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Sustainability Tech Edition
Unlocking Smart & Sustainable Tech
Solutions for Hospitality
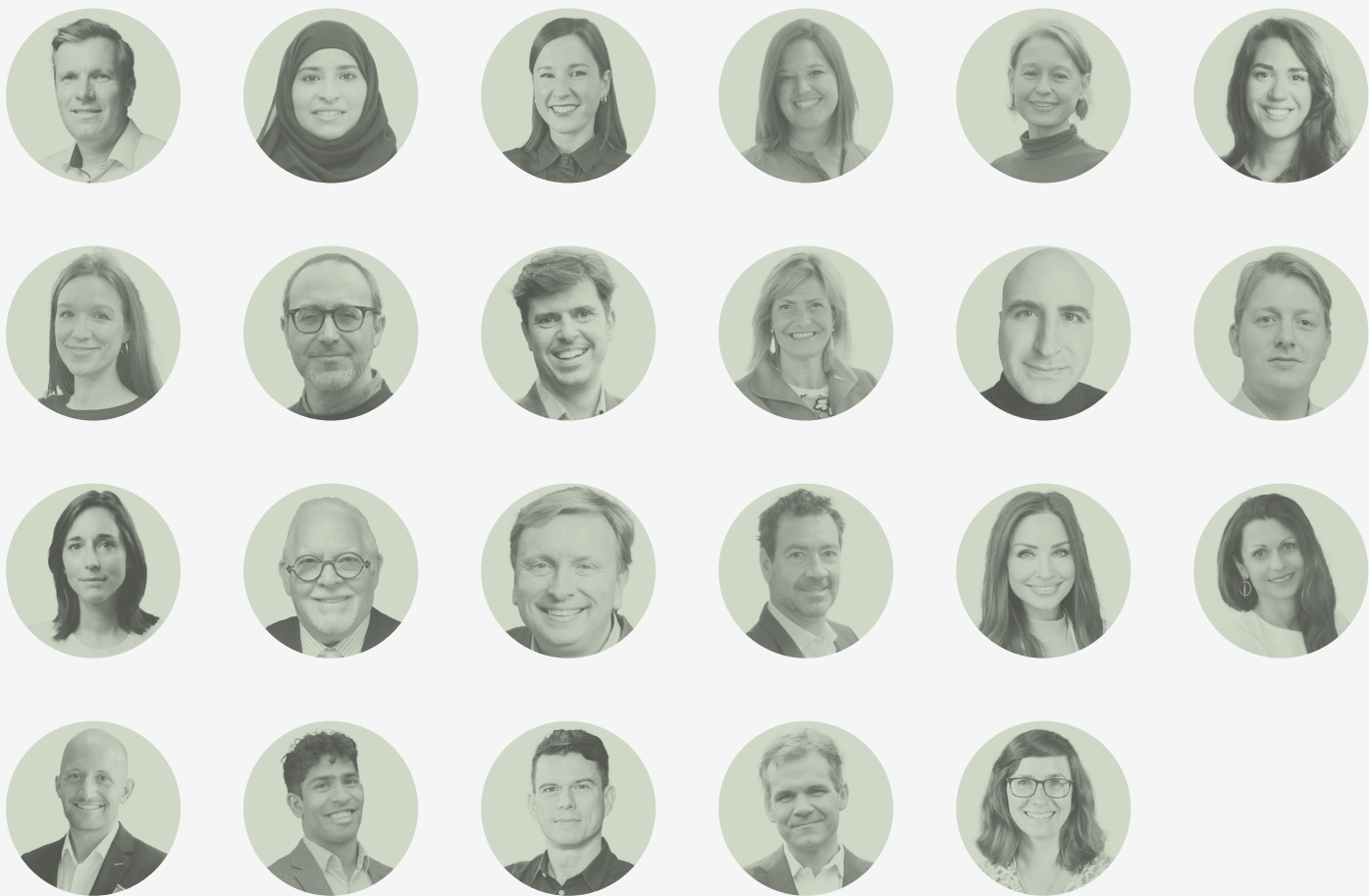
The Hotel Yearbook
Foresight and innovation in the global hotel industry

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Foreword: Technology: a Catalyst and a Challenger for Sustainability

Sustainable Tech

Willy Legrand

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In the dynamic world of hospitality, technology acts as both a catalyst and a challenger in our pursuit of sustainability. What I mean by this is that beyond its utility in streamlining operations and enhancing guest experiences, technology forces us to rethink our relationship with the natural world, society, and economies. Is technology the silver bullet to the major planetary challenges? Or is it a set of tools to help with our incremental improvements on the sustainability path? Or rather, is technology blinding us to the needs of behavioural and managerial changes in sustainable hospitality?

> *beyond its utility in streamlining operations and enhancing guest experiences, technology forces us to rethink our relationship with the natural world, society, and economies*

Today's hoteliers are faced not only with the promise of technological advancements but also with the profound responsibilities they entail. That is: the expectation of improved environmental performance but also making the right decisions which technologies to invest in for what purposes and for which return.

It seems as if the quest for sustainable development becomes increasingly complex. The geopolitical state of the world shows us the vulnerability of environmental and sustainability agendas to political whims. This is obviously a systemic weakness in the approach to managing global environmental challenges which requires a 'good ancestor'[1] or 'cathedral thinking'[2] approach.

As such, the hospitality industry is divided into: 1) those players increasingly geared towards short-sightedness and under the influence of political pressures and 2) those who understand the science, data and resulting consequences. Sustainability is equally about risk management as it is about resilience building and opportunity seeking.

So where do technological solutions fit into this? We can celebrate the strides made through technological interventions, from reducing energy consumption to minimizing waste. However, we must also confront the unintended consequences of these technologies: rising emissions, biodiversity loss, and societal disparities. These challenges are clearly interwoven into our political and economic framework and while there is no '*one technological fix for all*' solution, readers will be interested and potentially impressed by the advances made on various operational and strategic fronts in our industry.

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The Hotel Yearbook 2025 Sustainability Tech Edition explores these multifaceted issues with a critical eye. It explores how technology provides us with tools to address some of the most pressing challenges of our time, it also poses questions about the very problems it seeks to solve.

Readers have access to a comprehensive and critical exploration of how technology interfaces with sustainable practices within the hospitality industry under seven key themes:

1. Data-Driven Sustainability
2. Operational Efficiency and Waste Management
3. Behavioural Change and Consumer Engagement
4. Green Technology and Building Innovations
5. Data, Standards and Certification
6. Biodiversity and Environmental Protection
7. Social Impact and Ethical Considerations
8. Strategic Leadership and Culture for Sustainability

Under those themes, the *Hotel Yearbook 2025 Sustainability Tech Edition* unpacks timely topics such as leveraging technology to address the challenge of fragmented sustainability data and integrating AI-powered tools for carbon calculations, food waste management, and optimization of circular supply chains. The edition investigates the role of tech solutions in promoting energy efficiency, progressive water management, and effective waste reduction strategies in hospitality settings. The practical applications of certification and Life Cycle Assessment (LCA) methodologies are discussed ahead of the EU Green Claims Directive [3]. But not all is without resistance and friction. For some, technology serves as a tool for today's critical challenges while for others the lure of quick fixes is an obstacle to change. However, real progress in sustainability lies in using technology judiciously. Avid readers and industry professionals will find this Hotel Yearbook 2025 Sustainability Tech Edition not just informative but also essential in navigating the evolving landscape of sustainable technology in hospitality.

I invite all readers and industry leaders to explore practices of colleagues who have taken the time to share what works and what does not. By doing so, we can collectively adapt our perspective on technology's role in shaping a responsible and sustainable hospitality sector.

Enjoy and please share!

Willy Legrand, Chief Guest Editor
Henri Roelings, HYB Publisher

References & notes:

1. Krznaric, R. (2021). *The Good Ancestor: How to Think Long Term in a Short-Term*. WH Allen.

2. "Cathedral thinking" is more of a borrowed historical analogy rather than a concept with a traceable origin to a particular author. In the current context, it is a metaphor used to inspire current generations to initiate projects that require long-term dedication and to think beyond their personal or immediate benefits.

3. European Commission. (22 March 2023). *Proposal for a Directive on Green Claims*. Directorate-General for Environment. https://environment.ec.europa.eu/publications/proposal-directive-green-claims_en

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Hotel Yearbook 2025 Sustainability Tech Edition: A Summary

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Here is a summary on what to expect from the Hotel Yearbook 2025 Sustainability Tech Edition.

