



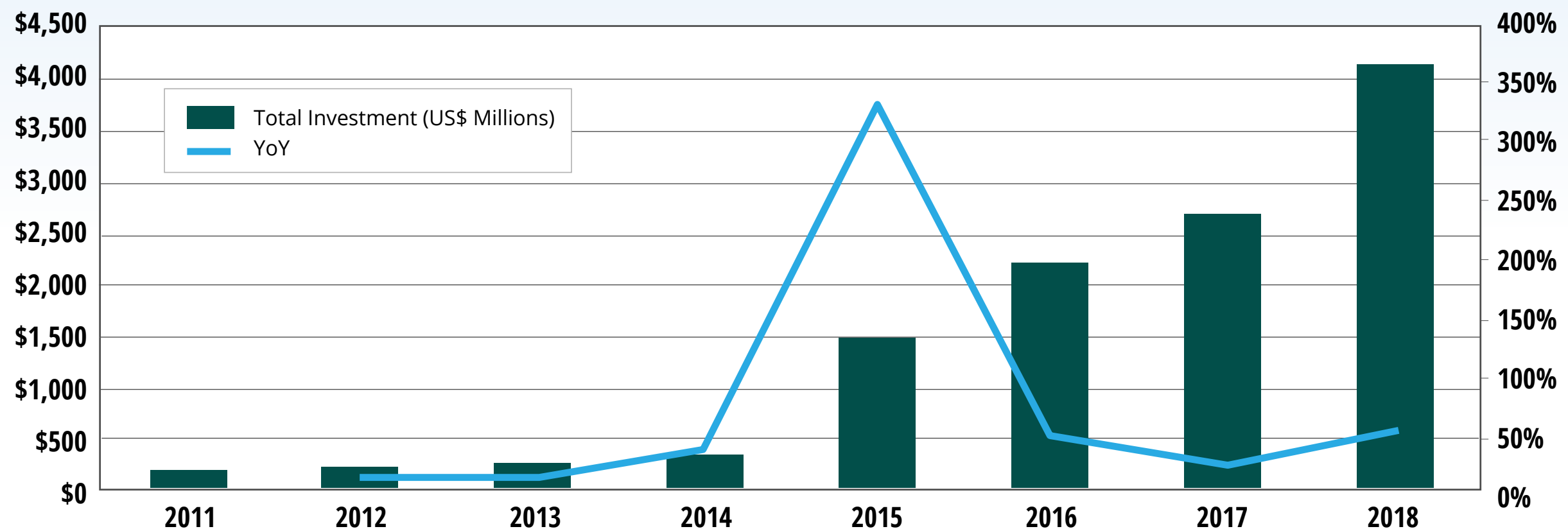
STATE OF THE ROBOTICS MARKET

**Current Trends, Opportunities,
and Recommendations**

ABIresearch
for visionaries

TOTAL VENTURE CAPITAL AND PRIVATE SECTOR INVESTMENT AND YEAR-ON-YEAR CHANGE FOR ROBOTICS IN 2018

- Major companies are increasingly seeing robotics as a key technology to invest in. Amazon has been amongst proactive leaders in this space.
- SoftBank is also making a significant play for robotics as part of its wider vision fund. Its key investments in robotics tend to focus on companies that provide a broad competency to a range of robotic products, as in the case of Brain Corp (navigation) and the recent US\$300 million investment in CloudMinds (cloud robotics). Its largest investment has been a US\$940 million investment in robotic delivery startup Nuro AI.





INDUSTRIAL ROBOTICS

Trend 1: A slowdown in China has led to a chastening of market projections

- Following breakneck demand for industrial robots from 2015 to 2017, there was a noted deceleration in 2018, in large part due to the plateau in demand from China.

Trend 2: The United States is finally improving its game in industrial automation

- The United States has a lower robot density and still stands as the fourth largest deployer of industrial robots. That said, there are signs that capital investment is increasingly being reallocated to industrial automation, and that robot vendors are benefiting.

Trend 3: Growth in unexpected places

- There is increased demand stemming from Mexico and Latin America. Meanwhile, growing markets of note in the Asia-Pacific region include India, Thailand, and Vietnam.

