

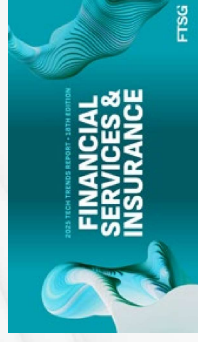
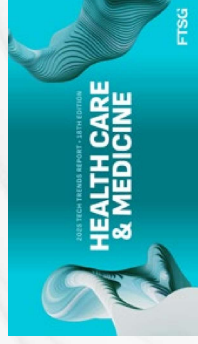
2025 TECH TRENDS REPORT • 18TH EDITION

# HOSPITALITY & RESTAURANTS

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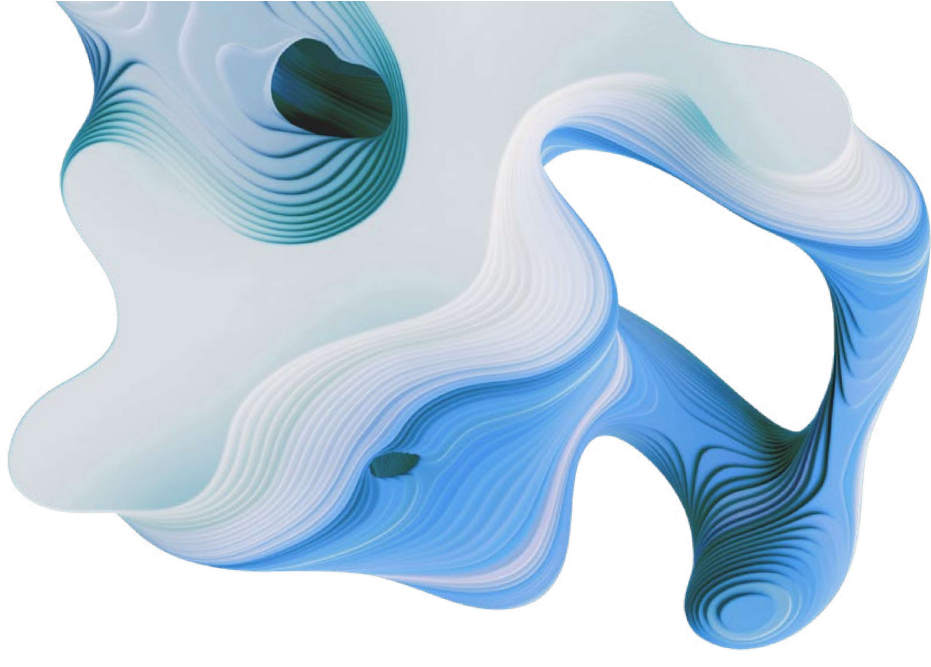
## Future Today Strategy Group's 2025 Tech Trend Report

Our 2025 edition includes 1000 pages, with hundreds of trends published individually in 15 volumes and as one comprehensive report. Download all sections of Future Today Strategy Group's 2025 Tech Trends report at [www.ftsg.com/trends](http://www.ftsg.com/trends).





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**Mark Bryan**  
Hospitality Lead

## Move past the back-of-house and into the future.

The hospitality industry is falling behind. While a few trailblazers are redefining what's possible with bold innovations, much of the sector is struggling to adapt, burdened by rising costs, labor shortages, and waning consumer confidence. This growing divide is holding the industry back at a time when transformation is critical. To move forward, the industry must take bold, collective action to close these gaps and embrace a more agile, innovative future.

This means more than making behind-the-scenes improvements, which are valuable but insufficient to secure guest loyalty. Instead, the solution lies in focusing on visible, guest-facing innovations that create emotional connections and unforgettable experiences. Sustainability is paramount, and businesses that innovate through waste reduction, energy-efficient systems, and regenerative practices will have an advantage. But ultimately, personalization must evolve beyond transactions, to offer meaningful moments that connect guests with the authenticity and culture of their destinations.

In restaurants, this means going beyond a fixed menu to provide a curated tasting based on guest sustainability preferences. For hotels, it goes beyond providing rooms; instead, their curated experiences could immerse guests in local stories and create lasting impressions.

To achieve this industrywide transformation, the pace of progress needs to accelerate. Advanced technologies that help businesses improve their agility—like AI-driven personalization, contactless systems, and seamless guest engagement tools—are no longer optional. Anticipating change, rather than reacting to it, will be the key to sustained success.

Hospitality has always been about creating connections and memories that last. Now, more than ever, the industry must pair those values with bold innovation to build a future that is resilient, vibrant, and inclusive. The time to act is now.



## Tech-driven wellness, personalized experiences, and planetary expansions are redefining luxury and innovation.

1

### Luxury hotel demand reaches “insatiable” levels globally

High-end properties are experiencing unprecedented occupancy rates and daily revenue growth, particularly in Asia and the Middle East, as affluent travelers seek premium experiences.

2

### Sustainability becomes nonnegotiable in hospitality

More than 80% of global hotel chains commit to net-zero carbon emissions by 2050, with guests increasingly choosing eco-friendly accommodations.

3

### Labor challenges persist despite industry growth

While the industry is projected to add jobs by the end of 2024, 45% of operators still report needing more employees to meet customer demand.

4

### Global hotel industry hits \$1 trillion milestone

Despite economic challenges, the worldwide hospitality sector achieves record-breaking revenue, driven by pent-up travel demand and increased spending.

5

### AI and automation reshape operations

Forty-one percent of restaurants plan to invest in AI technology to improve business forecasting, increase operational efficiency, and enhance customer experiences. At hotels worldwide, AI-driven chatbots handle up to 70% of customer inquiries.



## The hospitality industry must move forward as one to overcome pocketed stagnation.

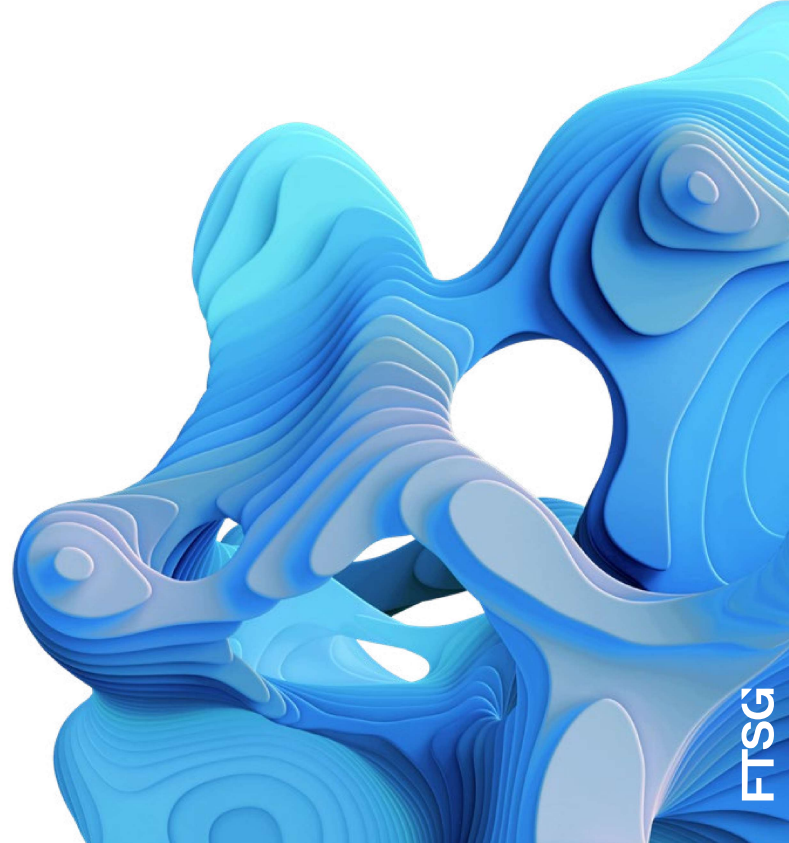
The hospitality industry is facing critical stagnation that threatens its long-term future. Companies have been slow to adapt to changing consumer demands and have struggled to balance growth with sustainability. While some businesses are innovating and thriving, the widening gap between leaders and laggards highlights the urgent need for transformation.

In the hotel sector, recovery remains uneven, with significant variation across regions and property types. Companies that have embraced experiential travel and wellness-focused stays are thriving, as are luxury brands that have expanded aggressively into high-growth regions such as India, Southeast Asia, and the Middle East. And direct bookings have surged, offering operators better control over pricing and deeper customer relationships. But elsewhere, the picture isn't as rosy. In much of the world, outdated infrastructure and limited innovation in other markets are stifling growth and leaving significant opportunities untapped.

The restaurant sector reflects a similar pattern of divergence. Quick-service and off-premise dining models are booming, driven by the convenience-focused behaviors of modern consumers and the essential role of delivery services. But many operators are struggling to integrate loyalty programs, streamline operations, or meet rising customer expectations. Economic pressures have forced many businesses to adopt creative pricing strategies and rethink their offerings just to stay afloat.

Sustainability has become both an imperative and a challenge. Leading properties are setting the standard by adopting eco-friendly practices, such as energy-efficient systems and regenerative agriculture. However, progress is fragmented and some markets lag behind due to financial and operational constraints. For the industry to meet growing expectations for environmentally conscious options, bridging this gap is essential.

