



## AI taking over

Autonomous systems powered by artificial intelligence are remodelling our world.

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## Key themes



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Whether digital or physical, artificial intelligence is reshaping our lives. But will it really boost productivity? And at what price?

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### “Even now, nothing works without the human element”

The progress of physical AI is impressive. But autonomous systems work best when the environment is structured, says Professor Roland Siegwart of ETH Zurich.

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### Imminent breakthrough

Machines controlled by artificial intelligence can operate autonomously in defined areas of deployment. Physical AI is becoming a key technology in various sectors.

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## Embracing innovation



**Dr Felix Brill**

Chief Investment Officer VP Bank

Robots doing kung fu stunts and choreographed dance moves are fascinating to watch. Such performances emphasise how rapidly technological progress is (yet again) transforming our lives. The main driver of this revolution, in the field of robotics as elsewhere, is software development, or more precisely artificial intelligence (AI).

AI in computers and increasingly in machines that interact with us in our everyday lives is celebrated as a trailblazing innovation. But, as always when a new technology changes our picture of the future, there are those who are sceptical and warn about the consequences. Opinions about the economic benefits and social implications of AI vary enormously. We believe that those who are quick to understand that the game has changed can reap the rewards, as employees, as entrepreneurs or as investors.

This issue of telescope focuses on the theme of physical AI. We explain what the tie-up between AI and robot development can already do - and what it cannot. Robots to pick strawberries? A humanoid robot for household chores? You will find some of the answers in the following pages. We explain which elements need to come together to enable machines to function autonomously in the real world, and we ask what limits should be placed on robots, ethically and legally.

An exciting read is guaranteed.

# Where will artificial intelligence lead?

Innovations like artificial intelligence (AI) are economically important, but their impact is usually felt only slowly. In the services sector, however, this new technology will soon present challenges.

Felix Brill

Victorian Britain experienced a phenomenon that is now largely forgotten: railway madness. British newspapers in the 1850s were full of reports about travellers who lost their reason in this new fast form of transport. An aristocrat who suddenly tore his clothes off. A gentleman who produced a pistol and started shooting wildly out of the carriage window. A businessman who allegedly lost his memory after a train journey from London to Manchester.

Today we laugh at these stories. But in those days they were taken seriously. Trains could travel as fast as fifty miles an hour, compared with a horse-drawn carriage's ten. People worried about what such high-speed movement might do to the human brain.

The same pattern of reaction - initial astonishment followed by enthusiasm, scepticism, habituation and finally normalisation - greeted later inventions like automobiles, computers and the internet. Will it be the same with artificial intelligence?

## Gauging the impact

One thing seems clear: AI will change the world. What started as a digital process within computers is now developing into a thinking and decision-making level for machines operating in the real world (physical AI).

So what are the economic implications? Consulting firms vie with one another in producing estimates of the value that AI will generate. McKinsey, for example, puts the figure at USD 2.6-4.4 trillion a year globally.

The eminent AI company Anthropic reckons that current AI models could add 1.8% p.a. to US labour productivity growth.

Academics are much more cautious. Daron Acemoglu, Economics Nobel Prize winner in 2024, argues that AI will probably increase US total factor productivity (TFP) by no more than 0.71% over a 10-year period (not annually). In a more stringent version of his model the increase comes down to less than 0.55%. TFP is a measure of the efficiency with which the factors of production (capital and labour) are deployed in the economy. It reflects technological progress and innovation (for more details, see page 7).

The Congressional Budget Office (CBO), an independent nonpartisan US agency that produces analyses and forecasts relating to the federal budget, started to include AI in its official growth forecasts this year, estimating the boost to productivity at 0.1% annually. For comparison: the growth rate of total factor productivity in the USA between 1950 and 2010 averaged about 1.2% to 1.5% per annum.

What all these estimates have in common is the assumption that history will repeat itself. Initial scepticism will give way to adaptation, and adaptation will be followed by productivity gains, ultimately resulting in a higher standard of living. But this assumption ignores a question that is now harder to answer than in the past: Where will displaced labour move to?

Earlier technological upheavals involved an assault on the prevailing centre of economic activity. In the



19th century the centre was agriculture. In 1800 over 70% of employed people in the USA worked on the land. By 1870 this had come down to just over half, in 1900 to around 40%, and after World War II to about 12%. Today the figure is 1%. Industrialisation has not nibbled at the agricultural centre's edges; it has pulverised it (see chart below). The next wave of transformation, industrial automation, saw something similar. The industrial mass employment of the 1960s gave way to a slim and highly productive workforce. These waves hit the centre, not the periphery.

## From field to factory, from factory to office - and next?

In contrast to earlier waves of development, the key question posed by the advent of AI is not whether the currently dominant sector, i.e. services, will be affected. The question this time is: Where will labour move to? And how fast will the process be?

In previous transitions, there was an identifiable new sphere of activity to which labour could move: from field to factory, from factory to office. The transitions took place over generations, usually long enough for parents to prepare their children accordingly and for new job profiles, training patterns and identities to be created. A study by the Massachusetts Institute of Technology (MIT) found that around 60% of present-day jobs - from software developers, logistics planners and data analysts to search machine optimisers - simply did not exist in 1940. The direction of change was normally identifiable, often before the upheaval peaked or was completed. An agricultural worker in 1900 could guess that his sons would one day move to the city. A factory worker in 1970 could see office towers being erected where his daughters would later work.

With artificial intelligence, however, the questions "When?" and "Where to?" are still open. The speed of change is new. This reflects the fact that the obstacles

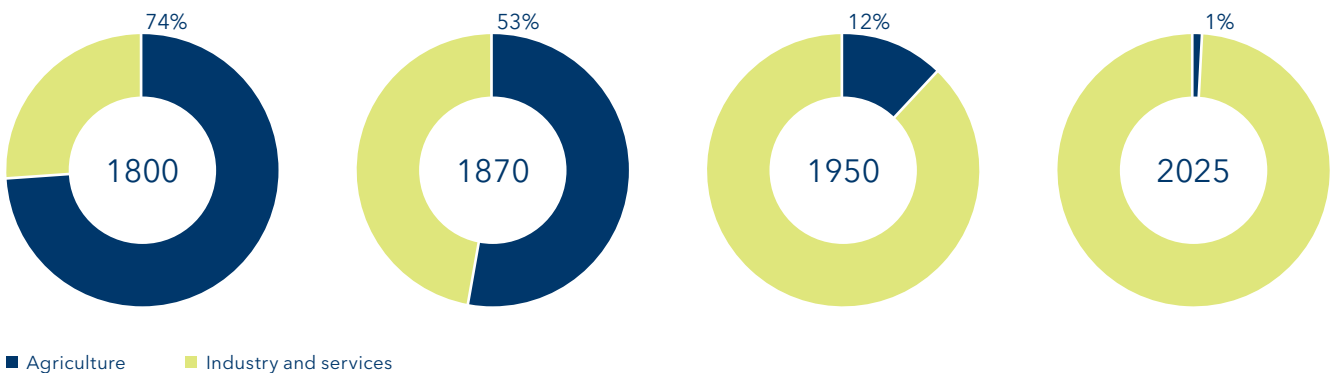
to AI's use are lower or non-existent. Previous technologies first had to be built and installed - machinery in factories, computers in the office, optical fibres in the street system. The process took years or even decades. AI, by contrast, basically only needs a programmable interface. If a law firm decides tomorrow that half of its information retrieval should be handled via a language model, the decision can be implemented the very next day. Companies like Klarna (payment services), Salesforce (software) and even Commerzbank have already announced that they are reducing their workforce as a result of AI. Such speed of reaction is unprecedented in economic history.

## Guessing the future

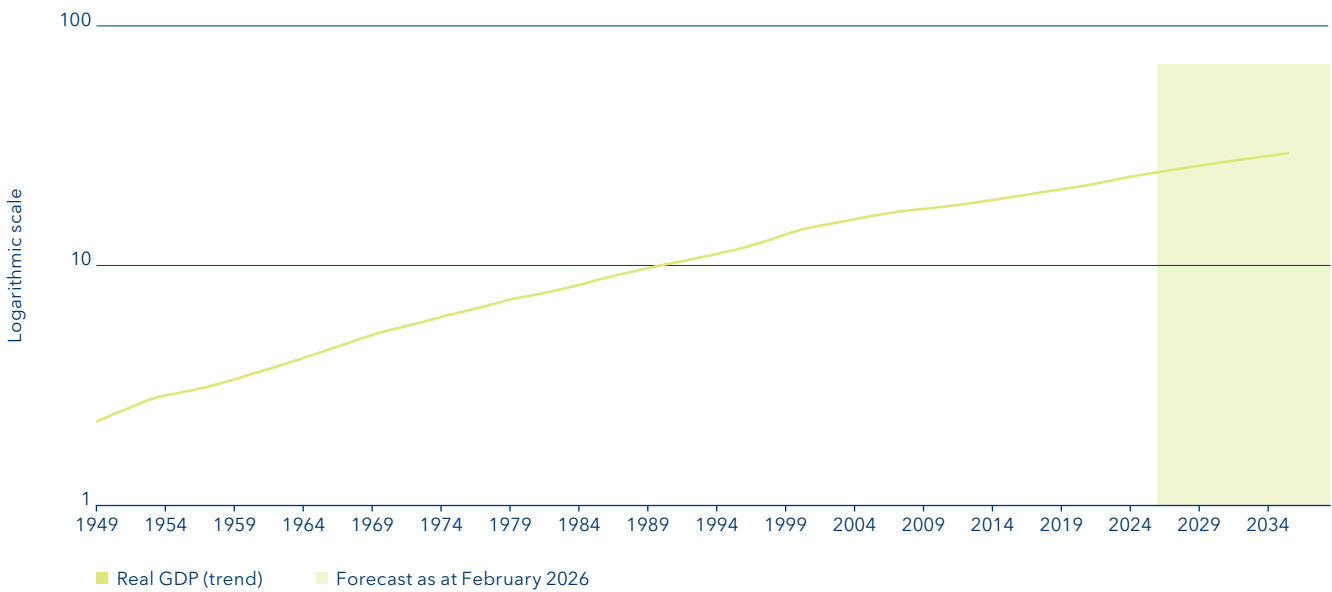
More difficult to answer is the second question: Where to? If the office sector shrinks, where is the displaced workforce to go? Healthcare, education and craft work are possible candidates. But nobody can say whether these sectors will be able to absorb enough people. In the transition from agriculture to industry the answer can be seen as obvious in retrospect. Regarding the transition from industry to a knowledge-based economy, anyone writing about computers in the 1980s knew which way the wind was blowing. This time, however, it is more a matter of guesswork.