Data-Driven Sustainability is leading the charge, enabling hotels to make informed decisions and enhance operational efficiency. **Agnes Pierce (Amadeus)** highlights the pivotal role of data-driven sustainability in the hospitality industry, where technology and improved data accessibility are seen as key by over a third of senior decision-makers for advancing environmental initiatives. Pierce discusses the challenge of data fragmentation and underscores the critical importance of standardized data.

Juliane Caillouette Noble (Sustainable Restaurant Association) emphasizes technology's pivotal role in sustainable operations, highlighting how digital tools can streamline processes and reduce environmental impacts. The article covers operational aspects around food waste reduction, energy efficiency, water conservation, and menu planning with one message: data is king.

Jessica Matthias (Sabre) showcases how AI and IoT can transform the hospitality industry into a more sustainable operation, enhancing both efficiency and guest experiences. This shift involves integrating technology throughout the guest journey, promoting data-driven sustainability from booking to check-out, while emphasizing the importance of ethical technology use.

Transitioning to Waste Management, **Marc Zornes (Winnow)** illustrates the significant advancements in AI-driven food waste tracking, demonstrating how cutting-edge technology can drastically reduce one of the industry's most substantial hidden costs. On this path, measurement is key as highlighted by **Brune Poirson (Accor)** who explores how Accor employs AI and partnerships with tech startups to significantly reduce food waste, reinforcing its commitment to sustainability by aiming for a 50% reduction by 2030. **Jeffery Smith (Six Senses)** discusses the urgent need for the hospitality industry, particularly within wellness tourism, to reduce plastic use and improve recycling practices. Highlighting health risks and environmental damage from plastics, he advocates for systemic changes rather than incremental efforts and showcase initiatives and resources aimed at eliminating unnecessary plastics, aligning with consumer expectations for sustainable travel.

Behavioural Change and Consumer Engagement are crucial in fostering sustainable practices. **Carlos Martin-Rios (EHL Hospitality Business School)** discusses leveraging AI for sustainability in hospitality, emphasizing its role in carbon management, circular supply chains, and waste reduction, while underscoring the need for strong leadership, training, and supplier collaboration to realize these benefits. **Pablo Pereira-Doel and Xavier Font (University of Surrey, UK)** study the use of technology and behavioral insights to boost water conservation in hotels. They explore how real-time eco-feedback systems in showers can significantly cut water usage by shaping guest behavior, emphasizing that combining smart technology with effective communication strategies enhances sustainability efforts and operational efficiency.

In Green Technology and Building Innovations, **Inge Huijbrechts (Radisson)** discusses green building principles, sustainable materials, energy-efficient systems, and advanced construction technologies such as passive design strategies and Smart Building Management Systems (BMS) transforming the built environment. **Glenn Mandziuk (World Sustainable Hospitality Alliance)** discusses the integration of smart technology and sustainable practices to mitigate the hospitality industry's environmental impact. He highlights AI in energy and waste management as critical to aligning industry operations with guest expectations for sustainability, advocating for a holistic approach that includes transforming corporate culture, nurturing partnerships, and engaging guests in responsible practices.

Similarly, **Muna Al Nahdi (Farnek)** highlights the role of technology in enhancing hotel sustainability. While many hotels implement various sustainability measures, the real challenge lies in verifying the depth and effectiveness of these initiatives. Data-driven approaches and benchmarking are crucial for assessing actual sustainability performance, ensuring that management strategies are not only about compliance or superficial actions but are genuinely impactful. This involves structured measurement, real-time data monitoring, and adhering to international standards to make a substantive difference in environmental conservation and social responsibility within the hospitality sector.

The conversation around Data, Standards and Certification is expanded by **Alina Arnelle (BeCause)**, who champions the need for uniform sustainability metrics outlining a centralized data platform to bridge fragmented practices and drive efficient, industry-wide environmental progress towards Net Zero by 2050. **Bijan Khazai (Hotel Resilient)** promotes a shift towards open, collaborative sustainability certification in hospitality, emphasizing transparency, inclusivity, and shared data to overcome the limitations of traditional schemes. Their model encourages continuous evolution and collective advocacy, providing actionable insights to address environmental risks effectively. Concurrently, **Lucy Eaglesfield (Lamington Group)** outlines its holistic approach to sustainability through its One Planet Living Strategy, aiming for net zero by 2030. They emphasize integrating health, circular economy, and net-zero practices into every development phase, from design to operation, showcasing innovation in creating sustainable and community-focused hospitality environments. That holistic approach is discussed in greater details by **Jens Sørensen (ClimateScore)** who explains the pivotal role of Life Cycle Assessment (LCA) in aligning the hospitality industry with the EU Green Claims Directive, emphasizing how it enhances operational transparency, compliance, and efficiency while meeting the sustainability demands of travelers and regulators.

Biodiversity and Environmental Protection take center stage as **Anne-Kathrin Zschiegner (The Long Run)** illustrates how technology, from AI to digital monitoring tools, can profoundly impact biodiversity management and elevate environmental standards across tourist destinations with examples of on-site application such as three-dimensional forest mapping.

Addressing Social Impact and Ethical Considerations, **Klaas Koerten (Hotelschool The Hague)** focuses on the complex relationship between automation and employment in hospitality, noting the unresolved tensions between technological promises and job quality. He advocates for practical technological solutions to enhance working conditions and mitigate staffing shortages rather than replace human labour. Similarly, **Greg Poirier (Audubon International)** evaluates the progression of sustainability in U.S. hospitality, emphasizing the underutilized potential of technologies like smart thermostats and recycling innovations. He identifies key challenges like short-term cost focus and maintenance issues but with optimism about overcoming these through improved management practices and engaging staff and guests in sustainability.

Lastly, in Strategic Leadership and Culture for Sustainability, **Danielle D'Silva (Booking.com)**, explains that tackling the sustainaibility challenges in travel involves supporting accommodation providers on their journey to sustainability by simplifying access to certification information and resources, and partnering with UN Tourism for free online sustainability courses, collectively aimed at making it easier for travelers to opt for sustainable options by increasing the accessibility and transparency of sustainability efforts in accommodations. Along similar lines, **Sally Davey (Travalyst)** emphasizes the urgent need for the tourism industry to transition from discussion to action in sustainability, highlighting both the responsibilities and transformative potentials of the sector. Travalyst aims to democratize access to trusted sustainability data, facilitating informed decision-making by centralizing consistent, credible, and compliant information, starting with accommodations, to empower travelers and accelerate sustainable changes as we approach key future milestones.

And finally, **Alexander Lennart Schmidt (Hotelschool The Hague)** explains how Hospitality Business Schools are pivotal in managing the rapid digital transformation in the hospitality sector, serving as a critical bridge between emerging technologies and the enduring human-centric nature of the industry. These institutions are shifting from traditional education models to innovation hubs, spearheading the integration of digital tools like AI and robotics with the traditional hospitality ethos through real-world testing and strategic partnerships, thereby ensuring future professionals can effectively meld technology with essential human interaction.

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Sustainability Management in the ESG and Net-Zero Era

Muna Alnahdi
Director- Sustainability at Farnek Services

FARNEK

Research suggests that more than 75% of travellers prefer to stay in a sustainable hotel. While many hotels have implemented various sustainability measures, an important question remains: How sustainable is the hotel in reality? The depth and effectiveness of sustainability initiatives must be assessed beyond surface-level claims, and this is where data-driven approaches and benchmarking become crucial.

THE ROLE OF DATA-DRIVEN APPROACHES IN HOTEL SUSTAINABILITY

A structured approach to sustainability management requires accurate measurement, performance tracking, and a clear roadmap for achieving sustainability goals. Whether the focus is on ESG (Environmental, Social, and Governance) compliance, carbon reduction targets, or corporate social responsibility, the ability to manage sustainability effectively depends on reliable data and performance indicators.

The principle of *"you can't manage what you can't measure"* is particularly relevant in sustainability. To achieve meaningful progress, hotels must track real data and key performance indicators (KPIs) that reflect their actual sustainability performance. A fragmented approach that focuses only on isolated measures will not drive long-term improvements. Instead, a comprehensive and strategic framework is needed.

