Global ex-US
For professional / qualified / institutional clients and investors
UBS Asset Management
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Robotics

From eyes and ears to brains

UBS

Robotics is moving beyond factories as cheaper sensors and smarter software expand its reach. The next opportunity may lie in AI-powered applications that allow autonomous systems to understand and act in the real world.

1. Robotics is moving beyond high-volume factory automation into services, logistics, agriculture, healthcare and other markets as scale improves and costs fall.

2. Cheaper, high-precision sensors have given machines "eyes and ears", making them safer, easier to deploy and more adaptable to varied tasks.

3. Cobots, AGVs, autonomous vehicles, drones and early humanoid pilots show how broader intelligence is expanding the practical market for robotics.

4. The next value shift is likely to come from AI applications, as models give robots the "brain" to understand the physical world and act in real time.

5. The UBS robotics and automation strategy targets high-value applications, where AI, robotics, and automation converge to help find solutions to real-world problems.

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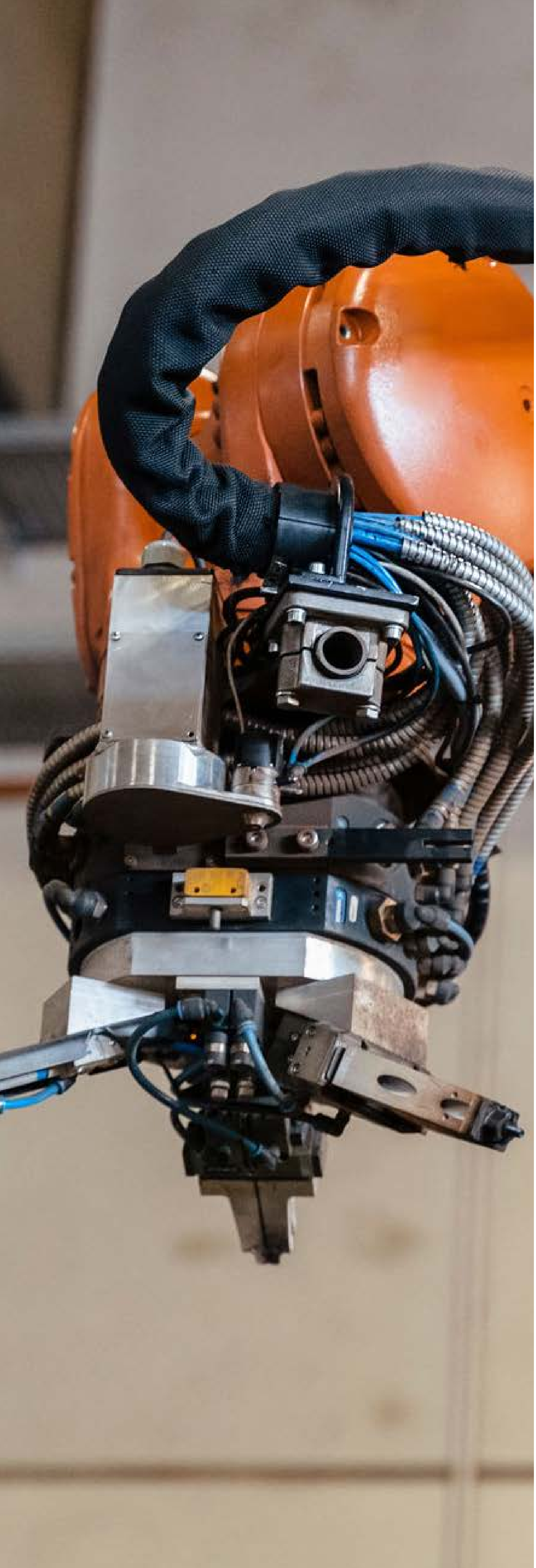


From fixed programs to autonomy

Over the past decade, automation and robotics have undergone a fundamental transformation. Once a niche market of industrial machines suited mainly to high-volume, low-mix manufacturers, robotics is becoming a far more diverse set of tools for a broader customer base across manufacturing, services, logistics, agriculture, IT and healthcare. As the robotics industry broadens, its ecosystem of suppliers and service partners is also expanding, while greater economies of scale are helping reduce the cost of building robotic and automation systems.