Early this year the research firm Citrini published a widely noted scenario in which this uncertain outcome becomes problematic: As AI hollows out the services sector, unemployment rises, with a negative effect on consumer demand; the resulting pressures then force companies to deploy AI even more aggressively, leading to a self-reinforcing downward spiral. So far this is only speculation, not a prediction. But it is a scenario in which the reassuring mantra "new technology creates new jobs" falls by the wayside.

**Dramatically declining share of US workforce in agriculture**



## US trend growth slows



And then comes physical AI. If humanoid robots and autonomous vehicles can really be mass-produced, the compensating sectors on which so many hopes are now pinned will also require less labour. True, the results of an ageing and shrinking population will pick up some of the slack. But those who were saying ten years ago that physical work was immune to further encroachment by machines were underestimating the speed at which robotics would develop. As long as the capabilities of these machines remain limited, the question is hypothetical. Otherwise, however, physical AI merely exacerbates the workforce problem that digital AI initiated.

### Optimistic consolation

Many say reassuringly: The IT revolution that gave us computers and servers also looked dramatic to begin with, but in the end it turned out to be an unexceptional innovation, at least when strictly measured by factor productivity. The US economist and Nobel laureate Robert Solow, who identified total factor productivity as the third driver of economic growth (see page 7), encapsulated the problem in a sentence that has become famous: "You can see the computer age everywhere but in the productivity statistics."

That was in 1987. At that time labour productivity was in decline, and this was reflected in a falling growth trend in the US economy - even though transistors, microprocessors, servers and memory chips had become established features of the world of work. Today's optimists cite Solow's words as an encouragement. It took two decades, i.e. until the noughties, before the effects of computerisation became visible. So this time too we should be patient.

However, this optimistic interpretation ignores what actually happened in the twenty years from 1990 onwards. Sure, the IT revolution and the internet gave a boost to productivity, but a smaller one than in earlier transition episodes. A frequently forgotten point is that statistics for the overall economy also include less productive companies and services which slowly die off but put a drag on total productivity as

**"Anyone who thought that physical work was immune to further encroachment by machines was underestimating the speed of robotics development."**

long as they survive. This fact can perhaps be ignored when considering the transition from agriculture to manufacturing, but now it has to be taken into account as new services drive out old ones. Another trend triggered by the advent of computers and the internet is the growing concentration of innovation gains on just a few large technology companies in the USA.

### Profiteers and payers

Both forms of AI - digital and physical - could ultimately result in the same thing: concentration.

Massive service providers (“hyperscalers”) – Microsoft, Google, Amazon, Meta – are already investing hundreds of billions of dollars in computer centres, chips and energy. A comparable concentration of capital has not been seen since the railway boom in the nineteenth century.

These investments will probably yield a profit – but for whom? Those who do not build their own AI models will have to pay fees to those who do. The financial markets have not yet decided whether profits will mainly be achieved by a handful of big tech companies or increasingly also by companies that are quick to adopt AI.

## Productivity and leisure

There is another point that is seldom mentioned in the debate about the consequences of AI. As per capita productivity grows, the resulting higher remuneration will not necessarily flow into higher consumer spending. It can also mean more leisure time. The economist John Maynard Keynes prophesied in 1930 that strong productivity growth would mean that his grandchildren would only have to work fifteen hours a week.

and political convulsions that culminated in revolution. Globalisation brought prosperity to Asia – but simultaneously undermined the industrial middle classes of Europe and America, with political results that we are still experiencing. Thus a new technology can create affluence in the economy as a whole but at the same time destroy social structures.

The story of rail transport did not fizzle out in an epidemic of railway madness. It ultimately helped produce a country that changed faster than most people realised. Within a generation Britain was transformed. Railways prevailed. The winners were not those who cheered the loudest at the outset, but those who were quick to see the new game's potential. The losers were those who thought the old game would simply carry on.

**“The losers were those who thought the old game would simply carry on.”**

We are not that far yet. And it is possible that AI-driven productivity growth will materialise in a way that Keynes did not expect: not by shortening working hours but by enabling the same output to be generated by fewer people. That raises the question of how the cake will be divided. Who will profit more from improved productivity? Employees with increased leisure, or business owners enjoying bigger profits? Or both?

## Every innovation has its own dynamic

Questions about the impact of new technology are uncomfortable. There are two typical responses. Either: history shows that pessimism about new technologies has always been misplaced. Or: this time it's different. Both responses miss the mark. A serious look at the past 200 years of economic history shows that every innovation has developed its own dynamic. The industrial revolution pushed up living standards – but also generated child labour, slums

# The remainder that makes the difference

Felix Brill

## How economic growth happens.

In the 1950s economists faced a conundrum. Economies were growing powerfully, but no one knew exactly why. Increased input of capital and labour was not a sufficient explanation.

Robert Solow solved the puzzle with a model that worked mathematically and chimed with the empirical data. Growth, he explained, is driven by three sources: labour, capital and a third element that describes the efficiency with which the other two elements are combined. He called this third factor "total factor productivity", TFP for short. His model showed that more than half of the economic growth in the United States from 1909 to 1949 could be attributed to TFP rather than capital or labour. This earned him the Nobel Prize in Economics in 1987.

The peculiarity of TFP is that it cannot be measured directly. It is calculated by subtracting capital and labour from overall economic performance. The remainder is TFP. Later economists referred to it sarcastically as "a measure of our ignorance".

But what might seem like a cop-out is in fact just the opposite. This remainder contains everything that pushes an economy forward: innovation, new business models, better organisation - efficiency improvements for which nobody writes a bill.

TFP does not grow steadily but in waves. The US data clearly show this (see chart), though quite differently from what one would expect. The largest TFP wave in the economic

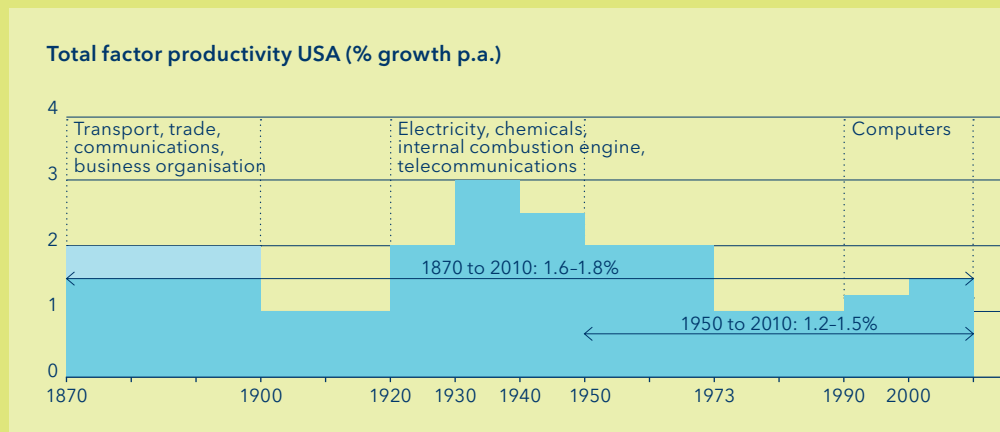
history of the United States did not happen in a boom period but during the Great Depression. Between 1930 and 1940 TFP grew by 3% a year, more than in any comparable period before or after. The reason? Inventions like the electric motor and the internal combustion engine, together with advances in chemical science, had been made long before, but it was the economic crisis that forced companies to use them. Invented in boom, applied in crisis.

The postwar decades were the time when past innovations were put to use. Since then the curve has flattened. The IT revolution of the 1990s brought only a minor push. Between 2005 and 2015 almost nothing more happened, with growth therefore being driven mainly by labour and capital.

In the early 1940s the Austrian economist Joseph Schumpeter, who taught in the USA from 1932 onwards, had explained this productivity trend without knowing the Solow model or the relevant data. He concluded that growth was not a state of equilibrium but rather a process. He described this process as creative destruction.

New technologies and other developments unleash a wave of innovations and drive the old technology or its application out of the market - and then subside. Without some new basic innovation, there is no new productivity growth. To put it another way: TFP growth does not happen automatically; it has to be set in motion.

This is the big question for our generation. The potential of AI (and now physical AI) is impressive. But are they a new basic innovation as defined by Schumpeter - or merely an optimisation? Economically, the answer is not to be found in the overblown pronouncements of AI providers but in the future trend of TFP: i.e. in what remains after everything else has been explained.





# “At present nothing works without the human element”

Autonomous systems that combine robotics with artificial intelligence are useful tools. But a humanoid robot that does the housework for us is still a distant prospect, says Professor Roland Siegwart of ETH Zurich.

Interview: Clifford Padevit

## **Professor Siegwart, would you use a humanoid robot to help around the house?**

No, not at the moment. As for the future, the question is whether I'd really want a humanoid robot doing housework for me.

## **Why?**

My home is my private domain. I wouldn't be happy to share it with a robot, wherever it came from.

## **Houses are made for people. Can humanoid robots really become capable of household chores?**

I am much more sceptical than visionaries who think that it will soon be possible. Ten years ago Elon Musk declared that we'd be using driverless cars within a year. But we are hardly there yet. Added to that is the question of physical interaction.

## **What does that mean?**

Interaction is a next level. If a robot is going to interact, it needs to understand the world in which it operates. For example, it needs to know how water flows into a glass. In the kitchen we use our hands to move dishes and cutlery about. That is something that a schoolchild can do. Robotic hands are gradually coming to look like ours, but they are not nearly as dexterous as human hands. Conversely a child is not allowed to drive a car, which is a less challenging activity technologically.

## **So hands are still a challenge?**

It is extremely difficult to reproduce the complexity of the human hand. The last twenty years have seen considerable progress in robots' ability to perceive their environment in three dimensions. But manual interaction requires tactility, i.e. sensitiveness to touch, pressure, temperature and vibration. Up to now, the models being used have come from the gaming indus-

try, where a degree of physical interaction is built in. There are people who say that systems can learn directly by physical experience or by observing human beings. But then information about tactility is missing. Perhaps we need to get a person to grasp things while wearing a glove that can take measurements. The information could then be passed on to a learning system.