Ultimately, outdated systems and resistance to innovation remain major barriers to progress in both hotels and restaurants. To overcome these challenges, businesses must prioritize targeted investments in infrastructure, streamline operations with advanced technologies, and develop flexible, forward-thinking business models. Agility and adaptability will be key to navigating external pressures, from economic uncertainty to evolving guest behaviors.





# A new era dawns with opportunities for location and loyalty.

## MAY 2024

### Hilton Introduces Modular Construction

By using modular construction for its new Garden Inn in Townsville, Australia, Hilton saved both time and money.

## JULY 2024

### Blockchain Revolutionizes Restaurant Loyalty

Blackbird Labs introduces \$FLY cryptocurrency rewards for diners checking into participating restaurants.

## DECEMBER 2024

### Space-Oriented Travel on Earth

Orbite and Accor are partnering on luxury astronaut training experiences in places like Paris, Curaçao, and Antarctica.

## JULY 2024

### Robots Offer High-End Spa Services

Combining efficiency with relaxation, Lotte New York Palace's robotic massagers are setting a new bar for spa services.

## OCTOBER 2024

### Sindalah Island Welcomes Guests

Saudi Arabia's NEOM project transforms a barren island into a luxury destination in the Red Sea.

« PAST



# Top-tier services and guest inputs will evolve through cobot-human-data integration.

## EARLY 2027

### Hotel Room Personalization Through AR

Hotel guests will use augmented reality to customize room elements like virtual wallpaper and lighting in real time.

## LATE 2029

### Restaurants Adopt Edible Packaging

The packaging eliminates waste while introducing unique flavors and textures to complement meals.

## MID 2037

### A Food Accessibility Revolution

Autonomous restaurants featuring robot chefs and dynamic menus will provide restaurant-quality food but won't require a fixed location.

## FUTURE >>

## LATE 2028

### Robot Concierges Expand to Mid-Tier Hotels

As prices drop, robotic concierge services handling tasks like check-in and room service delivery won't be limited to luxury hotels.

## EARLY 2032

### Biometric and Neural Feedback in Dining

Restaurants will monitor diners' emotional and sensory responses, adjusting taste and texture of meals in real time.





## Emerging trends offer unique opportunities to reduce costs, while maintaining customer satisfaction and company commitments.

### Enhancing Customer Experience

Hospitality trends, such as hyper-personalization and frictionless stays, are in direct response to consumers' increasing expectations for seamless, tailored experiences. These innovations enhance guest satisfaction and loyalty, which are critical for retaining competitive advantages in a crowded marketplace.

### Operational Efficiency and Cost Management

When companies integrate automation and smart technologies in hospitality operations, they can help streamline workflows, reduce waste, and optimize resource allocation. For example, AI-driven safety tools and predictive systems can make operations more cost-efficient while maintaining service quality.

### Alignment With Sustainability Goals

Sustainability is increasingly interwoven throughout hospitality trends, from predictive systems that minimize energy waste to modular hotels with self-sufficient energy systems. These innovations can both align businesses with global environmental standards and attract eco-conscious travelers.

### Adaptability to Market Changes

As the demand for hotels, restaurants, and hospitality experiences evolves, trends like modular and nomadic buildings allow businesses to rapidly adapt to changing market demands and geographic opportunities. This flexibility helps businesses stay resilient against economic fluctuations and infrastructure limitations.

### Staying Competitive in a Tech-Driven World

Consumers now expect technology to anchor their experiences; in this environment, businesses that fail to integrate augmented technologies or automation risk being outpaced by competitors. The ongoing evolution of customer needs makes these advancements a necessity for growth and survival in the digital era.

### Focusing on the Right Data

New systems and embedded technologies generate vast amounts of actionable data. By preparing for these innovations, hospitality and restaurant businesses can gain deeper insights into which data is relevant. This will help them to understand customer behavior and preferences both now and in the future.



## These individuals are at the forefront of development and transformation in the hospitality and restaurant industry.

- ◆ **Robert Macrae**, lead for Dynamic Interaction: Generative AI at SoundHound, for their work on managing voice recognition with multiple users.
- ◆ **David Nussbaum, CEO of Proto**, for their work on holographic concierge in hotel rooms.
- ◆ **Dr. Yiming Liu**, researcher at City University of Hong Kong, for their work on creating lickable devices.
- ◆ **Yang Yong, CEO at Nanjing JuYun Intelligence Information Technology Co.**, for their work on tracking fabric and linen usage in hotels using RFID tags.
- ◆ **Dr. Vayyu Hill-Maini**, assistant professor at Stanford University's Department of Bioengineering, for their work on improving the taste and nutrition of edible mycelium.
- ◆ **Speed Bancroft**, founder and CEO of Speedy Eats, for the launch of their first unmanned drive-thru.
- ◆ **Dr. Pasi Vainikka**, cofounder and CEO of Solar Foods, for their work on developing a new edible protein from electricity and carbon dioxide.
- ◆ **Dr. Kevin Verstrepen**, professor in genetics and genomics at Leuven University and codirector of the Leuven Institute for Beer Research, for their work in using AI to improve the taste of beer.
- ◆ **Dr. Laia Domingo**, chief science officer, Ingenii, for their work on quantum computing applications to monitor food waste.
- ◆ **Jolie Fleming**, chief product and technology officer at InterContinental Hotels Group, for their AI-powered trip planner.
- ◆ **Alfonso de Gaetano**, founder and CEO of Crurated, for their work on offering immersive wine experiences.



# Technology that empowers with smarter personalization, efficiency, and transparency...

## OPPORTUNITIES

### Customized Hotel Fees

Hotels that introduce dynamic pricing for in-room amenities and experiences will give guests the ability to pay only for the features they use, such as enhanced room functionalities, virtual reality entertainment, or wellness add-ons.

### Embedded Health and Safety

AI-driven monitoring systems are more discreet than ever, and companies can employ them strategically. In high-touch areas, this technology can ensure health and safety without intrusive measures, to blend guest comfort with operational vigilance.

### Produce Provenance

Food producers and distributors can implement blockchain to certify the nutritional authenticity of engineered foods, giving consumers greater confidence in synthetic or lab-grown options.

### Recipe Flexibility

In personal and professional kitchens, AI can recommend alternative sustainable ingredients in real time for recipes, ensuring consistent flavors while promoting eco-consciousness.

# ...must be balanced to protect privacy, maintain trust, and preserve human expertise.

## THREATS

### Privacy Concerns from Personalization

A heavy dependence on AI over-personalization in loyalty programs risks crossing privacy boundaries, leading to regulatory scrutiny or consumer trust erosion as brands increasingly monetize user data.

### Consumer Adoption and Trust

Consumer mistrust of genetically engineered foods or lab-grown ingredients could hinder adoption, fueled by misinformation or cultural resistance to artificial innovations.

### Workforce and Community Impacts

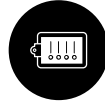
Overreliance on automation could reduce job opportunities, leading to tension between businesses and local communities dependent on traditional employment.

### Cyber Breach Risk

The interconnected nature of optimized management systems creates attractive targets for hackers, potentially compromising sensitive operational data.



## AI-driven operations, eco-efficient management, and advanced security systems are requirements for resilience, profitability, and trust in a rapidly evolving world.



Expand eco-friendly amenities by implementing attribute-based booking and gamified options so guests can curate stays that align with their values. This approach enhances engagement, incentivizes sustainable choices, and increases ancillary revenue.



Use biometric data from wearables or in-room sensors to offer tailored wellness recommendations, from curated spa treatments to personalized meal plans. This could evolve into premium wellness packages or subscription services tied to health analytics.



Invest in smart resource management and predictive maintenance tools to overcome the outdated infrastructure and technological systems that are common in the hospitality and restaurant industry.



Prioritize robust cybersecurity measures. With the rise of interconnected AI-driven management and blockchain systems, investments in advanced encryption, real-time threat detection, and staff training will mitigate vulnerabilities and protect sensitive data.



Balance automation with workforce adaptation strategies, including training for high-tech roles and reskilling programs. Maintaining a harmonious balance between technology and human touch will be key to sustainable growth.



Establish R&D hubs within hotels or restaurants. These labs could test and refine AI-driven personalization, robotics, or immersive technologies like virtual reality dining or augmented reality concierge services. They could also double as guest engagement tools, letting early adopters experience innovation firsthand.





## Important terms to know before reading.

### **BACK-OF-HOUSE (BOH)**

The area in a hospitality establishment for food preparation, storage, and staff administration, generally away from customers.

### **BIOMETRIC PAYMENTS**

Technology that uses biometric data like facial recognition, gestures, voice, or fingerprints for identification to complete a transaction.

### **DIGITAL LOYALTY PROGRAMS**

Membership or rewards programs that use digital technology like blockchain to track customer interactions and provide membership benefits.

### **ENVIRONMENTAL, SOCIAL, AND GOVERNANCE (ESG)**

The framework and disclosure practices that measure how a company addresses ethical, governance, and sustainability issues.

