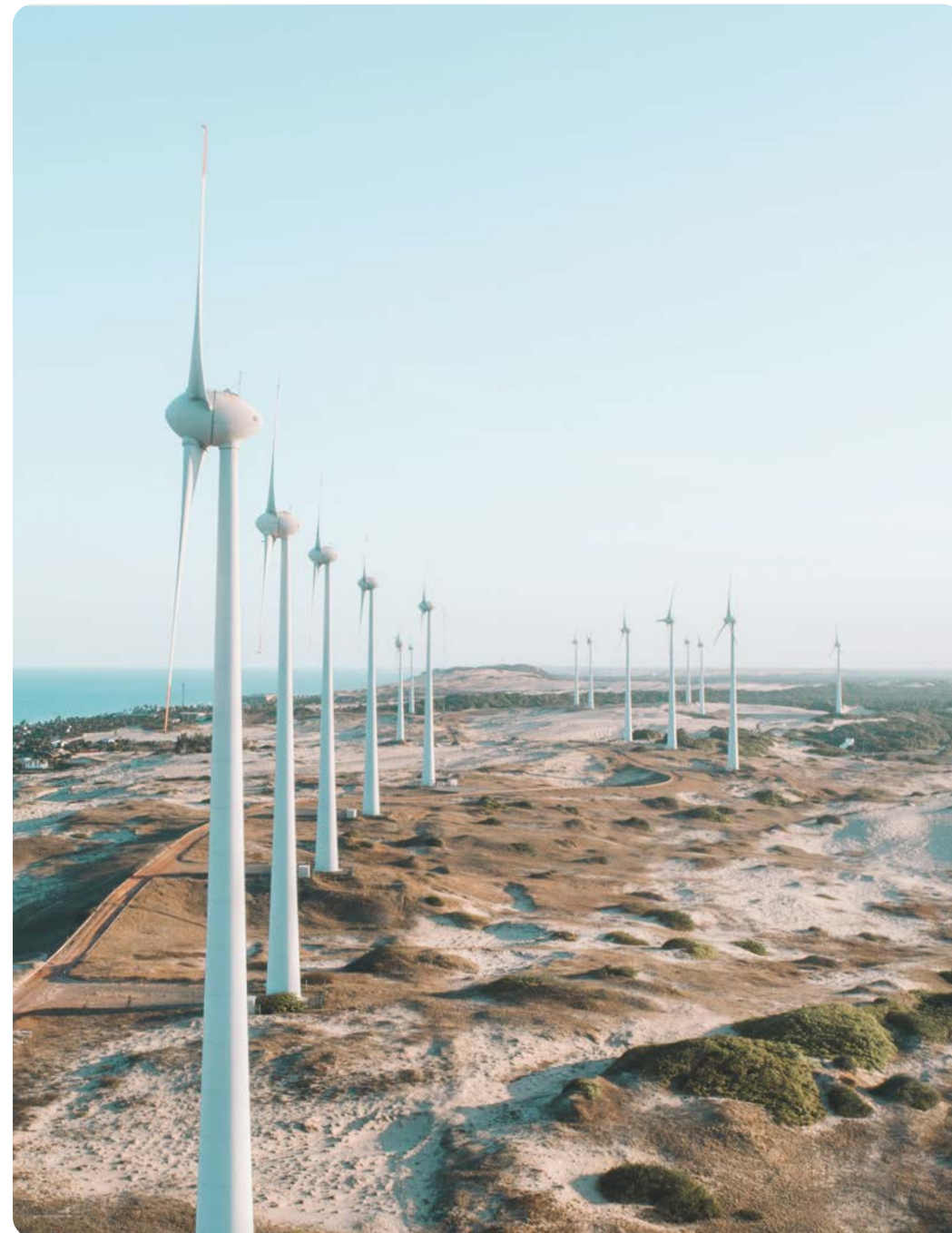Building solar panels, wind turbines, and energy storage batteries places an even higher demand on precious minerals.

Transitioning to clean energy sources alone doesn't fully mitigate our environmental impact.

Finding a new way: Balancing business with the environment

Balancing environmental issues with business value is a challenging task as market competition and sustainability can seem like opposing forces.

Carbon-based growth models have dominated economic growth theories since the Second Industrial Revolution, beginning in 1870. As a result, it can be difficult to consider a sustainable alternative from the outset, especially as the rule book for green innovation is still being written. So, while senior leaders are keen to support sustainable initiatives in principle, many are unsure of the practicalities of delivering this new type of business value.

PwC's 2021 CEO Survey[29] showed only 21% of respondents have made a net-zero commitment,[30] with 29% claiming their commitments were still under development. Of the remainder, 55% said they lacked the data to measure and mitigate emissions while 52% said their industry lacked an established decarbonization strategy.

However, as recent international and political commitments have shown, the push to develop sustainable enterprise is the future. It's critical that senior executives lead this transition. Similar data from PwC highlights that environmental issues are increasingly important topics for investors. In a recent survey, nearly 80% said sustainability was an important factor in their decision-making process and 50% expressed willingness to divest from companies that refused to act on climate issues.[31]

While senior business leader expectations are steadily evolving, investment capital for new sustainability initiatives is becoming easier to access. The commercial potential of new green technologies is immense. Securing an early stake within this dynamic space offers an incredible business opportunity.

One technology stands out as a leading mechanism to develop a profitable, sustainable future: applied AI.

PwC's 2021 CEO Survey[19]

21%
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29%
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Of the remainder:

55%
said they lacked the data to measure and mitigate emissions

52%
said their industry lacked an established decarbonisation strategy[19]

AI can help firms save time, money, and resources.

What is AI?

Before we can discuss applied AI, we must first define what AI means on its own.

AI, or artificial intelligence, is an area of computer science that seeks to develop intelligence in computers or robots. Researchers draw on our understanding of biology, psychology, computing, and more to help machines learn, interact and solve specific tasks in lab environments.

The ultimate hope of AI research is to one day develop a single, generalized (or multi-functional) AI. Unfortunately, in some ways, AI research's lofty goals and disparate knowledge basis can be its shortcoming.

'AI' is a very broad term that can describe solutions in regular use today, such as modern search engine tools or smart assistants. However, it can also depict futuristic applications we haven't yet built, like sentient and fully-conscious computers.

Because of its wide scope, the term 'AI' runs the risk of becoming a marketing buzzword; little understood, and used as a stand-in for 'advanced technology'. In such cases, AI is incorrectly and interchangeably used with other terms like 'neural network' and 'big data', obscuring the use cases across sectors.

That's why it's important to remember that within the wide spectrum of AI, there is huge potential for businesses of all kinds. Firms can deploy cutting-edge tech and deliver their services more efficiently.
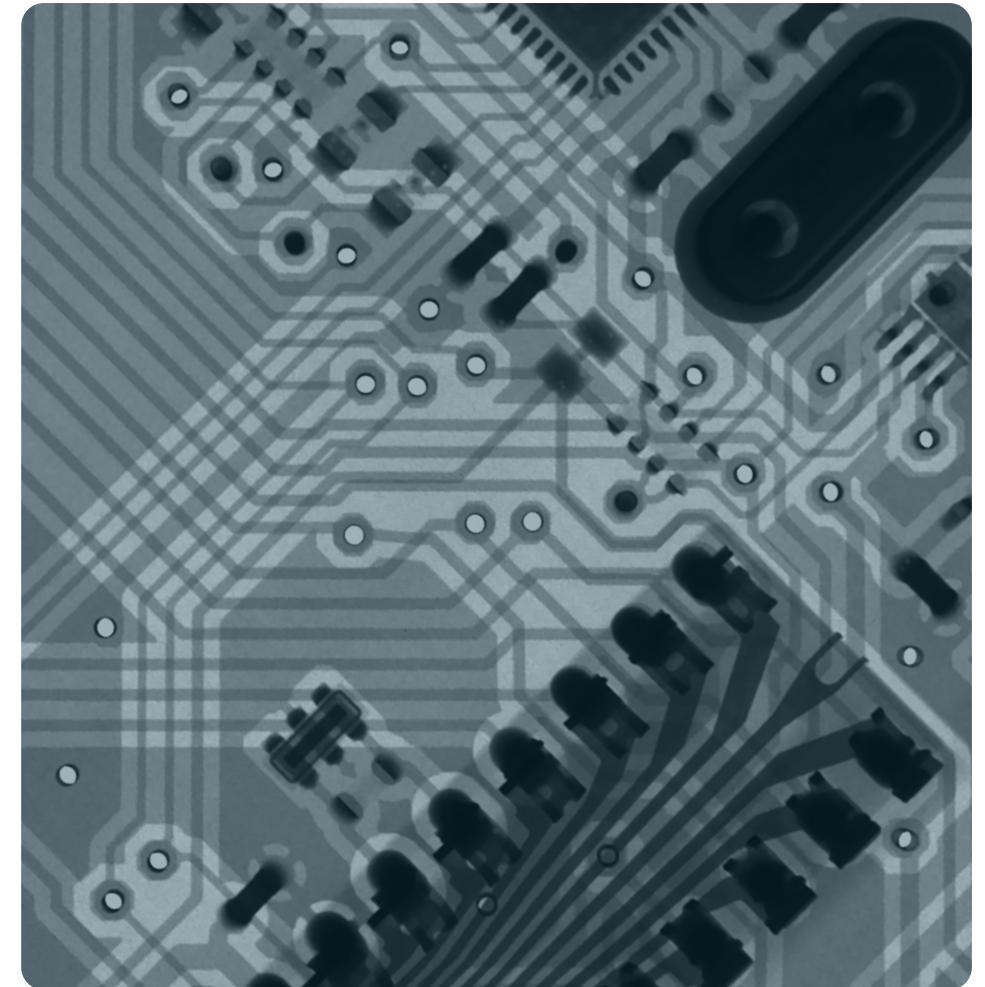
For example, AI can help firms save time, money, and resources on critical tasks, powering companies' productivity and customer service while also cutting waste.

Yet, as researchers debate whether machines truly 'think' and if AI models should be exactly like humans or just human-esque, progress can feel slow. Minor differences in definitions of intelligence within AI research can make the subject feel too academic, limiting its appeal to business users.

Further, creating a generalized AI is an enormous task. Computers have to learn a great deal, especially in early stages. Developments in AI have often been fragmented for this reason, with the concept of AI remaining intangible outside a niche group, well-versed in the technology.

As a result, AI is regularly positioned as the next big thing, but the technology can seem on the horizon. Out of reach for most companies.

Enter applied AI.

What is applied AI?

Applied AI is a branch of computer science that takes AI software out of the lab and places it into business environments, allowing computers and robots to perform real-world tasks.

Applied AI uses many of the same machine learning methods as traditional AI research. The key difference with applied AI is an emphasis on output and solutions, rather than internal processes and how close they mirror human capabilities. This commercial focus of applied AI has created the largest share of advancements within all AI research.

According to the 2022 AI Index Report from Stanford University, private investment in AI rose to $93.5 billion,[32] more than double the previous year. The boom in investment has helped many companies create successful applied AI solutions that are readily available to businesses today.

Moreover, applied AI has developed extreme proficiency within a range of tasks, meaning software solutions can offer significant efficiency gains to the businesses that adopt them natively.

Private investment in AI rose to

$93.5 billion

during 2022[32]

Personal data usage is a growing concern[34] for customers.

Today's AI solutions fall into four main categories:
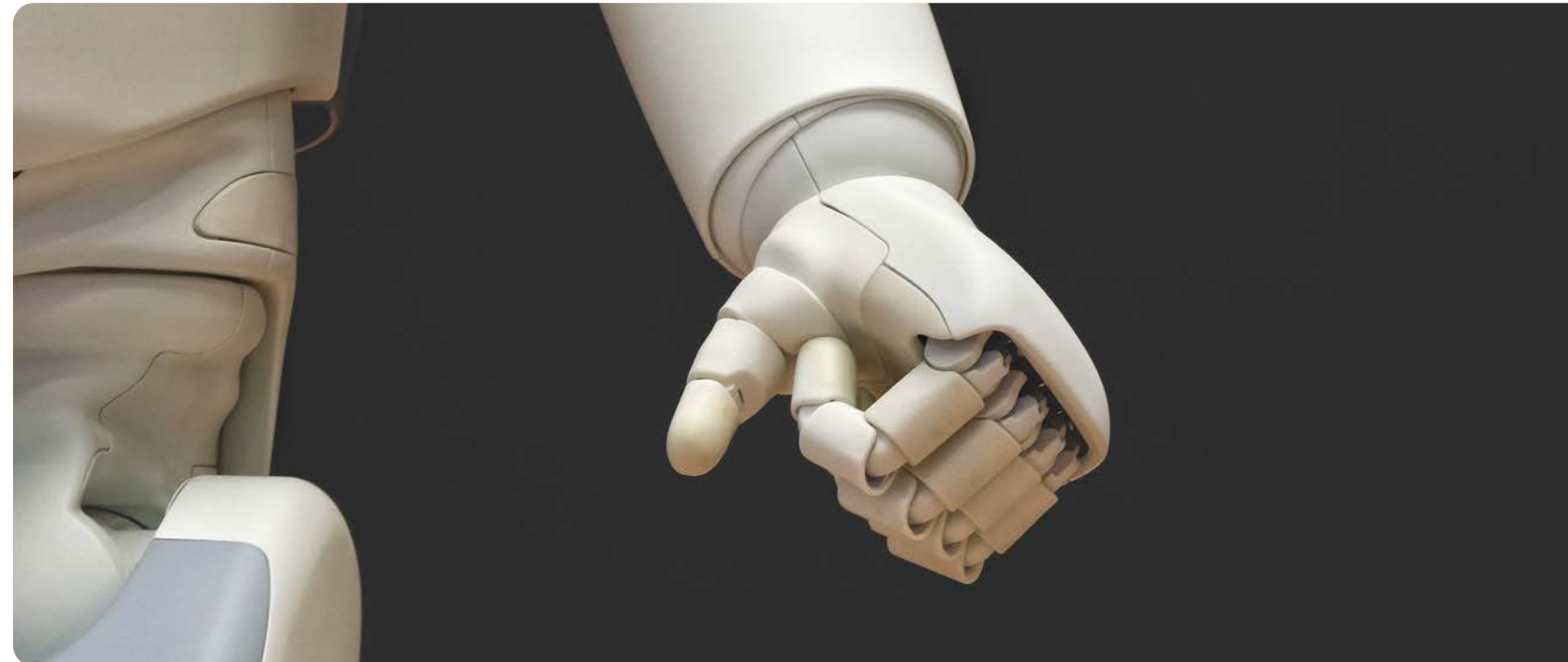
1. **Yet to be realized**

   AI is creating new and exciting services that fundamentally rethink certain areas of human life – like self-driving cars. Unfortunately, this category is difficult to scale for a variety of reasons, such as the practicalities of software training or the wider legal environment. For example, Europe lags in deploying autonomous vehicles[33] due to regulatory hesitancy.