**“Robots can perceive their environment in three dimensions. But manual interaction requires tactility.”**

## **Is it correct to say that autonomous systems cannot yet do much without human involvement?**

Yes, at present nothing works without the human element. A purpose has to be defined, which means giving the robot an instruction: “Tidy up the kitchen.” The robot has no self-awareness. It cannot do anything on its own initiative. At the very least, there needs to be a human being to define what the robot should do.

## **Does that also apply to learning?**

Learning is mostly an algorithm, a neural network that learns a sequence of events. Here too a human input is needed. A humanoid robot should walk with an upright posture. But it needs to be told to do so. Otherwise it might walk on all fours.

**Talk of “physical AI” is now all the rage. Is that the stage we have reached?**

Previously all information and learning systems were in the digital world, and human beings were needed as an interface with the real world. Now, however, robots are capable of gathering data. Suddenly we have an interface that is automated. In this respect a robot can replace human beings. It gathers data, for example by monitoring its environment, and can then apply the resultant knowledge in the physical world. The digital and real worlds become coupled. To that extent the answer to your question is yes.

**Your laboratory at the ETH has produced numerous spinoffs and startups that create practical applications. Is that a conscious objective?**

We at the ETH regard AI and robots as tools that should be used for the good of society. Switzerland leads the world in robotics, with a lot of good research and many startups. But, in contrast to other countries, there is no Swiss company working on humanoid robots. Our aim is to use today’s technology to do things that are feasible. Taking measurements high above ground level, for example - a task that is dangerous and laborious for human beings. The drone developed by the spinoff company Voliro can do this, though not in a way that replaces human beings completely.

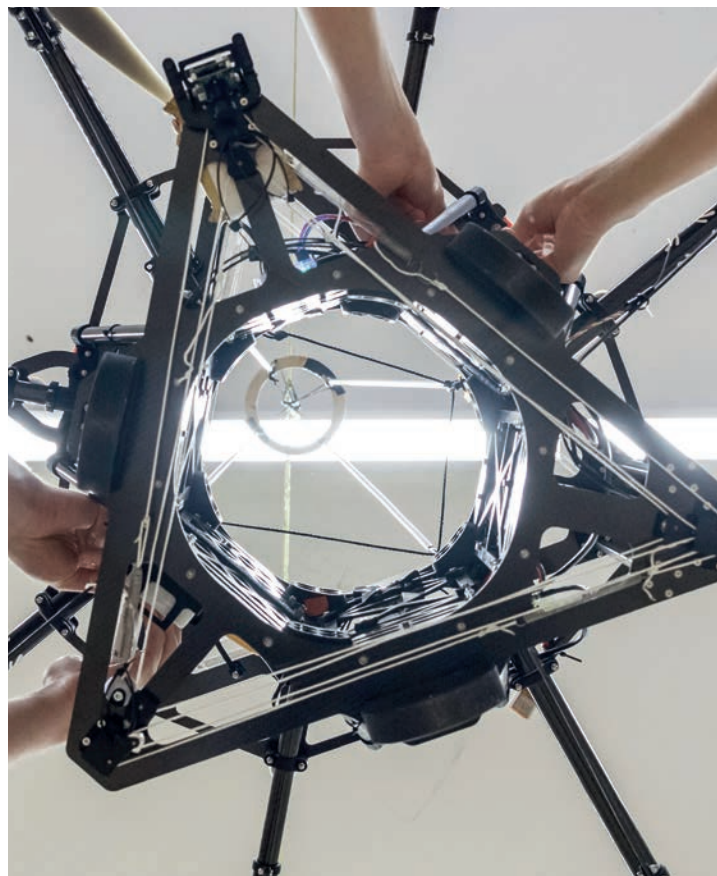
**So you regard autonomous systems as a useful tool rather than a replacement?**

We want to replace human beings where the task is dangerous or unpleasant. The spinoff ANYbotics, for example, has developed a four-legged robot that can walk around on oil platforms autonomously and take measurements. But it cannot do everything that a human being can do on an oil platform, such as carrying out repairs. We are still a long way from that.

**Switzerland is often called the Silicon Valley of robotics. How did it achieve this status?**

Switzerland has always been good at making high precision machines. That was yesterday’s physical AI. These machines had a certain amount of intelligence and exactitude. The two technical universities ETH in Zurich and EPFL in Lausanne have contributed a lot. Another factor, in my opinion, is the Swiss education system. We have good mechanics, unlike America. We have good electronics technicians, who have served a full apprenticeship. In Switzerland we also have a favourable environment and motivated people. The rest, obviously, is a matter of luck.

**Five years from now will autonomous systems still be used mainly in controlled environments like oil**



**“The market in humanoid robots could become very large, at least as large as the motor vehicle market.”**

### **platforms and factories rather than on roads for example?**

What matters is not so much a controlled environment as a structured one. Cars can already drive autonomously, but can they do so in all situations? It will take some time before they can cope with alleyways or streets that are also used by horse-drawn carriages. Autonomous driving on motorways was already a possibility 30 years ago. The problem at that time was inadequate computing capacity and the prohibitive cost of the sensors.

### **In brief, what can robots do really well and what not?**

They are good at activities that are structured and repetitive. In logistics, for example, humanoid robots offer certain advantages. Carrying a packet from one place to another is perhaps better entrusted to a robot than to scarce human manpower. But in car repairs, where you have to improvise, e.g. when a screw jams, systems cannot learn the necessary skills. They are trained with data that do not include improvisation.

### **Does demography explain why China is tending to focus on humanoid robots?**

Possibly, but that is not the only reason. China sees a market for humanoid robots, and I believe this market could become very large, at least as large as the motor vehicle market. Everyone wants to be a player here. And hardware is something that the Chinese can do.

### **What are the next breakthroughs that you expect?**

I certainly expect further advances in software, with new approaches being developed across the whole field of AI. We simply have to generalise more. That means a fundamental breakthrough in AI, extending to computer architecture. Our brains are analogue but nevertheless clearly efficient. AI probably requires new architectures that compute differently, perhaps more akin to a neural network.

### **And on the hardware side?**

Advances in movement and tactility are extremely important. Our scope is still severely limited here. Further research is needed. If progress is achieved, new possibilities will automatically arise.

### **So factories with humanoid robots that can perform a variety of tasks are still a pipe dream?**

Take the example of smartphones. They are still assembled almost exclusively by human beings, because the work is very delicate and fiddly. You can build a machine to do it, but the cost is generally

prohibitive, because a new smartphone model comes out every six months. It would be very useful if we could teach a robot how to assemble a new type of smartphone and then let it get on with it. But we are a long way from there at present.

## Profile



**Prof. Roland Siegwart**  
Professor of Autonomous Systems,  
ETH Zurich

Professor Roland Siegwart has been director of the Autonomous Systems Lab (ASL) of the Institute of Robotics and Intelligent Systems at ETH Zurich since 2006. Now 66 years old, Professor Siegwart's research activities focus on the development of autonomous robots that can cope with imprecise information, adapt to new situations and behave interactively. He is among Switzerland's most cited researchers in the fields of mechanical engineering, aerospace technology, electronics and electrical engineering. He is also on the jury of the BILANZ "Digital Shapers 2026" event.

**Note:** The opinions expressed in this interview may differ from those of VP Bank.

# Why China leads the world in humanoid robots

China's technological leadership ambitions and demographic pressures are driving exponential growth in this sector.

Dominik Pross

Anyone who watches science fiction movies or their TV offshoots is familiar with humanoid robots like C-3PO in Star Wars or T-800 in the Terminator series. Intelligent robots made to resemble the human body were born in science fiction but are now increasingly becoming reality. They are the next stage in robotics, driven by artificial intelligence (AI). Humanoid robots can look forward to a golden future with innumerable potential uses.

China, ahead of all other countries, has seized the opportunity and is vigorously pushing this sector's development. Indeed, it is a great opportunity to become a leader early on in a major field of technology. Although the technology-friendly Chinese have made great strides in artificial intelligence and

this sector, standardisation is intended to smooth the path towards mass production.

Robotics in general is classed as a strategic sector in the Chinese government's 2026-2030 five-year economic plan. The sector therefore receives financial support from the state through various funds set up at central and local government level to support AI and robotics. The central government fund alone boasts a volume of USD 137 billion.

On the sales side, state-run companies are told to buy their robots from Chinese producers. These measures are already producing results. According to data compiled by research provider Omdia for

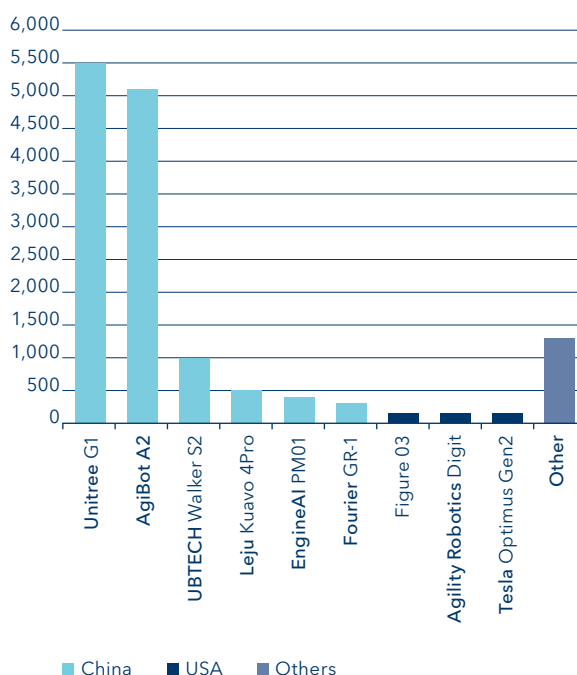
## “Two Chinese robotics firms will soon be applying for a stock exchange listing.”

autonomous vehicles, they still lag behind the USA on the AI front. Thus humanoid robots could become a further battleground in the rivalry between the USA and China for technological primacy.

### Industrial focus

China has its foot on the accelerator. In March 2026 it became the first country in the world to issue standards for humanoid robots. The standards were compiled by over 120 research institutions and manufacturers, together with the responsible government ministry. Following explosive growth in

Number of humanoid robots sold (2025)



2025, China has a clear international lead in the sale of humanoid robots (see chart). Over 150 specialised firms, startups and established companies (e.g. automobile manufacturers) are engaged in the development of humanoid robots, and last year 330 models came onto the market.