### **EXTENDED REALITY (XR)**

A technology that can augment the physical world through either virtual or augmented reality.

### **FACIAL RECOGNITION TECHNOLOGY**

Technology used to authenticate customers by analyzing their facial features.

### **FRICTIONLESS EXPERIENCES**

Experiences that minimize physical contact, remove obstacles, and create seamless interactions for guests and customers.

### **FRONT-OF-HOUSE (FOH)**

The area in a hospitality establishment where interactions between guests and staff occur.

### **KIOSKS**

Self-service terminals of any kind, typically used for ordering or obtaining information.

### **MID-AIR HAPTICS**

Technology that can track movement and enable the sense of touch without actually touching a physical object.

### **MODULARLY BUILT**

A construction technique that uses prefabricated components to create a space, building, or other structure.

### **NATURAL LANGUAGE PROCESSING (NLP)**

AI that can understand the human language and respond in a human-like manner.

### **QUICK-SERVICE RESTAURANTS (QSR)**

Restaurants that prioritize fast and convenient service over longer-stay dine-in experiences.

### **REVENUE PER AVAILABLE ROOM (REVPAR)**

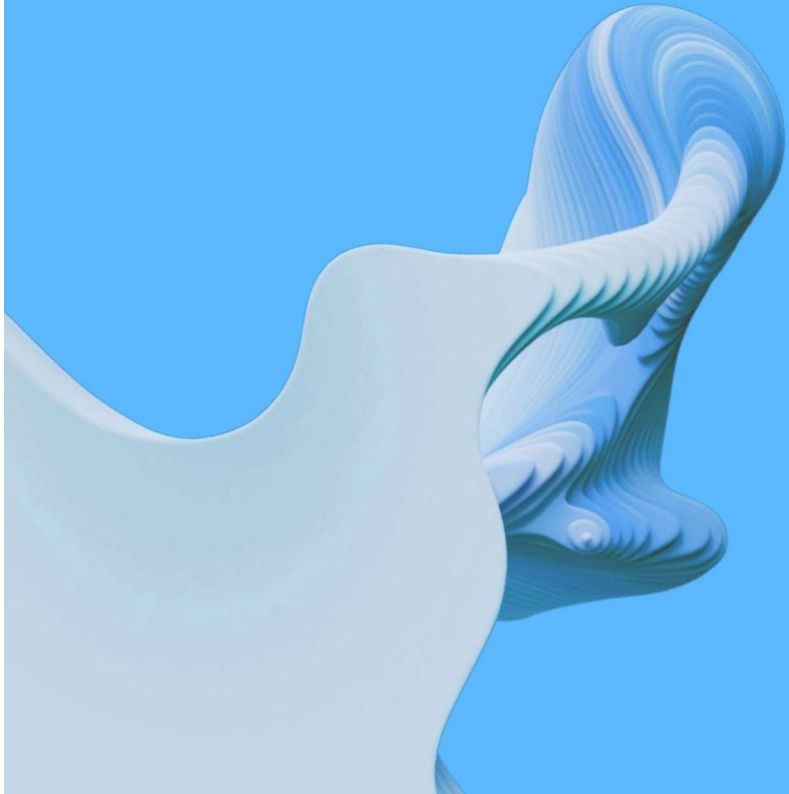
A key performance metric of the hospitality industry that divides the total room revenue by the number of available rooms and assesses a property's performance.

### **SMART MANAGEMENT**

The use of technology to automate certain parts of the operational management of a restaurant or hotel.



# HOSPITALITY & RESTAURANTS TRENDS



# ENHANCED HOSPITALITY EXPERIENCES



2ND YEAR ON THE LIST

# AUGMENTED EXPERIENCES

WHAT IT IS

**Augmented experiences are redefining the hospitality sector by blending innovative technology and traditional guest services to offer personalized, immersive, and efficient solutions that cater to diverse customer needs.**

HOW IT WORKS

Augmented experiences leverage advanced technologies, such as holographic concierge services, extended reality (XR) studios, and AI-powered systems to elevate guest interactions and operational efficiency. These are already being deployed around the world: InterContinental Hotels has partnered with Timeshifter, an app using circadian rhythm science to combat jet lag, while the Beverly Wilshire Hotel is using Proto's holographic concierge technology to enable realistic virtual interactions with staff. These advancements bring the industry even closer to merging physical and digital touchpoints.

Also, these technologies are enabling deeper travel experiences, whether in-person or virtual. The Hilton Tokyo's XR studio, powered by Vega Global, integrates high-tech visual solutions for hybrid events, bridging in-person and virtual participation. Similarly, Renaissance Hotels' RENAI program combines AI-driven recommendations with local expertise to enhance trip personalization. Platforms like Travly tap into the creator economy, turning user-generated video reviews into a booking incentive. These iterations create tailored, engaging, and functional guest journeys, powered by cutting-edge tools and data-driven insights.

WHY IT MATTERS

Augmented experiences are more than just tech innovations; they signal a transformative shift in how businesses engage with customers. By embedding these technologies, hospitality leaders can tap into new revenue streams, enhance brand loyalty, and achieve operational efficiencies. These developments also align with consumer demands for personalized and seamless experiences, ensuring competitiveness in a rapidly evolving market landscape.

For businesses, integrating augmented technologies makes it easier to scale up offerings, take advantage of plentiful data, and respond quickly to customer needs. The trend extends far beyond hospitality, influencing sectors such as health care, retail, and entertainment. The stakes are high: The evolution of these technologies will redefine customer expectations, making tech integration not a luxury but a necessity for survival and growth in the digital age. Failure to adopt augmented experiences risks alienating tech-savvy consumers, eroding market share, and leaving businesses unable to compete with innovators that are reshaping the standard for guest expectations. Successful entrants to this field will prioritize preferred experiences first, and then test and meet guest expectations.



2ND YEAR ON THE LIST

# SMART ROOMS

WHAT IT IS

Smart rooms, powered by the Internet of Things and AI, combine personalization, efficiency, and security.

HOW IT WORKS

Increasingly, hotels are turning toward smart technology to keep guests happy and safe. At Grand Copthorne Waterfront Hotel in Singapore, the Aiello Voice Assistant (AVA) is integrated with the hotel's property management system and task management system; they work together to transform rooms into voice-activated hubs, replacing traditional telephones. Guests take advantage of customizable modes like "Good Morning" and "Good Night" to adjust room settings for enhanced convenience and comfort; they can also control their own lights and air conditioning, and request services hands-free. Guests at the New Zealand hotel manage lighting, temperature, and security via smartphone apps that ensure elevated safety through credential encryption.

Beyond comfort, advanced technologies enhance safety and reputation. UK-based startup Spotta uses AI and image sensors for real-time bedbug detection, mitigating risks that could lower room rates by \$23 to \$38 per bad review. Now expanding into the US with Comcast's MachineQ, Spotta exemplifies AI's role in addressing persistent challenges. Meanwhile, futuristic concepts like Japan's "Mirai Ningen Sentakuki" highlight the potential for hyper-personalized wellness in hospitality: The biometric-monitoring "human washing machine" uses AI and ultrasound waves to cleanse and relax customers. Though currently a prototype, it reflects growing trends toward technology-driven guest experiences.

WHY IT MATTERS

These innovations not only meet growing consumer demand for hyper-personalized services but also enhance operational efficiency and cost management. Voice-activated systems like AVA simplify interactions, while mobile integration streamlines services and increases convenience. Behind the scenes, AI-driven systems like Spotta ensure safety and minimize risks to hotel reputations.

But the implications extend beyond guest satisfaction. Enhanced security features and proactive safety measures set new industry benchmarks. These trends also align with broader sustainability goals, as predictive systems reduce energy waste. For hotel operators, the ability to monitor and adapt to guest preferences allows for better resource allocation and staff utilization, and can be a profitability driver.

Companies that fail to adopt some of these technologies risk falling behind competitors. Long term, this trend underscores a broader societal shift toward smart, automated living environments, presenting opportunities for Internet of Things expansion across industries. It also offers the opportunity to expand a brand to new locations outside the hotel—even to rooms in a guest's home.



2ND YEAR ON THE LIST

## DIGITAL WELLNESS TREATMENTS

WHAT IT IS

The fusion of advanced technology and wellness is revolutionizing hospitality, as companies can offer guests bespoke experiences that prioritize health and recovery. This shift positions digital wellness as a competitive advantage for industry players.

HOW IT WORKS

As the industry continues to focus on catering to consumers' desire for greater well-being, this trend spans multiple innovations. There are partnerships like that of The Set Collection with Therabody, where high-tech suites equipped with devices like the Theragun massager offer deep tissue therapy. There are robotic massage technologies, such as WaverMat's gravity wave systems, where consumers can enjoy contact-free treatments using frequency-based therapy to alleviate stress and enhance relaxation. And there are luxury retreats, including the Carillon Miami's Sleep Well Retreat, that combine features like smart beds with touchless energy therapies to optimize sleep and recovery.

