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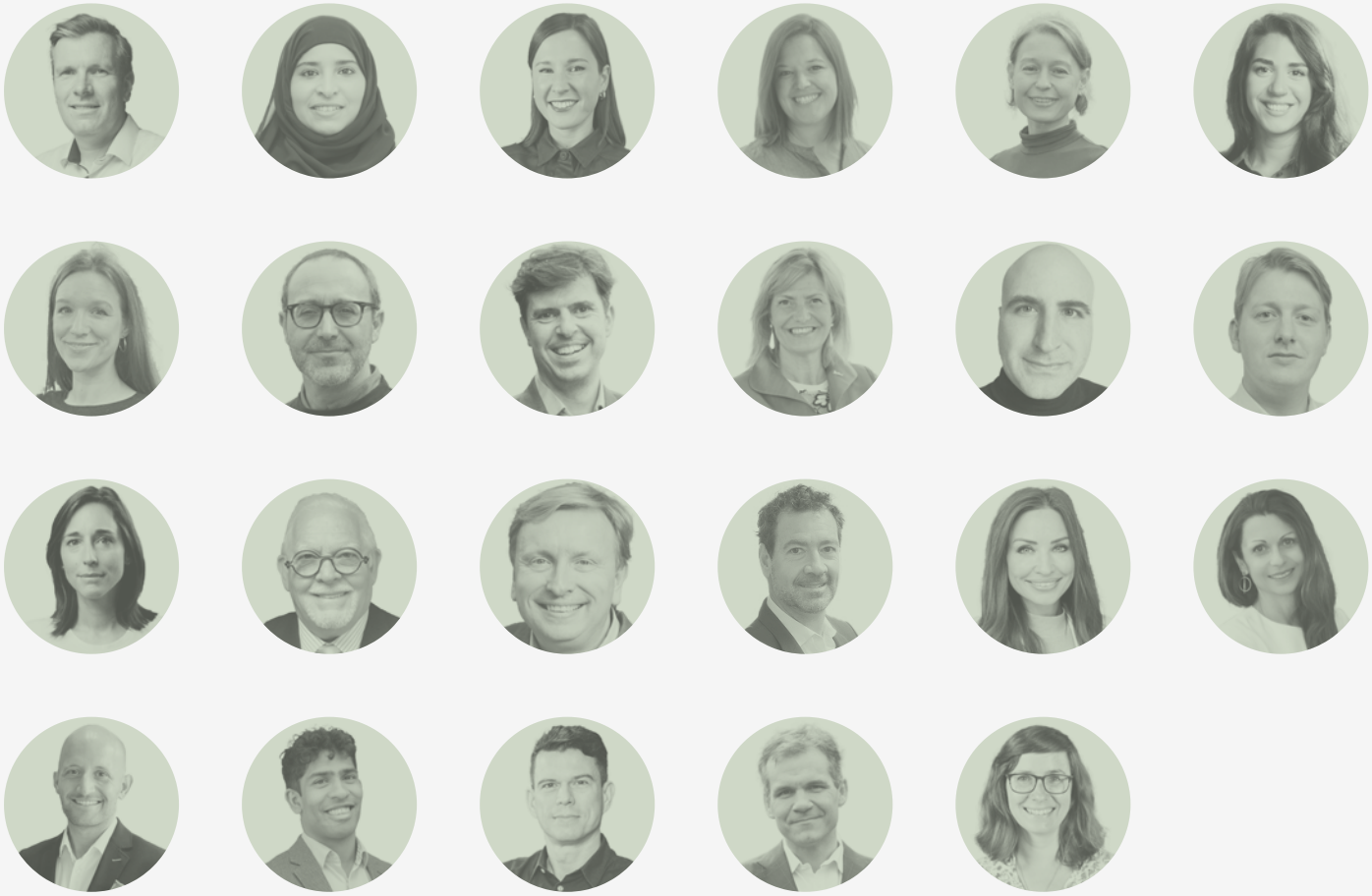
Sustainability Tech Edition

Unlocking Smart & Sustainable Tech Solutions for Hospitality



The Hotel Yearbook

Foresight and innovation in the global hotel industry

HYB

Smart and Sustainable: Transformative Technologies and Innovation in Hospitality

AI for Sustainability

Carlos Martin-Rios
Associate Professor of Management at EHL Hospitality Business School

EHL

The hospitality industry stands at a critical crossroads: sustainability has moved from a peripheral concern to a strategic and operational imperative. As hoteliers grapple with reducing carbon footprints, embracing circularity, and combating waste, many remain stalled by data inconsistencies and limited resources. Artificial Intelligence (AI) provides a path forward—not merely for reporting but for driving real-time operational improvements. This article explores four AI-powered sustainability solutions—carbon calculators, circular supply chain management, and waste optimization technologies—that can help hotel leaders achieve measurable impacts.

AI-POWERED CARBON CALCULATORS: BEYOND COMMITMENTS

Accurate carbon accounting is fundamental to any net-zero plan. Traditional calculators often rely on static formulas and manual inputs, leading to incomplete or outdated emission profiles. By contrast, AI-powered carbon calculators gather and analyze real-time data from energy meters, procurement systems, and occupancy patterns. This dynamic approach pinpoints specific areas for intervention—whether it's an inefficient HVAC system or an overly carbon-intensive supplier.

For example, the World Sustainable Hospitality Alliance incorporates AI-enabled carbon tracking through its evolving Hotel Carbon Measurement Initiative. By integrating data from building management systems, participating properties can parse carbon emissions per room or event, tailoring solutions to each operational segment.