Sensors give robots perception

The main reason robots and automation systems are finding larger and more diverse end markets is that they are becoming more intelligent. The term needs care. We are not talking about sentient beings, but about systems that can perceive their surroundings and adapt when required. One early step was the availability at very low prices of high-precision sensors, such as CMOS, LiDAR, MEMS and GNSS.[1] These technologies were originally developed more than 50 years ago for niche industrial markets at high prices. But the S-curve adoption of smart phones over the last 20 years (globally 1.2-1.5 billion smart phones have been shipped every year since 2013),[2] together with tablets, smart watches, and laptops, created a large new market that demanded smaller size, greater accuracy, and ever-lower price points.

By integrating these and other sensors into robotic automation systems, engineers gave machines "eyes and ears" with which to perceive their position and surroundings. That shifted robotics from mute, brute machines following pre-programmed instructions regardless of what was happening around them towards systems that are safer to work with, easier to use and set up, and flexible enough to perform a wider range of tasks.

1 CMOS – Complementary Metal Oxide Semiconductor, invented 1963 by Frank Wanlass at Fairchild Semiconductor (Computer History Museum (CHM))
LiDAR – Light Detection and Ranging, invented in 1961 by the Hughes Aircraft Company (IEEE Xplore)
MEMS – Micro Electrical Mechanical Systems, invented in 1965 by Harvey C. Nathanson at Westinghouse Research Laboratories (Robert Bogue, MEMS sensors: past, present and future, January 2007)
GNSS -Global Navigation Satellite System, developed in the NASA GPS project which started in 1973 ("GNSS History", International Committee on Global Navigation Satellite Systems, October 2005)