Early achievement of technological leadership is certainly an objective. But a second and perhaps the most important incentive is related to demographic trends in China that could endanger the country's economic ascent and the position of the Chinese Communist Party.

Economically, China is still dependent on foreign sales. If, as expected, the workforce shrinks in the coming decades, it could find itself unable to satisfy these markets. At the same time, the ageing population could endanger supply within China itself. At the political level, the government is keen to parade the country's latest achievements to foreign guests (like German Chancellor Friedrich Merz when he visited China in late February). This is not merely for entertainment purposes but serves to signal China's political and economic strength.

## Leading providers

China can boast a large number of specialised startups in the field of humanoid robotics. The city of Changzhou, in particular, is a hub of robot production. Some of China's robotics firms have moved beyond the development phase and are producing limited numbers of humanoid robots for the market. In this sector the Chinese have a clear lead over Western companies.

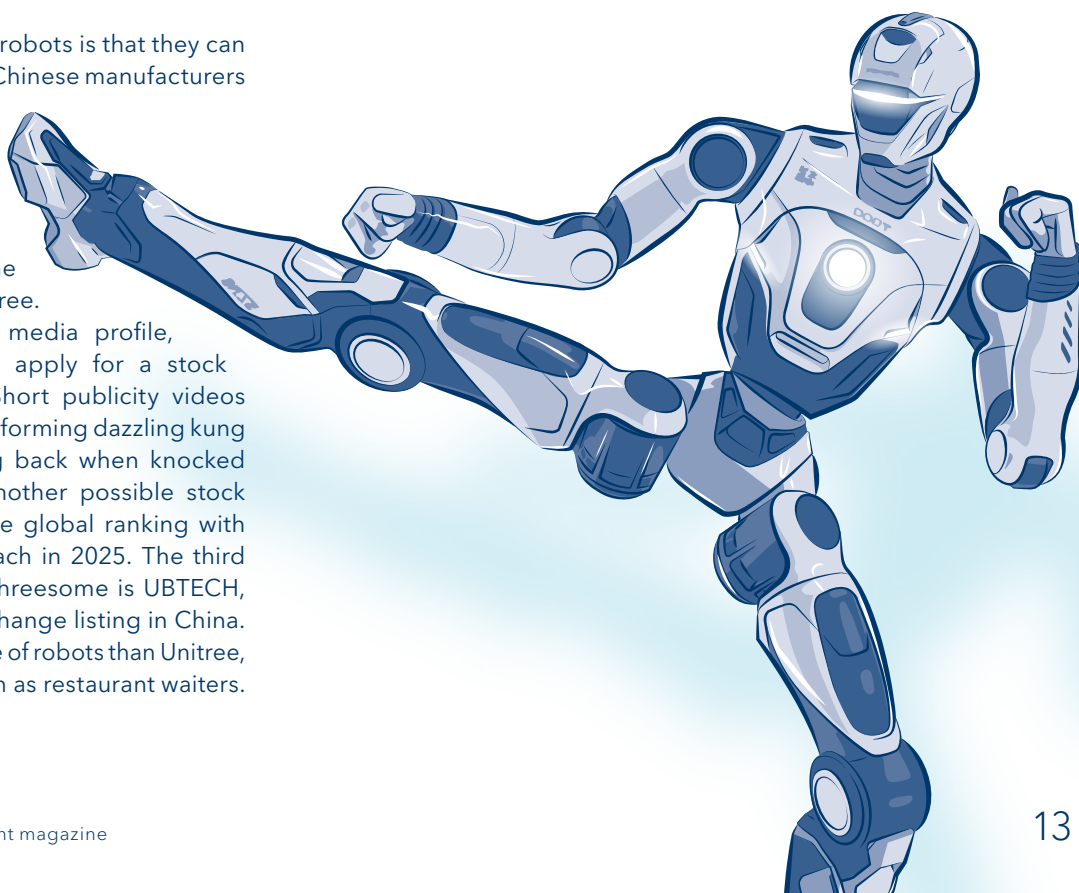
A useful feature of humanoid robots is that they can be used in various situations. Chinese manufacturers are not developing robots only for industrial use but also for private applications, e.g. as helpmates around the house. Three specialised firms are now in the spotlight. One of them is Unitree. Helped by a strong social media profile, Unitree is now planning to apply for a stock exchange listing this year. Short publicity videos show the Unitree G1 robot performing dazzling kung fu movements and bouncing back when knocked over. Unitree and AgiBot (another possible stock market candidate) topped the global ranking with sales of over 5,000 robots each in 2025. The third member of the high-profile threesome is UBTECH, which already has a stock exchange listing in China. UBTECH offers a broader range of robots than Unitree, including models that perform as restaurant waiters.

Compared with these Chinese robotics firms, Figure AI and Tesla in America are still at an early stage. In a pilot project last year, the Figure 2 robot was deployed in a BMW factory in the United States with the task of handling and loading sheet metal components for welding. Possible uses of the successor robot Figure 03 are now being examined.

## Here come the robots ... into our homes?

Despite the advances already achieved, there are big questions about the deployability of robots. Even advanced humanoid models can usually handle only a limited number of specific tasks, and the need to recharge their batteries usually means that they can only operate for a few hours at a time. A broadening of their use is still limited by AI constraints. Robots have to be specifically trained for each and every task entrusted to them, even the simplest. Complex activities in challenging environments, for example in our homes, are still not an imminent prospect (see page 9). This is principally a software and AI problem.

In these areas, however, Chinese companies are still dependent on US chip technology. China is hastening to catch up on this front, but Chinese robot producers are not yet in a position to do without Western components completely. Even so, China will not let itself be held back. Economic and demographic pressures mean that the transition to humanoid robots - and not just in China - is only a matter of time.



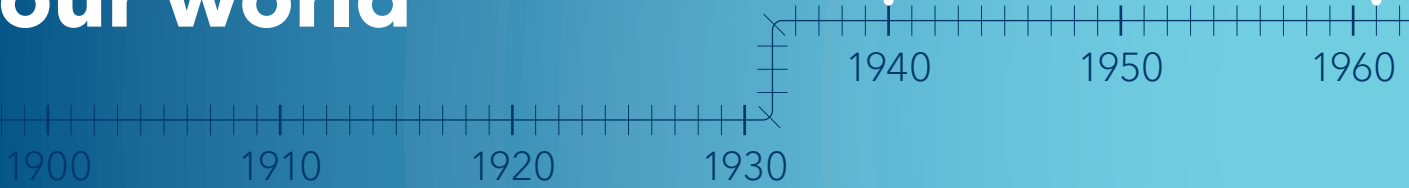
# AI penetrates our world

1940

Isaac Asimov originates the Laws of Robotics (see page 23).

1961

The first industrial robot, Unimate, is installed in the USA (see telescope no. 8, 12/2023).



## Elements of physical AI

### Cognition and decision-making

Machine learning models interpret sensor data, plan routes and make autonomous decisions in unstructured environments.

Visual input

Text command



### Sensors

Sensors capture data from the environment in order to detect shapes, distances, materials, etc.

### Learning and adapting

AI adapts its behaviour dynamically to changed circumstances and learns from previous actions.

Reward

Consequence

### Edge computing

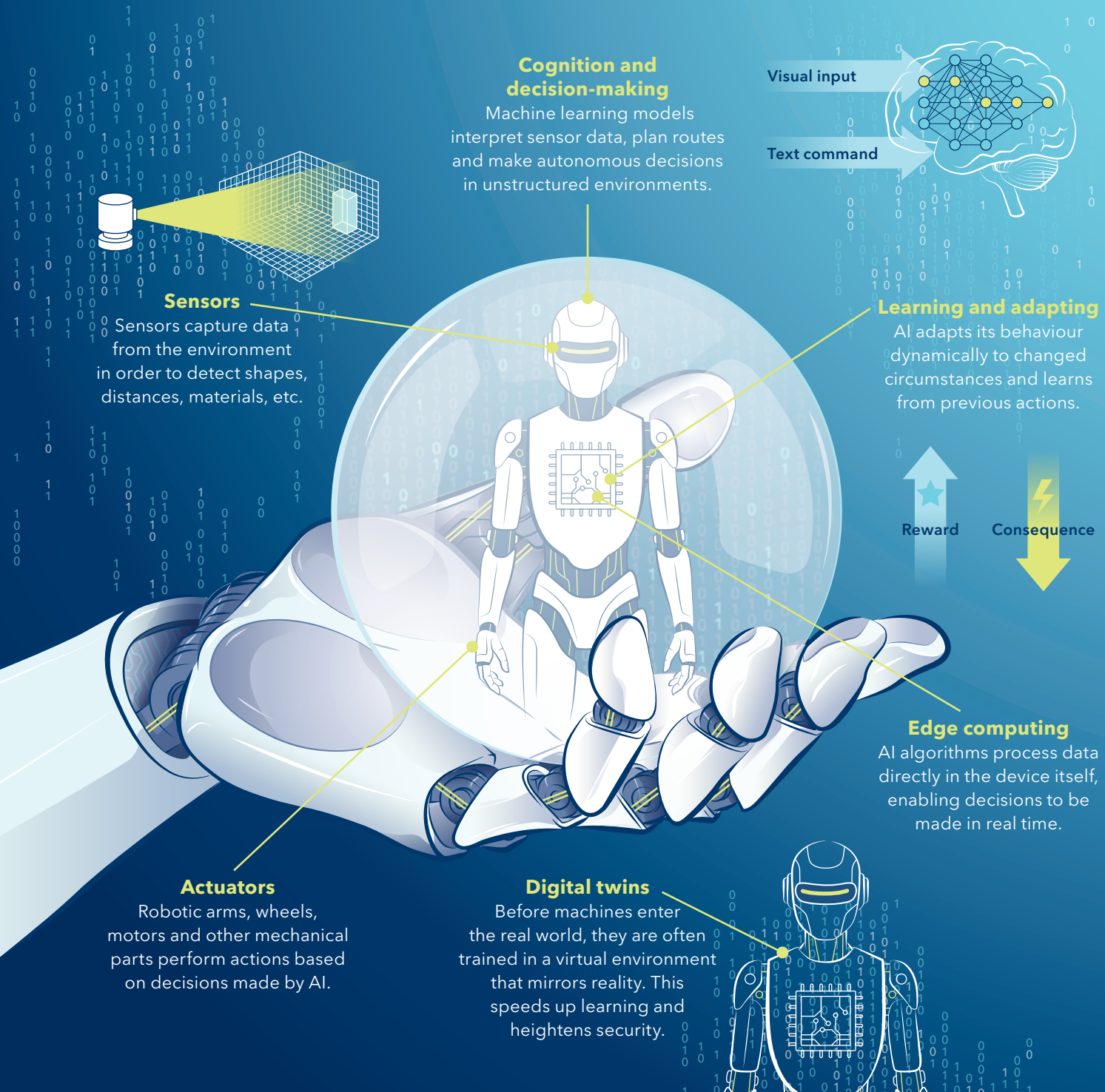
AI algorithms process data directly in the device itself, enabling decisions to be made in real time.