AI presents two main opportunities for businesses: **timeliness** and **strategic scenario planning**. AI-driven calculators produce rolling emissions updates, ensuring decision-makers can respond rapidly to spikes or inefficiencies. In parallel, machine learning models simulate reduction pathways—such as renewable energy swaps or occupancy-based lighting schedules—to identify which interventions yield the best return on investment.

However, data consistency and cost barriers remain serious challenges. Large chains must harmonize reporting practices across multiple jurisdictions, while smaller operators often rely on industry-level collaborations or subsidies to adopt AI solutions.

IMPLEMENTATION TIPS FOR BUSINESSES

1. **Automate data collection**: Use IoT sensors and smart meters instead of manual audits.
2. **Model different scenarios**: Evaluate the cost-effectiveness of interventions like heat recovery systems or on-site renewables.

AI FOR CIRCULARITY AND SUPPLY CHAIN OPTIMIZATION: DOING MORE WITH LESS

Hospitality's linear procurement model—buy, use, and discard—is under mounting scrutiny. Embracing circular principles means extending product lifecycles, reducing waste, and prioritizing materials designed for reuse or recycling.

AI-powered supply chain optimization can help hotels track supplier sustainability metrics, predict demand surges, and automate product *"end-of-life"* decisions (e.g., refurbish furniture vs. replace).

IHG's Low Carbon Pioneers program employs AI-based analytics to re-engineer procurement processes. By scrutinizing supplier credentials and using predictive stock levels, IHG has significantly reduced single-use plastics, prolonged linen lifespans, and established closed-loop furniture programs—benefiting both the environment and the bottom line.

AI tools vet suppliers based on carbon footprints, labor practices, or raw material origins, thus enabling more responsible sourcing. Predictive algorithms also align purchasing with occupancy trends, improving inventory efficiency by preventing overstock or unexpected shortages. Additionally, AI insights help design closed-loop systems, supporting reconditioning and recycling efforts, and converting potential waste into valuable resources.

Nevertheless, supplier resistance and system integration can impede progress. Many vendors still operate in traditional linear models. Hospitality firms must either incentivize or mandate progress toward circularity. Likewise, incorporating AI into legacy procurement software demands investment and collaboration across different departments.

IMPLEMENTATION TIPS FOR BUSINESSES

1. **Adopt AI procurement tools**: Platforms like FairSupply or DeepStream can assess supplier and material footprints.
2. **Emphasize take-back programs**: Build partnerships with suppliers that upcycle, refurbish or recycle old products.

AI IN FOOD WASTE MANAGEMENT: TRIMMING COSTS AND PRESERVING RESOURCES

Food waste remains one of hospitality's most pressing challenges, generating over USD 100 billion in global costs and highlighting systemic inefficiencies. AI-driven waste management solutions use real-time sensors and cameras to identify patterns, measure discard volumes, and suggest immediate remediation.

Hilton has partnered with Kitro, an AI waste management system featuring smart scales and computer vision. Several Hilton properties reported up to a 50% reduction in food waste, proving that technology can yield financial savings while meeting sustainability targets.

By analyzing disposal trends, AI tools can recommend menu changes, portion adjustments, or strategic procurement practices to curb overproduction. In addition, these platforms connect surplus food with local charities, preventing edible items from ending up in landfills. Nonetheless, successful adoption requires hotel staff to follow consistent protocols, from properly scanning food items to implementing recipe adjustments. Continuous surveillance also raises concerns about employee privacy and data protection, issues that must be carefully managed.

IMPLEMENTATION TIPS FOR BUSINESSES

1. **Invest in automated tracking**: Tools like Kitro or Leanpath provide granular data to guide kitchen optimization.
2. **Leverage predictive analytics**: Forecast seasonal variations or occupancy spikes to align purchasing and reduce spoilage.

CONCLUSION: OPERATIONALIZING AI FOR A SUSTAINABLE FUTURE

While ESG reporting remains vital, the hospitality sector's most significant sustainability gains lie in AI-supported operational changes. Carbon calculators deliver precision in emission tracking, supply chain optimization fosters circular economies, CSR reporting cements transparency, and waste-management technologies trim both costs and ecological footprints.

Yet success hinges on more than just installing the latest software—it requires visionary leadership, staff training, and strong supplier alignment. Here, there is a unique opportunity for hotels to strengthen ties with business schools. Through collaborative research, hotels and academic institutions can exchange knowledge, access cutting-edge insights, and co-develop tailored sustainability solutions.

The path forward is clear: when hoteliers unite data-driven strategies with an organizational culture of innovation and academic-industry partnerships, sustainability transforms from a buzzword into a tangible competitive advantage—one that reduces operational costs, satisfies eco-conscious travelers, and contributes to the global quest for responsible resource stewardship.

Additional Reading:

- Martin-Rios, C., Poretti, C., & Derchi G.B. (2022). Three anchoring managerial mechanisms to embed sustainability in service organizations. *Sustainability, 14*(1), 265. Access to article
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- Martin-Rios, C., Demen-Meier, C., Gössling, S., & Cornuz, C. (2018). Food waste management innovations in the foodservice industry. Waste management, 79, 196-206. Access to article
- Martin-Rios, C., & Ciobanu, T. (2019). Hospitality innovation strategies: An analysis of success factors and challenges. *Tourism Management*, *70*, 218-229. Access to article

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