Hotels are also embracing immersive technologies like VR for mindfulness. TreeHouse Hotels' Aura experience employs VR headsets to reduce stress, while Kimpton Fitzroy's "Room to Dream" integrates virtual reality with curated kits to encourage lucid dreaming. Fitness-forward hotels, like Dubai's SIRO One Za'abeel, feature cryogenic chambers and performance-tracking gyms designed in collaboration with athletes. These advances cater to growing consumer demand for wellness options that blend science, technology, and comfort.

WHY IT MATTERS

Digital wellness treatments position hospitality businesses as leaders in a growing global movement toward preventive health and self-care. By offering accessible and innovative wellness options, hotels and resorts can differentiate themselves in crowded markets, particularly as travelers increasingly prioritize mental and physical well-being during their stays. Beyond enhancing guest satisfaction, digital wellness can unlock new revenue streams, such as premium wellness packages and in-room technology experiences. And often, integrating digital wellness aligns with broader sustainability goals by enabling resource-efficient practices, such as virtual fitness classes that minimize physical space requirements and energy use. The broader implications include reshaping the competitive landscape, as hotels with advanced wellness offerings report higher occupancy rates and stronger brand loyalty.

These advancements also reflect shifts in consumer behavior toward health-conscious, tech-savvy lifestyles. With wellness tourism expenditures exceeding \$500 daily per traveler, businesses integrating digital wellness technology can capitalize on a lucrative market. Plus, the trend offers broader opportunities for collaboration among tech developers, wellness providers, and the hospitality industry to create a cross-sector innovation hub.



2ND YEAR ON THE LIST

# SMART RESOURCE MANAGEMENT

WHAT IT IS

**With smart resource management, companies can enhance operational efficiency, sustainability, and the overall guest experience even while addressing industry challenges like labor shortages and cost optimization.**

HOW IT WORKS

A standout innovation in this space is a centralized hotel operations management system, which organizes and tracks tasks like room cleaning, maintenance, and staff communication. Using a graphical user interface (GUI) as the central control hub, this system provides real-time updates on room statuses, task assignments, and staff schedules. This centralized approach is complemented by innovations such as RFID-enabled fabric tracking systems, which manage linens and towels throughout their life cycle. These systems reduce losses, prevent errors, and ensure efficient inventory management, enabling staff to focus on higher-value tasks. IoT-driven disinfection robots automate cleaning processes by employing sensors and making real-time adjustments to deliver consistent hygiene standards that reduce the need for human labor and optimize resource use.

Robotic automation, as seen in the Climia Benidorm Plaza, adds another layer of efficiency. Robots handle diverse tasks, from check-ins to food service and cleaning, enabling hotels to optimize staff workloads. These robots, equipped with AI and multilingual capabilities, ensure high-quality service, freeing up human staff to focus on personalized guest experiences.

Sustainability initiatives, like the all-electric hotel systems and water-saving IoT devices seen at Hotel Marcel, which operates on solar energy and innovative water management, significantly cut operational costs and appeal to eco-conscious travelers.

WHY IT MATTERS

Smart resource management is imperative for the hospitality industry, as it provides a path to greater efficiency, sustainability, and adaptability. As labor shortages and operational costs challenge traditional models, these new systems provide innovative solutions to manage resources with precision. And by automating routine tasks and optimizing workflows, hotels can reduce waste, improve staff productivity, and increase revenue. Beyond operational gains, these systems support broader sustainability goals so that hotels can meet regulatory standards and cater to environmentally conscious travelers. Smart technologies also enhance service delivery, creating personalized and seamless experiences that foster guest loyalty.

These systems can also fill in labor gaps. Because they reduce some of the complexity of managing a completely human workforce, less experienced managers could take on more responsibility. For hotel operators concerned about talent drought, these systems also improve the quality of working conditions by reducing the demand for menial tasks. As the hospitality sector becomes increasingly competitive, adopting smart resource management will be essential for businesses seeking to remain relevant and resilient in a rapidly evolving market.



2ND YEAR ON THE LIST

# NOMADIC AND MODULAR HOTELS

WHAT IT IS

**Modular and nomadic hotels are transforming hospitality with rapid construction, sustainable designs, and innovative guest experiences, offering agility and reduced costs for developers while meeting the evolving demands of modern travelers.**

HOW IT WORKS

Modular hotels are at the forefront of hospitality innovation with their ability to leverage cutting-edge construction techniques, energy-efficient designs, and rapid adaptability to create self-sufficient accommodations in diverse environments. Their structures incorporate prefabricated units with photovoltaic roof panels, integrated water systems, and advanced climate controls. Reducing energy consumption by more than 20% and meeting near-zero energy requirements, their sustainability-focused approach not only lowers operational costs but also aligns with environmental goals.

In New Zealand, a \$75 million modular Moxy Hotel in Auckland combines modular construction on its upper floors with traditional methods for its base, addressing logistical challenges through precise planning. Meanwhile, Dreams Curaçao Resort is enhancing its offerings with 52 modular oceanfront suites as part of an adults-only expansion that blends luxury with sustainability.

Adding another layer of innovation to modular construction are 3D printing technologies. The El Cosmico 2.0 project in Marfa, Texas, uses ICON's technology to create organic architectural forms while reducing labor costs and seamlessly integrating with natural landscapes. These advancements enable modular hotels to be constructed rapidly and efficiently, offering a versatile solution for various terrains.

WHY IT MATTERS

For businesses, modular hotels represent a transformative opportunity to expand into new markets, optimize operational costs, and address shifting consumer demands. Their rapid construction timelines and cost efficiencies allow companies to adapt to changing market conditions and deploy assets where demand is highest. Self-sufficient energy systems reduce long-term reliance on traditional utilities, cutting expenses and bolstering environmental credentials.

Portability and adaptability enable hotels to capture underserved markets, from remote ecotourism destinations to urban areas requiring quick redevelopment. These innovations also foster resilience against fluctuating economic conditions and infrastructure limitations, ensuring sustainable growth. Businesses that adopt modular and nomadic hotel solutions can enhance their brand reputation, attract eco-conscious travelers, and gain a competitive edge in a dynamic hospitality landscape. Modular hotels are not just a solution for today's challenges—they are a blueprint for the future of agile, sustainable hospitality.

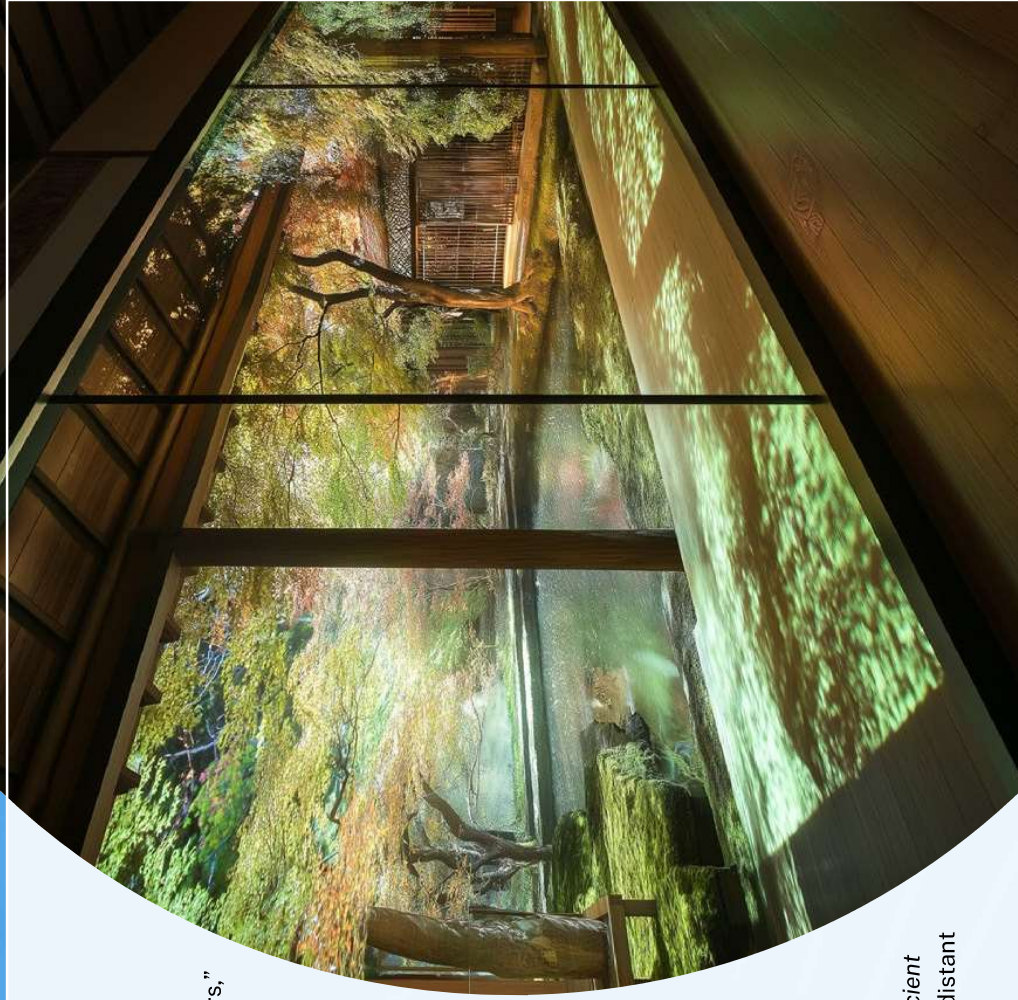


## SCENARIO YEAR 2036

# TIMELESS TRANSFERS

March 2036 marks a transformative moment in luxury travel as Four Seasons unveils “Timeless Transfers,” a pioneering initiative designed to alleviate the strain of overtourism on popular cultural destinations while offering guests immersive, authentic experiences. This innovative program re-creates the essence of World Heritage Sites within Four Seasons properties worldwide by blending cutting-edge technology with deep cultural storytelling. The debut theme, *Timeless Kyoto*, transports guests to Japan’s historic capital through immersive experiences. For example, they could participate in a traditional tea ceremony guided by a holographic version of legendary teamaster Sadō Matsumoto digitally captured in 360-degree VR. Visitors can explore endangered culinary traditions by joining virtual cooking classes that celebrate Kyoto’s iconic Kyo-Kaiseki and shojin ryori dishes, complete with interactive storytelling about their centuries-old origins. By partnering with local artisans, employing them as cultural consultants, and dedicating a portion of proceeds to community education programs, the initiative ensures that the people and traditions of Kyoto remain at the heart of this groundbreaking concept.