BENCHMARKING AND PERFORMANCE TRACKING: KEY ELEMENTS IN SUSTAINABILITY SUCCESS

Benchmarking is an essential tool for evaluating a hotel's sustainability performance in comparison to industry standards and competitors. It helps identify strengths, weaknesses, and opportunities for improvement. Hotels can leverage benchmarking to:

- Understand their environmental footprint in comparison to industry peers.
- Identify areas for efficiency gains in energy, water, and waste management.
- Improve ESG reporting and compliance with regulatory requirements.
- Enhance sustainability-related guest experiences and brand reputation.

Benchmarking also serves as a powerful change management tool for hotel chains and corporate-level sustainability initiatives. By comparing performance against industry standards, benchmarking enables hotels to:

- Set clear policies and sustainability targets
- Develop incentive programs for improved performance
- Foster knowledge-sharing and best practices across properties
- Recognize sustainability leadership
- Establish corrective actions, such as fines or disciplinary measures, for properties that fall behind

KEY SUSTAINABILITY KPIS FOR BENCHMARKING

Hotels can use specific key performance indicators (KPIs) to evaluate their sustainability efforts effectively. Some of the key environmental KPIs include:

- Energy consumption per square meter
- Energy consumption per guest night
- Water usage per guest night
- Waste diversion rates and Waste per Capita

Through my advisory work and experience with performance tracking tools, below are some of the key challenges in measuring and reporting sustainability KPIs in the hospitality sector:

- **Relevance and Standardization**:
  Not all KPIs apply uniformly across hotels; some may require normalization or contextual adjustments. Hotels of different sizes or locations may need to tailor KPIs based on specific operational needs. For example, smaller hotels may not prioritize large-scale energy-efficiency measures, while large resorts may need to adjust KPIs based on their extensive services. Certifications like **Green Globe**, and **LEED** help standardize performance metrics for hotels globally, offering adaptable frameworks suited to various types of properties. **LEED O+M**, for example, offers a comprehensive set of environmental performance standards that can be customized based on hotel size and operational complexity.

- **Technology Integration**:
  Inconsistent or inaccurate data can undermine performance assessments. Lack of proper digital systems can lead to inefficiencies and inaccuracy in data collection and reporting. Technology plays a pivotal role in sustainability management. Hotels should invest in smart energy management systems, automated water conservation solutions, waste-tracking tools, and digital dashboards for real-time data monitoring. These innovations enable hotels to identify inefficiencies, reduce costs, and enhance overall sustainability performance. Programs like **ISO 50001** (Energy Management System) and **LEED O+M** encourage the integration of such technologies, guiding hotels in adopting systems that improve energy efficiency and reduce costs.

- **Reporting Frameworks**:
  Multiple reporting structures and inconsistent frameworks can result in unreliable tracking. Hotels often struggle with balancing various reporting standards from different organizations. To streamline sustainability reporting, programs like **Global Reporting Initiative (GRI)** provide a global framework for sustainability reporting, helping hotels align with international best practices. GRI standards allow hotels to create consistent, reliable reports for stakeholders, regardless of location or certification.

- **Third-Party Validation**:
  Independent evaluations are often necessary to ensure credibility but may not always be available or feasible. Certification programs like **Green Globe**, **EarthCheck**, and **LEED O+M** offer third-party validation, ensuring hotels meet global sustainability standards. However, independent audits also provide another layer of validation.

- **Compliance and Transparency**:
  Adhering to sustainability regulations and maintaining transparency in reporting can be challenging. For international hotel chains, this can be especially difficult, as regulations may differ by region. Public Disclosures that are accepted globally such as the Carbon Disclosure Project (CDP) can help in streamlining compliance while ensuring transparency

CARBON INTENSITY IN BENCHMARKING

Carbon is a common denominator across various environmental metrics, including energy, fuel, waste, and purchased products. In many cases, it serves as an effective measure of operational efficiency.

Thus, incorporating **carbon intensity** metrics in benchmarking is essential to account for fluctuations in occupancy and operational scale. By normalizing carbon emissions based on guest nights, hotels can ensure fair and accurate sustainability comparisons across properties of different sizes and levels of occupancy. Tracking carbon intensity—allows hotels to measure their environmental footprint more accurately, regardless of fluctuations in occupancy rates or property size. This approach helps to establish more consistent sustainability benchmarks across diverse hotel portfolios.

Aligning sustainability efforts with international frameworks is also essential for driving long-term impact. Frameworks such as the **Science Based Targets initiative (SBTi)** offer scientifically validated pathways for reducing carbon emissions. By participating in these initiatives, hotels can ensure they are contributing to global sustainability goals, striving toward net-zero emissions, and being part of a global movement committed to reducing environmental impact.

THE FIVE-STEP FRAMEWORK FOR SUSTAINABILITY MANAGEMENT

In order to establish a proper sustainability management system, a systematic approach needs to be adopted following five key steps:

1. **Measure and Establish a Baseline:**
   Hotels must first assess their current sustainability and ESG performance by collecting accurate data on energy usage, carbon emissions, water consumption, waste management, and social impact metrics. Without a clear baseline, it is impossible to track progress or identify areas for improvement.

2. **Set Short-, Medium-, and Long-Term Targets:**
   To drive meaningful progress, sustainability goals should adhere to the SMART criteria—specific, measurable, achievable, relevant, and time-bound. A hotel might aim to cut carbon emissions by 30% within five years, boost renewable energy use by 50%, or eliminate landfill waste. Additionally, goal setting must align with global frameworks such as the Science Based Targets initiative (SBTi) ensuring commitments meet scientifically backed net-zero pathways and industry best practices.

3. **Develop a Roadmap and Actionable Plans:**
   A clear roadmap should outline the necessary initiatives, investments, and technologies needed to achieve sustainability targets. This plan should include milestones, budget allocations, and responsibilities for different departments within the hotel.

4. **Implement Sustainability Initiatives:**
   Execution is critical. Hotels must adopt best practices such as energy-efficient systems, waste reduction programs, responsible sourcing, and employee training. Sustainable guest engagement programs can also enhance the impact of initiatives.

5. **Measure Performance and Continuously Improve:**
   Ongoing monitoring and evaluation help ensure that sustainability initiatives remain effective. Regular audits, performance reviews, and transparent reporting contribute to continuous improvement and accountability.

In the ESG and net-zero era, sustainability in the hospitality sector is no longer optional—it is a business imperative. Hotels must transition from fragmented sustainability efforts to a structured, data-driven approach that ensures measurable impact. By leveraging benchmarking, performance tracking, and advanced technology, hotels can enhance their sustainability performance, meet global compliance requirements, and contribute meaningfully to a more sustainable future.

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Sustainability without borders

Sustainability Data

Alina Arnelle
Chief Sustainability Officer at BeCause

BeCause

In today's hospitality industry, hotels face mounting pressure to align their operations with global sustainability goals, local legislation, industry standards, and stakeholder expectations. The complexity of sustainability compliance stems from the multitude of regulations, certifications, and frameworks that require thorough analysis and a clear understanding of their interconnections. Adding to this challenge, compliance must be data-driven, with a solid audit trail substantiated by robust methodologies.

Sustainability without borders is the vision the hospitality industry must embrace to drive meaningful change. The industry is one of the most diverse and fragmented sectors, encompassing independent hotels, chains, destinations, suppliers, travel agents and booking platforms, all of which operate under different sustainability frameworks and regulations. Each stakeholder has unique data requirements, making standardization a challenge. **True sustainability knows no boundaries**—it spans various ESG factors, including energy consumption, water usage, waste management, carbon emissions, employee satisfaction and social responsibility initiatives. Effectively addressing these areas requires specialized knowledge, advanced tracking mechanisms, and comprehensive reporting strategies—often overwhelming for hotels attempting to navigate the landscape.

NAVIGATING THE COMPLEXITY

Given this complexity, where should hotels start? As sustainability gains traction and legislative demands increase, compliance remains the most logical entry point. Hotels must assess local regulatory requirements; with EU legislation often serving as a benchmark for global best practices. However, compliance alone is not enough. Many regulatory demands overlap with broader organizational and stakeholder expectations, meaning hotels must also engage with global and local sustainability organizations for guidance.

For instance, UN Tourism promotes sustainable tourism as a driver of economic growth and environmental responsibility, while the World Sustainable Hospitality Alliance (WSHA) supports ESG compliance, industry collaboration, and innovation. These organizations serve as valuable resources, equipping hotels with the necessary tools to develop strong sustainability strategies. **By leveraging these global resources, the hospitality industry can build a borderless network of sustainable best practices.** To be effective, these strategies must be grounded in data-led management, ensuring that performance is measurable, credible, and aligned with recognized methodologies.

