

Inside the Next-Generation Kitchen: Robotics, AI, and the Shift Toward Scalable Automation



Commercial kitchens are entering a new era in which automation is becoming fundamental to how restaurants operate.

Robotics now supports repetitive and high-risk tasks, AI tools help teams navigate rush periods with greater accuracy, and connected equipment makes kitchens safer, more energy-efficient, and easier to manage across multiple locations. These capabilities are already active inside fast-growing brands like Chipotle, CAVA, Sweetgreen, and Wingstop, where task-level robotics for frying, assembly, and slicing are paired with AI-enabled kitchen display systems, computer vision, and enterprise IoT platforms to improve labor efficiency, strengthen food-safety compliance, and elevate the guest experience.

A wave of innovation from leading OEMs is accelerating this shift. Companies such as Middleby/Lab2Fab with FryBot, Miso Robotics with Flippy, ABB Robotics for food service, and Electrolux Professional with OnE Connected are designing systems specifically for real-world kitchen environments – systems that are easier to install, simpler to service, and compatible with existing workflows. These capabilities point toward a next-generation kitchen built around autonomous cooking cells, robotics-assisted production lines, and AI-driven orchestration – all operating within the four walls of the restaurant, without the need for centralized fulfillment centers. This momentum reflects a convergence of stronger OEM readiness, rising operator demand, and technologies that are far more stable, connected, and commercially viable than they were just a few years ago.

Why Automation Is Accelerating Now

With OEM solutions becoming more reliable and operators more willing to adopt them, the industry is reaching a point where automation can make a strong impact inside everyday restaurant operations. At the same time, several major forces are reshaping the economics of commercial kitchens and accelerating the need for automation:



Rising digital demand and speed expectations

Online ordering and delivery platforms continue to drive unpredictable surges in volume, placing pressure on kitchen throughput and order accuracy.



Persistent labor shortages and safety concerns

High turnover, wage pressure, and frequent exposure to hazards make repetitive tasks, especially frying, ideal candidates for automation, allowing staff to focus on higher-value responsibilities.



The shift toward data-driven operations

Connected kitchen platforms now support energy optimization, predictive maintenance, remote recipe updates, and fully digitized Hazard Analysis Critical Control Point (HACCP) compliance across multi-site operations.



Growing investment in kitchen technology

According to the **National Restaurant Association**, **52% of restaurant operators are investing in technology to improve kitchen productivity**, evidence of the industry's commitment to automation as a performance driver.

These forces, combined with the maturing capabilities of OEM-driven systems, are accelerating the adoption of three interconnected pillars of modern kitchen automation:

1. Robotics for repetitive tasks

Robotics are now handling the most labor-intensive and hazardous areas of kitchen operations. Automated fry stations, for example, are a leading use case. Systems such as Middleby's FryBot and Miso Robotics' Flippy handle basket loading, frying, and hot-holding, reducing burn risks while generating labor savings, often up to **\$75,000 per store annually**. FryBot can process up to **85 baskets per hour**, while Flippy delivers high throughput in a small amount of space.

Automation is also reshaping assembly lines. Solutions like **Hyphen's Augmented Makeline** support high-volume digital ordering by automating bowls and salads, while **Chipotle's Autocado** automates a time-intensive prep task to improve consistency. Outside traditional restaurants, autonomous kitchen cells like RoboEatz ARK integrate storage, cooking, and cleaning into compact units suitable for hospitals, airports, and nontraditional foodservice environments.

2. AI orchestration and computer vision

Intelligence is becoming just as critical as mechanical automation. AI-driven orchestration tools forecast demand, balance workflows, and reduce waste during peak periods by dynamically aligning production with real-time order flow.

Computer vision adds another layer of operational insight. AI-enabled cameras monitor ingredient levels and activity in real time, help maintain freshness, minimize waste, and prompt teams to respond quickly as demand accelerates.

3. Connected ecosystems and smart infrastructure

Connected kitchen platforms bring equipment, data, and compliance into a unified operational view. Solutions from Middleby and Electrolux Professional offer multi-site visibility, predictive maintenance, energy optimization, and digitized HACCP processes across entire equipment fleets, strengthening food safety and operational consistency. Even ventilation is getting smarter: demand-controlled systems such as Halton M.A.R.V.E.L. automatically adjust airflow based on cooking activity, reducing heating and air conditioning costs.