The “Timeless Transfers” model is as much about preservation as it is about reimagination. Four Seasons has created a platform that addresses overtourism concerns while providing sustainable support for the communities from which it draws inspiration. Through collaborations with local historians, schools, and craftspeople, the program channels resources back to cultural preservation efforts, ensuring the longevity of endangered traditions. This initiative represents a blueprint for the future of luxury tourism—one where technology bridges the gap between travelers and the world’s most cherished cultural legacies without jeopardizing their integrity. With plans for future themes such as *Ancient Egypt* and *Renaissance Florence*, Four Seasons is poised to redefine cultural engagement, making once-distant destinations—and eras—accessible while preserving their essence for generations to come.





2ND YEAR ON THE LIST

# FRictionless STAYS

WHAT IT IS

**Technologies like facial recognition, AI-driven guest services, and digital wallets are transforming hospitality. These innovations enhance convenience, reduce friction, and redefine guest expectations, creating seamless and personalized travel experiences.**

HOW IT WORKS

From the moment a guest makes a reservation until they check out, new technologies are reducing traditional pain points throughout the process. New digital booking platforms make it even easier for guests to customize their stay by selecting amenities, all while tracking the environmental impact of their choices. Carbon footprint data, presented in CO2 equivalents, incentivizes eco-friendly decisions. This gamified approach, combined with rewards for sustainable choices, empowers travelers to curate experiences that align with their values—without additional human intervention.

When they go to a property, innovative systems further simplify the guest journey by providing quick and secure access. These systems generate unique codes for each reservation that guests simply scan at check-in. For group bookings, these systems dynamically adapt to changes, like modifying guest details or reassigning rooms, by updating codes in real time. This reduces administrative overhead while enhancing security.

When travelers make it to their rooms, digital keys integrated with platforms like Google Wallet eliminate the need for physical cards or standalone apps. At hotels like the Clarion Hotel Post, guests can unlock rooms and access amenities with their smartphones using NFC technology. Piaggio Fast Forward's Kilo robots take convenience a step further by assisting with luggage transport and other tasks, ensuring a seamless transition from arrival to relaxation.

WHY IT MATTERS

This evolution of frictionless stays signals a broader shift in the hospitality industry: Consumers want more tech-enabled experiences that balance personalization, security, sustainability, and fewer forced interactions. Waiting in lines is no longer tolerable. As competition for guests intensifies, these technologies present opportunities for businesses to differentiate themselves from more traditional and potentially cumbersome hotel stays by meeting rising guest expectations for seamless experiences that they can navigate with ease.

The inclusion of sustainability as a core feature has broader implications, as it encourages behavioral changes among travelers and gets hotels to align with global environmental goals. While consumer preferences increasingly favor eco-conscious options, this alignment not only drives customer loyalty but also positions hotels as leaders in sustainability. Enhanced digital identity systems further mitigate security risks while offering flexibility for real-world scenarios, ensuring operational resilience. This focus on frictionless experiences is starting to move past check-in, with guests becoming unwilling to wait for an operator to answer their call when booking the room or maintenance to arrive to fix the thermostat or TV. Hotels should expect this trend to continue to grow and converge with other guest experiences.



2ND YEAR ON THE LIST

# HYPER-PERSONALIZATION

WHAT IT IS

Hyper-personalization is reshaping industries by leveraging AI, data analytics, and real-time technology to deliver individualized customer experiences.

HOW IT WORKS

IHG Hotels & Resorts' Mind Lobby initiative is a prime example of this trend: The experience unveiled in Sydney uses eye-tracking technology to analyze subconscious reactions to travel imagery and offer guests highly personalized recommendations based on a list of preferences. IHG's technology investments also include \$300 million in data analytics, AI-powered trip planners, and a reimaged booking experience. The IHG One Rewards mobile app, updated with features like attribute-based booking and AI-powered itinerary planning, further enhances guest personalization. Collaborations with companies like Apple for in-room AirPlay functionality also highlight IHG's commitment to convenience and customization.

Elsewhere, new patented technologies are transforming service delivery. A recently introduced system assigns each guest a dedicated robot whose tasks and routes are customized based on individual requests and hotel conditions. Complementing robotics, another innovative transient personalization mode makes it so guests can interact with a hotel's automated assistant without logging in to personal accounts. This system securely syncs with the guest's personal assistant to deliver tailored responses while maintaining privacy. Designed for environments like hotel rooms or shared devices, it combines ease of use with robust security, for a seamless, personalized experience in transient scenarios.

WHY IT MATTERS

Personalization is not a new trend but has evolved into hyper-personalization, to address even nuanced customer needs. This continuing paradigm shift in customer engagement requires businesses to deliver customized experiences at scale. Even more so than price, hyper-personalization will be a deciding factor for some guests, and it will foster deeper brand loyalty. The integration of AI, robotics, and transient personalization tools represents a convergence of technologies that simplifies decision-making, optimizes resource allocation, and anticipates customer needs. Guests may soon be able to select these experiences as part of their frictionless stay, or choose them as an enhanced add-on that could result in greater revenue for the hotel and brand. Personalization options could also differ by hotel locale, which could entice guests to travel to a new destination to try out its curated personalization. As consumer expectations rise, organizations must adopt these advanced solutions to remain relevant, responsive, and innovative in a rapidly evolving marketplace. Hyper-personalization is not just a competitive advantage—it's becoming a core differentiator and marketing tool.



2ND YEAR ON THE LIST

# BUSINESS AUTOMATION

WHAT IT IS

**Hospitality businesses are embracing automation to enhance guest experiences and operational efficiencies.**

HOW IT WORKS

While automation has been part of the hospitality industry for years, ZentrumHub's partnership with Mize takes it a step further by enhancing hotel connectivity for online travel agencies. These platforms optimize processes, reduce post-booking costs, and provide business intelligence to maximize profitability. Meanwhile, tools like Stayflexi's Empower provide real-time market intelligence with features such as price predictions and competitor analysis, so hotels can dynamically adjust their strategies.

Another example is Mews, which acquired Atomize last year to integrate real-time revenue management capabilities. This acquisition equips hotels with dynamic pricing strategies, ensuring competitive and optimized offerings. Additionally, Grazzy's digital payment solutions streamline tipping processes, which enhance employee satisfaction, reducing turnover costs.

In emerging markets like China, Shiji's WeChat booking engine exemplifies localized automation as it seamlessly integrates with consumer behavior trends to create a frictionless booking experience. A newly patented blockchain-based hotel system introduces tamper-proof records for room reservations, transfers, and check-ins. During check-in, the blockchain verifies the token and reservation details, to both prevent fraud and enhance customer trust.

WHY IT MATTERS

This wave of automation is addressing multiple challenges in the hospitality industry—everything from labor shortages to rising consumer expectations for personalized experiences. As with the “Frictionless Stays” trend, by automating repetitive tasks and enabling data-driven decision-making, businesses can reduce operational costs, improve employee retention, and drive customer loyalty. However, this shift has broader implications, such as the potential for workforce displacement and ethical considerations around data privacy. Brands must be cautious to choose which automations will be beneficial without completely disintermediating their core labor force.

The trend also democratizes access to advanced tools for smaller businesses, leveling the playing field and fostering innovation in an industry historically dominated by major players. As these systems scale, and connectable technologies or generative AI platforms introduce new innovations, the hospitality sector is likely to experience a shift toward new business practices that companies should start considering today. Creating these new standards now means that businesses can own the competitive market with its own standards rather than reacting to a competitor's. By creating new standards, brands can begin reshaping competitive landscapes to their advantage.

