

TECHNOLOGY

## Self-Driving Robots: A Revolution in the Local Delivery

by Mokter Hossain



Image Credit | Starship Technologies

*Self-driving robots can revolutionize delivery and are quickly becoming omnipresent in urban areas.*

✓ **INSIGHT** | NOTE 05 Apr 2022

---

Self-driving robots are revolutionizing foods, groceries, and package deliveries. They are a reality and becoming a part of urban life in many cities. Initially, people are curious about robots but after robots have been in an area for some time, they get used to it. They provide

convenient services to improve our everyday life. In the USA alone, robots are used on more than a dozen college campuses for food delivery. The typical size of delivery robots is like luggage. Some robots are similarly small-sized and others are significantly larger and heavier. Small-sized robots run through sidewalks and the larger ones on public roads. Estonian-origin Starship robots have delivered two million autonomous deliveries in different cities across the world since they started three years ago. In September 2021, the company announced plans to deploy 500 robots for the supermarket chain co-op in multiple cities in the UK. Currently, it has several thousands of robots in UK, USA, and some European countries. Nuro's and Robomart's fully autonomous robots are large and use open roads to carry fresh food in cool and heated chambers. Eliport is a Barcelona-based start-up that claims to have four-wheeled robots that, unlike other delivery robots, load and unload autonomously instead of packing by human hand.

#### RELATED CMR ARTICLES

**[“A Brief History of Artificial Intelligence: On the Past, Present, and Future of Artificial Intelligence”](#)** by Michael Haenlein & Andreas Kaplan. (Vol. 61/4) 2019.

Like Uber, anyone can download the app and order items for robots to deliver. Customers can choose items, drop a pin to indicate the delivery location, track the robot, get an alert to meet the robot, and pick the items unlocking the item chamber through apps. Robots are mainly involved in delivering goods from supermarkets, grocery stores, restaurants, and medicines from pharmacies in urban settings. Customers can track the location of the robot and the time to reach the destination.

Co-op, a supermarket chain in the UK, is using hundreds of robots to deliver groceries to its customers. Their popular delivery items are bananas, bread, cucumbers, eggs, milk, etc. Big players like Amazon, eBay, and Uber are also using robots for their last-mile deliveries. Uber acquired Postmates X in 2020 and spun it out with the name Serve

Robotics after one year to boost autonomous delivery services. With machine learning technologies, these robots are getting smarter and safer. Over 90 percent of the time, robots travel completely autonomous in the dark, heavy rain, and snow using 3-D maps.

## Robot features

The cost of a typical delivery robot ranges from \$2,500 and \$5,000. Robots are battery-powered with a quickly reversing option and can move at a top speed of 4mph, which is also typical speed of pedestrians. Delivery robots are typically equipped with lasers, around 10 cameras, four radars, eight ultrasonic and many other sensors to detect solid objects. Robots can correctly identify traffic signals and cross streets safely. Radars help to detect nearby vehicles and cross a road when it is safe. Typically the cost of a camera is \$10, radar \$20, and ultrasonic sensors \$5. Robots can see 360 degrees and integrate a “situational awareness bubble” around them to identify and navigate avoiding obstacles. Robots are engineered to complete several deliveries on a trip. They take advantage of low-speed settings. DoorDash is a popular start-up that started its robot delivery service about four years ago. Large companies such as Amazon and FedEx are also using robots for delivery purposes. In collaboration with Starship, well-known car manufacturing company Mercedes-Benz has come up with a Vans and Robot idea named mothership concept. Each Van carries eight robots. For example, Vans reach the delivery area and dispatch the robots to different destinations. Each of these robots can carry 10kg. Drivers can track the robots and fill the robots in the Van easily, accurately, and efficiently. Experts suggest that the COVID-19 crisis advanced robotics technology by several years.

## Competitions and business model

Competition for robot delivery is not so high because each company is perhaps operating alone in a city or a college campus. However, there are some places where multiple companies operate. However, competition will be growing, as more robots of different companies will be operating in the same areas, and regulations are established. They have competitions with other robot delivery start-ups, drone delivery services, and self-driving cars. Thus, robots become part of the community. Robots companies usually get

commissions and tips on their services. We know little about the fact that some delivery service providers like UberEats charge small fees for the delivery but take around 25 percent of meal price from the sellers. Robots reduce this commission significantly down. Delivery robots reduce added costs and they do not take tips.