Together these advances are modernizing kitchen operations and delivering improvements across safety, efficiency, and cost — setting the stage for next generation of high-performance restaurant environments.

Why Scaling Automation Remains the Core Challenge

As interest in kitchen automation grows and more operators adopt these technologies, a different challenge is becoming clear: proving a system works in a pilot is very different from rolling it out across hundreds or thousands of restaurants. Many solutions perform well in early, controlled deployments, but scaling them requires capabilities that go far beyond initial product innovation. It demands reliable manufacturing at volume, consistent quality across diverse store environments, and long-term support in real-world kitchen conditions.

Even with more mature OEM offerings and stronger operator demand, most automation systems still face a significant gap between successful pilots and full multi-site deployment. Three barriers account for most of this slowdown:

- **Supply chain maturity**

Food-grade robotics require durable, high-precision components that can perform reliably under intense heat, grease, daily washdowns, and long operating hours. Many innovators still lack access to supply networks capable of producing these parts consistently at scale, leading to variability, higher costs, or long lead times.

- **Industrialization of manufacturing**

A product that performs well in a test kitchen may struggle under the real-world demands of an 18-hour commercial shift or the environmental variation across a national brand's portfolio. Real-world environments introduce wide variations in temperature, humidity, shift length, store layout, menu complexity, and staff experience. To scale reliably, systems must go through rigorous engineering validation, durability testing, repeatable assembly processes, and full manufacturing readiness.



- **Design for Manufacturability (DfM)**

Early automation concepts are often engineered for novelty and performance rather than cost-efficient, high-volume production. DfM involves revisiting these designs to simplify assembly, ensure component availability, reduce cost, and support long-term serviceability. Without this step, even strong solutions tend to remain limited-run pilots.

Overcoming these hurdles is essential for automation to become **reliable, safe, and economical** at scale.

How Automation Elevates Kitchen Performance

Kitchen automation is delivering a step-change in operational efficiency. By streamlining prep, cooking, and service workflows, automated systems help reduce ticket times, shorten guest waits, and increase throughput during peak periods. These tools also improve consistency, ensuring dishes meet the same quality standard regardless of staffing levels or shift changes.

Beyond speed and accuracy, automation enhances safety and cost management. Smart equipment supports HACCP compliance, limits cross-contamination risks, and takes on hazardous tasks such as frying or handling hot oil. Connected platforms also manage oil temperatures, ventilation cycles, and cleaning routines to reduce burn and fire risks. At the same time, precise portioning and automated monitoring help reduce food waste and improve forecasting for inventory, staffing, and production needs.

These improvements translate directly into stronger unit economics. Automation reduces labor demands for repetitive tasks across front- and back-of-house, and some concepts using serving robots report 20–50% reductions in labor costs. By reallocating staff toward higher-value cooking and hospitality roles, productivity rises while operational costs become more predictable. As these results become more consistent across the industry, leading brands are demonstrating that automation can deliver in real-world environments.



20–50%
reductions in labor costs

WHAT LEADING BRANDS ARE DEMONSTRATING

Several restaurant brands have already demonstrated how automation can elevate performance at scale.

- **Wingstop** is seeing great results through its **Smart Kitchen initiative**. Stores report roughly **40% reductions in ticket-time**, consistently meeting **10-minute** lunch targets, and maintaining delivery windows under **30-minutes** — contributing to stronger marketplace rankings without additional advertising.
- **Chipotle** is using automation to relieve its most time-intensive tasks. **Autocado** automates high-touch prep step by peeling an avocado in just 26 seconds, improving consistency. At the same time, Hyphen's automated makeline handles digital bowls and salads during peak surges, allowing staff to focus on other menu items and maintaining throughput during high-volume periods.
- **CAVA** is applying AI vision within its kitchen display system to enhance freshness and accuracy. Leadership emphasizes that technology augments human hospitality rather than replacing it, reinforcing how automation can elevate frontline roles.

