TAMROS MONDAL,
SUBJECT MATTER EXPERT,
RETAIL & CPG

ROBOTS IN RETAIL: DRIVING INNOVATION ONE AISLE AT A TIME

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Inside Amazon's warehouse[1] in southern New Jersey, U.S., it isn't uncommon to find giant beetle-like robots moving around busily with vertical shelves stacked on them. The inventories on these shelves are continually replenished in real-time by human 'stowers.' Whenever orders are received, human 'pickers' pick items off the shelves (using instructions on computer screens) and place them in bins that are carried by another set of robots to 'packers' for dispatch to customers. Leveraging robotics, Amazon has successfully automated manual monotonous tasks across its warehouses while upgrading the responsibilities of its workers.

The impact of robotics today is multi-dimensional with the integration of digital elements such as cloud and analytics. According to Boston Consulting Group (BCG),[2] the global robotics market is estimated to reach USD 87 Billion by 2025. It is believed that more than half of this will be allocated for the retail market. This is not surprising, since retail has always been an early adopter of advanced technology.

Automation is not a new phenomenon to this industry and had set in early to create efficiencies in retail supply chains. However, now warehouse and factory automations are being pursued under pressure to innovate, especially against the keen competitive thrusts from e-commerce retailers that are heavily investing in robotics. At Tesco, for example, Radio Frequency Identification (RFID) robots are scanning inventories for entire stores in just an hour (as against seven hours for a store employee) with far less errors. However, retailers are beginning to realize that innovation must set in holistically and extend far beyond just the warehouse or supply chain.

Robotics Across the Retail Value Chain

From logistics and supply chains to back-office operations, store operations, merchandizing, sales and marketing to customer-facing experiences, robotics can drive innovation, and help boost top and bottom-line outcomes. Online retailers are developing systems that are user-individualized for customers at the front-end and business users at the back-end.

While it is true that the bulk of repetitive work is concentrated at the Enterprise Resource Planning (ERP) level, retail Chief Information Officers (CIOs) can infuse robotics into every stage of the retail value chain to significantly speed up the innovation. Welcoming customers, minimizing negative experiences in-store, achieving zero-defect logistics, product picking and delivery, and customer path observation and analysis – robots can play a game-changing role in each of these areas of operations.

1. http://www.nytimes.com/2017/09/10/technology/amazon-robots-workers.html
2. http://www.bcg.com/d/press/21june2017-gaining-robotics-advantage-162604

Boosting Productivity in Logistics and Supply Chain

Robotics has already transformed Distribution Center (DC) operations with their incredible speed and accuracy of order picking. Amazon has stated that its operating costs have come down by 20 percent.[3] C&S Wholesale Grocery employs robots in its warehouses to pick orders, and Walmart uses drones in its warehouses to monitor out-of-stocks and accurate slotting.

The new generation of robotics, automation tools and technologies have the capabilities to support zero-defect logistic processes to achieve new highs in productivity. The *Effi-BOT*, for example, is a fully automated trolley deployed by DHL Supply solutions. From single- to multi-order picking, it creates a more efficient and interactive process to track complex inventory movements and handles pickers' manual work in the warehouse.

The use of robots in the logistics and supply chain enables retailers to achieve sizeable savings from stock-out shortages and losses, and shrinkage due to administrative errors. It also offers retailers the flexibility to move their sales personnel to functions that will drive higher sales.

While drones are currently used to deliver smaller packages, they may be used, in the near future, to deliver larger items of varying shapes and sizes. This may be one apt solution that retailers can adopt to address the challenge of growing numbers (nearly one-third) of U.S. haulage drivers who are approaching retirement age. Robots can be deployed in small to medium-sized retail companies too – costs are not prohibitive across the board. For example, a Baxter robot costing around USD 25000 has in the past sorted plastic products for over 2000 straight hours.

Pick & Pack

- Sawyer, the collaborative robot from Active8, with its embedded vision system, provides tremendous efficiency in picking, co-packing and handling multiple e-commerce orders
- Tally, Tory, Scallog and Stockbot are robots in the retail industry that find application in inventory, stock-taking and surveillance

3. www.cmswire.com/customer-experience/how-amazons-robot-army-is-driving-customer-experience/

Bringing Intelligence to Merchandising and Store Operations

As robots increasingly move from warehouses to shopfronts, embedding Artificial Intelligence (AI) in them will allow retailers to dramatically transform their customer interactions. While a basic sensor-based robot can bring customers what they are looking for, an AI-led robot can offer personalized product recommendations. The robot's 'advice' is invariably driven by analytical insights gleaned by combining data such as customers' age and location with their purchase histories.