   Consequently, solutions in the 'Yet to be realized' category are largely limited to proof of concept stages, meaning their applications won't be available en masse anytime soon.

2. **Available today but under-utilized**

   AI applications like natural language processing are being widely deployed with great commercial success. Amazon Alexa and Apple's Siri are just two examples. However, their positive impact is limited relative to self-driving cars.

   Rather than reshaping a key aspect of human life, like transport, natural language processing software has been constrained to assisting in search queries and small day-to-day tasks like setting alarms for most users.

3. **Beneficial but in the background**

   AI can be applied to background operational tasks within business or government. Such applied AI solutions can manipulate and analyze data at scale, helping to optimize new advertising campaigns or, most recently, model outcomes from the pandemic.

   Despite the potential benefits of greater applications, personal data usage is a growing concern[34] for customers. These AI tools therefore lack a strong foundation of consumer confidence, limiting their rollout.

4. **Solutions without application**

   DeepMind's AlphaGo is the first computer program to win a game of Go against a professional human player and the reigning world champion at the time.

   The board game is profoundly complex, with over 10^{170} possible configurations (which is more than the number of atoms in the known universe).[35] Consequently, AlphaGo's proficiency undeniably represents a significant advancement in AI technology, as the software is able to identify and deploy strategic game solutions amid billions and billions of options.

   However, AlphaGo doesn't currently solve any real-world or enterprise problems, meaning its place in AI's future is yet to be defined.

Natural language processing software has been constrained to assisting in search queries and small day-to-day tasks like setting alarms for most users.

Why applied AI is different

Each of the above AI solutions falls short in one or more of five key success factors within applied AI:

Positive human impact

Scale

Immediacy

$ $ $ $ $ $ $ Commerciality

Trust
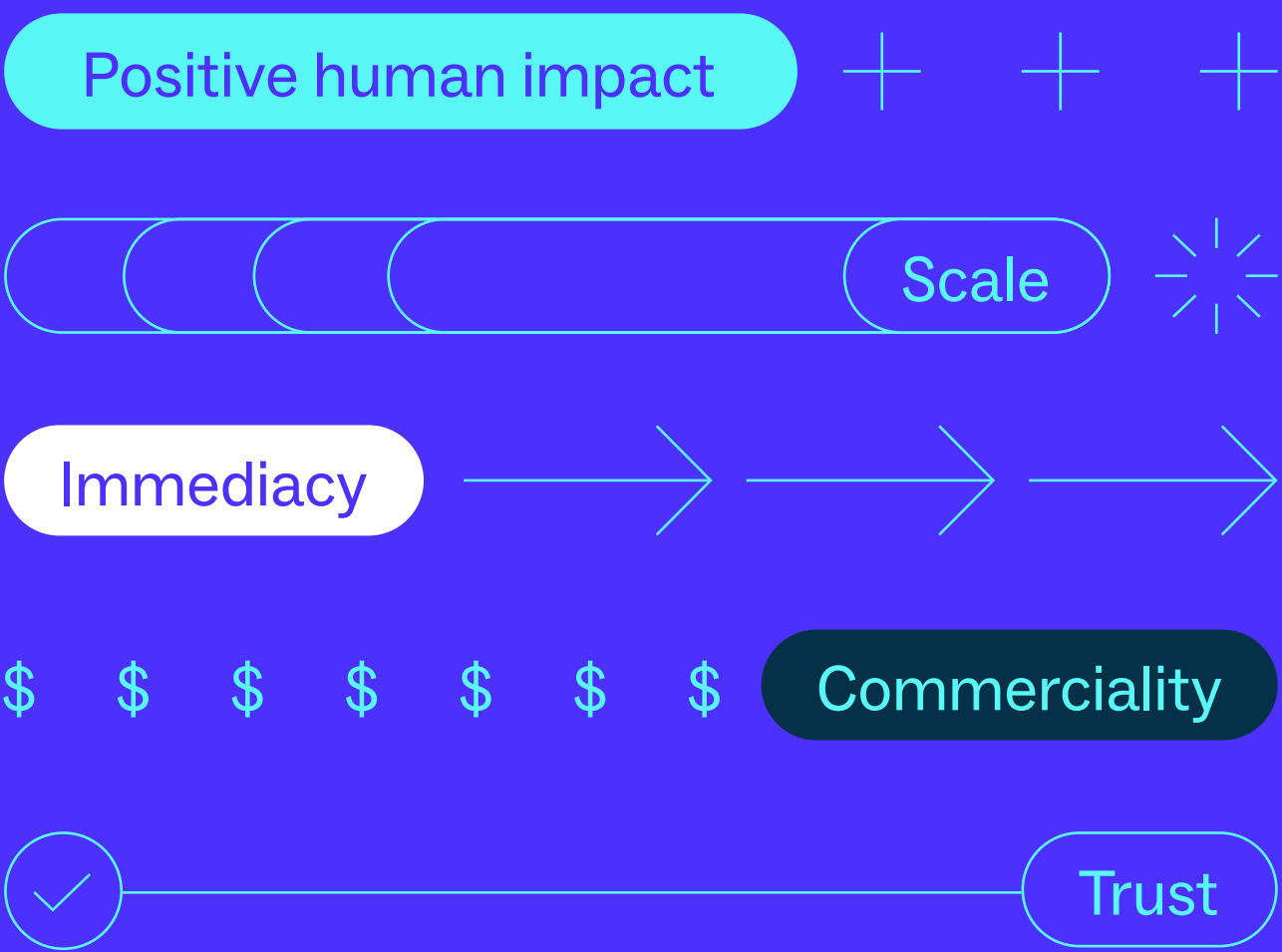
We call this the 'Application Gap': the shortcoming of AI solutions to quickly, effectively and ethically deliver a solution that's commercially viable and beneficial to the community.

For this reason, our definition of applied AI is that it:

✓ **Is available today**

✓ **Has an obvious positive impact on people's lives**

✓ **Is accurate and trusted**

✓ **Solves systematic, real-world problems affecting millions of people**

"Applied AI is to be celebrated. Not feared or mistrusted. It can change the world in incredibly positive ways to benefit people, industry and the planet."

Razvan Ranca, CTO and Co-founder of Tractable

Why now is the time to act

Businesses must innovate, adapting to today's challenges with available technology. Applied AI solutions are the key to unlocking greater growth potential without sacrificing the health of our planet.
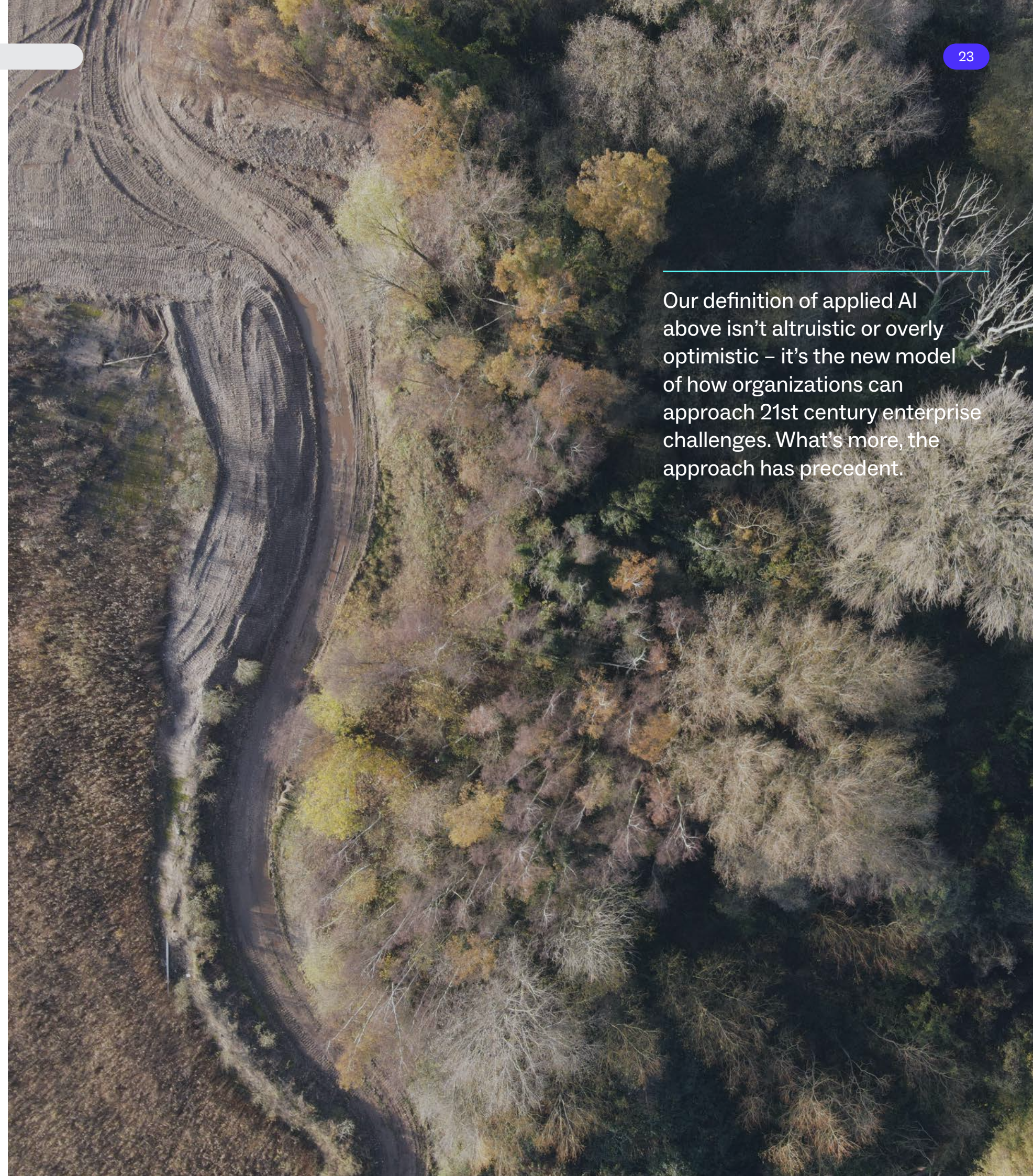
Industrial AI tools can help your business become more efficient and productive, allowing your employees to eliminate repetitive and routine tasks in their workflows. With newly available time, employees can add meaningful value elsewhere and play a more active role in business growth – benefiting customers and honing your market competition.

However, using applied AI without considering sustainability issues at the same time could harm your organization's impact over time.

Consumers are increasingly making spending choices based on environmental issues. Studies show that 84% of consumers[36] claim a poor environmental track record may cause them to stop buying from a brand. Equally, CMOs (Chief Marketing Officers) cite customer experience as one of their top marketing challenges[37] in 2022, meaning that consumer opinions are more essential than ever to long-term viability.

Sustainability, CSR (Corporate Social Responsibility) and profit can intersect to serve both the interests of businesses and the planet. CSR can limit your operational costs, increase your agility, improve consumer perceptions, and create a more distinct brand in a crowded global marketplace. Applied AI for sustainable applications can achieve the same outcomes.

84%

of consumers claim a poor environmental track record may cause them to stop buying from a brand

Our definition of applied AI above isn't altruistic or overly optimistic – it's the new model of how organizations can approach 21st century enterprise challenges. What's more, the approach has precedent.

Applied AI, in particular, can help increase business efficiencies and free up staff talent to work on keeping companies competitive.

AI for Good[38] is a UN initiative that seeks to identify and scale AI-based solutions for sustainable human development. One of the organization's cornerstone campaigns is to build a stakeholder network to tackle the climate crisis. The aim is to develop innovative technologies to model new resource management strategies by monitoring consumption levels and measuring environmental impact.

However, AI for Good is part of a broader movement: Tech for Good. The world's biggest firms, including Microsoft,[39] IBM,[40] Huawei,[41] and Google,[42] have invested significant resources into research projects to identify more ways to combat climate change.

Tech for Good companies are trying to leverage the latest tools and platforms to identify the root causes of major humanitarian issues to create lasting, sustainable solutions. But how can businesses remain profitable whilst investing in sustainable practices?

Simultaneously creating business value and meeting climate change goals is no small task. Here, your company can capture significant commercial opportunities by identifying inefficiencies in your processes and workflows. By allowing AI to undertake manual tasks, you can find solutions that reduce climate burn.

AI can empower your organization to meaningfully combat your climate impact while also improving your wider operations. Applied AI, in particular, can help increase business efficiencies and free up staff talent to work on keeping companies competitive.

Therefore, applied AI, when realized to its fullest potential, is synonymous with a Tech for Good approach: combining social, environmental and commercial benefits to achieve a net-positive effect.

Section 1:
Opportunities of applied AI

Evaluating your business' social, environmental and commercial impact can be difficult without a validated framework. You may be asking which issues are a priority within your community and wondering if all issues are equally important as one another.

Here, the UN's Sustainable Development Goals (SDGs)[43] serve as a useful basis for uncovering key sustainability and CSR challenges. The 17 SDGs are divided into three sections: Environment, Society and Economy. The subsections provide a helpful lens to explore the use cases for applied AI in business.

We've collated examples of major challenges facing people and businesses today, and where applied AI offers an ideal solution.