## Impact on human jobs

Delivery robots pose a serious threat to employment. Millions of people are working in delivery sector to survive and feed their families. A contrasting argument is that human brains can be used for more important tasks than mere making deliveries. Further, the CEO of Starship Alastair Westgarth pointed out that his start-up is creating more job openings for human beings that it takes away for tasks such as programming software, developing apps on phones and tablets.

The delivery robots industry is creating new types of jobs such as operators, developers, and mechanics. Stanley Tang, a co-founder of DoorDash, believes that their robots are complementary to human deliveries. He argues that robots do deliver many short distances and small orders that typically delivery people do not want to take on. In the same vein, the co-founder and CEO of Marble start-up Matt Delaney feels that robots are suitable for short-range and small-sized. Orders. For example, Starship robots can deliver within a radius of a few kilometers. Therefore, delivering jobs for long distances is still beyond robots' territory. However, one thing obvious that robots are reducing physical works and increasing intellectual works, thereby creating knowledge-based jobs.

## Accident and theft

Delivery robots are small, travel at a low speed, and do not have cars in their paths as they move in sidewalks. Machine learning is the key element for robots to get around without any incident. Even if robots hit someone or something, the damage or injury is extremely small. However, robots are not appropriate on crowded sidewalks. According to Henry Harris-Burland, the vice president of marketing at Starship, there is no incident of theft or

vandalism of robots, which are equipped with alarm systems to prevent such incidence. Only the customer who orders the item can unlock the robot chamber with the App. However, pranksters or creepy passers-by may do nefarious things to the robots.

## Regulations

Regulations to govern the delivery robots are yet to be established in different countries. Robot delivery creates new challenges for regulatory bodies. Just like self-driving cars, some local regulations and laws need to be considered to get the robots rolling around scot-free. Therefore, to see delivery robots everywhere we need to wait a bit. Self-driving typically navigates relatively organized roads but robots need to deal with the unrelenting and unpredictability of sidewalks. Dealing with the regulatory officials is a challenging task as every city authority wants to protect their public spaces. In 2017, San Francisco banned delivery robots from sidewalks and subsequently allowed them to operate in certain areas. Many cities are regulating which paths robots can take and how they should behave. Gaining the trust and approval of people is vital to deploy delivery robots in a locality. Even though robots are not taller than an average dog and run slowly, some people feel threatened by them. Robot companies talk to local governments, drop awareness leaflets to residents, create online community dialogue meetings with local cooperative organizations to reduce fear of people. Robots have some limitations. For example, they can not climb stairs and get stuck in some locations, and need human help. Robots can deliver short distances but for longer distant delivery, they are not yet to be ready. These robots need to run a gauntlet of pedestrian legs and dilapidated side paths and watch debris pedestrians, pets, scooters, trees, trashcans, etc. Hence, many regulatory and practical issues need to consider for delivery robots.

## Benefits of delivery robots

No doubt, delivery robots make our everyday life convenient. They reduce carbon emissions, congestion, road use, energy consumption, carrying cost, road accidents. Some robot delivery services are valuable for small shops. People with disabilities welcome delivery robots as they have difficulty walking or driving to stores. A Swedish startup

TeleRetail has logistical problems with local businesses and compete with giants like Amazon. Delivery robots provide last-mile delivery and move traffic from the main road to the sidewalks. Opinions out there that robots can reduce the traffic congestion and parking problems as often we see that freight and delivery vehicles are parked unauthorized areas thereby blocking fire hydrants, crosswalks and bike lanes. A recent report from McKinsey & Company pointed out that self-driving vehicles and sidewalk robots can reduce last-mile delivery costs down by 40 percent.

---



Mokter Hossain [Follow](#)

Mokter Hossain is an Assistant Professor at the Center for Entrepreneurship, College of Business and Economics, Qatar University. Previously, he worked at Manchester University, Aalborg University, Aalto University, and Imperial College London. He has a PhD in strategy and venturing, an MBA in International Business, an MBA in Marketing, and a Postgraduate Diploma in Finance. His research interests lie at the intersection of entrepreneurship, innovation, and strategy on topics such as frugal innovation, open innovation, crowdsourcing, crowdfunding, sharing economy, etc.