COLLABORATIVE ROBOTICS

Trend 1: Meteoric growth from a low base

- The collaborative robotics market has not yet exceeded US\$1 billion and remains a marginal subcategory of industrial automation. Nevertheless, the scope for growth between 2018 and 2021 remains high.

Trend 2: The market dominance of Universal Robots is over

- Universal Robots's performance for 2018, though high, was 20% short of expectations. Recent quarterly results by the company parent Tera-dyne indicate that 2019 too will be challenging.
- In East Asia, AUBO (China), Techman Robot (Taiwan), and Doosan Robotics (South Korea) have gained significant traction.
- Interestingly, the major industrial robot vendors, though all engaged in offering collaborative robotics, have struggled to incorporate them into their broader strategies. The challenging macroeconomic environment and dire financial results in early 2019 indicate that the legacy vendors are not going to start taking market share from pure-play cobot developers anytime soon.



MOBILE ROBOTICS

Trend 1: Diversification of form factors

- Traditional Automated Guided Vehicle (AGV) will continue to play a significant part in the market, but there is increasing variance in mobility and form factors. Floor scrubbers, passenger vehicles, heavy industrial trucks, and even more exotic systems like bipeds and quadrupeds are being deployed at an accelerating rate.
- Given advances in sensor fusion and vision-based navigation, Autonomous Mobile Robots (AMRs) will outnumber AGVs by 2030.

Trend 2: Diversification of applications

- By far the largest application for mobile robotics is material handling within contained and structured environments. As demonstrated by Amazon and other e-commerce giants, AGV solutions for fulfilment can be scaled up with outstanding pace.
- Data collection is another use case of considerable value, with increased demand in energy and industrial sectors for automated visual inspection that cuts costs and saves time.