**SCENARIO YEAR 2034**

# THE EVERYDAY HOTEL AI WORKFORCE STRIKE OF 2034

In June 2034, more than 10,000 Everyday hotel workers in San Francisco are staging a citywide strike to protest the rollout of the company's Autonomous Workforce Deployment system. The AI-driven platform, designed to dynamically allocate labor across tasks like housekeeping and front desk operations, is accused of displacing workers, reducing hours, and creating chaotic mid-shift reassignments. Employees have reported being replaced by cleaning bots and AI concierge systems without proper consultation or retraining. Union leaders have criticized Everyday for prioritizing efficiency over workforce sustainability, and demanded better protections and transition programs. The strike quickly gains support in tech-forward cities like Seattle and Boston, where automation tensions are also rising.

The disruption underscores the broader conflict between technological innovation and job stability in the hospitality industry. When guest services falter under AI-only operations, local governments intervene to mediate, pushing Everyday to suspend further AI rollouts. Company officials quickly shift their priorities to invest in retraining displaced workers and implement a two-year employment buffer. The strike becomes a defining moment in 21st century labor, prompting new regulations to govern workforce automation and highlighting the importance of balancing innovation with social responsibility in an increasingly automated world.





# AUGMENTED RESTAURANTS AND DINING





2ND YEAR ON THE LIST

# CONTACTLESS PAYMENTS

WHAT IT IS

Contactless payment technologies are transforming customer interactions across industries by enhancing convenience, increasing efficiency, and boosting sales.

HOW IT WORKS

Companies are taking advantage of new technology to make it easier for customers to order and pay—which then often results in increased sales. Grubrrr, in partnership with Olo, combines self-ordering kiosks and digital menu boards with data-driven insights, boosting restaurant sales by 12%–22% and streamlining in-store and online operations. GoTab's Phone-Only POS offers an NFC-enabled, compact design compatible with Apple Pay and Google Wallet, increasing check averages by 35% and driving \$83 in sales per hour of labor.

Steak 'n Shake, through a partnership with PopID, has deployed facial recognition payment kiosks across 300 US locations, cutting transaction times to seconds and improving customer loyalty. Similarly, Whataburger's pay-by-face system, also powered by PopID, has expedited checkout and boosted convenience at select locations. Meanwhile, blockchain innovation is entering the space with Blackbird Pay, which reduces transaction fees to 2% and includes instant settlements with integrated loyalty rewards.

Raydiant's Order & Pay Kiosks feature real-time inventory syncing, digital receipts, and customizable branding, with plans for AI-driven personalization. Across these examples, contactless systems are boosting sales, reducing costs, and aligning businesses with digital-first consumer demands while providing invaluable data insights to drive profitability.

WHY IT MATTERS

These technologies meet the growing consumer demand for convenience and personalization, creating seamless interactions that enhance satisfaction and build loyalty. They improve the overall customer experience by reducing wait times and eliminating inefficiencies in payment processes. But they also help businesses streamline their operations and reduce costs, so they can focus their resources on strategic initiatives and growth. Plus, another significant advantage of contactless payments is the valuable data they generate: data that businesses can use to gain insights into customer behavior, optimize inventory, design targeted marketing strategies, and ultimately drive increased revenue and operational efficiency.

Adopting contactless payment solutions positions businesses to align with evolving digital-first consumer preferences, ensuring they stay competitive in a fast-paced market. Additionally, these systems future-proof operations by reducing dependency on legacy technologies, increasing agility, and enabling companies to adapt quickly to new trends.



2ND YEAR ON THE LIST

# AUTONOMOUS RESTAURANTS

WHAT IT IS

**The rise of autonomous restaurants—dining establishments where customers can order, pay, and get their food without human help—reflects a broader societal trend toward frictionless, technology-driven experiences that blend convenience, personalization, and sustainability.**

**FTSG**

HOW IT WORKS

Costa Coffee's Costa Coffee Creations, debuting in August 2024 at Austin-Bergstrom Airport, exemplifies this industry evolution toward autonomy: The system operates independently for up to seven days, offering up to 8 million drink combinations in a compact 24-square-foot space. Without a human barista, the kiosk has established a more efficient process while still meeting customers' demands for ultra-customized coffee drinks.

Other chains are experimenting with augmenting human labor with automation. Chipotle is piloting Autocado, which processes avocados in just 26 seconds; it's also testing an automated makeline for digital orders, which now make up 65% of the company's sales. Developed with Hyphen, these systems optimize workflows and enhance speed without compromising quality. In Manhattan, vegan fast-casual restaurant Kernel uses a Kuka robotic arm to reheat centrally prepared meals, reducing on-site staff and maximizing efficiency. Meanwhile, Richtech Robotics' humanoid bartender ADAM serves drinks at Texas' Globe Life Field, reducing wait times and freeing staff for guest interactions.

Beyond hardware, AI systems like Nory revolutionize restaurant management by optimizing staffing, inventory, and demand forecasting using historical and real-time data. Additionally, predictive systems synchronize kitchen operations with customer demand, streamlining workflows and reducing waste while enhancing diner satisfaction with real-time order updates.

WHY IT MATTERS

Automation can help restaurants mitigate labor shortages, reduce costs, and maintain 24/7 operations, fundamentally changing the economics of the food service industry. These technologies enable a level of scalability and consistency previously unattainable, offering a pathway for smaller operators to compete with large chains by adopting modular, tech-driven models. These innovations also provide ways for smaller brands to enter new markets: Now, capital investments are focused solely on space and technology, as opposed to hiring more humans that require additional benefit plans and management teams.

From a societal perspective, the trend reflects shifting consumer preferences for seamless, personalized experiences. It also reflects a distrust of human intervention in the everyday dining experience. Automation empowers restaurants to meet these demands and expectations. In the future, this means that restaurants can use their human staff to focus on high-value tasks like customer engagement and marketing while the industry redefines the traditional serving roles. For example, a restaurant could have staff members devoted to making human contact for reservations and post-dining follow-up, engagement designed to entice guests back. As cities become denser and real estate costs rise, compact and efficient autonomous systems can also provide a blueprint for sustainable, space-conscious urban dining.



2ND YEAR ON THE LIST

# EVERYWHERE ORDER AND DELIVERY

WHAT IT IS

Innovative technologies like autonomous robots, drones, and AI-driven solutions are making it possible for consumers to order and receive products anytime and anywhere, enhancing speed, sustainability, and accessibility in the evolving delivery ecosystem.

HOW IT WORKS

In Los Angeles, Shake Shack and Serve Robotics have partnered to deploy 2,000 self-driving robots, showcasing the potential of Level 4 autonomous bots to navigate independently and deliver orders sustainably. Customers select “robot delivery” through the Uber Eats app and then track the robot’s progress and unlock the order with a passcode when it arrives. Similarly, Speedy Eats vending machines offer fresh meals 24/7, stored for up to 10 days in refrigerated lockers, with an automatic system to discard expired items. These machines fill a market gap for convenient, high-quality food.

AI-driven solutions like the chatbot FIFE add a personalized dimension to food ordering. Using natural language processing, FIFE tailors recommendations based on allergies, health needs, and mood, to create a highly engaging user experience. In crowded kitchens or dining rooms, advanced voice interface systems associate commands with specific tasks without interference so that voice commands can be heard and understood.

Innovations also address the unique challenges of delivering food to remote locations, such as beaches, parks, or event venues. Autonomous kiosks integrated with an app, enable seamless ordering from nearby restaurants with food getting delivered to secure lockers where customers can retrieve their meals with passcodes. These solutions eliminate the need to leave the area while ensuring safe, private, contactless, and convenient service.

WHY IT MATTERS

For businesses, this transformation to anytime, anywhere ordering and delivery will necessitate changes in operational strategies, including adjustments to ordering parameters. Companies must consider order size, preparation time, and delivery radius when designing logistics systems that balance speed and cost-effectiveness. Daily pop-up locations are becoming a viable strategy that involves using mobile or temporary hubs to meet demand in high-traffic areas or underserved regions. Businesses can use these locations, powered by smart inventory systems and autonomous delivery options, to respond dynamically to customer needs without investing in permanent infrastructure.

As they shift to automation, businesses will need to rethink customer interactions. AI-powered chatbots and personalized ordering systems enhance engagement by offering tailored recommendations based on customer preferences and behaviors. This deeper level of customization builds loyalty and satisfaction while streamlining the ordering process.

Ultimately, this trend not only improves the customer experience but also drives significant cost savings, reduces environmental impact, and introduces new revenue streams through expanded service capabilities. Businesses that leverage these technologies will be better positioned to compete in an increasingly fast-paced, convenience-driven economy, where flexibility and innovation are key to staying ahead.



2ND YEAR ON THE LIST

# MONITORING FOOD WASTE & IMPACT

WHAT IT IS

Advanced technologies like AI, IoT, and computer vision are transforming how businesses monitor, reduce, and manage food waste, enabling smarter operations and fostering sustainability across the food supply chain.

HOW IT WORKS

As companies integrate food system innovations, food waste monitoring has evolved. AI-powered solutions, such as those by Winnow, weigh and photograph discarded food, categorize waste by type, and generate actionable insights; chefs can use those insights to refine menu designs and optimize purchasing. In grocery distribution, predictive systems like Afresh leverage AI to account for seasonal trends, promotions, and shelf-life data, to improve inventory management and reduce spoilage.