Planet

Agriculture

Agriculture is inextricably linked to the planet's health. Unpredictable and more extreme weather patterns brought about by climate change place pressure on farmers, risking the security of global food systems.

For example, seasonal droughts[44] are lasting longer in North America, while greater rainfall in the UK has led to more frequent flooding.[45] Around the world, the story is the same: it's becoming more difficult to yield reliable harvests.

At the same time, contemporary agricultural methods place a significant strain on resources like water and land.[46] Agricultural systems must change, adapting to become more sustainable and resilient.

AI technologies such as NatureFresh[47] are helping farmers reduce their water and nutrient usage. NatureFresh uses AI to fine-tune crop environments by collecting data on plant growth, optimizing water, light and heat levels for each type of produce. As a result, crop yields are more predictable, higher quality and less resource intensive, allowing farming communities to thrive whilst protecting local ecosystems.

Pollution

Although international agreements seek to limit the sustained use of fossil fuels, enforcing environmental laws continues to be a challenge across the world. Historically, companies emitted more than they declared, which has lowered confidence in environmental compliance data.

AI tools from Flaring Monitor[48] and Climate TRACE[49] can identify pollution levels by tracking natural gas flares using satellite data and other remote sensing techniques. These measurement tools are improving the transparency of emissions like carbon dioxide and methane, helping to hold large emitters to account with greater accuracy.

Similar systems, designed by IBM, are improving the water quality[50] in one of India's most polluted lakes, highlighting the flexibility of AI-based environment solutions to tackle pollution. IBM's effort is having a long-term and beneficial impact on the local community by improving their health and creating new investment opportunities.

AI tools can identify pollution levels by tracking natural gas flares using satellite data and other remote sensing techniques.

People

Inclusion

AI tools are also helping to drive social good as well as environmental justice.

Software developed by Microsoft is opening up access to learning environments for people with disabilities. Natural language processing (NLP) tools can generate live captions,[51] allowing deaf individuals to participate in lectures without the need for a sign-language interpreter. Although the current roll out of NLP tools pales in comparison to the availability of software like Siri on personal devices, the potential benefits are vast with ever-increasing adoption.
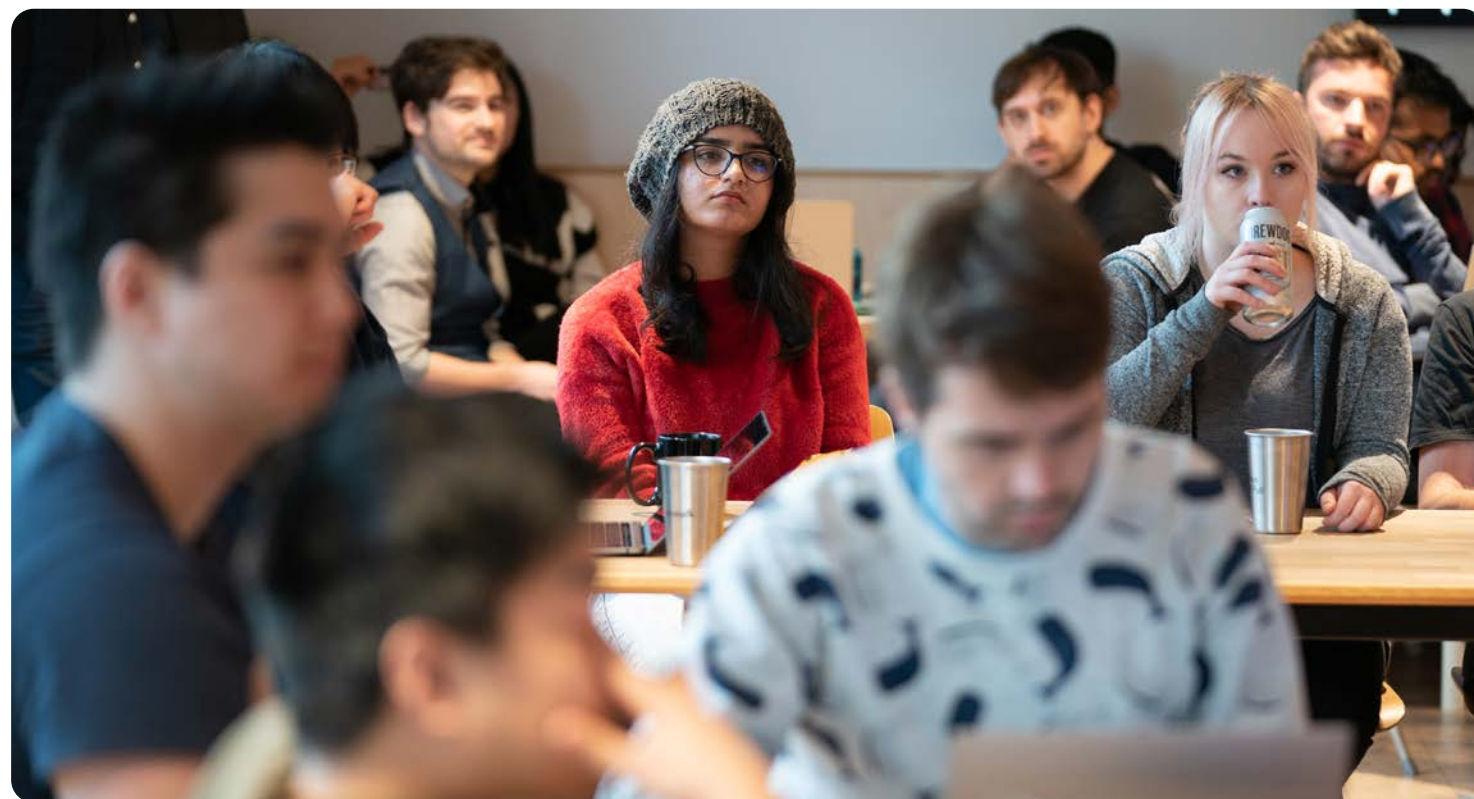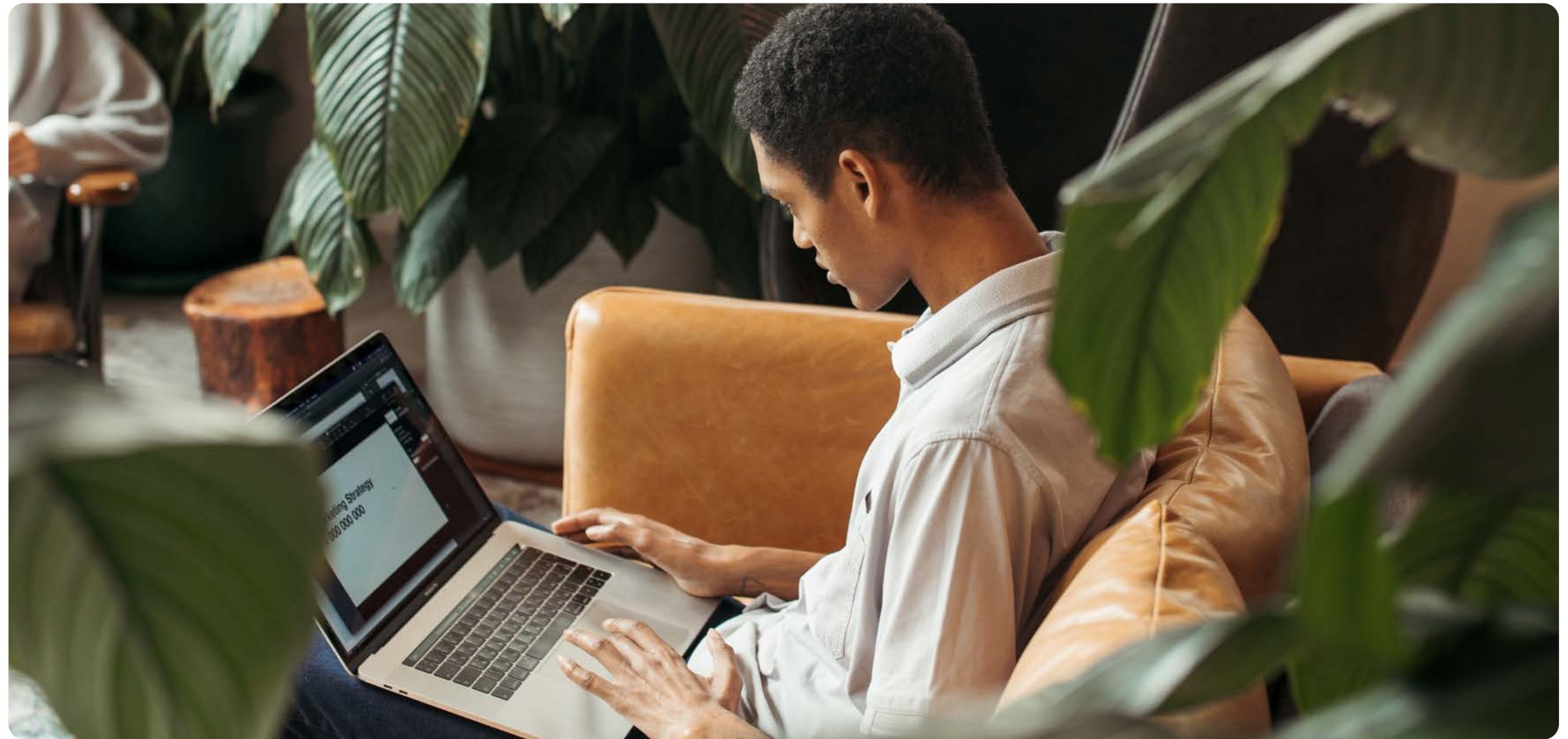
Similarly, image recognition[52] software is empowering people who are blind to navigate their environment with more confidence and independence. AI programs can recognize the differences between people and objects, identify currency values, discern document formats and communicate important environmental qualities like light levels and color values.

Excitingly, the business case for increased inclusion is strong, as firms with more diverse workforces outperform less diverse ones by as much as 36% according to McKinsey data.[53] Applied AI technologies can help businesses access previously untapped talent and demonstrate a firm commitment to their core values.

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36%.

Health

AI software has now surpassed medical experts in recognizing conditions like cancer during routine screenings. The latest AI programs can analyze patient scans and other diagnostic data 30 times faster than human doctors and identify emerging conditions with 99%[54] accuracy. Patients can also access treatment earlier, minimizing remission rates, radically improving long-term outcomes.

Similarly, machine learning (ML) algorithms can assist healthcare professionals by keeping them up to date with the most recent clinical research. IBM's Watson provides analysis of trends in healthcare literature,[55] equipping professionals with the latest medical knowledge and leading evidence-based care methods.

In turn, hospitals remain competitive by offering higher quality care and saving patient lives.

Patient scan analysis times
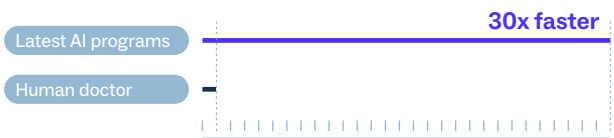
| Latest AI programs | 30x faster |
| Human doctor | |

The latest AI programs can analyze patient scans and other diagnostic data 30 times faster than human doctors and identify emerging conditions with 99%[54] accuracy.

The US alone generates roughly

293 million tons

of waste annually.

Industry

Manufacturing

Business equipment life-span is finite. But data-driven firms are gradually transitioning to a more proactive asset-management strategy, helping to lengthen equipment service lifetimes.

Machine learning algorithms from companies like OpenText[56] analyze operational patterns in critical business machinery using IoT (Internet of Things) sensors.

The software can then identify when physical assets will fail, allowing senior leaders to authorize preventative servicing before machines break.

AI-enabled equipment management strategies can maximize production uptimes and prolong the lifespan of vital tools, compounding asset investment returns even further. Moreover, applied AI systems also reduce unnecessary consumption by ensuring equipment receives relevant servicing, rather than being replaced entirely for faults on a wasteful, speculative basis.


Circular consumption

Single-use and disposable materials are another mounting challenge for our planet. The US alone generates roughly 293 million[57] tons of waste annually. Every year, a similar total of virgin materials must be deployed to keep pace with the country's consumption demands. Although some regions have taken steps to reduce single-use plastics,[58] individuals and businesses' consumption is currently unsustainable.

Circular consumption, or the sustained reuse, repair and recycling of existing goods, is an essential component of any sustainable future. Autonomous robotic solutions like ZenRobotics[59] are helping community waste centers to identify viable materials from discarded goods like laptops, returning them to manufacturers. AI can prevent excessive mining of precious metals, protecting habitats and offering pre-refined metals to suppliers at low-cost.