Mapping the complexity of the regulatory environment.
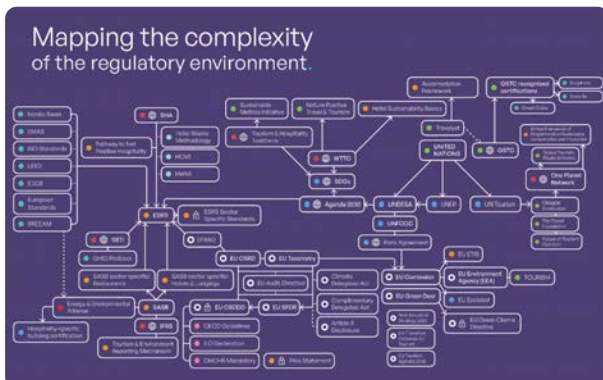
THE NEED FOR UNIFIED SOLUTIONS

Yet, despite the wealth of resources available, the industry struggles with fragmented sustainability data scattered across multiple sources and formats. This lack of standardization makes it difficult to extract insights, track progress, implement meaningful improvements, and benchmark performance. Ultimately, while sustainability data should facilitate progress, it often becomes a burden due to disconnected reporting systems and excessive administrative workloads. A roadblock to progress.

A world without sustainability borders requires unified data solutions. A unified data management platform is essential to breaking these silos, enabling seamless information exchange between hotels, destinations, marketplaces, and certifiers, and freeing up time for impactful sustainability initiatives, which can contribute to Net Zero by 2050.

ELIMINATING DATA BORDERS

This is where BeCause enters the ecosystem, streamlining sustainability data management through a centralized platform. By consolidating data, BeCause enables seamless information exchange among hotels, booking platforms, suppliers, and destinations, ensuring that sustainability efforts are not only encouraged but also efficiently executed.

Our centralized data hub:
Eliminating data borders

Market places
Hospitality entities
Investors
Auditors
Suppliers
Industry organizations and authorities
Certifications & commitments

By eliminating data borders, BeCause's centralized data hub allows the industry to work together as a cohesive ecosystem. As a leading industry player, BeCause integrates legislative requirements, industry best practices, digital sustainability management tools, tourism-specific frameworks and information exchange capabilities into a single hub. This approach eliminates redundancies, enhances data interoperability, and fosters a transparent and efficient sustainability operational environment.

BeCause simplifies reporting, enhances credibility, and reduces administrative burdens, driving wider certification adoption across the industry.

Automated data synchronization minimizes manual reporting efforts, improves accuracy, and strengthens compliance with global ESG frameworks, making sustainability management more effective. Integrated sustainability data into all project management, unlocks actionable insights, empowering organizations to make strategic, data-driven decisions at scale. Moreover, by embedding real-time data into procurement and booking systems, hospitality marketplaces can drive systemic change, shifting industry standards toward more responsible operations. Policymakers and tourism boards can leverage this centralized data to promote greener tourism, enhance destination branding, and align with regulatory requirements.

The future of hospitality lies in breaking down data silos and fostering an interconnected industry where sustainability data becomes a fundamental driver of decision-making. **Sustainability without borders is more than a concept—it is a movement that unites the hospitality industry in a shared mission.** Through a platform like BeCause, hotels, marketplaces, and destinations can collaboratively build a more responsible and transparent, future—one where sustainability is seamlessly integrated into operations, compliance is simplified, and positive impact is maximized.

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Smart Ways Technology Can Support Sustainable Operations in Your Hotel

Sustainable Operations

Juliane Caillouette Noble
Managing Director at The Sustainable Restaurant Association (SRA)

At The Sustainable Restaurant Association, our mission is to accelerate positive change across the global hospitality industry, building a sector that is environmentally restorative and socially just. In this article, we explore how technology can support hotels, restaurants and other foodservice businesses on this journey.

We won't sugar-coat it: 2025 will be a tough year for hospitality. With pressure coming from multiple angles — economic, legislative and staffing, on top of the myriad challenges presented throughout every shift — many operators will be tempted to abandon their ESG goals to focus on simply staying afloat. The surprising truth, however, is that embracing sustainability can actually support businesses through times of economic pressure, helping to reduce operational costs, boost reputation and customer loyalty, attract and retain staff, and reassure stakeholders. While resources and time are tight for many hotels and restaurants right now, there is a wealth of technological solutions available to support this journey, improving efficiency and reducing environmental impact while cutting costs in the process.

Restaurants are inherently social spaces that play vital roles within their communities, and the people working in the service industry are a key part of what makes meal experiences special and memorable — so we should be wary of using AI to replace the social and cultural elements of hospitality. We don't need our meals served by faceless robots; our goal should be to protect what is uniquely human about hospitality while making the best possible use of technological solutions in other areas — like driving sustainability forward.

Where technology really shines is in its capacity to facilitate data-driven change. Things like waste segregation, stock management and energy and water reductions can all be made vastly more efficient using AI, making sustainability more achievable for businesses overall — even through challenging times. As phrased in the Guidebook produced by RESTwithEU (a pilot project to support and drive the digitalisation of the European restaurant industry), *"consider it as venturing into a realm where improved efficiency, better customer experiences and heightened profitability await."*

Let's dive into some of the ways technology can support sustainability in hospitality operations.

FOOD WASTE

Wasted food is one of the industry's biggest problems, with a colossal 1.05 billion tonnes of food waste generated in 2022, and foodservice responsible for 28% of that figure. Not only is this morally reprehensible while one-third of people worldwide live with food insecurity, but it's catastrophic for our climate. When food is wasted, all the energy, water, labour, transport emissions and other resources that have gone into producing it are also lost. Meanwhile, food loss and waste generate 8-10% of annual global greenhouse gas emissions, simultaneously making a significant contribution to biodiversity loss by wasting almost one-third of the world's agricultural land.

This needs a critical overhaul from an environmental perspective but, on a day-to-day basis, it's also crippling the industry. In an era of skyrocketing costs, food waste is a completely unnecessary expense. By working with the right technology, your business can go a long way towards preventing food waste and lowering scope 3 emissions while also increasing efficiency and improving profitability.

Food waste management technology makes it simple to track and measure production and plate waste, revealing patterns you can then work to change. For example, if a particular menu item consistently generates a lot of plate waste, then either portion sizes should be adjusted or that dish should be removed from the menu. Over time, these systems can give accurate predictions for how much food is needed based on the number of covers expected, providing your kitchen with valuable information when it comes to prepping.

Meanwhile, smart stock management, inventory control and supply chain optimisation solutions can eliminate over-ordering and ensure that ingredients are used before they go bad, while providing valuable insights into consumer demand. With inventory tracking, businesses have an up-to-date view of what's in stock, allowing for more efficient ordering. Some of these solutions can integrate with POS systems to automate updates as dishes are sold, letting front-of-house staff know when to stop taking orders for a particular item. Conversely, these systems can also alert your team on which dishes need to be pushed to prevent stock going to waste.

ENERGY USE

We always recommend that businesses make the switch to renewable, clean energy, which can dramatically slash scope 2 emissions. Eliminating gas and embracing a fully electric kitchen can feel like a big move, but the kit has now become so efficient that there has never been a quicker return on investment.

After this, the next step is to introduce solutions that will monitor and reduce the amount of energy used, lowering both bills and environmental impact. Installing smart meters is a great way to track energy use, helping you make targeted changes. Appliance-level energy monitoring is extremely effective; timers and sensors can be added to extractor fans, overdoor heaters and toilet cisterns, ensuring that they run at reduced levels during quiet periods and turn off overnight. These systems can also alert teams if equipment is left on outside trading hours, while remote management tools let you monitor and control equipment and fixtures systems from a distance, eliminating unnecessary consumption.

Taking care of staff is an important (and often overlooked) part of social sustainability, and some of these solutions bring additional benefits to kitchen teams. For example, Demand Control Kitchen Ventilation (DCKV) technology uses sensors to detect heat, smoke and steam, automatically adjusting motor speed to match. Not only does this save energy, but it also reduces kitchen noise and air pollutants, creating a better, safer working environment for kitchen staff. Similarly, switching to induction hobs keeps kitchens cooler and allows more precise heat control while also reducing emissions.