IoT-enabled solutions, such as RFID-embedded plates combined with smart scales, track portions in real time, provide nutritional data, and facilitate automated billing, helping restaurants align consumption with actual needs. These systems reduce buffet waste and empower customers to make healthier, more informed decisions. At a systemic level, Quantum Reservoir Computing (QRC) represents a new leap forward in addressing food waste: By incorporating complex quantum circuit designs and external data like trade volumes and production levels, QRC helps companies more accurately predict price trends. These forecasts help stabilize supply chains, reduce overstocking, and minimize food waste at large scales.

In addition, deep learning models like MobileNetV2 are 93% accurate in estimating weight and classifying food waste. These systems, trained on datasets like Food11, enable rapid and lightweight deployment in kitchens and retail applications, to optimize operational efficiency.

WHY IT MATTERS

At its core, this trend addresses inefficiencies in the food supply chain that are both expensive for businesses and bad for the environment. By integrating advanced waste monitoring technologies, businesses can make data-driven decisions that optimize production, inventory, and resource allocation.

The implications stretch far beyond immediate cost savings, which are significant. Businesses that use food waste monitoring can align their strategies with the growing customer demand for sustainability, and strengthen their relationships with environmentally conscious consumers as a result. And as regulations around waste management tighten globally, adopting these technologies can also ensure compliance and reduce risks associated with fines or reputational damage.

In addition, the data companies can collect from waste monitoring opens doors for even more innovation. Businesses can refine their forecasting methods to align with real-time consumer behavior, enabling hyper-efficient production models and reducing spoilage. In industries like hospitality and retail, these systems can support new business models, such as dynamic pricing or subscription services tailored to minimize surplus.



2ND YEAR ON THE LIST

# IMMERSIVE EXPERIENCES

WHAT IT IS

**Immersive experiences in hospitality, dining, and retail are redefining engagement, blending technology and multisensory storytelling to foster participation and emotional connection.**

HOW IT WORKS

Immersive experiences use interactive technologies to transform passive consumption into active participation. Ideum's Tasting Table is one example of this; the table integrates a 55-inch touch display, wine-recognition technology, and customizable digital tasting wheels.

This allows for interactive wine-tasting sessions where guests explore flavor profiles while their preferences are captured for analytics. Similarly, virtual reality (VR) environments are moving beyond visual engagement by incorporating olfactory and tactile elements to replicate real-world scenarios. Driven by research that shows adding synthetic scents enhances VR's ability to evoke food cravings, multisensory inputs are becoming more important for companies building authentic virtual dining experiences.

Innovations in taste simulation are also advancing rapidly. AI-driven models are powering a terahertz-based digital taste bud sensing system that enables precise, noninvasive flavor analysis. In addition to this, researchers at City University of Hong Kong have developed a "lickable VR device" that can replicate up to nine flavors using food-grade chemicals activated by voltage and saliva. Projection mapping also plays a crucial role: Mutti's immersive dining at London's Saatchi Gallery used this technology to animate the life cycle of a tomato on guests' tables, as a complement to a multicourse meal. Such initiatives turn mundane activities into narrative-driven spectacles.

WHY IT MATTERS

Immersive experiences represent a continued need for new and experiential moments in order to capture consumers' attention and wallets. More immersive dining experiences help to create memorable interactions, deepen emotional ties, and enhance brand differentiation. Not only that, they also offer a reason for diners to come back if those experiences change over time, evolve with the diner, or are personalized. Industries from retail to hospitality can leverage this trend to increase customer dwell time, boost spending, and gather behavioral insights. For businesses, immersive technologies provide tools for personalization, creating tailored experiences that align with consumer preferences. For example, AI-driven platforms can adapt sensory elements in real time, offering an unprecedented level of customization.

In a world becoming more connected, immersive settings blur the lines between online and offline, as virtual dining, interactive projections, and augmented reality attract digitally native consumers. By blending narrative, technology, and multisensory elements, businesses can turn ordinary transactions into extraordinary experiences, and foster long-term loyalty and engagement.



# ES

**We enter our second century with the same commitment to innovation, harnessing the power of our people and technology to respond to guest demands. Our research paints an exciting future for the hospitality industry, highlighting the growing importance of human interaction in an increasingly tech-centric world.**

Simon Vincent, EVP & President, EMEA, Hilton



2ND YEAR ON THE LIST

# ENGINEERED FOOD AND MEALS

WHAT IT IS

**Engineered food technologies are redefining the global food ecosystem with innovations like edible QR codes, solar-powered proteins, and biocompatible colorants.**

HOW IT WORKS

Researchers and companies are utilizing synthetic biology, 3D printing, and advanced materials to reimagine food systems. For instance, researchers at the Singapore University of Technology and Design have developed 3D-printed edible QR codes that blend flavors and nutrients into codes with personalized nutrition information. Finnish company Solar Foods has introduced Solein, a protein-rich powder made from CO2 and electricity that only requires 1% of the energy used by traditional farming methods. And the technology is scalable: Solar Foods' Factory 01 is capable of producing enough edible biomass for 6 million meals annually. Meanwhile, researchers are addressing consumer demand for natural food colorants by leveraging the unique properties of hydroxypropyl cellulose, which can display vibrant, food-safe colors without synthetic additives. This not only enhances a food's visual appeal but also aligns with the rise in health-conscious and environmentally aware consumer preferences.

Startups like BloomSpoon are also creating dual-purpose products, such as cutlery made from biodegradable wheat straw that can sprout into plants after disposal. In the realm of automation, advanced spectrometric methods are improving food safety and aiming for consistent quality control by precisely detecting spoilage through the acid value in oils and greases. These examples illustrate the versatility and potential of engineered food technologies, which span from sustainable ingredient production to personalized, data-driven meal solutions.

WHY IT MATTERS

The rise of engineered food technologies has profound implications for businesses and industries globally. Using these scalable and efficient innovations to replace traditional agricultural systems could mitigate supply chain vulnerabilities, reduce environmental impact, and address global food security challenges. They also enable hyper-personalized nutrition, to align with the growing consumer demand for tailored dietary options and transparency in food production. As these technologies mature, industries must adapt to a future where engineered food becomes integral to mainstream consumption, requiring investments in infrastructure, talent, and regulatory frameworks. There are environmental benefits too, as the shift from resource-intensive farming to laboratory-based production can significantly reduce greenhouse gas emissions and land use while contributing to broader sustainability goals. For businesses, this trend offers opportunities to innovate, differentiate products, and respond to the increasing prioritization of health, convenience, and environmental stewardship among consumers. The evolution of engineered food underscores a pivotal shift in how industries must approach food production and distribution in an era defined by climate urgency and technological advancement.

SCENARIO YEAR 2044

## BHOJAN NIRVANA: SAVOR WITHOUT WASTE

In the heart of Mumbai, a bold new restaurant is taking the popularity of edible utensils and turning the concept into an art form. Known simply as Bhojan Nirvana, this culinary marvel has reimagined the practice of eating by blurring the lines between what you savor and what you hold in your hands. The restaurant boasts that it offers the ultimate bliss: food that includes its own utensils and doesn't produce any waste.

The innovation begins the moment your meal arrives. A creamy dal makhani is cradled in a delicately spiced bowl made entirely of lentil flour, baked to a crisp, golden perfection. The accompanying naan spoons are infused with garlic and coriander, sturdy enough to scoop every last bit of the rich, velvety dal, yet tender enough to melt in your mouth when you take the final bite. Desserts steal the show—a saffron kulfi served atop a cardamom-scented almond disc that cracks satisfyingly under a spoon made of jaggery and coconut.

Bhojan Nirvana goes further by incorporating modern technology into these time-honored practices. Its edible bowls, plates, and cutlery are engineered using advanced food science to ensure sustainability, flavor harmony, and zero waste. It's a feast for both the palate and the planet, and it might just change the way we think about food entirely.





2ND YEAR ON THE LIST

# AUTOMATING LOYALTY

WHAT IT IS

**Brands are integrating AI, gamification, and immersive technologies to reimagine loyalty programs, creating deeper engagement and more meaningful customer relationships.**

HOW IT WORKS

Most brands know that loyalty increases share of wallet. Companies in a variety of industries are already experimenting with using new technologies to up their member loyalty game and keep them top of mind with their consumers. Video-based review app Franki is doing this well: It replaces traditional reviews with engaging user-generated videos. Its Social Club rewards program offers cash back for spending and video creation, while its “Adventures” feature gamifies dining with scavenger hunt-style challenges. Among restaurants, Chipotle’s gamified promotions tagged to events like National Burrito Day have driven record-breaking app engagement and loyalty program enrollments. Similarly, Burger King’s in-app games, such as Balloon Burst and Cloud Float, connect with customers emotionally as they blend nostalgia with interactivity.

AI further enhances these systems by enabling deeper personalization. Wendy’s uses the AI-driven platform Par Punchh to create gamified and tailored offers, while Le Pain Quotidien’s Alain.AI pulls from customer data to develop region-specific menus and expand loyalty benefits. Uber Eats’ TikTok-style video feed showcases nearby restaurants to promote authentic discovery without relying on ads. Meanwhile, DoorDash’s “Dine Out” feature rewards users for in-restaurant dining with app-based credits, incentivizing foot traffic.

