

# Transforming the Future of Retail with Robotics-As-A-Service

If you hold a random screw in front of OSHbot, the multilingual robot at Lowe's Orchard Supply Hardware, it will scan the item and lead you to the aisle that has it<sup>1</sup>. At Hointer, a Seattle-based apparel store, robots deliver selected clothes directly to the fitting rooms<sup>2</sup>.

## Abstract

Robots have today moved beyond the realm of traditional jobs such as assembling of parts in the automobile and manufacturing industries. From military to healthcare to retail, robots are slowly becoming ubiquitous, delivering newer efficiencies. When combined with the digital forces such as cloud and analytics, these smart companions can have a positive impact across the retail value chain.

## Impact of Robots on the Retail Value Chain

In the next 5-10 years, robots are likely to play an important role throughout the retail value chain including both front-end and back-end operations such as:

### Customer assistance

- **Deploying robotic carts**  
A robotic shopping cart can assist shoppers by guiding them to the right aisle. It can also perform an auto-checkout as shoppers add items to the cart or cancel the checkout when items are removed.
- **Delivering personalized engagement**  
In a fashion store, robots can serve as shopping assistants by inferring personal likes and dislikes from non-verbal cues such as facial expressions, gestures, and body language of customers.
- **Offering value-added service**  
Large retailers typically have separate counters for 'in-demand services'. Robots can be used to provide a range of value-added services such as currency exchange, gift-wrapping, price comparisons, and dispensing loyalty coupons.

### Employee assistance

- **Supporting faster fulfillment**  
Robots can be deployed at stores for quicker fulfillment of online orders, especially during peak hours and the holiday season.

### Routine checks and compliance audits

- **Minimizing out-of-shelf scenarios**  
At least 25% of 'out of stock' items are in the store—just not on the right shelf<sup>3</sup>. Robots can be deployed to move around the store constantly, capture images of aisles and products, send alerts to a central system for misplaced items, empty shelves, and low stock situations, and automatically replenish shelves.
- **Ensuring planogram compliance**  
Robots can be deployed for out-of-shelf (OOS) checks and planogram compliance, thus helping consumer packaged goods (CPG) companies save thousands of dollars. Robots can capture images of aisles and products to gather insights on product performance and design store-specific planograms.

In the U.S. alone, retailers lose an average of 1.3% or \$54 billion of sales through shrink per year<sup>4</sup>.

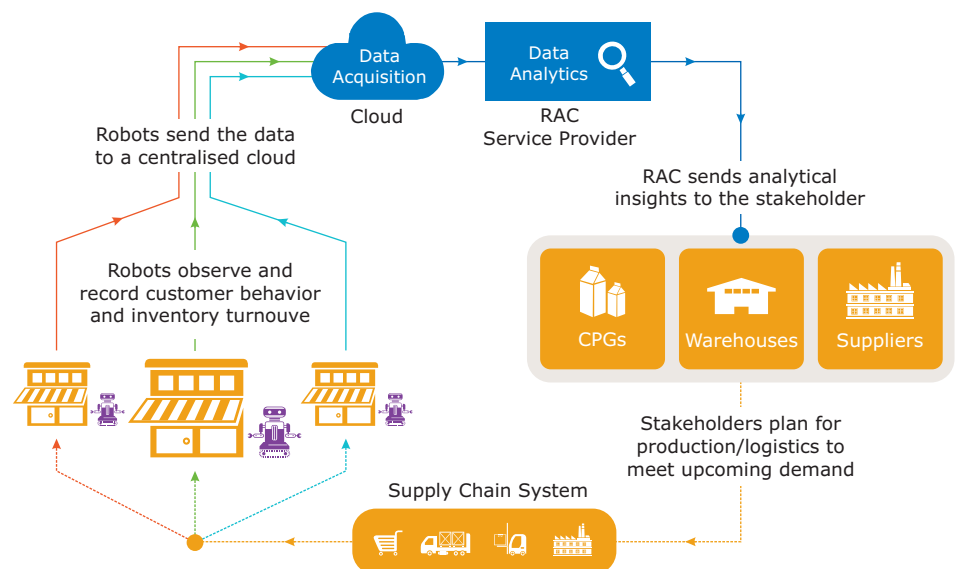
- Mitigating shrinkage and theft  
Surveillance robots deployed at stores can help identify suspicious activity based on motion and blinking eye patterns of shoplifters and store personnel. They can also capture images of trespassers and send alerts to the store manager to help reduce pilferage.