Although the above examples feature companies directly addressing the imperatives set out under the UN's Sustainable Development Goals, this isn't the only way businesses can make a difference. AI can also make a positive contribution indirectly, whilst jointly improving business operations.
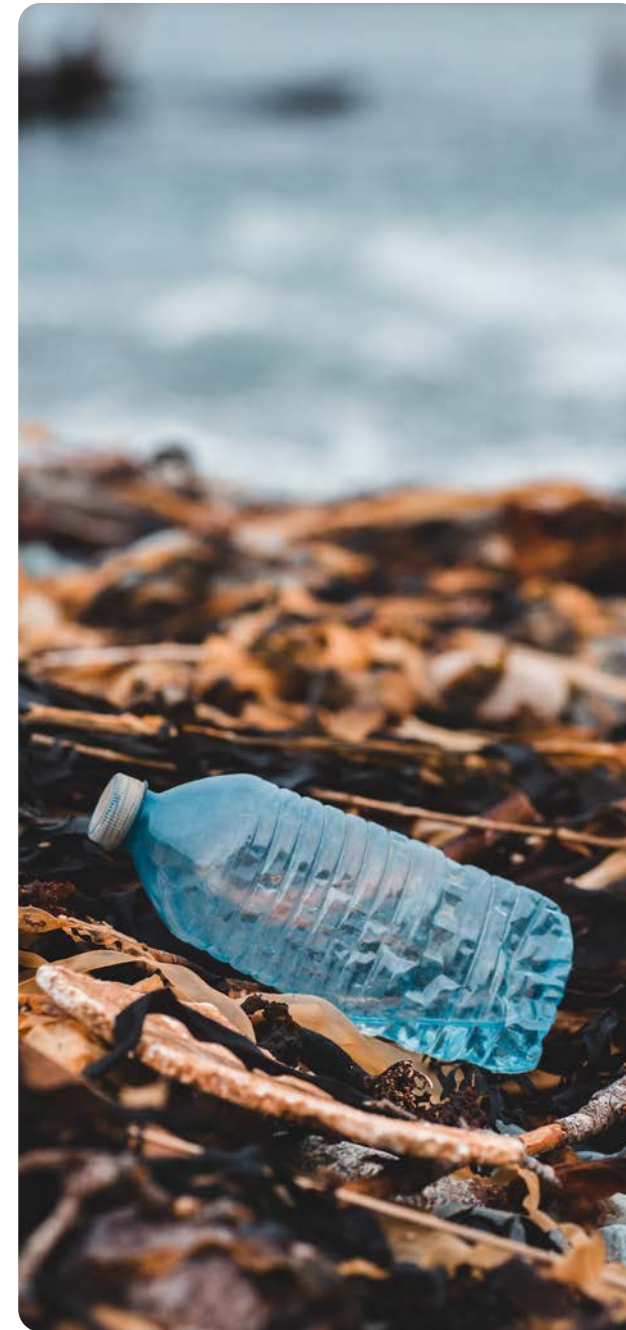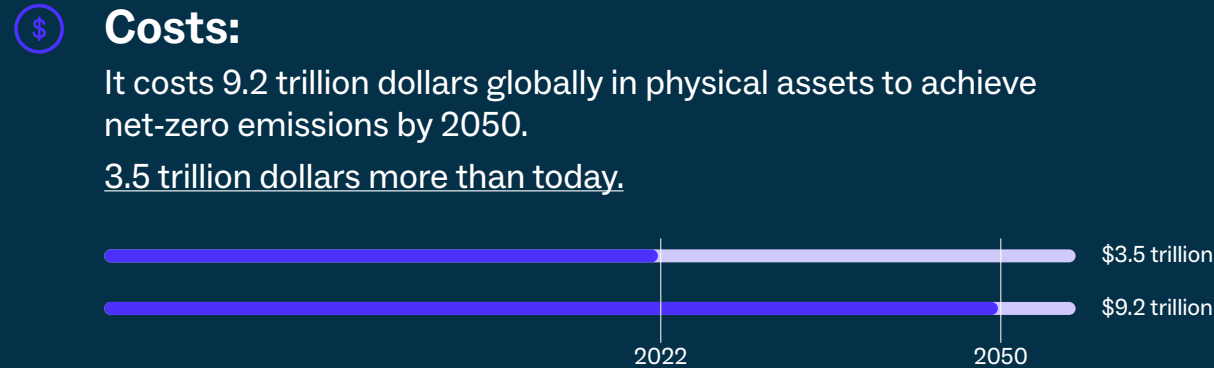

"AI applies cutting-edge tech to deliver services more efficiently. Businesses cut waste and reduce strain on natural ecosystems."

Razvan Ranca, CTO and Co-founder of Tractable

AI in numbers

IBM's report on the Business Value of AI[60] identifies significant financial benefits for AI-enabled businesses:

Reduced operating costs

$ Costs:

It costs 9.2 trillion dollars globally in physical assets to achieve net-zero emissions by 2050.

<u>3.5 trillion dollars more than today.</u>

	$3.5 trillion
	$9.2 trillion
2022	2050

⚡ Risks:

Energy supply volatility

⊕ Opportunities:

01 Preventing the build-up of physical climate risks

Revenue gains

Advanced AI adopters attribute

10–12%

points of revenue gains (or erosion offset)

6.3%
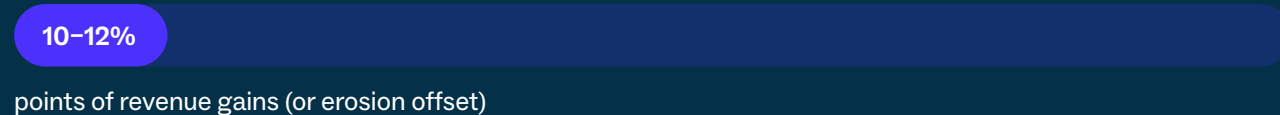
Advanced AI adopters attribute 10–12% points of revenue gains (or erosion offset). AI companies report 6.3% points of direct revenue gains directly attributable to AI on average, which offset revenue erosion for those hit hardest by the pandemic or helped capitalize on new growth opportunities for those experiencing greater demand.

Operational benefits using virtual agent technology

99%

of companies report a reduction in cost per contract from using virtual agent technology

$5.50 cost savings per contained conversation

12% rise in customer satisfaction

9% rise in agent satisfaction

3% revenue gain
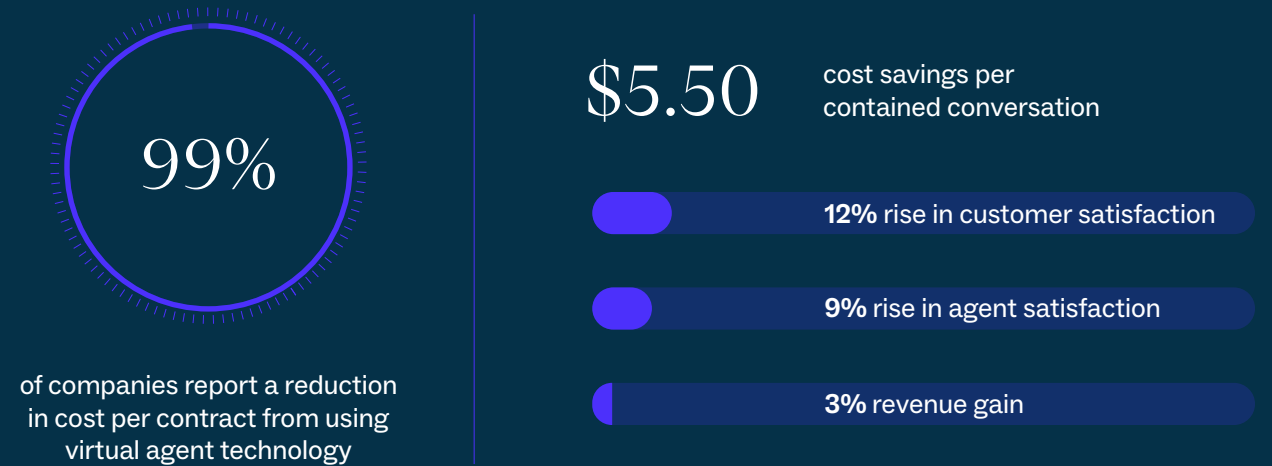
→ It's not only the case that AI confers significant business value and operational efficiencies.

AI can also effectively tackle critical sustainability concerns at the same time.

As a result, applied AI technologies offer substantial business value, helping businesses to simultaneously identify new efficiencies and mitigate environmental impact .

Section 2:
The value of applied AI

While there are immense opportunities to accelerate sustainability through applied AI solutions, there is no one-size-fits-all solution. As a result, we must consider how to take advantage of AI tools effectively and responsibly on a case-by-case basis. That being said, there are some universal truths that apply to AI technologies in business.

In this section, we discuss the practicalities and boundaries of AI technologies within organizations and ecological contexts.
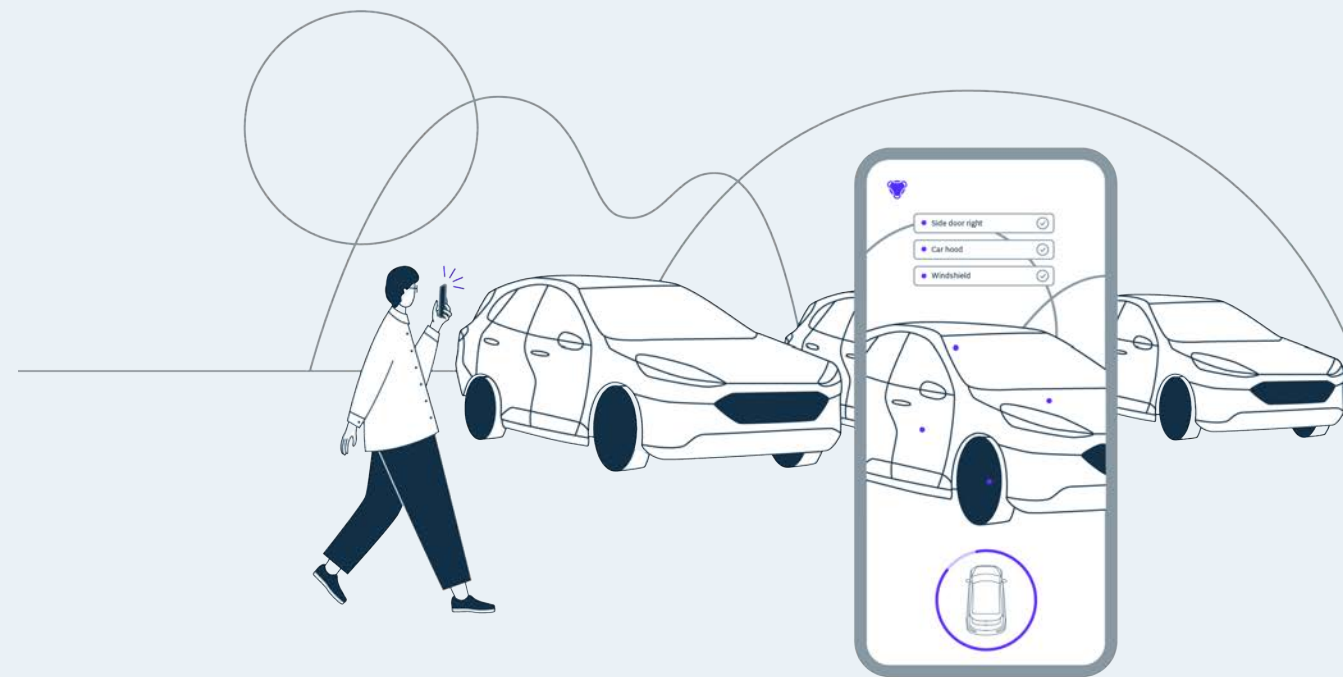
Strengths and challenges within AI

Strengths

Artificial intelligence technologies are extremely proficient at managing and analyzing vast data sets. Unlike humans, AI software does not succumb to distractions and is able to maintain its performance indefinitely. AI is the perfect solution for tasks that require sustained attention over large, intensive workloads that humans would typically find monotonous.

For example, Plus[61] and TuSimple[62] are developing fleets of self-driving freight vehicles, helping to meet the shortage of long-haul transport workers and eliminate freight-related road accidents.

Machine learning algorithms are also highly skilled at forecasting. By analyzing geospatial information and weather patterns, AI systems like ALERTWildfire[63] are identifying wildfires in real-time and assigning appropriate support from first responders. In addition to saving lives, the software is helping to limit environmental damage and maintain existing carbon stores in the region.

Artificial intelligence is only as good as the data with which it's provided.

Challenges

Despite advancements in AI applications, the scope of the technology remains relatively limited given what we know to be the full potential of artificial intelligence. Today's artificial intelligence software is largely domain-specific, as programs are typically proficient in a core skill set, rather than possessing broad learning capabilities.

While AI software may be successful in completing tasks similar to intended use cases, proficiency decreases as demands become more novel and unfamiliar.

Although AI can provide a useful way to support impartial decision-making, artificial intelligence is only as good as the data with which it's provided. For this reason, AI software is vulnerable to analytical or performance biases.

For instance, research[64] into facial recognition software has demonstrated systemic performance issues for women and other minorities. Unfortunately, such performance discrepancies risk compounding present-day social inequalities at a time when equitable social change is central to global sustainability.

As a consequence, ethical oversight is crucial to ensure AI remains a force for positive and lasting change against today's societal and environmental challenges.

Finally, AI tools often struggle with tasks requiring subjective judgment that humans take for granted. Such problems can be difficult to define since they lack numerical input or output values that allow AI software to compare against ideal performance thresholds.

Instead, senior leaders should maintain their existing oversight when it comes to tasks where answers are less clear-cut. In many ways, we can see how it's the combination of AI systems working with human oversight that create the best outcomes.

Ethical oversight is crucial to ensure AI remains a force for positive and lasting change against today's societal and environmental challenges.

AI transformation in property and automotive assessment: Indirect sustainability in action

The insurance industry, in particular, makes for an interesting use case to analyze indirect sustainability through AI as customer claims require subjective judgment. Traditionally resistant to change, the insurance sector is currently undergoing a rapid transformation as businesses embrace technologies like AI to adapt to the new normal.

According to Deloitte, insurance companies have traditionally lagged behind when it comes to tapping into AI's potential.[65] However, emerging insurtechs and startups are enthusiastically stepping into the space and seizing a competitive advantage. As natural disasters caused by climate change have become more common, it has only further highlighted the crucial role technology plays in streamlining business processes for insurance companies.

The COVID-19 pandemic has shaken the insurance sector. Estimated losses in the industry exceeded $55 billion during 2020,[66] accounting for the second greatest shock to insurance revenues next to Hurricane Katrina.

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Research also shows that global pandemics are more likely with increasing deforestation,[67] underlining our reliance on the planet and subsequent vulnerability under its destruction. The industry has to find more efficient ways to do business and is turning to AI as a means to achieve this goal.

As outlined above, AI applications are varied. So varied, in fact, that McKinsey estimates that AI investments across use cases in the insurance sector could add $1.1 trillion[68] in annual value to the industry. While the stakes are high, so are potential returns in a fiercely competitive market.

Below are examples of how AI is being used to improve revenues and drive sustainability in the property and automotive industries like insurance, repair and salvage. Each example also includes a case study highlighting how AI's benefits can extend across the entire sector.

McKinsey estimates that AI investments across use cases in the insurance sector could add

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in annual value to the industry.

Auto insurance

In the US, 284 million vehicles[69] operate on the roads and 229 million drivers own a valid license. Unfortunately, collisions are still common, with nearly 13 million accidents[70] occurring in 2019 alone.