WHY IT MATTERS

Personalized, technology-driven programs improve customer retention, ultimately increasing lifetime value and fostering deeper emotional connections with brands. These automated systems increase efficiency by streamlining loyalty program management, reducing labor costs while driving measurable outcomes. Plus, they can reduce traditional marketing costs, which means less spend on ads, commercials, or print materials. And the data these programs produce is invaluable: It can lead to key insights that empower companies to predict customer behavior and respond quickly to evolving consumer expectations.

These gamification and immersive technologies also allow businesses to scale engagement beyond physical locations, creating a competitive edge in crowded markets. These innovations set new consumer expectations, compelling industries to adopt similar practices or risk losing relevance. Automated loyalty programs not only boost revenue but also drive long-term growth by embedding brands more deeply into customers’ daily lives. Trust and satisfaction grow as a result. This trend signals a future where engagement is personalized, seamless, and increasingly indispensable for business success.



1ST YEAR ON THE LIST

## DYNAMIC MENUS

WHAT IT IS

**Dynamic menus, powered by AI and real-time data, are reshaping consumer interactions across industries, offering hyper-personalized choices, flexible pricing, and streamlined operations.**

HOW IT WORKS

Dynamic menus give companies the ultimate flexibility, allowing them to adapt in real time to changing customer tastes, inventory shortages, and market trends. These advanced systems now employ reinforcement learning, simulating “trial and error” processes to refine strategies. Menus are treated as “states,” with actions like adding or removing dishes evaluated based on metrics such as customer satisfaction, sales, and profitability. This reinforcement learning ensures ongoing optimization by learning from interactions and refining recommendations. The customization potential for this technology is vast, as companies can tailor menus for specific segments or seasonal trends while balancing satisfaction with profitability.

Data collection is key for this trend, including capturing customer feedback, ordering patterns, and inventory status. With this data, the system dynamically adds new dishes that align with preferences, removes underperformers, and adjusts pricing to balance the menu’s affordability with the company’s profit. Even where the dish is placed on the menu is optimized for visibility and sales. These systems are already rolling out in some fast-food locations: Wendy’s is investing \$20 million in digital menu boards that use dynamic pricing during peak times, while Taco Bell is using voice-activated AI to improve order accuracy in hundreds of locations.

WHY IT MATTERS

By leveraging AI-driven adaptability, these systems provide hyper-personalized experiences that enhance customer satisfaction and loyalty. The ability to adjust offerings in real time based on live data—such as inventory levels, demand surges, and individual preferences—keeps businesses agile in rapidly changing markets. This capability not only improves operational efficiency but also maximizes revenue by aligning products and pricing with customer behaviors.

For businesses, dynamic menus represent an evolution in decision-making. Instead of relying on static strategies, companies can now employ data-driven insights to predict trends, optimize inventory, and allocate resources more effectively. This adaptability is crucial in industries like retail, hospitality, and health care, where customers’ needs are diverse and always evolving. Key to this is the integration of reinforcement learning, which ensures continuous improvement and drives innovation while reducing manual workload.

Beyond operational benefits, dynamic menus address critical challenges in customer engagement. Personalized recommendations reduce decision fatigue, while real-time updates foster transparency and trust. However, this trend also raises questions about pricing fairness, data privacy, and the balance between automation and human connection.



SCENARIO YEAR 2027

## JOIN THE PRE-DINING CLUB: WHERE DINING MEETS COMMUNITY

Ready to turn every meal into a global adventure? The Pre-Dining Club invites you to join a community of food lovers where dining is about more than what's on your plate—it's about building connections, exploring cultures, and discovering new flavors.

Here's how it works: Sign up to join our micro-dining communities and rotate through curated, themed groups like the Sweet-Tooth Seekers or the Umami Enthusiasts. Each week, you'll be paired with fellow diners who share your tastes and values—even those from across the globe. Imagine dining at a top restaurant in your city while companions in Sweden and Mexico experience the same vibe, and then connecting afterward to share stories, build friendships, and plan your next adventure together.

But that's just the beginning. As a member, you'll also get access to Pre-Dining Loyalty Training, immersive programs that prepare your palate for bold culinary experiences. Receive interactive kits from partner restaurants, refine your tastes, and earn rewards before you even step foot in the door. This isn't about gamification—it's about transforming dining into a journey of discovery, connection, and confidence. Sign up and meet your global taste community today!





1ST YEAR ON THE LIST

# MANAGEMENT OPTIMIZATION

WHAT IT IS

**Real-time data integration, AI-driven decision-making, and advanced supply chain transparency are redefining management optimization as we know it.**

## HOW IT WORKS

Increasingly, hospitality companies are using advanced technology to ensure efficiency across their operations. At Chipotle, a nationwide rollout of RFID technology ensures automatic inventory tracking; this enables the chain to manage limited-time offers and monitor supplier compliance in real time. It also integrates seamlessly with the company's upgraded Oracle ERP system, to achieve comprehensive data-driven insights.

Yum Brands has implemented an AI-first strategy across its fast-food properties, deploying tools like AI-driven inventory systems and the Poseidon POS system in Taco Bell locations. The company's SuperApp provides restaurant managers with AI-enhanced operational advice, including inventory predictions and employee training involving augmented reality technologies.

Wendy's partnership with Palantir Technologies demonstrates how AI can unify disparate data streams for optimized supply chain management. Through predictive modeling, Wendy's anticipates the inventory its stores will need, and figures out how to transport the products. Meanwhile, Chipotle's investment in Lumachain's computer vision-based platform tracks product conditions throughout its supply chain, boosting food safety and reducing waste. Automation also plays a role in reducing labor-intensive processes, as seen in Chipotle's testing of the Autocado machine and automated food assembly lines. These and other developments point toward scalable efficiencies in food preparation.

## WHY IT MATTERS

For smaller brands, operational efficiency is the difference between a successful location or one that closes due to economic failure. Enhanced supply chain visibility minimizes disruptions, leading to improved product availability and customer satisfaction. By automating routine tasks, businesses redirect human capital toward strategic and creative roles, fostering innovation. The integration of AI enables predictive decision-making that empowers organizations to adapt swiftly to market changes. Furthermore, real-time data accessibility cultivates transparency and trust, benefiting both stakeholders and consumers.

For industries at large, management optimization promises scalability, reduced operational costs, and a competitive edge. For quick-service restaurants, this could help optimize produce orders, determine which staff members are most efficient at daily tasks like food prep, and reduce the need for costly equipment if it proves to be ineffective. Using optimization tools to uncover and address these needs can help improve revenue per store as each store may have different optimization needs. As these technologies become mainstream, businesses must navigate ethical considerations, like job displacement and data privacy, to ensure sustainable adoption.



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Mark Bryan is a Senior Foresight Manager at Future Today Strategy Group, leading the Built Environment, Hospitality, Retail, Supply Chain, Restaurants & CPG practices. Mark's portfolio of clients includes national foundations, global CPG companies, international associations, product manufacturers, international retail brands, higher education institutions, nonprofits, multi-family developers, supply chain organizations, health care systems, senior living facilities, restaurants, and large corporate clients.

In his work at FTSG, Mark has explored the future of communities, housing in urban settings, certifications and testing, product development cycles, parent and children's needs, digital interactions, supply chain and logistics, geographic cities, the workplace, immersive experiences, hotels and restaurants, design, manufacturing, urban planning, engineering, and artificial intelligence's impact on various industries and sectors. He has researched and developed hundreds of evidence-based trends, scenarios, and strategic insights for FTSG's global clientele.

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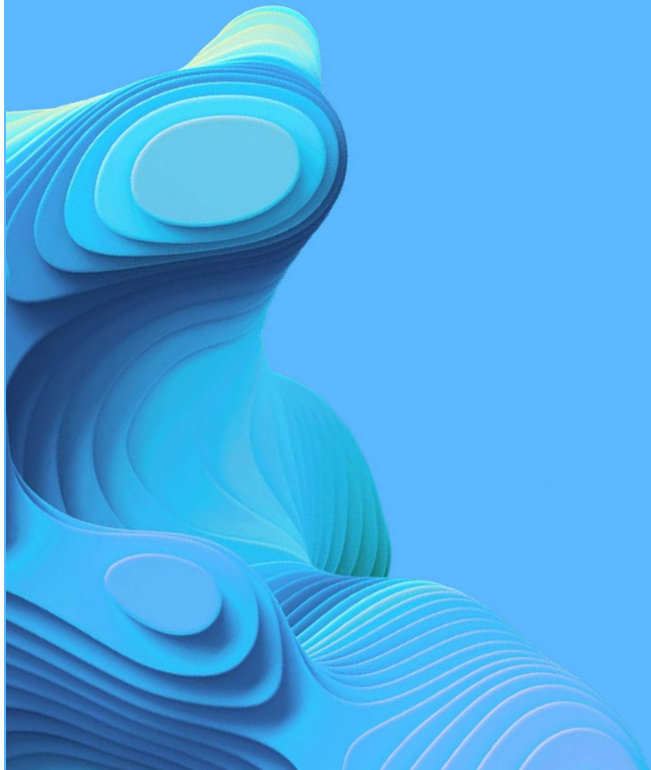
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