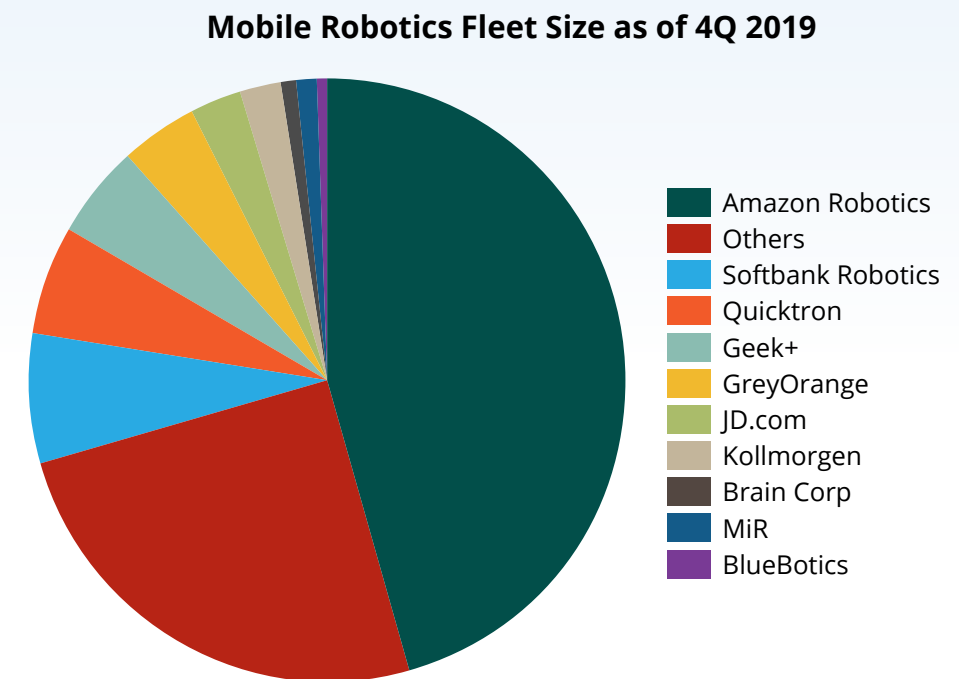
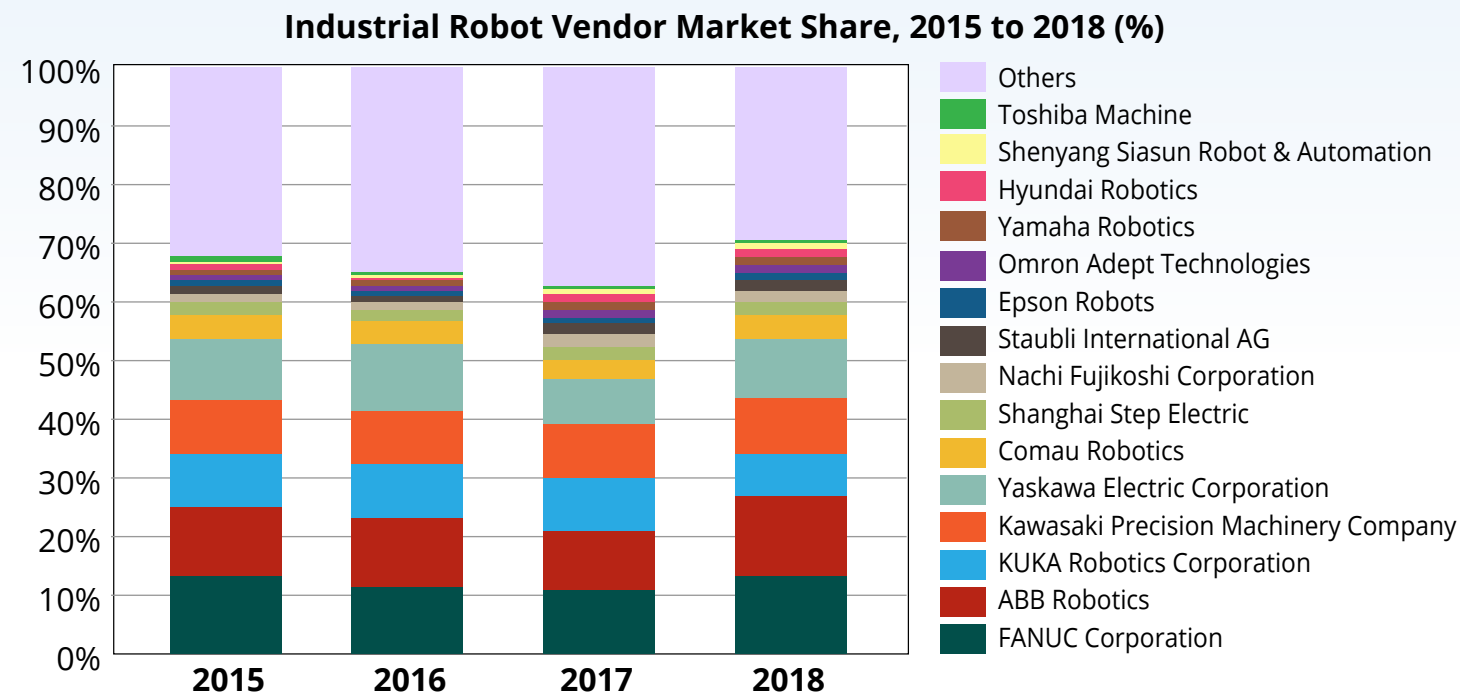
Trend 3: Diversification of verticals

- Outside of warehousing or manufacturing, there has been a lot of movement. For some verticals like agriculture, retail, and infrastructure, the deployment of robots remains very thin on the ground, but growing demand drivers and improved technology is bringing deployment within reach.



THE CHANGING VENDOR LANDSCAPE

- While generally overemphasized, challenges for the global manufacturing supply chain have affected the industrial robotics market. The slowdown for new demand in China has continued throughout 2019 and is affecting not just Chinese suppliers but also local Asia-Pacific vendors in South Korea and Japan.
- Amazon and other e-commerce providers are leading in the deployment of mobile robotics. Most of these systems require external infrastructure like barcodes and magnetic tape to move around. Developers of AMRs are beginning to deploy thousands of vehicles in a variety of use cases. Examples include Brain Corp, MIR, and BlueBotics.





EXOSKELETON

- The market for exoskeletons is still largely unproven, but the development of exoskeleton-as-a-service continues apace and will see a reduction in barriers to entry.
- Manufacturers are beginning to roll out full-body suits for logistics applications in the U.S. military.
- The exoskeleton will increasingly be seen as a smart wearable, and vendors are developing IoT platforms to obtain value from the wearer's data.