When a car accident happens, drivers need to submit an insurance claim. The process requires complex coordination between multiple parties and features a range of difficult steps. In addition to the distress of enduring the accident, parties must provide detailed assessments for damage, salvage or repair. To process the claim, insurers need access to client, policy and auto-repair data.

Claims processing: then and now

Traditionally, claims processing was a manual, standardized, time-consuming, repetitive and (crucially) attention-demanding task. Applied AI can expedite the entire process by scanning incoming data, interpreting it agnostically and quickly systemizing settlements. Insurers can process highly stressful claims at higher volumes, saving their employees time while also minimizing the costs per claim.

AI systems, together with supporting hardware for data collection (such as geospatial data, HD video, or IoT data sets) can also gather evidence and make appraisals faster and safer. As a result, insurers can get a more complete picture with verifiable data points in real time.

The pandemic has placed further emphasis on digital technology, with many US state insurance supervisors encouraging and even demanding digital service delivery. For example, an emergency order issued by the Insurance Commissioner of West Virginia[71] mandated insurers to use digital technologies for claim adjustments. By collecting evidence remotely without dispatching insurance personnel, insurers can reduce mileage and indirectly reduce pollution and greenhouse gasses.


Unfortunately, collisions are still common, with nearly

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occurring in 2019 alone.

Auto repair

By 2020, the global automotive repair industry was worth an estimated $722.8 billion.[72]

The repair industry has boomed partly because of rising costs of new and used vehicles. As a result, consumers are keeping the same vehicle for longer and increasing preventative maintenance. In turn, demand for aftermarket parts and services is rising, encouraging new growth and revenue opportunities.

AI systems are now advanced enough that they can suggest a coherent strategic repair plan. Companies can more easily manage their inventory for a fast-moving flow of damaged cars – essentially allowing them to accurately track and supply parts according to demand, thereby reducing waste at the same time.
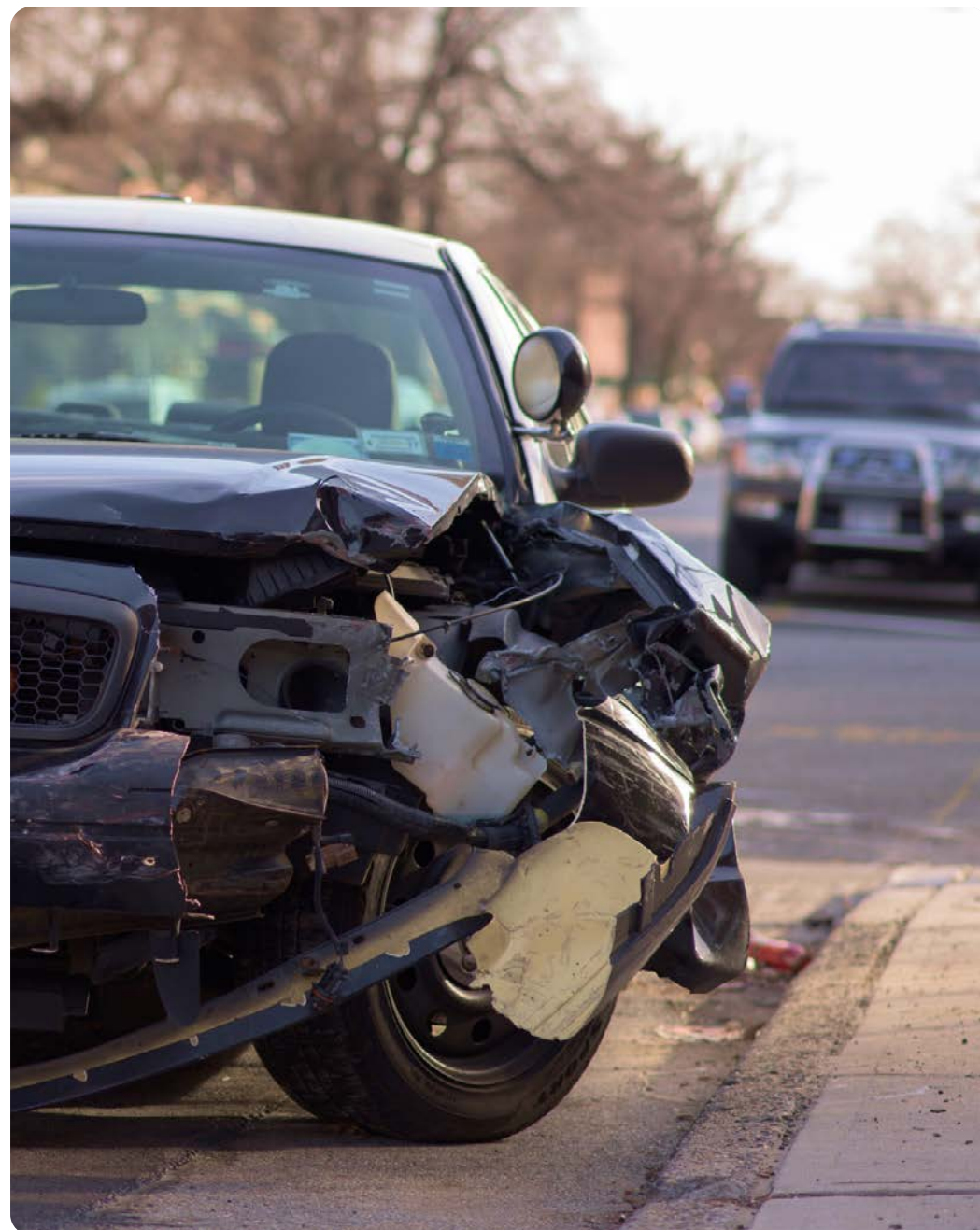
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Case study

Tokio Marine, property and casualty insurer

AI application
Tokio Marine, a Japanese company, uses Tractable's AI-based computer vision system to examine and appraise damaged vehicles, making sense of the damage as a human would, in near real-time.

How AI works
The computer vision AI system processes photos of the accident to understand the full range of available decisions such as repair, paint and blend operations, and will calculate the labor hours required.

Benefits
Processing time is significantly shortened from days to minutes while also removing inefficiencies in the process and delivering a better customer experience. By streamlining the claims process and delivering it remotely, Tokio Marine can also reduce wastage and ensure it continues to meet its wider CSR goals.
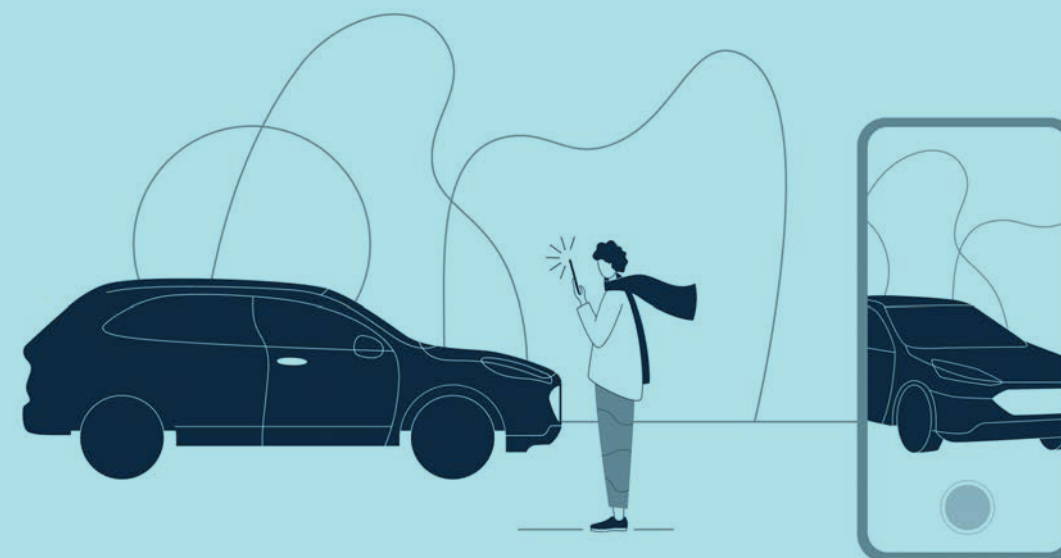
Fleet and sales

According to the Cox Automotive and Grant Thornton Insight Report,[73] short-term vehicle leasing and subscription products will have a significant impact on the future of the fleet market. The report highlights that there will be a wider range of age and time cycles for cars as second and even third-hand ownership becomes more common. As a result, fleet and rental companies will need to improve vehicle utilization and monetization to stay viable.

Businesses need to consider the condition of second-hand cars or fleet cars, a key factor behind ROI and consumer satisfaction. As Alex Dalyac, CEO and Co-founder of Tractable points out, "the number one worry for a consumer buying a used or pre-owned vehicle is its condition and the potential for unseen blemishes and damage that aren't reported or readily visible."

There will be a wider range of age and time cycles for cars as second and even third-hand ownership becomes more common.
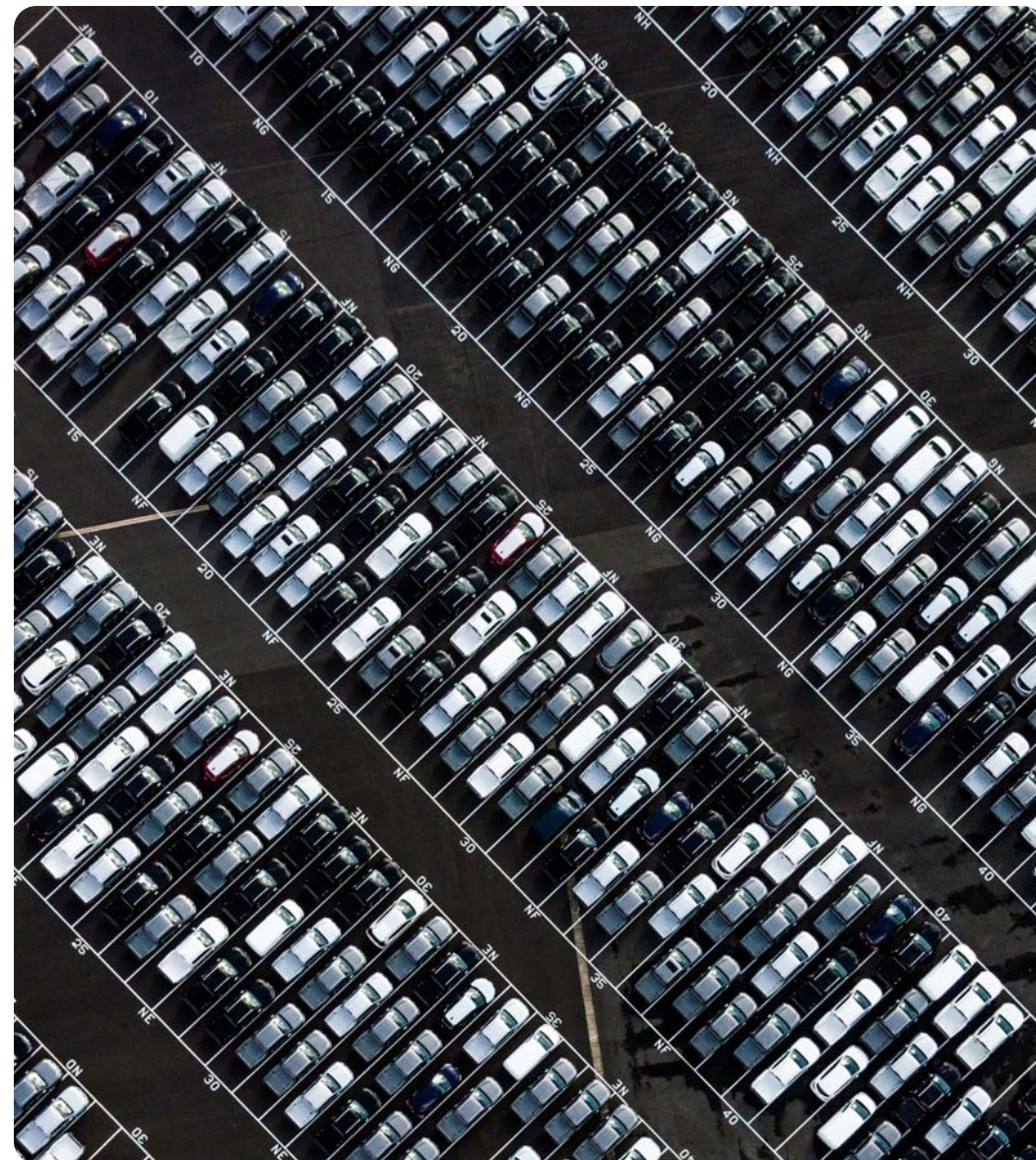
Accurate assessments are critical for second-hand dealerships as vehicles are often purchased sight unseen. Similarly, rental damage is often under-reported, which means a loss of profit for business owners. While buying a second-hand vehicle may seem environmentally friendly, as it reduces mass production, quality also plays an important role in ensuring second-hand cars don't indirectly make pollution disproportionately worse with fuel inefficiencies.

Applying AI can address and solve these problems. AI-empowered data insights facilitate accurate reporting and decisions in real-time and adds "transparency into the process to build greater trust between dealers and customers," says Alex Dalyac.