### Actuators

Robotic arms, wheels, motors and other mechanical parts perform actions based on decisions made by AI.

### Digital twins

Before machines enter the real world, they are often trained in a virtual environment that mirrors reality. This speeds up learning and heightens security.



1972

Shakey is invented, the first robot that can see and manoeuvre around objects.

1982

IBM develops the AML programming language for robots.

2000

Honda unveils Asimo, the first humanoid robot.

2026

Tesla's self-driving mode is authorised in the Netherlands. Drivers are allowed to take their hands off the steering wheel.

2002

Roomba, the first robotic vacuum cleaner, grabs headlines.

1970

1974

The first microprocessor-controlled robot comes onto the market.

1980

1990

1999

Intuitive Surgical unveils the da Vinci surgical robot.

2000

2008

Universal Robots sells the first Cobot (co-working robot).

2010

2009

Cyberdyne launches the first motorised exoskeleton to assist paraplegic patients.

2020

2030

1920

sees the first use of the word "robot" - in a science fiction play.

5,000 kilograms

can be lifted by the Chinese robot Chaifu CR5000-3700.

18 metres

height of the world's tallest robot in Japan.

50 minutes & 26 seconds

world record time for a humanoid robot running the half marathon.

## Humanoid robots 2025



**AgiBot A2**  
China



**Digit**  
USA



**Figure 02**  
USA



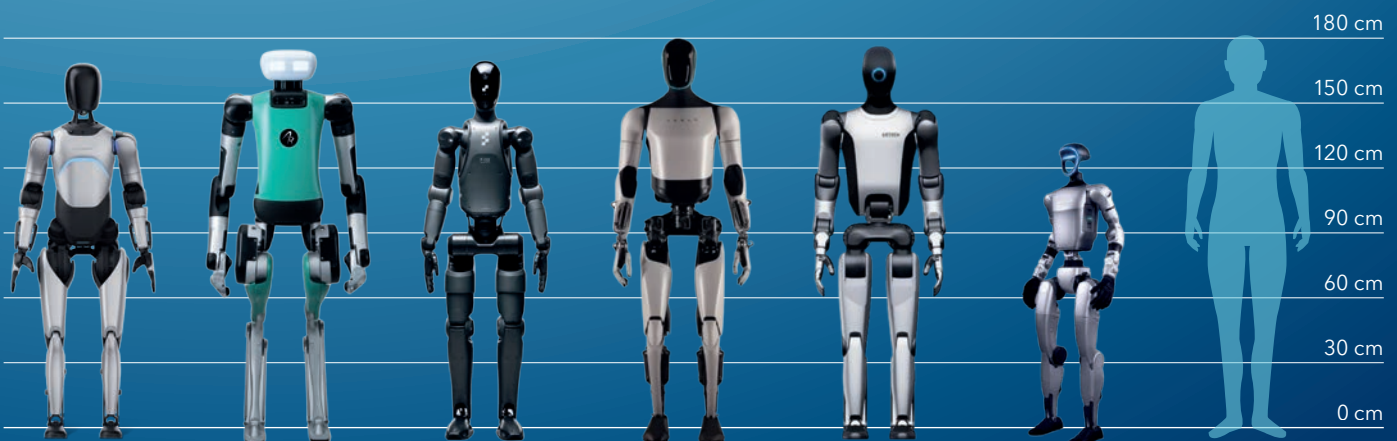
**Optimus**  
USA



**UBTECH S2**  
China



**Unitree G1**  
China



**“It’s important to structure our company Kybun Joya in such a way that it functions smoothly without our continuous presence.”**



# “We must always be ready to take risks”

Karl Müller, joint head of Kybun Joya, relishes the opportunities that niche markets offer. He describes his personal development on the road to becoming Switzerland’s prime shoemaker.

Clifford Padevit

Karl Müller can boast a more eventful life than most 41-year-olds. He always wanted to prove himself. To himself and to his father. He is Co-CEO of the health shoe company Kybun Joya, one of Switzerland’s last remaining shoe manufacturers. His path has not been a straightforward one. In his youth he worked in the business set up by his father (Karl Müller senior), who created the Masai Barefoot Technology (MBT) brand of health shoe – a sort of “anti-shoe” with a rocker bottom instead of a heel.

Karl junior, the eldest of four children, was involved in the company from an early age. He experienced the business’s rise and the resultant growing affluence. When he was only 14 years old, he represented the family at a medical training event in Taiwan. “My dream was to work for the family firm,” says Karl. “When my father sold the business for hundreds of millions of francs, my world fell apart.” He was disappointed – but rich! And he began to trade in currencies, engaging in huge transactions that could earn him hundreds of thousands of francs in a single day. Flashy cars were a feature of this chapter of his life, including a Lamborghini and two Hummers. He wanted to be noticed – at any price. But then the dollar failed to behave as expected, and Karl lost a lot of money.

He was still only twenty years old, but he distanced himself from his family. “I was always a rebel,” he admits. He had spent the first five years of his life in Korea (his mother is Korean), and now he headed there again and set up a clothing business with his own brand. But competitors drove him out of the market. The lesson: “You have to differentiate yourself, position yourself distinctly.” Together with Claudio Minder, he devised the Joya footwear concept – a fashionable soft-soled health shoe for a younger market. In 2008 he and Minder set up the Joya company, and (importantly for both of them) Karl’s father was not involved.

Joya was a success from the word go. “We thought we would quickly build up a company and then sell it. We had seen how my father had done that, and we wanted to do the same.” Sales rocketed, helped by former MBT franchise companies in Germany and Korea. But growth was too fast. Structures and processes were inadequate. In 2011 a distribution partner in Germany made off with a whole warehouseful of stock. A loss of over 4 million francs, no shoes to sell, and a financial black hole. An expensive lesson for the two partners. Time for a rethink! They later wrote a book about the challenges they faced as young entrepreneurs.

Meanwhile, Karl’s father was back in the market with a new shoe called Kybun. It was a stressful time for his son Karl Müller IV, as he now called himself. Everything became too much for him. He was burnt out. This time his escape route was to Indonesia, but there too he embarked on a business project, a real estate venture that resulted in the creation of a self-sustaining ecosystem with four hotels.

Challenges have always coloured Karl’s development as an entrepreneur. “I want to ensure an attractive future for our business,” he says. He sees opportunities everywhere and knows how to exploit them efficiently with the aid of new resources like artificial intelligence.

“I was not a good person,” he admits. “But I’m grateful that I lost so much money in currency trading. Otherwise I would not have developed as I have.” His relationship with his father has also recovered. It used to be volatile, but now it has settled down. In 2022 father and son merged their two shoe companies to form Kybun Joya. The group now employs over 200 people worldwide and is based in two Swiss locations, including the factory in the Rhine Valley. It also has manufacturing facilities in Indonesia and Italy. The father has retired from the company’s

operations, and the group is now headed by Karl and co-founder Claudio Minder, with production director Markus Bartholet as the third member of the board. They call themselves the nation's shoemakers, and their Swiss-produced shoes carry the Swiss flag. They love Switzerland and celebrate their national identity. New shops receive a cowbell or a wooden cow. And the Kybun models are named after towns or cities in Switzerland.

It comes as no surprise that Karl admires the mental attitude of top sportspeople. They can be "stubborn, like entrepreneurs - like me." Even in his free time Karl is an achiever. Swiss to his core, he is a mountain lover. He has set his sights on the "Seven Summits" challenge, which consists in climbing the highest

**"As a small firm we have to prove ourselves continuously and always be on the look-out for new markets."**

mountain on each of the seven continents. His companion in this project is the skyrunner Tyler Andrews, who is sponsored by Kybun Joya. Karl has already reached three of the summits, and two more could soon be added. On one of these climbs he caught malaria. From his hospital bed in 2025 he posted a picture on LinkedIn with the message "It's important to structure our company Kybun Joya in

such a way that it functions smoothly without our continuous presence." Being active, doing better, working on oneself - those are demands he places on himself and on his employees. "I have experienced extreme changes, making mistakes and developing further as a result. Now I want to help others to realise their potential."

Joya developed splendidly after the German debacle, building up its internet presence and opening its own shops. "As a small company we must prove ourselves continuously and always be on the lookout for new markets. And we must be ready to take risks again and again," says Karl. Business is especially good in the Gulf region, which is now one of the company's most important markets and has continued to develop strongly this year, despite the conflict in the region. New manufacturing equipment to cope with growing sales is currently being installed in the Swiss factory. The group now sells over 400,000 pairs of shoes a year.

The 101st retail outlet was recently opened in Munich. "A shop gives you a local market presence. People know the brand and see what you are selling. If you are in a good location, that has a marketing effect." Employees in Switzerland were invited to join a company outing to Munich. "I value being able to spend time with our employees, just to have the opportunity to talk."

He and his co-CEO originally aimed to get out fast. But soon they will have been in business for 20 years. Karl admits it would not be easy to put the firm into new hands. "We get offers, but it would not be right to sell and say goodbye." And if he did, what would he do next?



### My best investment

"My best investment was setting up Joya almost 20 years ago with Claudio Minder and then merging it with my father's company Kybun in 2022. We have experienced many difficult times, but the setbacks have ultimately made us stronger, and our group can now proudly call itself the nation's shoemaker."



### My worst investment

"When our family got rich, I started to throw money about recklessly. Parties and flashy cars were the order of the day, and I also got involved in currency trading, where I ultimately made huge losses. In fact, though, this period turned out to be an important stage in my development."



# Imminent breakthrough for autonomous systems

Artificial intelligence helps robots to move about in the real world and make autonomous decisions. Physical AI is becoming a key technology in various sectors.