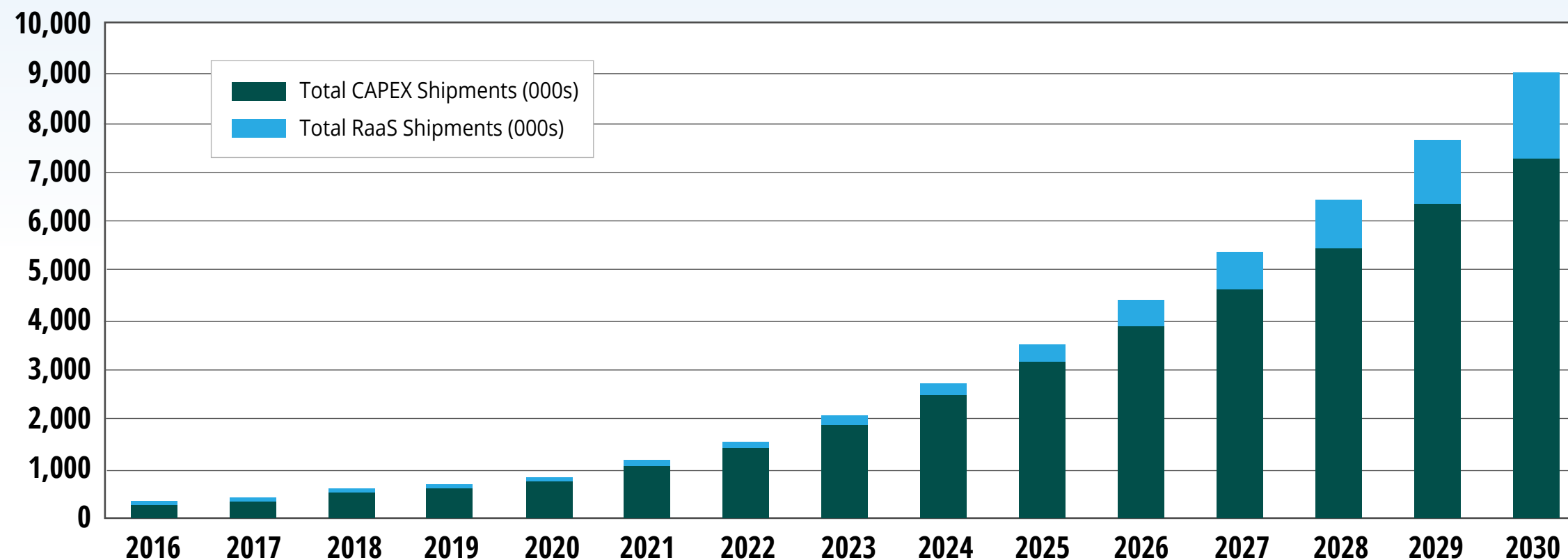
UNMANNED AERIAL SYSTEMS

- After years of considerable funding, the drone market has experienced some difficulty in meeting the promise it showed.
- The largest use case is undeniably for inspection and maintenance. Military, civil, and commercial applications are expanding.
- Increasing numbers of companies are trialing and implementing drone delivery operations. ABI Research expects this to be a US\$10 billion market by 2030.



SOFTWARE AND SERVICES IN ROBOTICS

- While robotics is tied to hardware shipments, software applications like fleet management, analytics, operations, and development are becoming more important.
- All major subcategories are seeing a rise in the popularity of OPEX-based business models like Robotics as a Service (RaaS) and Software as a Service (SaaS). This is especially true in nascent verticals where the impact of robotics has so far been marginal.
- For mobile robotics, highly professionalized versions of the Robotic Operating System (ROS) are becoming more and more prolific.



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These findings are part of our **Robotic Technologies Research Service** which covers industrial, collaborative, commercial robots, exoskeletons, and unmanned systems. It focuses on technologies that interact and augment human workforce in line with ongoing industrial transformation. Special focus is dedicated to innovation spanning the entire technology supply chain from discrete advances in mechatronics, sensors, processing, and robotic software to the long-term impact of strategic technologies like machine learning, machine vision, 5G, AR/VR, edge computing, and distributed computing.

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