Case study
Impel (formerly SpinCar)

AI application
Impel's 360˚ WalkAround, an AI computer vision solution enabling businesses to spot damage, assess condition, and accurately value a vehicle pre-and post-purchase, greatly improving the customer experience and encouraging second-hand car ownership.
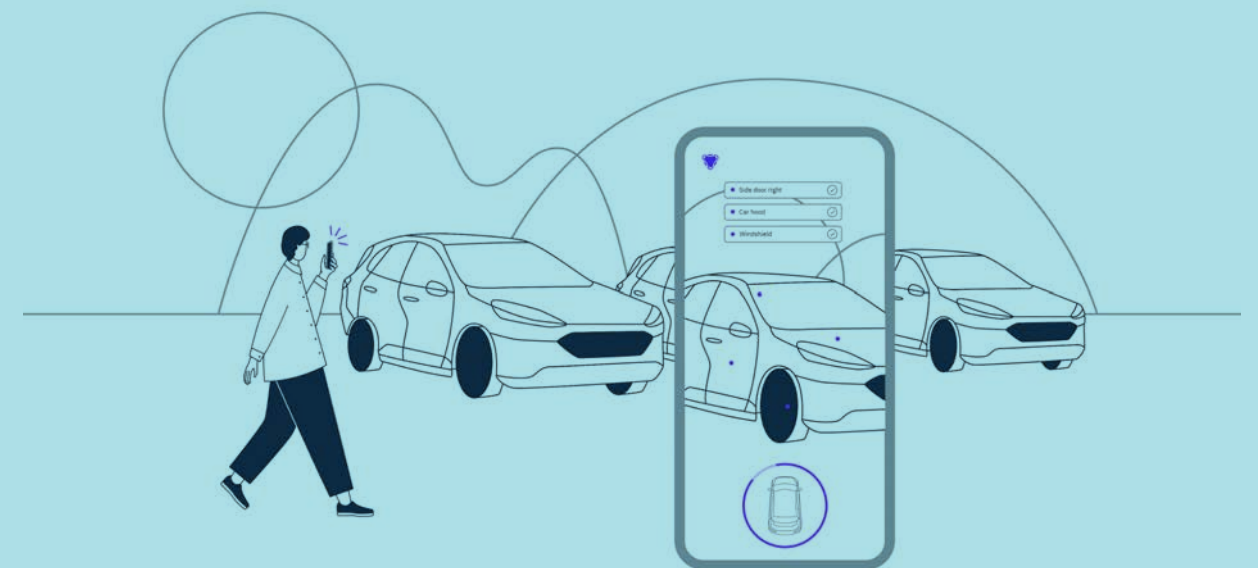
How AI works
Used car dealers often purchase vehicles sourced outside their local area sight unseen. Visual AI allows car dealers to see the car's exact condition, including fuel efficiency, ahead of its arrival to enable them to make the right purchasing decision. Assessment for repairs can be done in real-time at any location, which helps with vehicle planning and rotation. Live damage assessment ensures customers are correctly charged while AI-powered insights also create a report to streamline fleet management.

Benefits
By making the purchasing process easier and more seamless, AI can help drive greater efficiency and effectiveness while also positively contributing to sustainability by reducing mass production.

"Purchasing a vehicle is one of the largest transactions in a consumer's lifetime. By partnering with Tractable, we can revolutionize online vehicle exploration. Dealers create an engaging and transparent experience, providing shoppers with precise and accurate details about a car's condition."

Michael Quigley, President and Co-founder, Impel

A staggering

6.1 million

passenger cars, vans, and other light goods vehicles were scrapped in the EU in 2019.
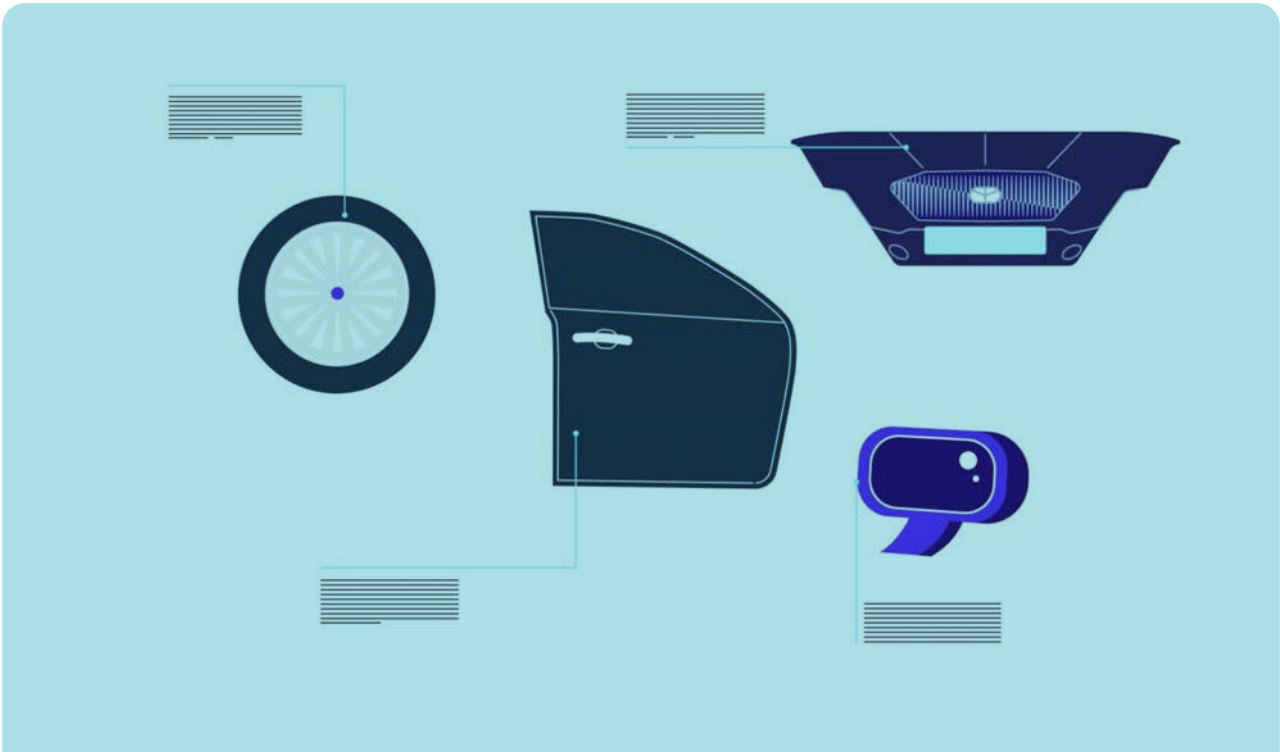
Salvage

End-of-life (ELV) vehicles pose a significant sustainability challenge, to the extent that the European Commission proposed a Directive on ELVs in an effort to manage the impact of their toxicity.[74] A staggering 6.1 million passenger cars, vans, and other light goods vehicles were scrapped in the EU in 2019 alone, amounting to over 7.6 million[75] tons of scrap weight, most of which is non-biodegradable.

The Environmental Protection Agency (EPA) notes that the proper disposal of discarded vehicles can reduce risks to workers, public health and the environment. Companies that take advantage of best-in-class procedures can lower disposal costs, reduce landfill capacity and seize more opportunities to recover valuable resources. Companies can even earn additional revenues from dismantling and scrapping operations.[76]

The salvage industry is well-positioned to take advantage of applied AI to benefit business and the environment. Companies can optimize their extraction of value from ELVs, reducing waste and toxicity in the process.

Case study

LKQ North America, leading provider of alternative vehicle parts

AI application
LKQ partnered with Tractable to accelerate and optimize the recycling of salvage vehicles across North America.

How AI works
Tractable's AI program uses computer vision to assess specific damage on each vehicle and then determine the parts that can be recycled and reused. Trained on millions of historical examples, the technology can assess specific damage on par with human intelligence, which increases the consistency and accuracy of these decisions.

Benefits
By improving and making it easier to recycle parts, LKQ can successfully increase the amount of parts that can be reused, reducing waste. Furthermore, this technology also allows them to reduce the company's carbon footprint by assessing parts without in-person appraisal.

As a result, Tractable's AI has helped recycle hundreds of thousands of cars and counting.

"Tractable's AI has enhanced our expertise with identifying high-quality parts on salvage vehicles [which] can be recycled and reused. [It] further assists LKQ in delivering the right parts, to the right place, and at the right time."

Yogi Shivdasani, VP of North America Supply Chain at LKQ

Property and real estate insurance

Automotive isn't the only insurance sector benefiting from applied AI.

Devastation resulting from natural catastrophes will define the property and casualty insurance industry in the years to come.[77] Natural disasters have become more common by a factor of five over the past fifty years as a result of climate change.[78] Of these natural disasters, weather, climate, and water hazards accounted for 50%, 45% of all reported deaths, and 74% of all reported economic losses between 1970 and 2019.

For insurers, in-person assessments of natural disasters are complex and risky. Repair estimates and payouts can be delayed by reduced accessibility, spikes in the volume of local claims and health risks for assessors due to onsite hazards.

However, applied AI can address these challenges by enabling faster and more efficient claims processing. Customers can send photos of damage using a web-based app for instant assessment without the need for in-person appraisals. AI programs can then prioritize urgent cases at a scale that isn't possible for human claim teams.
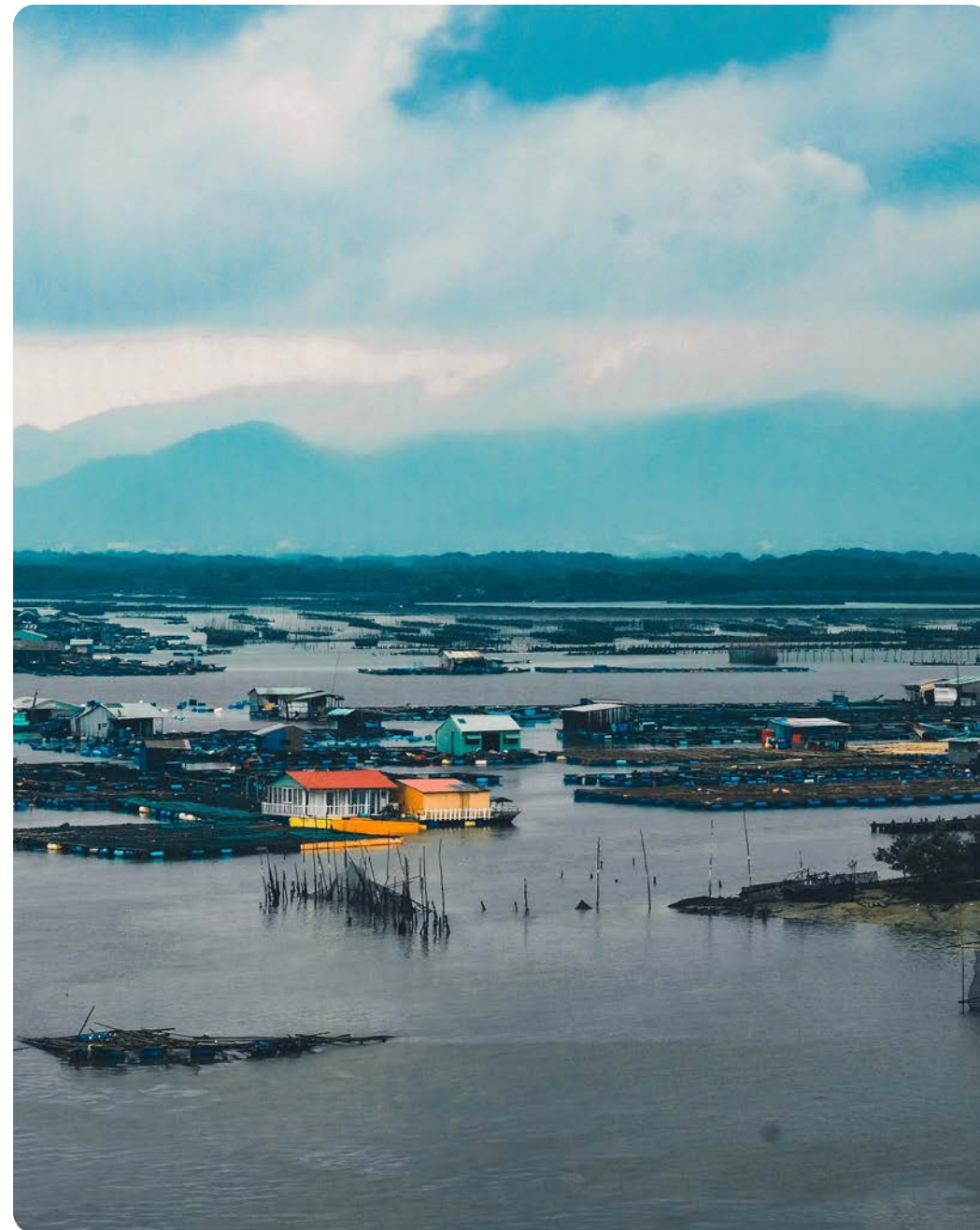
Devastation resulting from natural catastrophes will define the property and casualty insurance industry in the years to come.[77]

## Case study
MS&AD Insurance Group

AI application
Tractable uses computer vision to examine and appraise the external damage caused to buildings in Japan by wind, hail and hurricanes – helping homeowners to rebuild quicker.

How AI works
Computer vision algorithms allow anyone with a smartphone to quickly and easily assess damaged property using a smartphone app. Individuals simply need to take photos and submit them to the AI platform. The AI platform makes an immediate assessment and relays this information to the insurers, significantly decreasing claim processing times.