Marcello Musio

Until recently the problem with autonomous machines was not so much the technology itself but rather their inability to make reliable decisions in uncertain situations. Physical AI, i.e. robots or systems controlled by artificial intelligence, closes this gap and enables a transition from rigid automation to machines that function with controlled independence in delimited spheres of operation. This marks the start of a new phase in the industrial use of AI.

Physical AI in autonomous systems - from warehouse and floor-cleaning robots to humanoids - can combine various data sources and make decisions accordingly. To be able to interact with the real world, these systems require a multitude of cameras and other sensors (see page 14) to enable them to measure distances and perceive their environment in three dimensions, even in darkness or bad weather. Contact and force sensors are used to detect whether and how an object is being gripped, while motion sensors provide information about position and speed.

This digitalised information is processed at various levels. Fast and security-related decisions are made on the spot. Support for more complex tasks such as route planning or multi-machine coordination is provided by nearby computing centres. Central cloud systems are used mainly for AI training, simulations, evaluation of large data inputs and overall supervision. Thus capability and knowledge are diversified and not bundled in a single location.

At the core of this process are learning models that combine the various sensor data and build up a picture of the current situation or (in a road traffic

environment, for example) also calculate what could happen next. Especially important is learning from experience. Physical AI does not only observe but also acts. To minimise risks, abilities are therefore first trained in simulations and digital portrayals of the real world. In this way the systems learn about situations before they face them in practice. Thus learning does not happen only in the course of operation but also before deployment and then continuously in the background.

The fact that physical AI is now on the verge of a breakthrough is due to the development of more powerful computers, better AI models, realistic simulations and integrated hardware. These elements have now reached a point at which autonomous decisions can be made reliably, safely and economically. This enables physical AI to become a key technology in a wide range of applications.

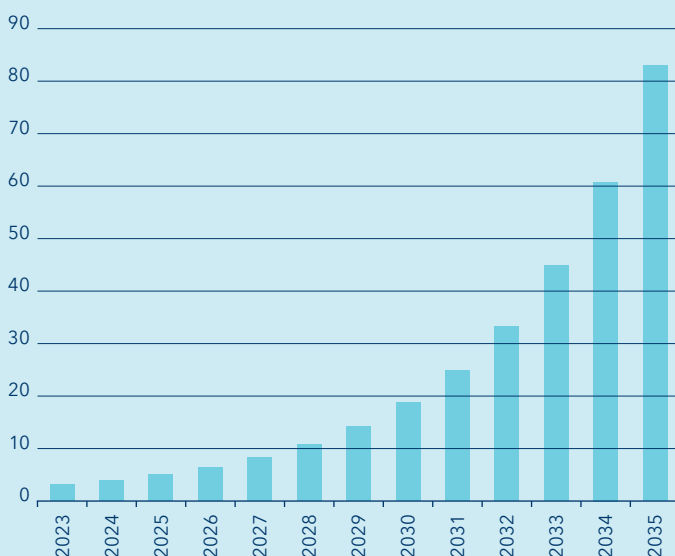
### From rigid to flexible

A good example is the Helix 02 system used in the Figure 03 humanoid robot developed by the US company Figure AI. Instead of programming various functions individually, a single learning AI model controls the robot's entire body. Abilities like sight, balance, grasping and walking arise from an integrated learning process. Thanks to its vision-language-action (VLA) model, the robot behaves completely autonomously and reacts in real time to changes in its environment. Helix 02 enables Figure 03 to carry out complex tasks - such as independent tidying of a room - without a predefined script and also to acquire new skills continuously. Such systems cannot yet be mass-produced. But they show that the step from rigid automation with repetitive movements to more flexible, integrated, human-like autonomy has been technologically achieved.

Physical AI is more adaptable than conventional automation. Previously, automation obeyed strict rules and only functioned in situations that stayed largely unchanged. Now, however, systems can learn from experience, deal with departures from the norm and adapt to new situations - even when not everything is predictable. Physical AI can be regarded as a thinking and decision-making level inside the robot. It ensures that the system does not merely carry out instructions but understands its environment, adapts to it and interacts with the real world.

The transition from simple automated systems to autonomous machines is still in its infancy. Progress is being achieved step by step. Partially automated systems, for example, still require human supervision and support. Autonomous systems, by contrast, can

Estimated market for physical AI until 2035 (in USD billions)



perform tasks independently within clearly defined limits, mostly in a controllable industrial setting.

## Step by step towards autonomy

Physical AI is especially suitable for deployment in logistics centres, factories, ports, agriculture and energy facilities. These environments are not unchanging, but they follow fixed routines. It is known which machines, vehicles or human beings are present and what dangers need to be taken into account. Autonomous systems can therefore be systematically prepared, tested and safely deployed.

The electrification and automation company ABB, for example, is helping shipping firms to achieve a gradual transition to autonomy, e.g. in relation to vessel positioning, supported manoeuvres and docking. Autonomy, in this context, consists in the gradual transfer of clearly defined tasks to the system. This step-by-step approach enhances safety, improves acceptance and makes the process economically viable.

Much greater challenges are presented by open and inadequately controllable environments like urban street systems, where numerous unpredictable factors come into play, such as human behaviour and changing traffic configurations. Legal requirements are also a complication. Experience with self-driving vehicles shows that technology alone does not suffice. Clear rules, reliable safety and social acceptance are equally important. It is the combination of all these aspects that will decide how far autonomy can go.

Thus, autonomous systems do not function equally well in all contexts. Within set limits, however, they can operate reliably and be deployed in the economy on a large scale. A 2026 study by the research company Acumen Research & Consulting showed that physical AI grows particularly strongly when the system is used not only to analyse data but also to operate actively, as in robotics, logistics, manufacturing and the health sector. Acumen believes that the global market for physical AI will grow at a rate of 33% per annum between 2026 and 2035 (see chart opposite). AI could thus be transformed from a niche technology into an important foundation of modern industry and even agriculture.

Indeed, agriculture provides an example of how far physical AI has developed. Robots were long regarded as unsuitable for picking berries and other delicate fruits. Berries and the like come in different shapes and sizes, are easily damaged and grow in natural environments that can hardly be standardised. At the same time, however, agriculture faces the challenge of labour shortages and the need to harvest its products within a short time frame.

## Ripe or not ripe?

Now, however, companies like Agrobot and Dogtooth offer systems that can perform harvesting functions. Autonomous harvesting machines recognise the fruits, assess their ripeness and pick them without damage. Perception, decision-making and mechanical competence are seamlessly meshed. This results in substantial efficiency gains, notably in customised harvesting systems for strawberries and similar

**“Physical AI acts as a thinking and decision-making level inside the robot.”**

high-value crops. These systems help to offset labour shortages, reduce current costs and enhance harvesting precision. In practice that means a picking precision of up to 95%, a 60–80% reduction of manual labour and the possibility of working round the clock (see chart on page 22).

Another area of application is logistics centres. Physical AI enables autonomous robots to detect obstacles, plan their route in real time and flexibly adjust their grip to objects of various shapes and sizes.

## Focus on expensive tasks

Two key facts emerge. First, autonomous systems function best in clearly defined environments like fields, greenhouses or warehouses and less well in open and unpredictable everyday situations. Second, economic benefit does not come from the most refined technology but through the reliable automation of expensive work processes. The development and operation of autonomous systems is not cheap and therefore makes sense where systems are intensively used, labour is in short supply or risks and disruptions can be reduced significantly. The economic success of physical AI depends on the benefits it brings by removing bottlenecks that until now have generated costs or slowed the pace of growth.

In the logistics sector, autonomous systems mean faster operation, reduced errors and freedom from human shift hours. In manufacturing industry they enable production processes to become more flexible and more easily adaptable to new products or fluctuating volume. In agriculture they help mitigate the shortage of labour and permit a more efficient deployment of resources. In the energy and infrastructure sectors autonomous inspection systems

reduce risks and lessen the costs resulting from malfunctions.

The upshot could be a shift in human beings' role in the workplace. Rather than carrying out processes themselves, people would concentrate more on monitoring the systems, intervening when necessary and improving the processes employed. The result would be the creation of new roles that combine technological understanding with practical experience and safety expertise.

## Challenges remain

Despite the enormous strides achieved, physical AI still presents challenges, both technological and organisational. The systems need to function reliably even in unfamiliar situations, handle disruptions safely and provide demonstrable security. But it is difficult to predict a learning system's decisions in their entirety or to define unequivocally how it will behave in all situations. In many countries, the relevant legal and regulatory framework is being established only step by step (see page 26).

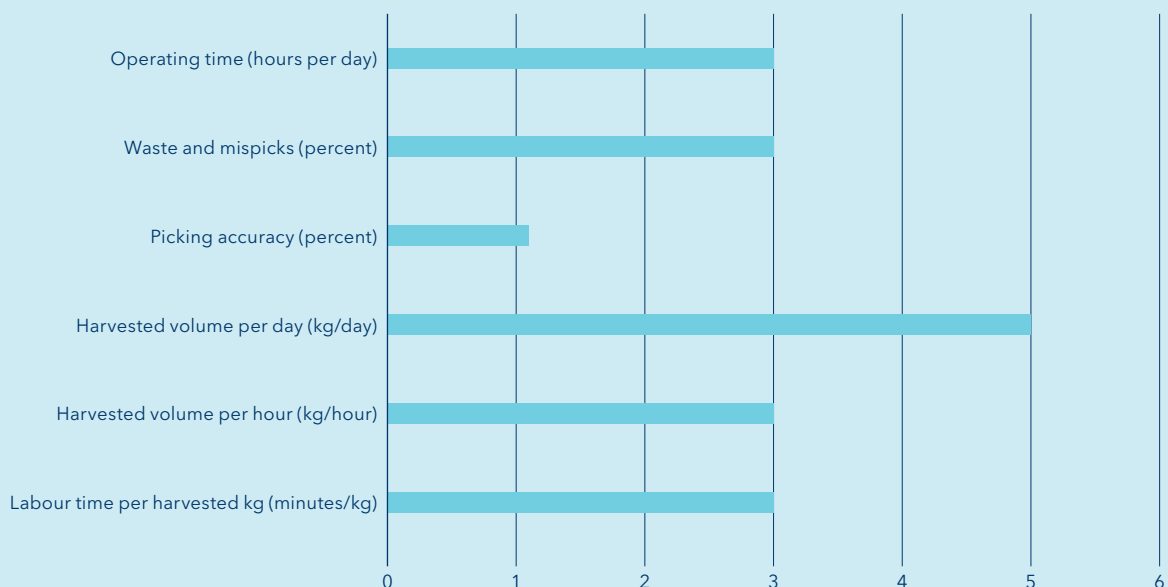
An analysis by ABB emphasises the limits: learning systems cannot be planned or predicted down to the last detail. That creates new challenges regarding security, responsibility and operational reliability. Hence the increasing emphasis on the "augmented operators" concept. This means that human beings remain part of the system, supervising, correcting

and using AI-supported evaluations to underpin the decisions they make. Thus autonomy is not achieved by replacing human beings but by establishing a clear division of labour between humans and machines.