2 IDC, "Worldwide Quarterly Mobile Phone Tracker," May 2026.

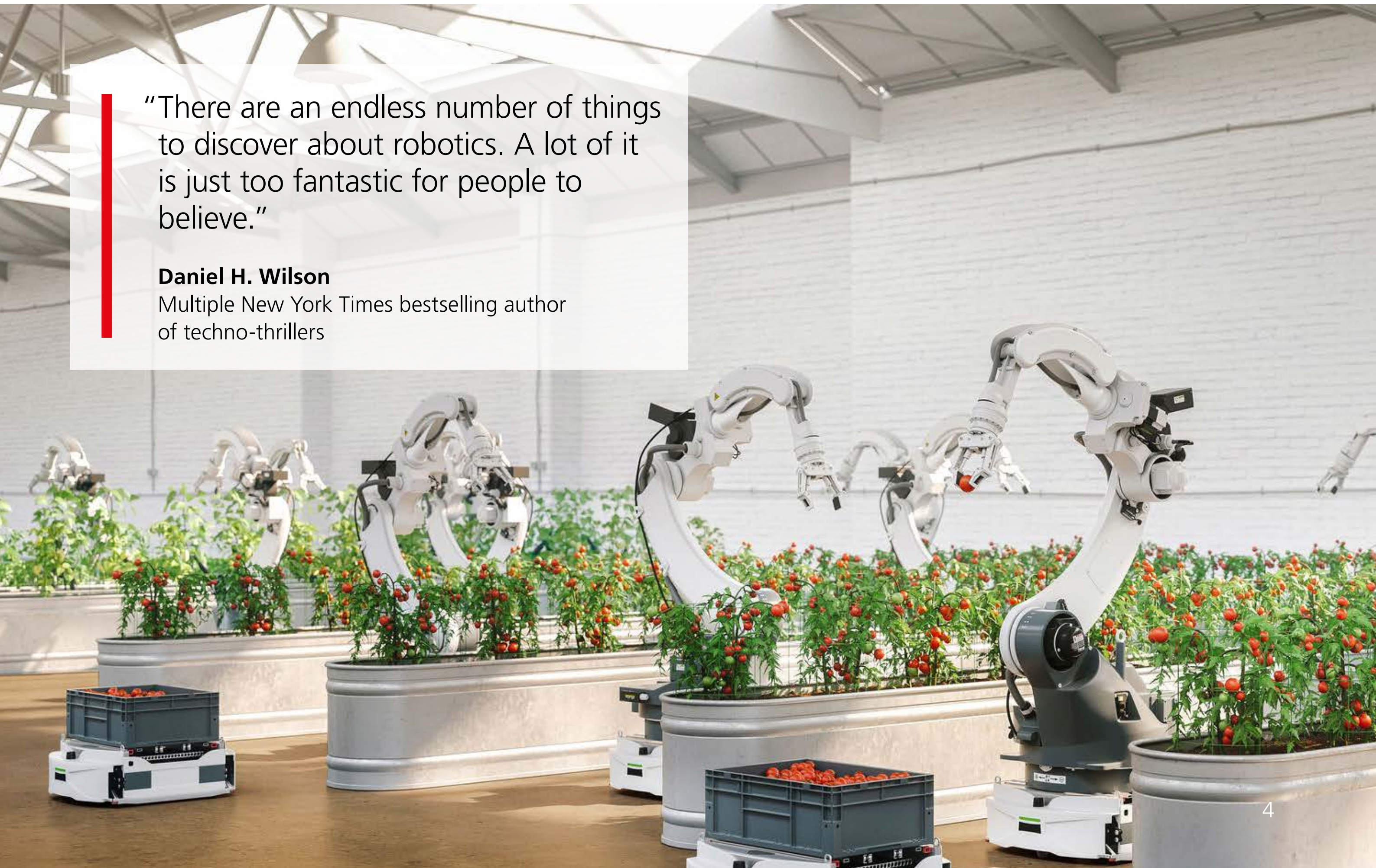
Smarter robots, broader markets

Endowed with a growing array of sensors, these smarter machines have found a far larger and more diverse set of use cases than their factory-bound predecessors. Collaborative robots, or cobots, and automated guided vehicles, or AGVs, have already grown into large product categories. Cobots now work safely alongside humans in life sciences and electronic manufacturing, handling delicate objects or performing repetitive tasks, while AGVs have revolutionized assembly lines and intralogistics. In more and more cities, from San Francisco to Singapore and Zurich, autonomous vehicles are becoming a familiar sight as they map and learn to navigate urban environments and increasingly operate commercially as robotaxis. Fleets of autonomous drones, airborne and maritime, are also being deployed to protect borders, monitor towns and patrol seas. And in the past couple of years, pilot trials of humanoid robots have begun in factories and warehouses, where they are performing simple but labour-intensive tasks.