Many of these solutions also allow you to purchase clean energy at the most cost-effective times. Smart water heaters can heat water when electricity is at its cheapest, storing it for later; electric delivery vehicles with bidirectional charging can give stored energy back to your premises; and pairing battery storage systems with solar panels captures clean energy in cost-conscious ways. Creating a long-term strategy for stacking a number of these solutions together will provide the best outcomes.

WATER USE

Smart water systems are designed to monitor and manage water use, giving operators both insights and control in real-time. Using IoT technology, smart water meters allow businesses to track how much water is being used in different areas and will alert you to anomalies like leaks before they can do real damage. Sensors connected to these systems can adjust water pressure or temperature as needed to conserve water and energy use. By monitoring the performance of water pipes, pumps and thirsty equipment like dishwashers, this technology can even forecast when a breakdown is on the horizon, alerting management ahead of time to avoid costly disruptions.

Invest in water-efficient appliances; over time, this can have a significant impact on the amount of water (and money!) you use. You don't have to replace them all at once, but when the time comes to buy new equipment, choose water-smart options. For example, many ice machines discard some of the water they take in, rather than freezing it all; choose a machine that converts as close as possible to 100% of its intake into ice. As a bonus, newer models often have a better energy efficiency rating, meaning you'll also cut your bills.

Because foodservice requires a lot of handwashing, installing low-flow taps — preferably with motion sensors — is a simple, inexpensive and effective way to decrease consumption. When it comes to dirty dishes, low-flow rinsing nozzles use significantly less water than older models. Hotel rooms can benefit from low-flow taps and shower heads and dual-flush toilets.

MENU PLANNING

Digital menu management allows chefs more flexibility when it comes to updating their menu. This makes it easier to work directly with local suppliers and create dishes based on what they have to offer when it's in season and at its best, rather than ordering ingredients based on an already-designed menu. Integrating these systems with front-of-house POS systems can reduce or eliminate the use of paper in your business.

Carbon footprint calculators can also have a big impact on sustainable menu design, allowing chefs to create and tweak dishes based on their carbon footprints. Whether or not you choose to add carbon labelling to customer-facing communications like menus, this technology provides tangible information that can help chefs to better understand and control the impact of their choices.

DATA IS KING

All these solutions have one thing in common: unprecedented and extremely helpful access to data. The value of this cannot be over-estimated; it allows hospitality businesses practical insights into long-term patterns, giving operators a greater degree of control than ever before. By making the most of these data, restaurants can see reduced costs and increased efficiency, reducing environmental impact while also supporting business success and building a more resilient, future-proof industry.

Learn more about The Sustainable Restaurant Association and our sustainability certification designed for the hospitality industry, the Food Made Good Standard, at www.thesra.org.

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Democratising access to sustainability data

Sally Davey

CEO Travalyst

Travalyst

We've all seen firsthand how travel and tourism can be a double-edged sword, both a force that has the potential to do enormous good, or if mismanaged, cause significant harm. This industry is responsible for around 9% of global greenhouse gas emissions, as well as having a wide range of both positive and negative impacts on communities, biodiversity, social equity, and more.

Extreme weather events are contributing to an increasingly worrying number of natural disasters, many of which are in tourism hotspots such as the recent fires in Los Angeles and the flooding in Spain last year. Yet tourism continues to grow.

According to UN Tourism, by 2030, we're expecting 1.8 billion international arrivals each year; nearly double the numbers we saw just two decades ago. Accommodating those kinds of numbers can only be sustainable if we focus beyond profit, prioritising people and places too.

We've spent decades talking about sustainability, eco-tourism, green tourism, regenerative tourism, and conscious travel. Whatever label we give it, we must do better and we must turn talk into action. We only have five years until 2030, a key milestone on our global journey towards a resilient future for our planet.

When tourism represents around 10 per cent of global GDP, and one in ten of all jobs, the opportunity to drive positive change is enormous.

Every day I'm inspired by countless examples of tourism as a force for good:

- One of my favourite examples is SASANE in Nepal; a social company that trains female survivors of human trafficking to become certified tour and trekking guides.

- Similarly, there's Amba Yallu at Kandalama; Sri Lanka's first hotel run entirely by women. From resort manager to gardener, the hotel has 80 staff, all female, and I admire them for their groundbreaking commitment to female empowerment, something tourism is specifically well-placed to support.

- There's Taj Exotica Resort & Spa in the Maldives running entirely off renewable energy during the day with its floating solar park.

- And an example closer to home, for me at least, is Invisible Cities in Scotland; a social enterprise that trains people who have experienced homelessness to become tour guides of their own city.

All of these are examples of a better way to travel and operate, and give me hope.

Imagine a world where travellers could easily find these options that leave a more positive footprint. We know from our own research at Travalyst that consumers (63%) don't want to spend time researching the impact of their travel choices. We know that they want data at their fingertips. Thanks to Travalyst's work in its first five years, flight emissions information has appeared in billions of searches and is now seen by travellers globally when booking a trip.

By leveraging this experience, we now aim to democratise access to sustainability information beyond flights.

Right now, there is no single source of truth for sustainability data for the tourism industry. The information that does exist is fragmented, incomplete, often behind paywalls, and sometimes not compliant. This can leave the industry feeling uncertain and overwhelmed about how they can measure, communicate and improve their efforts. Which, in turn, leads to confused and disengaged travellers - across both leisure and corporate travel. We want to help to change that.

Through industry collaboration, our mission is to provide trusted information at scale to empower better decision making and accelerate impact-led change across travel and tourism. Travalyst is taking on an ambitious initiative to centralise the collection and distribution of consistent, credible and compliant sustainability data for key areas of travel and tourism, starting with accommodation. We will support the scaling of this information through our coalition partners and beyond, which means travellers can start to make more informed choices based on trusted data every time they travel.

2030 is right around the corner and 2050 will be here before we know it. There has been years of discussion but action is now urgently needed. As a neutral organisation we are accountable only to the planet, and are uniquely positioned to coordinate system-wide collaboration and catalyse change. And indeed, deep and intentional collaboration across the industry is needed, with urgency, to protect the communities and places that we love for future generations.

HYB

Technology alone can't solve all of travel's sustainability challenges

Sustainable Stays

Danielle D'Silva
Director of Sustainability at Booking.com

Booking.com

While there is a lot of attention right now on AI and the role it will play in shaping the future of travel, technology has long been a key driver of growth for the travel and tourism industry. Can it now make our sector more sustainable?

At Booking.com, we believe one of our biggest opportunities for impact is supporting accommodation providers on their own sustainability journeys. However, the pathways many of our accommodation partners have to take are far from straightforward. Our partners tell us that while they want to integrate more sustainability practices into their operations, they face a number of barriers – especially when it comes to achieving third-party certification; a vital step in substantiating sustainability claims.

There's consistency in these barriers. Accommodation partners tell us they lack knowledge on which certifications are available in their regions or which practices they should implement next. They also point to high certification costs and the challenge of communicating their efforts to travelers. Technology plays a pivotal role in overcoming these barriers.

Many accommodation providers don't have the time or knowledge to research certifications and sustainability practices. This is particularly the case for small and medium-sized enterprises (SMEs). Without more targeted support from policymakers, they may lack both the capital for sustainability investments and access to financing.

At Booking.com, we can make the pathway to certification more straightforward. We've tested many approaches to doing this over the years. Now, with a better understanding of partner needs, and technology which enables information-sharing at scale, we can offer even more comprehensive support.

Through their individual extranet page on Booking.com, our partners can now access tailored recommendations on relevant certifications which fit their profile, needs and operations, as well as insights on ways to enhance their sustainability efforts. For SMEs especially, this can reduce the time needed to implement new practices.
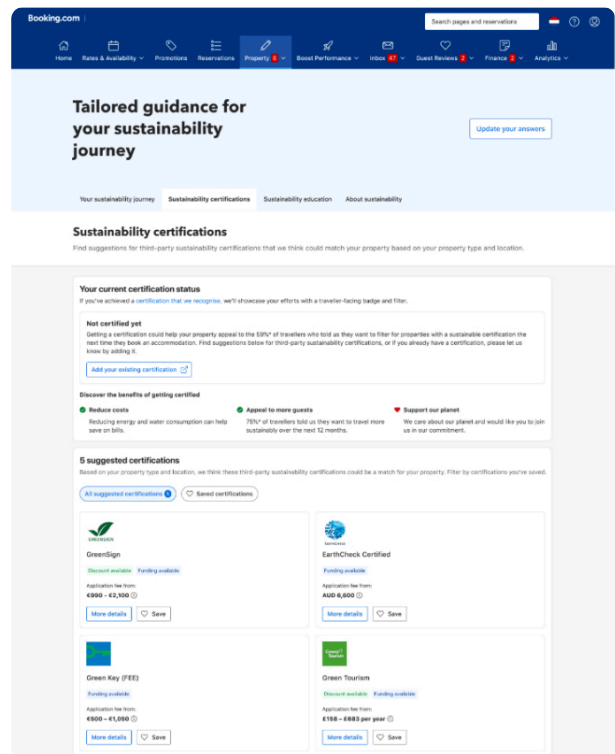
For hospitality providers who want a deeper understanding of more sustainable hospitality practices, we partnered with UN Tourism to develop a series of open online courses on four key topics: water, waste, food and the local community. The courses are free to all accommodation providers everywhere – whether they are a Booking.com partner or not.