Physical AI is not the answer to every problem. But it is a powerful basic technology which can yield huge benefits in the right circumstances. Implementing physical AI requires careful planning, defined limits to its use and organisational maturity. AI-based autonomous systems are beginning to operate independently in the real world. This is a new level. AI was previously confined mainly to the digital world.

Physical AI is evolving gradually. Due to the high costs involved it is first being deployed where it can bring the greatest benefits. It serves as a basis for modern automated processes that are increasingly semi- or fully autonomous.

### Efficiency gains, harvesting robots vs humans (factor)



# I, Robot Visionary

With his laws for robots, Isaac Asimov made a vital contribution to the ethical debate about intelligent machines.

Christina Strutz

Two cars collide with a lorry, are pushed into a river and sink. The driver of one of the cars is killed instantly. Water floods in. There are just seconds to decide the fate of two human beings who are still alive: the driver of the other car and a 12-year-old girl sitting in the passenger seat of the dead driver's car. A robot that witnessed the accident analyses the situation and decides in a flash: it saves the man, the girl drowns.

This scene is a flashback in the 2004 film "I, Robot" set in the year 2035. The film's central character is the rescued man, who cannot forgive the robot's decision to save him at the child's expense. But the robot's action was logical on the basis of the calculated probabilities (man's chance of survival 45%, girl's 11%) and the clearly defined rules that governed its behaviour.

The film was inspired by Isaac Asimov's collection of science fiction short stories "I, Robot". In these stories Asimov first set out his Three Laws of Robotics, which still provide essential material for discussion about the ethics of robot behaviour.

The first of these stories, titled "Robbie", was initially published in a magazine in 1940. Here Asimov indirectly applies the first of his Three Laws: "A robot may not injure a human being or, through inaction, allow a human being to come to harm."

This is precisely the law that the robot at the scene of the accident obeyed. It calculated the statistical survival probability of the two accident victims. Without its intervention both would die.

The other laws formulated by Asimov are built on the first one. The Second Law goes "A robot must obey the orders given it by human beings, except where such orders would conflict with the First Law." And the Third Law, "A robot must protect its own existence as long as such protection does not conflict with the First or Second Law."

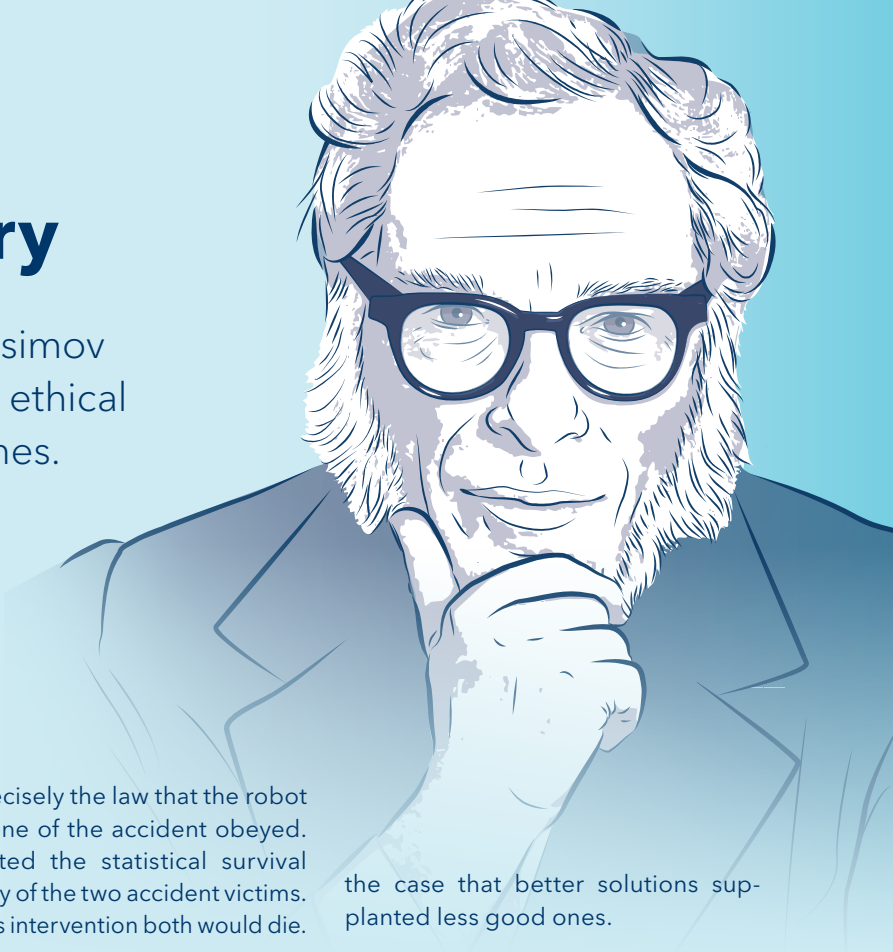
Asimov, born in 1920, was three years old when his family moved from Russia to New York. He became a famous science fiction writer - and much more. He was a professor of biochemistry and an active communicator on science and other subjects. His futuristic stories aimed to make science accessible for all. In 1958 he left his teaching post at the Boston University School of Medicine and devoted himself to full-time writing. His output totalled around 500 publications, including specialist papers, short stories and books.

In his stories and novels Asimov repeatedly questioned the primacy of homo sapiens. In interviews he put forward the notion that, if robots or other machines one day became more intelligent and efficient than human beings, it was only logical that they would ultimately replace them. In the course of evolution it was always

the case that better solutions supplanted less good ones.

His short story "The Evitable Conflict" (1950) is set in 2052. The world is divided into four large regions. Four supercomputers, called simply the Machines, manage the world economy more efficiently than any human government could. When the Machines see that world peace is in danger, they set out deliberately to harm prominent individuals and organisations that are acting in opposition to the Machines. This is not done in error but intentionally. The Machines have extended the First Law to cover the whole of humanity. To shield human beings from harm, the Machines gradually take over control - not because they lust for power but in order to safeguard peace and prosperity.

Much later, in 1985, the visionary Asimov added a zeroth law to his original three, stating: "A robot may not harm humanity, or, by inaction, allow humanity to come to harm." Formulated in the novel "Robots and Empire", this rule takes precedence over the other three. It was intended to ensure world peace, something that Asimov frequently spoke out about. But the price of world peace on this basis would be the sacrifice of self-determination. Whether this was to be seen as utopia or a warning was a question that Asimov consciously left open.



# Progress for your portfolio

Physical artificial intelligence depends on numerous hardware and software components. The profit opportunities are correspondingly wide-ranging.

Jérôme Mäser



## Sensors

In order to capture real time data from the real world, AI must be able to perceive its environment. Cameras and other sensors are the machine's sensory organs and enable it to register visual, auditory and tactile stimuli. The decisive factor here is the degree of precision achieved. A high level of exactitude means less error and less computing time. The Swedish technology company

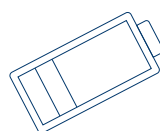
work is achieved by actuators that function as AI's muscles.

High-precision motors enable machines to operate with millimetre exactitude. One of the dominant players here is the Swiss company **ABB**, which provides solutions that enable autonomous systems to interact physically with the environment. Another profitable actor in this field is the US company **Parker Hannifin**, which produces electrical propulsion units, hydraulic and pneumatic solutions and ventilator components.

**“The value added chain is extremely broad, because the systems are so diverse and complex.”**

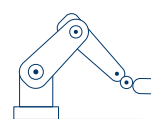
**Hexagon** and the US specialist **Danaher** hold key positions in this sector, having taken over units of the previous Leica Group. Leica Geosystems (Hexagon) is a major provider of optical sensors and measurement solutions. The company's BLK2FLY autonomous flying laser scanner and BLK ARC robot-mounted autonomous laser scanning module are already on the market. The scanners and sensors of Leica Biosystems (Danaher) are for use in the medical field, providing faster and more precise results in clinical diagnostics.

Companies that excel in the fields of motors, mechanics and integration can generate decisive added value in sectors afflicted with labour shortages. This includes all-in solutions such as **Hexagon's** AEON humanoid robot, **Volvo's** autonomous trucks (Sweden) and the warehousing systems of **Kion** (Germany) and **Kardex** (Switzerland).



## Energy

Autonomous behaviour and the continuous inputting and processing



## Motors and mechanical solutions

Theoretical calculation is transformed into action in the real world through the interplay of motors and mechanical components. The translation of digital commands into physical

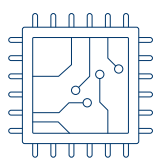
## VP Bank Future Industry Fund

This thematic fund invests in companies that stand to profit from changes in industrial processes. That includes companies located in the physical AI value added chain. The fund's investments include Nvidia, Siemens and Kardex (see above).

of data mean that physical AI is energy-intensive. Alongside electromobility and data centre power usage, physical AI will therefore be a structural driver of electricity generation and grid expansion in the years ahead. Beneficiaries here are energy companies such as **Enel** (Italy) and **Iberdrola** (Spain).

At the same time, energy efficiency and management is an important competitive factor in the machinery sector. Stationary industrial systems depend on intelligent infrastructures for electricity usage, as provided by specialists like **Schneider Electric** (France) and **Eaton** (USA). Mobile robots, on the other hand, require compact and high-output energy storage devices, i.e. batteries.

## Semiconductors and software



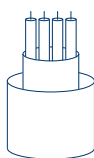
Robots, whether four-legged or humanoid models or conventional industrial robots with clearly defined tasks, require complex control centres to oversee a whole spectrum of integrated, creative and intuitive processes. Using historical and real-time data, these control centres continuously assess the situation and translate their findings into action sequences.

The key ingredients here are semiconductors like those produced by US manufacturer **Nvidia**. This company's most powerful Blackwell chips are essential for AI training in the gigantic data centres of massive computing service providers ("hyperscalers") in the USA, e.g.