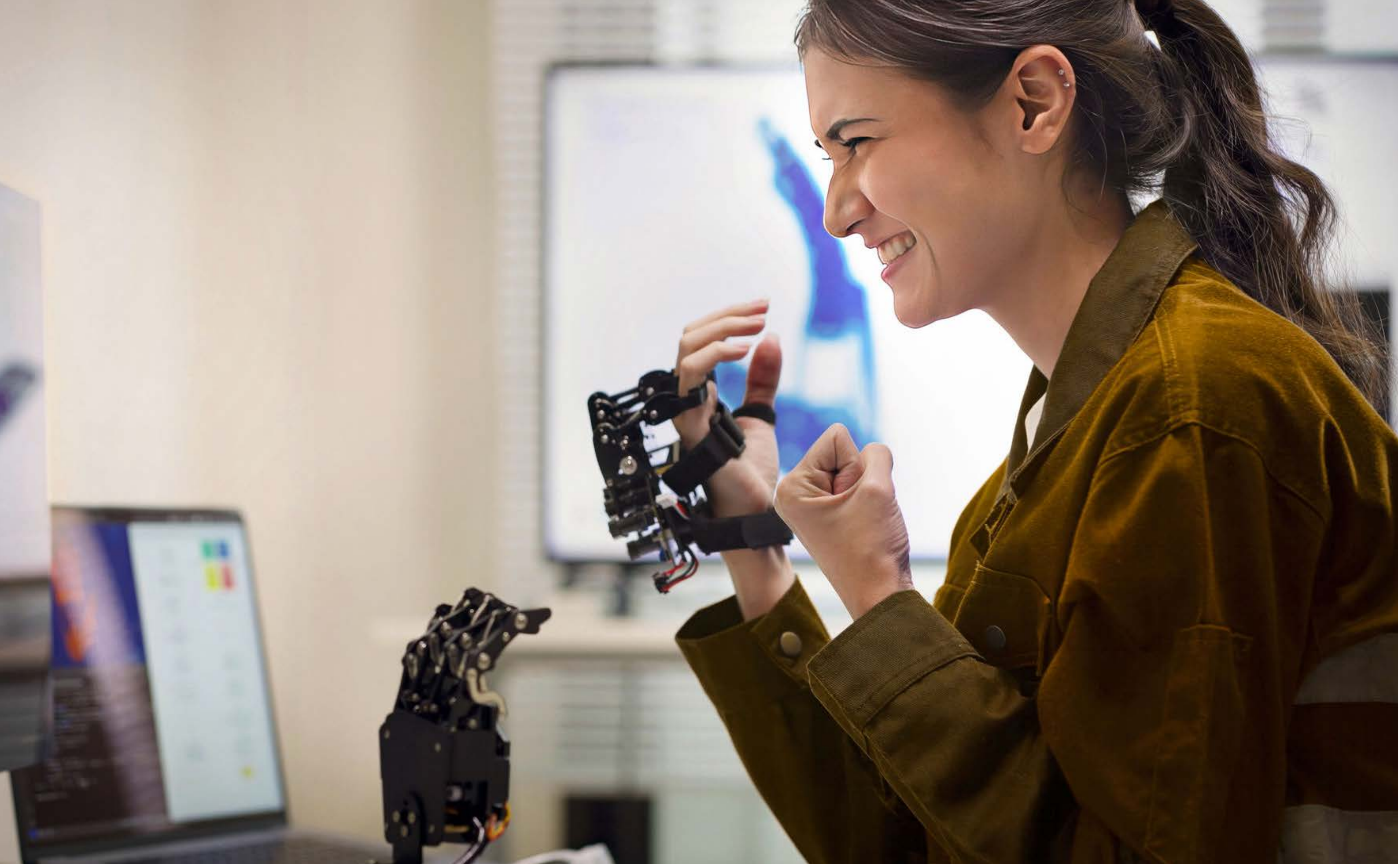
AI gives robots a brain

As technology advances, AI should bring greater adoption and greater benefits in automating digital, knowledge-based processes. We also expect deeper convergence between AI and physical automation systems. The past decade was defined by giving automation systems "eyes and ears": sensors that allow a robotic system to gather information about its surroundings, its own position and the objects it may need to avoid, such as an autonomous vehicle avoiding an accident, or interact with, such as a humanoid robot sorting parcels in a logistics centre. But perception alone is not enough.

It is one thing to perceive something; it is another to know how best to respond. The next phase of growth in robotics will likely be driven by giving machines the "brain" to understand, interact with and learn from information received through sensors. Advances in AI have so far been concentrated in the digital realm of large language models (LLMs), but physical models that explain the real world are also starting to emerge. As AI continues to improve, the brains of robots and automation systems should become stronger too, enabling increasingly autonomous systems to interact seamlessly with the world around them.



> "There are an endless number of things to discover about robotics. A lot of it is just too fantastic for people to believe."
>
> **Daniel H. Wilson**
> Multiple New York Times bestselling author of techno-thrillers



From AI pipes to applications

For now, market attention is concentrated on capital investment in the physical infrastructure that will provide the computing power for broader and deeper adoption of AI applications: data centres, chips, optical interconnects, semiconductor foundries and production equipment.

This infrastructure is critical, but it is not AI itself. It is the pipes that deliver AI. History suggests that once enough of a foundational hardware layer has been built, from railways to fibre-optic networks, it is likely to commoditize. Over the long term, value then shifts away from the pipes and plumbing of the digital world towards companies that develop commercially successful AI-enabled systems and applications running on that infrastructure.

The UBS robotics and automation strategy is focused precisely on this high-value, application end of the spectrum. where robotics and automation software and hardware are applied to real-world problems. By automating both physical task and the cognitive decisions required to execute it in real time, these next-generation solutions represent the real future opportunity of this global theme.

The building blocks for a golden era of innovation in robotics and automation are in place.

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