Benefits
By leveraging Tractable's AI solution, insurers can better support victims of natural disasters without lengthy delays or risking their team's safety. Claims can now be processed in as little as a single day rather than several months.
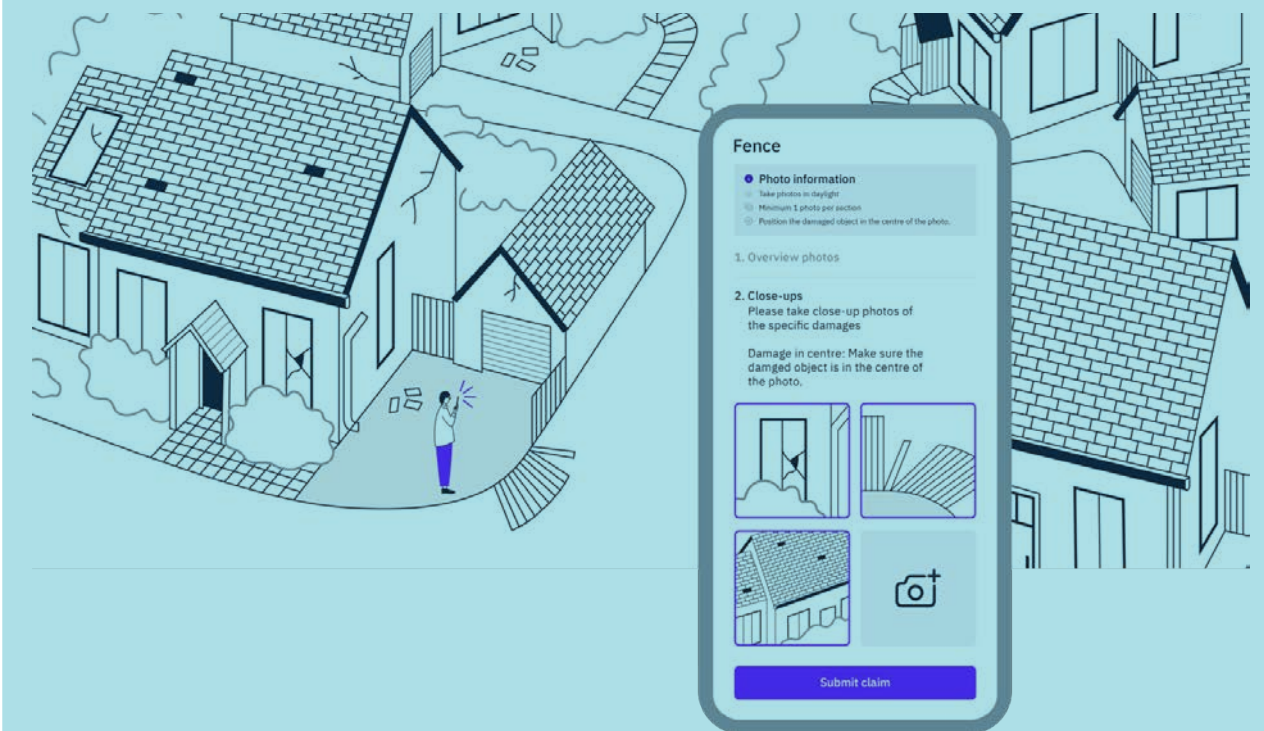
Section 3:
How to harness the power of applied AI

According to Andrew Ng, Co-founder of AI Fund, Landing AI and Google Brain AI, "building a website [or] sprinkling on a little bit of machine learning doesn't make you an AI-[enabled] company."[79]

Successfully transforming your organization relies on embedding AI throughout your business, meaning mindsets and processes must evolve at the same time as workplace technologies.

While there are immense opportunities to create value and improve sustainability outcomes through applied AI, there is no one-size-fits-all solution. As a result, senior leaders must consider how to take advantage of AI tools effectively and responsibly on a case-by-case basis. To this end, there are core steps in any AI adoption you should keep in mind throughout the development process.

Finding the right applied AI partner

Deploying AI within businesses can improve a range of functionalities, from product development and services, to customer satisfaction and profit margins.

Although automated solutions support more efficient workflows within respective organizations, they can be vastly different from one another in design and utility.

For instance, Copilot[80] by GitHub provides programming templates based on input from users. The AI tool accelerates software development by decreasing workloads for programmers and allowing them to focus on quality assurance processes. By contrast, Salesforce's Einstein AI[81] platform offers natural language processing support to automate routine customer interactions and escalate sensitive customer cases.

Regardless of the application, effective AI solution providers excel in six key areas of intelligent data modeling. A basic understanding of each can help you evaluate different providers and project outcomes, helping you to identify the best applied AI provider for your organization.

Mature systems can improve customer satisfaction ratings by allowing policyholders to have faster access to policy benefits like courtesy cars or repair work.

Below are six core domains of functionality that you must investigate to identify a suitable AI partner:

1. **AI maturity**

   AI maturity is a catch-all term describing the current evolution of an AI software. While all AI tools collate, organize, and reconcile data from competing sources and formats, mature solutions perform operations more efficiently. Critically, the maturity of the system is defined by the objectives you seek to achieve.

   For instance, AI use cases range from vast processing tasks to time-sensitive operations. Here, one system's AI maturity would be defined by its speed while the other by its ability to scale.

   In either case, a tell-tale sign of maturity in AI software is the ability of the solution to conduct straight-through processing (STP), executing a host of processes using a single data input without manual intervention.

   To use a real-world example, submitting insurance claims is a stressful experience for policyholders when insurers lack a seamless digital platform. Yet, generating an instant claim is far from impossible – some providers are already doing it.

   Mature, insurance-focused applied AI software can hasten customer claims by processing case data and quickly appraising the damage against the policy's terms.

   In turn, mature systems can improve customer satisfaction ratings by allowing policyholders to have faster access to policy benefits like courtesy cars or repair work.
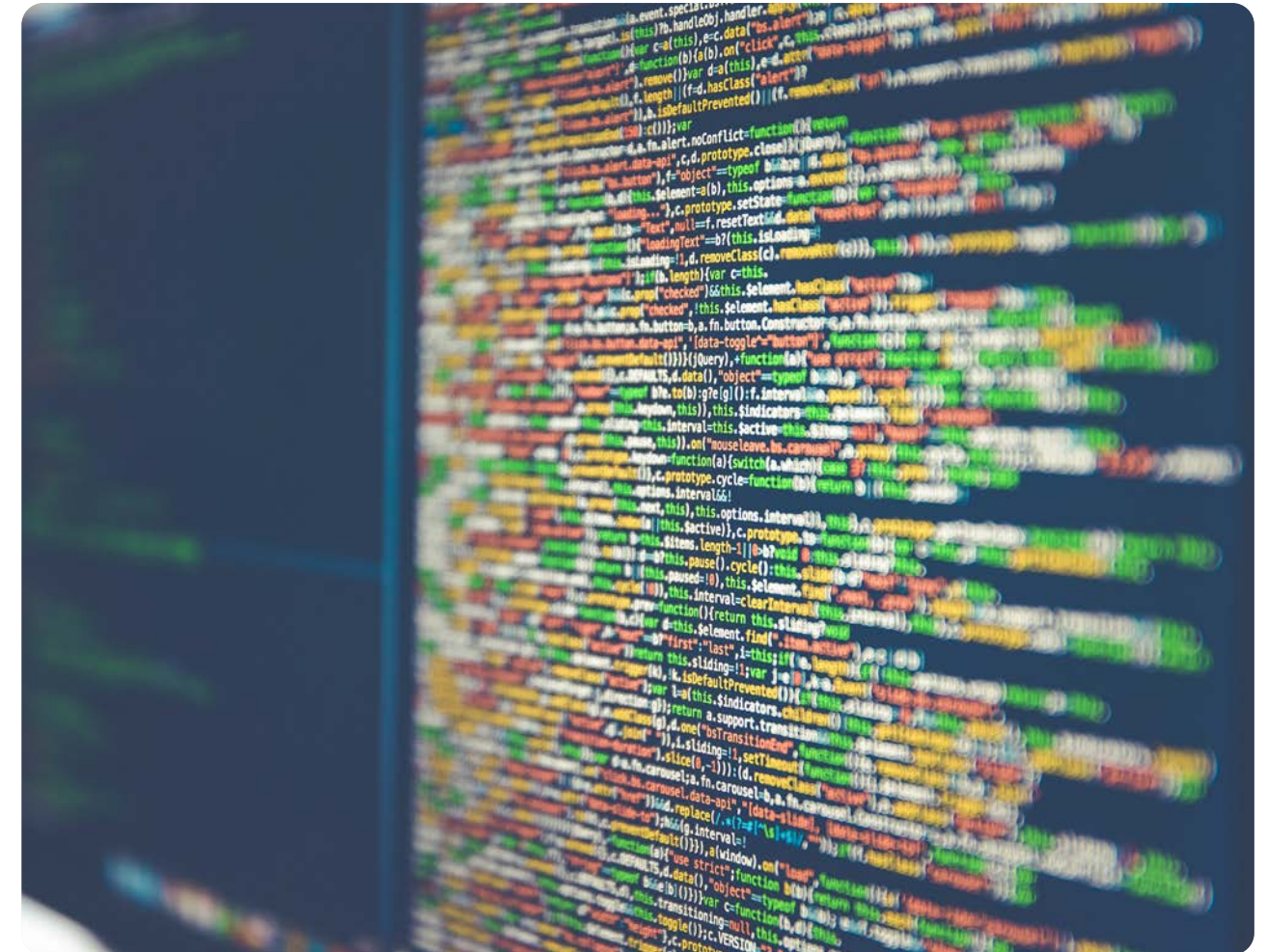
2. **Structured and unstructured data mining**

   One of the main differences between AI solutions is whether they use structured, or unstructured data to complete their tasks.

   Structured data refers to records contained within a formatted environment, like spreadsheets, databases and metadata. On the other hand, unstructured data refers to information that is not contained within a predefined way, like images or audio.

   AI software can use structured financial data to analyze stock performance. Image recognition software, by contrast, uses unstructured data from live video feeds to detect objects. While most business and sustainability AI use cases will utilize structured data, unstructured data sources shouldn't be overlooked. A mix of both use cases can help businesses comprehensively meet their commercial and climate goals.

A mix of both use cases can help businesses comprehensively meet their commercial and climate goals.

3. Adaptability

Different markets behave in different ways. You can deploy AI solutions specifically to address international business complexities, like identifying variations in consumer behavior, simplifying records or streamlining processes.

Expert AI providers should offer a seamless implementation process globally and drive market adoption by improving your customers' experience. For example, making the AI functionality available on personal devices, adding multiple languages, and creating a clear user interface to account for varying levels of digital literacy.

Equally, solutions providers must also accommodate your unique business challenges and potential software partners should be keen to train their AI to meet your unique circumstances.
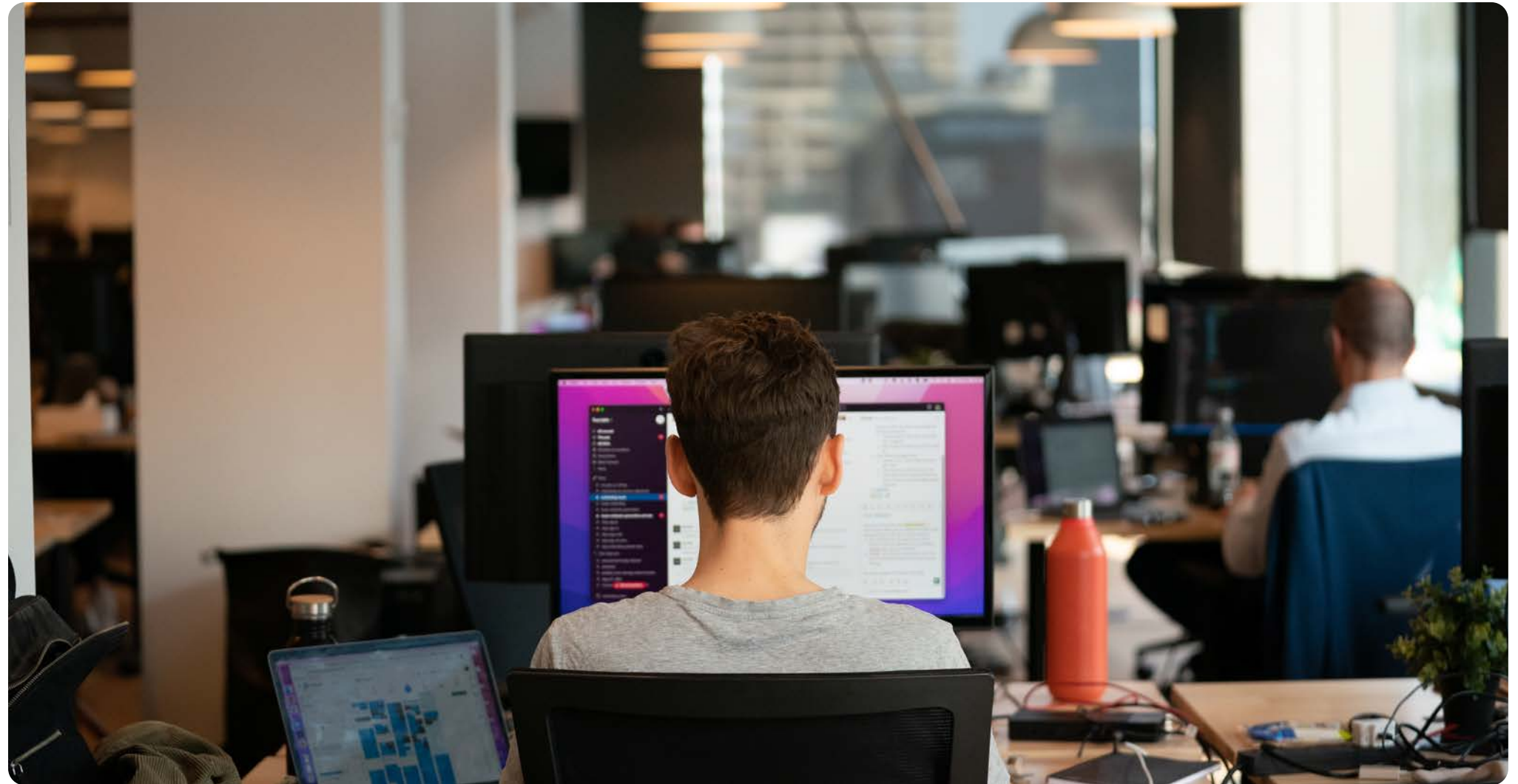
4. Platform environment

Where your AI is hosted is a vital consideration when weighing up solutions providers.

Open platforms are more advantageous to businesses because they're future proof. Open AI ecosystems help to reduce costs by avoiding lock-in scenarios and giving you more access to competitive providers. By allowing different vendor softwares to integrate with your data, you can also increase your AI's scalability.

Such interoperability enables disparate systems to 'speak' to one another, ensuring functions like claims operations go smoothly.

Open AI ecosystems help to reduce costs by avoiding lock-in scenarios and giving you more access to competitive providers.

5. **Autonomy**

Autonomy refers to an AI's independent functionality and is one of the initial goals of most AI projects. Although supervised learning trials are necessary early on, most software tools transition to unsupervised trials and, eventually, full autonomy once they perform as intended.