The barriers to obtaining third-party certification aren't just lack of knowledge. Some businesses need additional financial support to take meaningful steps toward sustainability. To help our accommodation partners overcome cost-related challenges, we have negotiated discounts with select certification bodies and highlight local funding opportunities on their extranet pages.

Our ultimate objective is to make it easier for travelers to make more sustainable choices by displaying the sustainability efforts of accommodation providers. With both regulations and travelers themselves demanding that sustainability information is shared with greater clarity and veracity, substantiating those efforts by a third-party certification is crucial. However, currently, certified properties make up a tiny percentage of our listings, so we're focused on growing the supply of more sustainable options, and we're doing that by making it easier for our accommodation partners to access insights and information that will enable faster progress on their sustainability journeys – through the ways mentioned above.

Where digital products have less impact is the 'say-do' gap – the gap between what travelers say are their intentions when it comes to sustainability and the actions they take during their trip. The cooperation of guests is vital to the efficiency of many sustainability practices within hospitality. I'm proud of our recent collaboration with Accor and the University of Surrey on new research into messaging strategies and tactics that can positively influence traveler behavior.
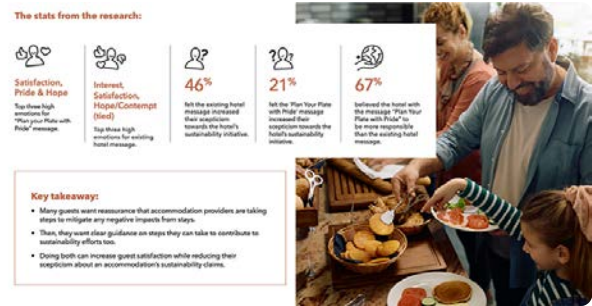
The research, conducted through in-depth interviews, diary studies, lab tests and in-property trials, surfaced four clear takeaways – alongside tactical ways to implement the findings. What this research highlighted most clearly across all of its takeaways is that technology can bring guests to an experience but offline communication, such as menu information and in-room messaging, still plays a vital role in helping them understand how to act more sustainably while on their trip.

What is clear from both this research and our own annual traveler surveys is the need to highlight sustainability practices in a way that is authentic, clear and precise. Demonstrating credibility is critical to engaging travelers successfully on the topic of sustainability.

Next to this, the research shone light on how effectively balancing messaging that appeals to both the pleasure and comfort of a more sustainable action. Sustainability is not the antithesis of luxury, it does dull the travel experience – on the contrary, it can enhance it. Our industry needs to collectively work to bust this persistent myth that more sustainable behaviours equate to less enjoyable experiences.

Both of these findings underscore another takeaway, which is that guests want to be empowered, not dictated to. Travel is, in its purest form, an exploration – whether that takes place three miles from home or 30,000. With the right information, explained in the right way, we can give guests the tools to explore in their own way. Technology enables us to surface inventory more effectively, but it is the traveler who ultimately makes the decision to utilize these options. Therefore, it is up to us as an industry to make those decisions easier, be that through more sustainable choices or clearer information on the value of these options.

The final takeaway of the research is that many travelers want to act as responsibly when they travel as they do at home – but they need help to bring that same level of responsibility into their travel experience. For example, as a resident of Amsterdam, recycling is part of my everyday life. However, often when I travel, recycling is a challenge, usually with one option for all my garbage and no clear communication on what is and is not recycled. The research shows that we need to enable these actions and make them compelling options.

Technology is not a remedy to the sustainability challenges travel and tourism is facing. It will take collective effort and continued collaboration from all of us across the industry to implement best practice and share the right information – in the right way – to bring together the actions of service providers and the intent of travelers to make more sustainable the way to experience the world.

HYB

Beyond the Buzzword: Lamington Group's Blueprint for Sustainable Hospitality

Net Zero Hotels

Lucy Eaglesfield
ead of Sustainability at Lamington Group

LAMINGTON

With the introduction of the Digital Markets, Competition and Consumers Act (2024), businesses face significant fines for misleading environmental claims. While intended to provide reassurance to consumers, this has led many to stay silent about their sustainability efforts for fear of getting it wrong. Yet, with the climate emergency and overuse of resources, access to transparent information has never been more vital in raising the bar.

ACTION SPEAKS LOUDER THAN WORDS

With the introduction of the Digital Markets, Competition and Consumers Act (2024), the Competition and Marketing Authority has been given power to impose significant fines on any business found to be making misleading environmental claims. Although designed to provide rigour and reassurance to customers, businesses are now choosing not to share their sustainability credentials for fear of saying the wrong thing. However, with the current climate emergency and the reality of over-resource use, access to transparent information is more important than ever to raise the bar.

Lamington Group (B Corp), who proudly set up the world's first hometel brand, room2, is a business with a mission: to redefine the real estate and hospitality sector through its One Planet Living Strategy; committing to designing and operating hometels within the circular economy, pushing the boundaries on guest wellbeing, and targeting to achieve whole life net zero by 2030.

By focusing on Health & Wellbeing, the Circular Economy, and Net Zero, we are not just shaping our own strategy—we are providing a framework for others to follow. The hospitality industry has an opportunity, and a responsibility, to lead the way.

Lamington Group stands apart from many hospitality businesses because it not only operates its properties, but also owns them. This unique position allows them to embed sustainability at every stage—from site acquisition and design to construction and daily operations. With full control over our buildings, we have the opportunity to lead the industry, experiment with innovative solutions, and share our insights with those who have less influence over their properties. This agility enables us to trial new initiatives swiftly, adapt without bureaucratic hurdles, and drive meaningful change on our own terms.

The One Planet Living Strategy aligns with the United Nations Sustainable Development Goals. It integrates social, environmental, and economic sustainability across ten key principles, backed by specific, measurable goals and reported under three pillars: People, Planet and Places.

Within this article, we want to showcase the three principles which underlie Lamington Group's strategy in the hope of encouraging other hospitality leaders to do the same. Through focusing on Health & Wellbeing, Circular Economy and Net Zero, we want to prove that it is possible to successfully combine sustainability and hospitality and share wins as well as failures.

Lamington Group is a certified b Corp
Nov 2023 Lamington Group achieved B Corp Certification

PEOPLE: ADDRESSING HOLISTIC HEALTH & WELLBEING

Health and well-being has become increasingly important in recent years, though the terms are sometimes used as buzzwords without meaningful action behind them. So, what does it really mean to be a business that supports the health and wellbeing of its guests, employees and its community?

Lamington Group envisions the future of hospitality as one that prioritises well-being, minimises environmental impact, and sets a new standard for a healthier stay. To achieve this, well-being must be considered throughout the entire life cycle of a property—from the first steps in a building's design to the final moment a guest departs.

At the design stage, numerous certification bodies exist to encourage architects and developers to integrate well-being from the outset. At room2, we are committed to achieving 'WELL' certification - one of the highest benchmarks in wellness-focused design - on all future properties. This means our spaces are thoughtfully crafted using natural materials, oxygen-boosting plants, and design elements that optimise air quality, temperature, and humidity for ultimate comfort and health.

Beyond design, operations play a crucial role. Hospitality is fundamentally about people, and sustainability should enhance experiences rather than limit them. That's why we take a holistic approach to well-being, focusing on three key pillars: social, mental, and physical health.

At Lamington Group, we are passionate about fostering active, social, and meaningful lives to enhance the well-being of our guests, employees, and the communities we serve. From on-site gyms and pet-friendly policies to spaces designed for relaxation, our environments support holistic wellness. Additionally, we are eliminating toxic cleaning products and high-VOC paints, ensuring our properties provide a safe, low-chemical atmosphere.