These examples show that the industry is moving in a new direction, shaped by strong performance results and changing market priorities.



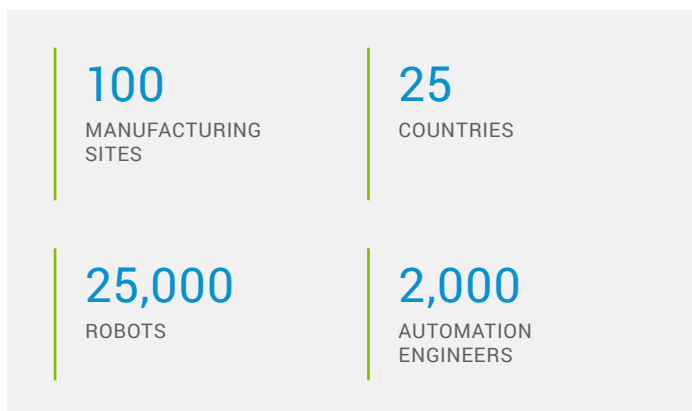
How Jabil Enables Scalable, Real-World Automation

The results seen across leading restaurant brands highlight what is possible when automation is designed for scale. Jabil helps innovators achieve that level of reliability by bringing together deep expertise in robotics, retail automation, and high-volume manufacturing. This combination positions the company to support technology developers as they accelerate product development, enter new markets, and deploy solutions across large restaurant networks.

Over many years, Jabil has built the technologies, talent, and global infrastructure needed to bring intelligent automation to commercial scale. **Across more than 100 manufacturing sites in over 25 countries**, the company leverages AI, machine vision, and predictive analytics to turn promising automation concepts into reliable, high-volume solutions.

Today, more than **25,000 robots** operate within Jabil's global network, supported by over **2,000 automation engineers and technicians**. This expertise allows the development of solutions ranging from collaborative robotic arms, autonomous mobile robots (AMRs), and fully integrated, high-speed production modules.

What sets Jabil apart is the way all these capabilities work together. A unified digital backbone connects every operation, providing real-time visibility into machine performance and production processes. AI continually evaluates system behavior, identifies emerging issues before they affect quality, and adjusts operations to preserve efficiency. Automated optical inspection strengthens accuracy, while predictive maintenance helps prevent unplanned downtime through early detection of equipment needs.



This connected environment also supports the engineering teams who build and scale these technologies. Machine-learning and generative-AI tools guide decision-making throughout the engineering lifecycle, reducing errors and accelerating development. Once new automation solutions are validated, standardized rollout processes ensure consistent deployment across Jabil's global footprint, shortening the path from prototype to full production.

For commercial-kitchen innovators, these capabilities address the hardest challenges of scaling automation. Jabil provides:



Mature supply networks for food-grade and high-precision components



Industrialization expertise to ensure reliability under demanding kitchen conditions



Design-for-Manufacturability (DfM) guidance to reduce cost, simplify assembly, and support scalable production



Integrated AI and machine-vision capabilities to improve reliability, quality, and system uptime

Combining global manufacturing strength with advanced automation expertise enables Jabil to help innovators bring next-generation kitchen technologies to market at scale, supporting faster adoption, higher reliability, and solutions operators can trust across large restaurant networks.

Automation has already proven its ability to strengthen efficiency, safety, and consistency in commercial kitchens. The next stage of progress will depend on strengthening supply chains, advancing industrialization, and embedding DfM early in product development. With partners like Jabil providing the technical depth, global infrastructure, and manufacturing discipline needed to support this transition, the industry is well-positioned to move from isolated pilots to reliable, scalable, human-centered automation that elevates kitchen operations for the long term.

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For additional information, visit
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About Jabil

At Jabil (NYSE: JBL), we are proud to be a trusted partner for the world's top brands, offering comprehensive engineering, manufacturing, and supply chain solutions. With over 50 years of experience across industries and a vast network of over 100 sites worldwide, Jabil combines global reach with local expertise to deliver both scalable and customized solutions. Our commitment extends beyond business success as we strive to build sustainable processes that minimize environmental impact and foster vibrant and diverse communities around the globe. Discover more about us at www.jabil.com.