## Understanding the Combined Power of Robotics, Analytics, and Cloud (RAC)

Leveraging autonomous, multipurpose, and bespoke robots is likely to have lasting impact on the retail value chain. However, winning in the digital world will require harnessing the combined power of the digital five forces—Big Data and Analytics, Mobility and Pervasive Computing, Cloud Computing, Social Media, and Artificial Intelligence (AI) and Robotics.

A fleet of robots designed to perform multiple front- and back-end functions can be deployed across different stores to capture critical customer-specific and store-related data and insights such as customer preferences and inventory turnover by geography. The data is stored on a centralized cloud system that can be retrieved by different stakeholders to make informed decisions.

Advanced analytics helps CPG companies and retailers consolidate data from all stores to better understand customer purchasing behavior and track real time demands. Such insights can help distributors plan ahead effectively. Analytics can also be applied to other retail functions such as supply chain management, marketing, and business operations.



*Leveraging RAC for integrating customer browsing and purchasing behavior with the supply chain*

## Emergence of Robotics-As-A-Service Business Model

Deploying a fleet of robots, maintaining them, and integrating robotics with multiple databases across the retail value chain is challenging both in terms of budget and effort, which can be addressed by a new business model where robots are offered as a service rather than as a product. The advantages of the Robotics-As-A-Service (RaaS) business model, based on an RAC framework, are:

- Minimal upfront costs  
Since robots are programmed to execute complicated computation on a cloud server, the costs associated with employee adoption of an enterprise RAC platform are minimal.
- Smarter networks  
Robots are designed to be part of an intelligent ambient system. This means that they can interact with surveillance cameras and RFID antennae, enabling a smarter business network.
- Economies of scale  
The RAC service provider can deploy a fleet of robots to support multiple business functions, reducing the average cost of ownership. Technologies such as cloud that enable resource sharing can help further reduce costs.
- Easy upgrade of skills  
For a robot, learning a new skill can be as simple as downloading a mobile app. This can help reduce the effort and time taken to learn new skills, empowering robots to improve performance quickly.

## Leveraging RaaS for Mid-Segment and Big Box Retailers

A medium-sized retail store may prefer using a simple robot for basic monitoring and stock assessment on shelves. On the other hand, a big box retailer may opt for services that offer special capabilities such as interacting with customers through speech and vision. While the physical infrastructure cost would increase linearly with expansion, the operational cost will reduce exponentially as the same software can be used for managing several hundred robots.

Big box retailers such as Staples, Walgreens, Gap, and The Office Depot, and online players such as Amazon are using robots in their distribution centers. These robots fetch merchandise and deliver it to workers for packaging and shipment<sup>5</sup>. Amazon has installed 15,000 robots across 10 warehouses in the U.S. to get packages out more quickly. This holiday season, robots have allowed Amazon to ship packages in as little as 13 minutes from pick stations. This is a dramatic improvement over the average hour and a half taken to ship packages at older centers<sup>6</sup>.

The RAC service provider can be responsible for maintaining these robots and providing analytics based on the data gathered across multiple stores and brands to CPG companies. This will provide visibility to warehouses on upcoming demand and to customers on product availability, which both mid-segment and big box retailers can benefit from.

## Conclusion

Retailers need to identify jobs that are manual, mundane, repetitive, or hazardous. Deploying robots for such types of tasks will allow retailers to improve productivity and enable employees to focus on high value-adding tasks such as servicing customers.

With the growing focus on optimizing overheads, the RaaS business model can provide retailers with opportunities to reduce costs, improve organizational efficiency, enhance customer experience, and in turn, drive profits.

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