*Reception worktop Created by spared.eco.
Recycling shampoo bottles from room2 hometels and
turning them into our reception top*

PLANET: PROVING THAT NET ZERO IS ACHIEVABLE

As global temperatures continue to climb, 2024 was recorded as the first year to pass the 1.5C global warming limit despite world leaders vowing a decade ago they would try to avoid this. The urgent need for climate action is clear. With the real estate industry being a major greenhouse gas emitter, Lamington Group is taking action to drive a net zero future.

This led the team at Lamington Group to make a bold but necessary commitment to only build and operate to whole life carbon net zero standards for any new properties. We have launched an ambitious net zero roadmap, and each year voluntarily report and assess our greenhouse gas emissions through a third party. We have noticed that businesses are struggling to get started on their net zero journey, but through being transparent we want to show that true net zero can be a practical reality, rather than an aspirational goal. Each year we publish our sustainability and greenhouse gas emissions reports here.

By designing and operating net zero buildings, businesses have to think long-term to avoid stranded assets. The advantage of this approach is clear: buildings remain viable for longer, operate more efficiently with lower running costs, and retain higher financial value over time.

However, there are several challenges in achieving true net zero design, which we at Lamington Group have faced during our journey. First, whole life net zero buildings are complex to develop and still a relatively new concept. Architects, designers, builders and operating teams must be pushed beyond conventional approaches with clear and ambitious targets.

Second, while emerging low-carbon technologies—such as lower carbon concrete—offer significant carbon reductions, their higher initial costs can be a deterrent for many developers. Yet, when factoring in long-term savings and the reduced need for future carbon offsets, these solutions can become viable and financially sound. Lastly, it's crucial to critically assess products and materials marketed as *"net zero."* Some may be simply relying on carbon offsetting without delivering real reductions.

All room2 hometel properties are carbon neutral, audited by a third-party (ISO 140064) to ensure accountability. These properties operate on 100% renewable electricity, harness solar energy and leverage smart energy solutions such as occupancy-based lighting, LED technology, and ground source heating and cooling systems.

Data from on-site lab rooms informs ongoing improvements, resulting in an 18% year-on-year reduction in total Scope 1 & 2 emissions since 2019. The message is clear: sustainable operations can be both effective and commercially viable.

PLACES: THE FUTURE OF CIRCULAR HOSPITALITY

The concept of a circular economy has been around for decades, but making it a reality requires time, investment and dedication.

It is not enough to reduce waste in hospitality by switching to reusable toiletries and asking guests to reuse their towels. Hoteliers need to consider how resources are being used from the design stage to its end of life.

Lamington Group is on this journey and bringing the concept of circular hospitality to life. Our aim is to fully integrate circular economy principles in every aspect of our business, from the choice of building materials and procured goods, to the approach we adopt to turn operational waste into 'new' products. This can be seen throughout the hometels, with welcome desks crafted from repurposed shampoo bottles, carpets woven from recycled fishing nets, and light fixtures created from orange peels.
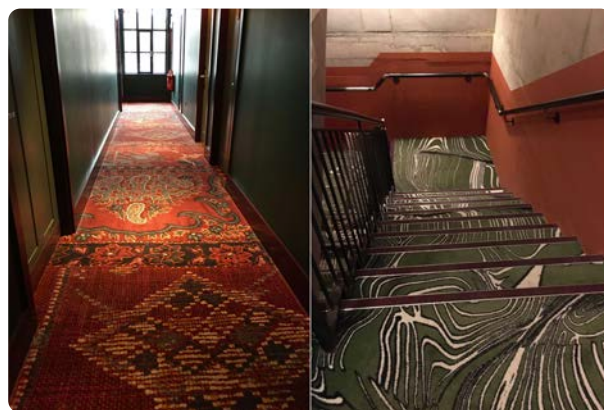
*Regenerated Carpet
Cradle to Cradle certified carpets made from abandoned
fishing nets and industrial scraps*

Our zero waste to landfill policy, also helps us drive our goal forward to reduce our overall waste production. Unlike traditional hotels, room2 hometels offer in-room recycling, facilitated by custom-designed 3-in-1 bins that make waste segregation seamless for guests.

3-in-1 Bins
We didn't like the bins we saw on the market so we decided to design our own 3-in-1 recycling bins. Separating general waste, mixed recycling, and food waste in one easy place. We are also repurposing waste plastic into coasters and other items using a plastic injection machine, provided by the Sustainable Design Studio.

Meeting room Lampshades by BIOHM made with orange waste and mycelium

Guided by our sustainable design principles, we prioritise natural, local, high-quality and circular materials and products that showcase talented people in each community.

From partnerships with local artists to bespoke craftsmanship, our spaces celebrate creativity and culture.

Our properties are more than just places to stay - they are thoughtfully designed spaces that are connected with each community they inhabit. By creating places that bring people together and encourage responsible interactions with the environment, we contribute to stronger, more vibrant communities.

Room
Two 'lab rooms' which provide real-time granular information on energy and water use as well as air quality. Don't worry, it's not big brother watching you! Learnings from these 'labs' can be used to see how sustainability interventions work for test the efficiency of new appliances.

THINKING AHEAD

To drive meaningful change, we've been researching how cities across the globe are addressing the climate emergency—and integrating these insights into our upcoming projects. By combining these insights with our own tried-and-tested approach, Lamington continues to lead the industry, pushing boundaries and challenging the status quo. With room2 York and room2 Manchester in development—and more in the pipeline— we have a bold ambition to grow to 5,000 keys by 2030, making sustainable hospitality more accessible across the UK, and showing others how to follow suit.

Smart technology and behaviour change for water conservation in hotels

Water Conservation

Xavier Font

Professor of Sustainability Marketing, University of Surrey

Pablo Pereira-Doel

Director of Undergraduate Hospitality Programmes, Surrey Business School, University of Surrey

Water scarcity is a growing challenge, particularly in tourism hotspots where guests consume far more water than residents. While technology—such as smart shower timers and leak detectors—can help, its effectiveness depends on guest behavior. Our study, conducted across hotels in Denmark, Spain, and the UK, tested real-time eco-feedback devices in showers and found they reduced water use by 25.79%, saving an average of 10 litres per shower. Guests responded best to selfless, high-effort messaging, demonstrating that combining technology with behavioral science can drive meaningful conservation. As water becomes an increasingly critical resource, hotels must embrace smart solutions that balance sustainability with guest experience.

WATER SUSTAINABILITY IN HOSPITALITY

Water scarcity is a pressing global challenge, with over a third of the world's population living in high water-stressed areas and forecasts indicating worsening conditions. Many of these regions are popular tourism destinations, aggravating the situation as tourists use significantly more water than residents. For instance, while individuals at home use around 120-170 litres per person/day, a tourist use up to 350 litres. Water conservation in hospitality is not only about sustainability; it is essential for business resilience. Hotels rely on water for various operations, from guest rooms and swimming pools to landscaping and food production. Water shortages can disrupt operations and damage reputation. Hotels, as major water users, face increasing pressure to implement sustainable practices that balance guest experience with environmental accountability.

While technology offers valuable solutions for water conservation, it is not always a panacea. Showerheads, leak detectors, smart timers, greywater recycling mechanisms, and water-efficient appliances can significantly reduce water consumption, but their impact will be limited -or insufficient- if guests and staff do not adapt their behaviour. To optimise the benefits of technology innovation, a human-centred approach needs to be always present. This means that we need to understand people, specifically how they interact with water and why or why not. Behavioural science-based approaches can offer these answers.

TECHNOLOGY-ASSISTED BEHAVIOURAL CHANGE INTERVENTION

Showers constitute one of the most water and energy-intensive behaviours at home and in tourist accommodations, making them a prime target for conservation efforts. Research shows that showering accounts for a substantial proportion of in-room water use, with reductions largely depending on guest behaviour and hotel infrastructure, such as showerheads, water pressure and flow, the use of timers, and so on.

One such solution is the use of continuous real-time eco-feedback technology in shower cubicles through a smart device that detects when a shower is taking place and provides immediate information to guests in form of a timer, capturing their attention and influencing their behaviour. Importantly, guests' freedom remains unrestricted.