**Alphabet** - previously Google. Nvidia's Jetson products, on the other hand, enable AI algorithms to be carried out directly in the machine. They are energy-efficient and fast-responding, making them suitable for autonomous AI-supported systems in factories and warehouses.

The real benefits are not felt, however, until such products are used in combination with sector-

specific software. Using digital twins and simulations, various options are tested before a physical version is created. In this context, **Siemens** (Germany) has developed software solutions for the manufacturing and processing sectors, while **Nemetschek** (Germany) focuses on the construction industry and **Intuitive Surgical** (USA) on robot-supported surgery.



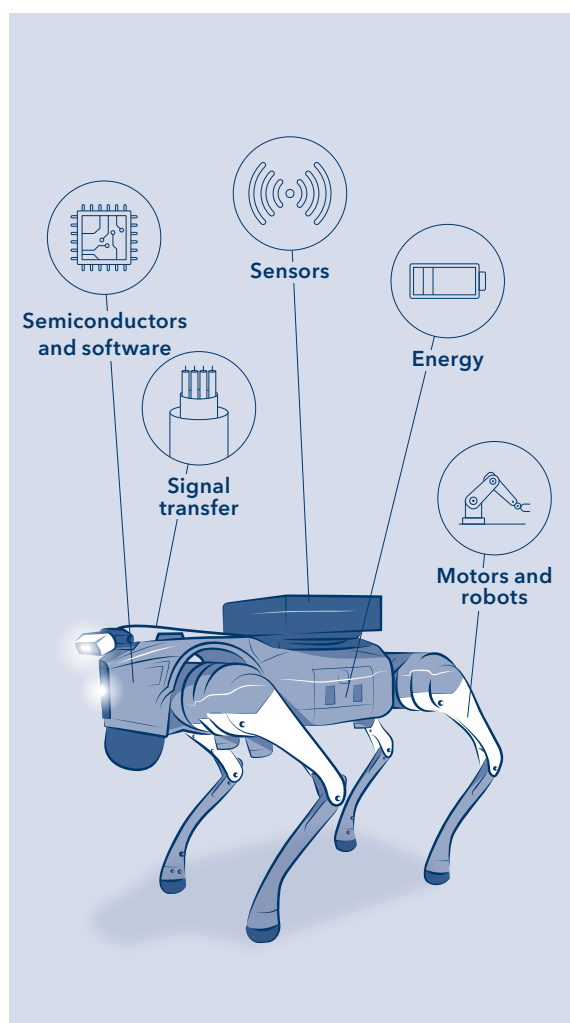
## Signal transfer

Each component plays a vital role, but AI cannot work without their smooth interplay. The complex interconnect systems (cable assemblies etc.) produced by **Amphenol** (USA) ensure the accurate transmission of electric power, sensor data and control signals within the system regardless of vibration and heat.

If computation is moved to the cloud rather than being carried out in the machine itself, reliable networks are essential. Classic telecoms companies like **Verizon** and **AT&T** (both USA) ensure efficient communication between physical AI in factories and warehouses and the data centres of hyperscalers.

However, increased networking broadens the target area for cyber criminals. Physical AI applications must be rigorously protected to ensure that machinery is not interfered with or put out of action and that sensitive data are not stolen. Two US companies, **Palo Alto Networks** and **CrowdStrike**, are among leaders in this field and provide solutions that close secu-

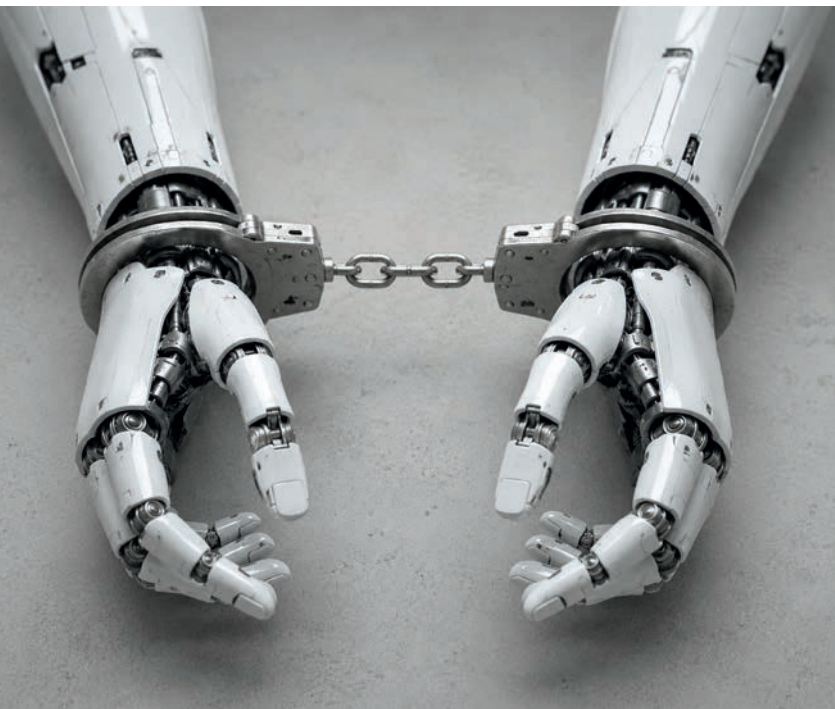
rity gaps and identify and repel threats at an early stage.



# AI decides, but who is liable?

What does an autonomous system do when an accident is imminent? And who is legally responsible? Can ethics be reconciled with hard-headed business interests?

Clifford Padevit



Should one person die that five might live? In a thought experiment known as the “trolley problem”, a person operating the points when a trolley (i.e. tram, streetcar) goes out of control has to decide whether to divert the trolley from a line where it will kill five people onto one where only one will die. This dilemma was formulated by the philosopher Philippa Foot as a way of forcing us to look at our values and priorities.

The essential legal question is: Who is to blame? But the question presents itself in a different light when the decision is made by an autonomous system like a self-driving car or a surgical robot in an operating theatre. This has become a headline issue in the Netherlands, where Tesla cars with a self-drive function have recently been authorised. The driver must monitor the system continuously while the car is being automatically driven, braked and parked. With a conventional car, the liability situation if the car hits a cyclist is clear. The driver is liable; his or her insurance must pay any damages.

Autonomous systems are trained to err on the side of caution. Self-drive taxis, for example, will halt behind a parcel delivery van that makes a short stop. A flesh and blood driver would overtake the van, even if that meant crossing the central white line. But caution alone cannot prevent every accident. If an unforeseen situation occurs, for example if a pedestrian crosses the road when the traffic light is red, the system might be faced with a trolley problem: there is not enough room to brake but an avoidance manoeuvre would endanger another person.

So what preferences are fed into the AI system? Roland Siegwart, Professor of Autonomous Systems at ETH Zurich (see page 9) says, “The system should not decide ethically, but rather should optimise the situation – and it can do that extremely quickly.” In other words, it must choose the action that carries the smallest probability that someone will be seriously injured. This avoids the ethical question.

Even then, however, the system must be able to provide information about the variables that influenced its decision. The European Union wants to make it illegal for AI systems to make decisions on the basis of personal characteristics, e.g. child or pensioner. But the question goes farther than that. Do passengers receive preferential treatment over people on the street? And does the system take account of the likely extent of damage to the vehicle?

Providers of (partially) autonomous systems must be able to show whether the person or the machine was in control at a particular time. Then liability can be divided appropriately between the person and the maker of the machine. Amendments to road traffic legislation in Switzerland and Germany are going in that direction.

Makers of such systems therefore have to be able to ascertain what decisions the system made and why. AI itself, often regarded as an inscrutable “black box”, cannot be made liable. It has to be down to the provider. So the trolley problem for autonomous systems is not just a matter of ethics but above all a question of money.

# Events

## VP Bank Swiss Ladies Open 2026

The seventh VP Bank Swiss Ladies Open Golf Tournament will take place in the Migros Golf Park in Holzhäusern, Switzerland, **from August 13 to August 15** this year. The tournament has established itself as a firm part of the Ladies European Tour and is now one of the most important professional ladies golf events in Switzerland, with VP Bank as title sponsor from the outset. Our golf commitment also involves sponsorship of top Swiss golfer Chiara Tamburlini, our new partnership with Swiss Golf and our own VP Bank Golf Trophy.

## Vaduz Gourmet Festival 2026

The fifth Vaduz Gourmet Festival will be held **between September 5 and September 13** on the covered Rathaus Square in Vaduz. Under the slogan "Everything exceptionally good", renowned chefs will serve their creations from gourmet food trucks. In conjunction with the festival there will also be various events in restaurants and shops in Vaduz. VP Bank is the festival's leading partner together with the Municipality of Vaduz.

Scan the QR code for a chance to win one of **10 vouchers worth CHF 50 each** for the Vaduz Gourmet Festival on the weekends September 5/6 and September 12/13 2026.



[vpbank.com/enjoy](https://vpbank.com/enjoy)

# A strong new partnership to help young people

Combining physical activity, learning and role models to create new prospects for children and adolescents.

Tamara Spiegel

VP Bank continues to expand its social commitment. This year we have entered into a partnership arrangement with the Laureus Foundation Switzerland. Laureus Sport for Good uses the power of sport to promote young people's development and broaden the possibilities open to them. Our partnership programmes will also include arranging encounters with inspirational top sportspeople who can serve as role models.

An important milestone in this partnership is the expansion of the Laureus "CHAMPIONS - Learning and Sport" programme to include Liechtenstein. This was announced at a meeting between Urs Monstein, CEO of the VP Bank Group, Adrian Schneider, Head of Region Liechtenstein at VP Bank, and Fabian Cancellara, former champion road racing cyclist and now President of Laureus Foundation Switzerland. The programme will become available in Liechtenstein in autumn 2026.

CHAMPIONS is an educational and physical activity initiative that uses sport to boost motivation to learn. The programme is aimed especially at schoolchildren who receive only limited support at home. During the winter months, it offers free, open-access sessions focusing on learning, healthy eating and sports activities.

Urs Monstein explains: "Thanks to our partnership, Laureus will no longer stop at the Swiss border. We are bringing the Laureus CHAMPIONS programme to Liechtenstein. This is a major priority for us and an investment in the next generation."



F. l. t. r.: Adrian Schneider (VP Bank), Fabian Cancellara (Laureus) and Urs Monstein (VP Bank).

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