A sufficiently developed AI solution should tackle the vast majority of its workload independently while passing outliers onto staff for further investigation. In particular, an effective AI system should perform well on data it's never interacted with before.

However, if the software isn't well-calibrated, your AI may end up creating an additional burden by flagging too many routine task examples for human oversight.

A quick way to weed out potential AI providers is to ask for a demonstration and submit random data as a test. For example, you can source practice data sets like online images or your own legacy data and test for false positives versus true negatives.

Key performance considerations include whether the AI accepted the image, processing time and the confidence interval data. If the vendor isn't comfortable with a demo, it's a likely indication that the AI software is in an earlier beta stage.
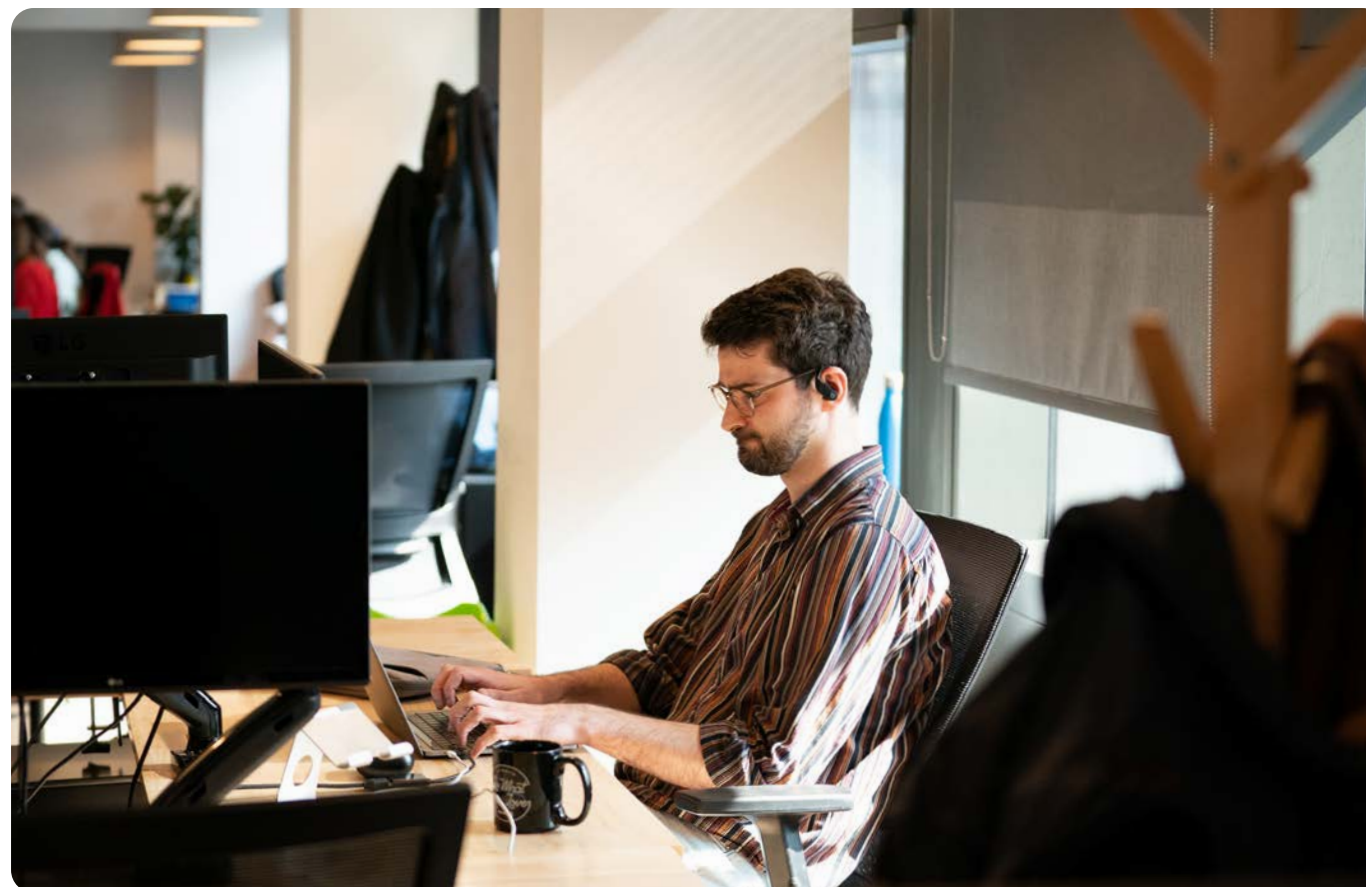
6. **Security**

Finally, data security is a vital component within all software tools.

Any AI implementation must avoid compliance issues by protecting data from cybersecurity breaches. It's critical that personal records are not held longer than required, especially considering the arrival of new data laws and widespread privacy concerns.

More sophisticated security solutions rely on anonymized data, mitigating the risk of exposing sensitive information by breaking the link in personally identifiable records.

A sufficiently developed AI solution should tackle the vast majority of its workload independently while passing outliers onto staff for further investigation.

What's next in applied AI?

We are at the frontier of a new era of business intelligence. Today's applied AI tools can give senior leaders a level of strategic visibility and analytical insight previously thought impossible.

"Often, when we think about how AI can solve problems, the applications are theoretical. But this technology is making a difference for millions."

Adrien Cohen, Co-founder of Tractable

By leveraging applied AI solutions, businesses can identify pivotal opportunities to increase their efficiency at a granular level. Firms' own data, combined with modern applied AI solutions, can help uncover new strategic initiatives and accelerated workflows.

Businesses can also foster greater productivity by freeing up staff talent from tedious workloads. In particular, software solutions can allow employees to add value in other areas of business, like customer service and strategic innovation to create a more resilient organization.

Applied AI tools can help firms revolutionize their operations and customer services, allowing them to adapt to today's discerning consumer and shifting market. What's more, AI's flexible learning capabilities allow the technology to quickly evolve, taking on new tasks, providing organizations with increased strategic agility and long-term value.

The same applied AI tools also have broad applications within the sustainability effort, helping the fight against climate change and extending their value beyond commercial benefits.

Innovative tools like digital twins, real-time emissions analytics, and IoT-enabled asset management tactics mean organizations can reduce waste, lower energy usage, and maximize resources.

As a result, applied AI provides crucial value for the planet and its people. In addition to providing greater business intelligence, applied AI can help businesses deliver on the priorities of the climate crisis and stay true to modern consumer expectations.

About Tractable
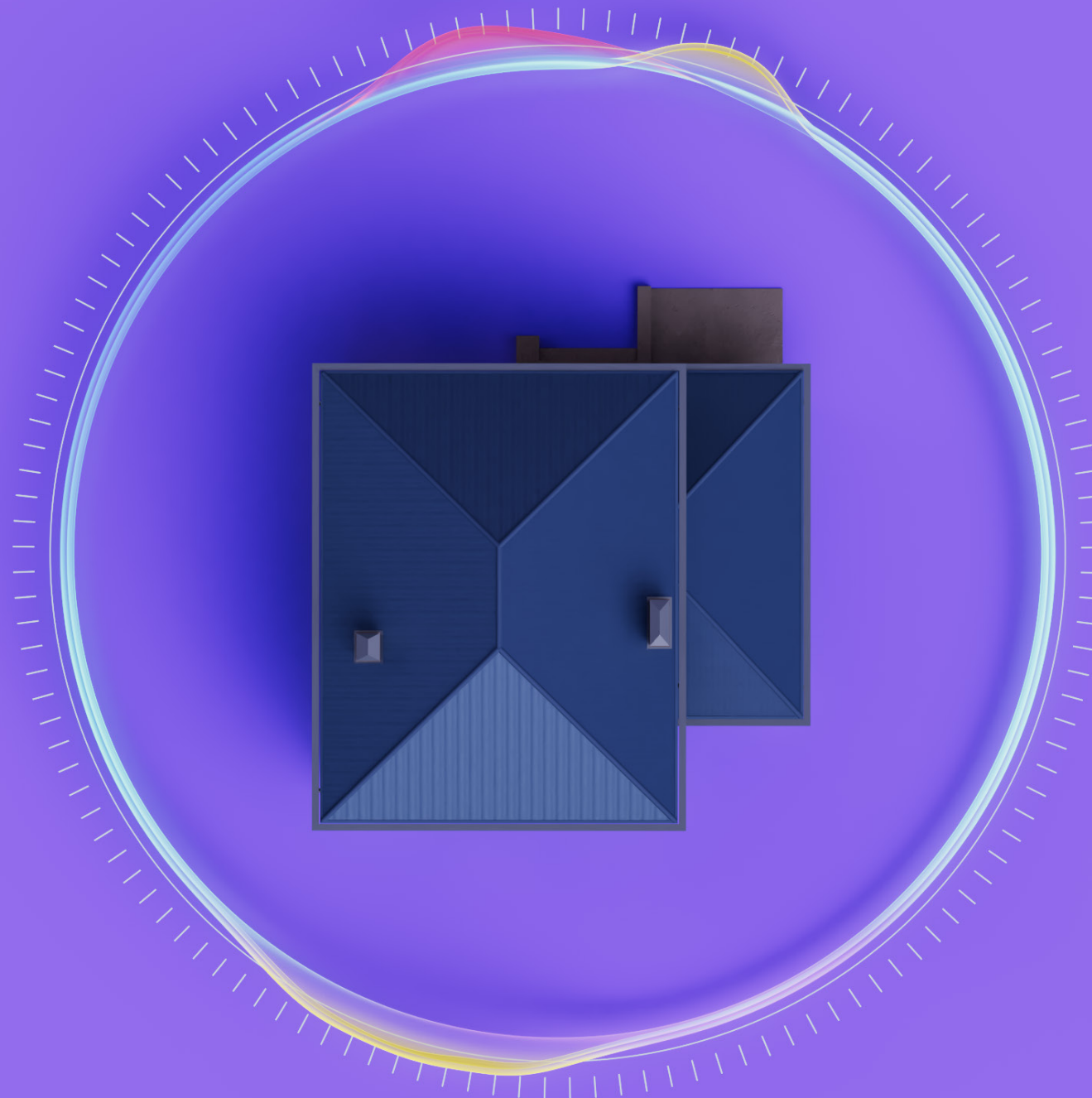
Tractable is an AI company bringing the speed and insight of applied AI to visual assessment of cars and properties.

Trained on millions of real-world situations, Tractable's AI-powered solutions process more than $2 billion in vehicle repairs and purchases annually, and connect everyone involved in insurance, repairs, and sales of cars and properties, including salvage and recycling – helping people work faster and smarter, while reducing friction and waste.

Founded in 2014, Tractable is the AI tool of choice for world-leading insurance and automotive companies, including over 10 of the Fortune Global 500. Backed by Insight Partners and other top-tier investors, our world-class research and engineering team is based in London, with offices across North America, Asia and Europe.

Get in touch

To see for yourself how Tractable Applied AI works, please request a demo.

tractable.ai

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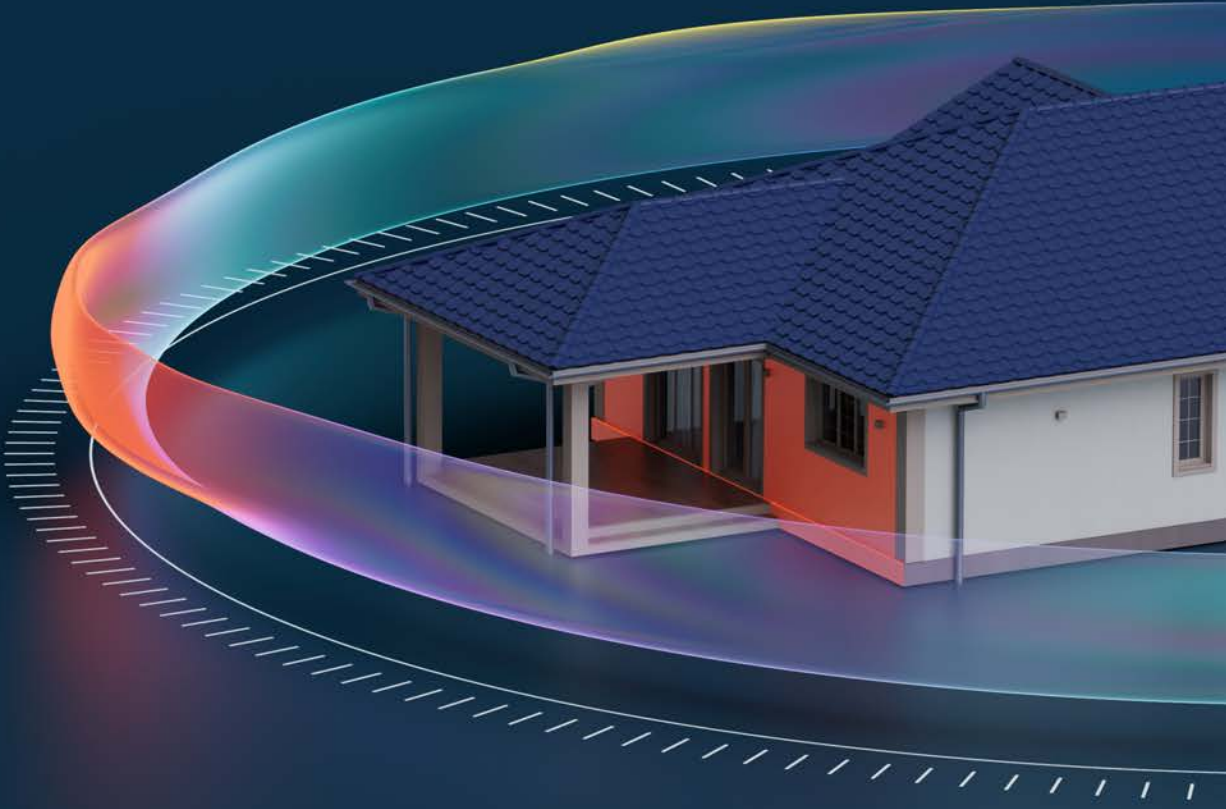
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