Pepper, a humanoid robot driven by AI, is a good example of how the convergence of AI and robotics can drive customer engagement and experience. The robot can be pre-programmed to chat with customers, answer their questions and give directions. The manufacturer, SoftBank Robotics, claims that Pepper can also recognize human emotions. AI also enables it to use the tone of a customer's voice to assess whether they are happy or sad. At a pilot conducted for Pepper at B8ta in California, U.S., the tech retail store witnessed a 70 percent rise in footfalls.

Robots such as Pepper can use their robotic arms to pick out merchandise that customers choose through touch screens in the store. They can help retailers save on store space by shelving merchandise vertically. Clothing outlets can also use robots to quickly fetch items through the store's mobile app to customers in dressing rooms. Customers can order and pay for what they pick up before leaving the dressing room.

As the digital revolution in retail gathers steam, robotics, Internet of Things (IoT), AI and big data are intersecting to personalize customers' shopping experiences. Retailers can use these technologies to ingest customer intelligence into in-store and out-of-store promotional activities to optimize product assortments.

Spaced Out: The Robotics Advantage

- Space management
- Real-time tracking of product movement, stock levels and product placement
- Speedy and automatic scanning of huge store areas and imaging products on all shelves and aisles
- Accurate and correct stocking, tagging and pricing of products
- Early correction of errors to minimize costs, predictive planning based on past performance

Strategizing for Enhanced Customer Experiences

The Order & Pay App by Starbucks is an example of robotic self-service systems that enhance customer experience with pre-orders and payments. Other aspects are self-checkouts, self-service scanning and mobile shopping. Today, organizations are rethinking the means adopted to analyze customer behavior for deriving actionable insights. Dedicated marketing intelligence departments today process humungous data and adopt IoT components such as 3D sensors that track customer journeys in-store. Probabilities and statistics then create models for in-depth insights that enable better:

- Connections with end customers leading to 'wow' experiences
- Automation for efficient and effective follow-up processes
- Proactive recognition and correction of customer issues

Sensor features look to analyze customer count, path-tracking, behaviors, attention spans and emotions. The customer scoring system spots unhappy customers and uses their feedback to take corrective actions.

Retailers use augmented or virtual reality robotics to immerse consumers in a virtual environment for a more engaging and enticing experience. For example, IKEA's application allows customers to travel through their catalogs in augmented reality, virtually installing furniture in 3D-modeled rooms. Virtual fitting rooms create customer avatars from their photos and morphological features — some also provide customized recommendations.

An even more exciting innovation in this area is the development of robot sensors that recognize micro-expressions and associate them with specific individuals. The recently developed *Emovu* software aims to track and analyze shoppers' emotions and engagement levels as they go through a store.

Robotic Customer Touch Points

The innovative applications and impact of robotics in the retail industry offer tremendous potential and opportunity. Welcome robots, robots that track, monitor and analyze customer journeys, and operational robots — such innovations are bound to provide significant benefits, both for customers and retailers.

Robots may have limitations in the manipulation and demonstration of complex thinking and reactions that require a high degree of intuitive or creative skills. However, these are innovations for the future with improvements in AI and deep learning technology. For now, however, robotics in retail has moved to facial and voice recognition features, enhanced responses, interpretations and reactions.

While robots in retail are still a novelty, their rising adoption and evolving sophistication will make them ubiquitous in the future. For customers, the increasing presence of helpful robots in stores will translate into hassle-free, personalized shopping experiences. Retailers can capitalize on the rise of the robots to realize improved productivity, cut costs, enhance customer experiences and boost profits. Robotics, when combined with digital technologies such as analytics, AI and machine-learning, has the potential to drive transformation across the retail value chain. And that transformation will materialize sooner than one thinks.

Shopper's Assistant

Hointer, a retailer in Seattle, is a completely automated store. Customers can use their smartphones to scan an item of clothing (only one item of each category is on display) and provide their choice of size and color. They can then go to the fitting rooms where robots deliver them their choice of clothing. With the assistance of the robots, they can change sizes and colors. Once done, they can check out their purchases using self-service kiosks.

About WNS

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