To evaluate the impact of real-time eco-feedback technology, we conducted a covert experiment across six tourist accommodations in Denmark, Spain, and the UK. The study, published in the *Journal of Travel Research*, involved deploying over 100 smart shower devices to test their effectiveness in reducing shower duration, and consequently, water and energy consumption as well as emissions from heating the water. The smart device also recorded key data, such as the date and time of each shower, its duration, and the number of water pauses. Participants were real hotel guests who were unaware of the study, allowing their natural behaviour to be anonymously captured.

The experiment collected data from over 17,500 shower events and found that guests who received real-time eco-feedback reduced their water runtime by 25.79%, either through shorter showers or water pauses for lathering. This translates to an average reduction of 77 seconds per shower, saving approximately 10 litres of water per shower at a standard flow rate, along with the associated energy and carbon emissions. This significant reduction stresses the potential of real-time eco-feedback technology to drive sustainable behaviour even in hedonic settings like hotels.

HOW BEHAVIOURAL SCIENCE CAN ENHANCE OR LIMIT TECH INTERVENTIONS

Beyond technology, behavioural insights play a crucial role in optimising -or even reducing- conservation efforts. The study also explored the impact of persuasive messaging combined with the real-time eco-feedback. Different messages were tested, contrasting selfless (environmental responsibility) and selfish (personal benefit) motivations, as well as varying the levels of effort required to comply. For example, one message framed the challenge as *a typical shower here has water running for 4:50 mins, will you beat the clock?* while another message *a typical shower here has water running for 3:30 mins, will you beat the clock?*.

The findings revealed that messages priming selfless motivation and setting a high-effort goal (3:30 mins target) were the most effective across accommodations. Participants, real hotel guests, were more motivated to shorten their showers for environmental purposes than for personal benefits. This suggests that hotel guests are more likely to engage in pro-environmental behaviour when their actions align with broader social values and when a clear, measurable goal is presented. Ultimately, we all want to feel good about ourselves.

INDUSTRY IMPLICATIONS

The study demonstrated that guests are ready to conserve water when hoteliers make it easier for them to do so. The implications for the hospitality industry are profound. Water conservation is not only an environmental necessity, especially in many coastal and island tourism destinations, but also a financial and regulatory priority.

Hotels implementing real-time eco-feedback and behavioural nudges can:

1. **Reduce operational costs** – Lower water and energy consumption directly decreases utility bills.

2. **Enhance ESG performance** – Sustainability metrics are increasingly scrutinised by investors, regulators, and travellers.

3. **Improve guest experience** – Many travellers prefer hotels with visible sustainability initiatives that allow them to contribute to conservation efforts. Guests want to do good.

4. **Comply with future regulations** – As governments introduce stricter water conservation policies, proactive hotels will be better positioned to adapt.

ACTIONABLE INSIGHTS FOR HOTELS

Hotels seeking to integrate real-time eco-feedback technology into their sustainability strategies should consider the following steps:

1. **Install real-time water eco-feedback devices** in guest showers to increase awareness and trigger guests' conservation behaviour.

2. **Leverage persuasive messaging** by aligning them with guests' values and behavioural tendencies. The message is important, it can facilitate or impede behaviour.

3. **Experiment with goal-setting techniques** to identify the most effective reduction targets.

4. **Integrate water conservation data into sustainability reporting** to strengthen ESG transparency and compliance.

5. **Train staff to communicate sustainability efforts** and encourage guest participation in conservation initiatives.

CONCLUSION

As the hospitality industry moves toward greater sustainability, real-time eco-feedback technology represents a cost-effective, scalable, and high-impact solution for water conservation. This study provided robust empirical evidence that real-time eco-feedback technology, when combined with the right behavioural insight, can significantly reduce water consumption in hotels.

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Sustainable Tech: Pioneering Green Hotel Buildings and Operations

Sustainable Hotels

Inge Huijbrechts
Chief Sustainability and Security Officer, Radisson Hotel Group

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HOTEL GROUP

Just coming out of the hottest year on record, the hospitality industry is at a pivotal moment in its sustainability journey. With global climate targets, shifting consumer expectations, and increased regulatory pressure, hotels must accelerate their transition toward greener buildings and operations.

At Radisson Hotel Group, we aim to be pioneers in responsible business practices and are looking at which innovative technology we can pilot to drive meaningful change. From AI-driven energy optimization to carbon-neutral construction, we need to look beyond our traditional methods to deliver Net Zero 2050 and a sustainable future for the hotel industry.

THE RISE OF GREEN BUILDINGS

One of the most significant sustainability challenges in hospitality is the environmental footprint of hotel buildings. In existing lifecycle measurements of hotel buildings, the build phase represents only 13% of the emissions, whereas operations represent the remaining 87%, but by 2050, the carbon split in new construction will be almost 50/50. *(Source: Embodied carbon vs. operational carbon | One Click LCA)*

Radisson Hotel Group has embraced green building principles, integrating sustainable materials, energy-efficient systems, and advanced construction technologies. For example, state of the art hotel designs should prioritize:

- **Passive Design Strategies:** Optimizing natural ventilation, daylighting, and insulation to minimize energy demands.
- **Smart Building Management Systems (BMS):** These systems increasingly use AI or can be fully AI-powered to continuously monitor energy use and automatically adjust heating, cooling, and lighting taking into account predictions about building occupancy, load and weather, to optimize efficiency without compromising guest comfort.
- **Sustainable Materials:** The incorporation of recycled, locally sourced, and low-carbon materials significantly reduces construction emissions. This is taken into account in the main green building certifications such as LEED and BREEAM, and new technology is actively being researched by industrial companies such as ecofriendly alternatives to concrete, like AshCrete.
- **LEED, BREEAM and EDGE Certifications:** As part of our NETZERO2050, the focus on internationally recognized green building standards ensures that sustainability is embedded in every stage of development.

GREEN ENERGY: POWERING A CARBON-NEUTRAL FUTURE

Energy is a cornerstone of sustainable operations. Hotels operate 24/7, consuming high amounts of electricity and fuel for lighting, heating, cooling, and appliances. The transition to full electrification and renewable energy is imperative for reducing the industry's carbon footprint.

Radisson Hotel Group is actively integrating green energy solutions into its properties, including:

- **Solar and Wind Energy:** 80 of our hotels run 100% on renewable electricity and an increasing number feature on-site renewables, mostly solar PV or solar thermal, reducing reliance on fossil fuels.

Radisson Blu Resort, Fiji Denarau Island, which has one of the largest PV installations in a Pacific resort

- **Geothermal Heating and Cooling:** This technology taps into the soil's natural temperature regulation to provide sustainable climate control, significantly lowering energy consumption. This technology is being trialled in selected new hotels coming online.
- **Energy Storage and Grid Optimization:** Battery storage and smart grid systems enhance energy efficiency by optimizing power distribution and reducing reliance on peak-hour electricity from non-renewable sources.
- **Power Purchase Agreements (PPAs):** Partnering with renewable energy providers ensures that a significant percentage of our electricity consumption is sourced from clean energy. The issue in hospitality remains the uptake volume and the diverse asset ownership.
- **Hydrogen innovations:** Expensive but climate friendly technology that takes gas and converts it for emission free heat. Further roll out of this technology requires stability of subsidy and regulatory frameworks. The Radisson Blu Hotel Frankfurt has a large-scale hydrogen fuel cell installed.

Radisson Blu Hotel, Frankfurt with large-scale hydrogen fuel cell installed

By transitioning toward renewable energy, we are making strides toward our ambitious goal of becoming a net-zero organization.

GREEN OPERATIONS: AI AND SMART TECHNOLOGIES FOR SUSTAINABLE HOSPITALITY

Technology is providing opportunities for hotel operations, which enable more sustainable and personalized practices, but which take time to adopt. AI, IoT, and data analytics are driving tailored service offerings, efficiency, reducing waste, and enhancing decision-making.

AI-POWERED ENERGY MANAGEMENT

Artificial intelligence is transforming energy efficiency in hotels. AI-driven platforms analyze real-time data from sensors and smart meters to optimize energy use. Key applications include:

- **Predictive Maintenance:** AI algorithms detect inefficiencies in HVAC systems, identifying potential issues before they lead to energy waste or costly breakdowns.
- **Demand Response Management:** AI can predict peak energy demand and shift loads accordingly, reducing reliance on non-renewable sources.
- **Guest Room Automation:** Smart room technology adjusts lighting, temperature, and appliances based on occupancy, ensuring energy is only used when needed.

SUSTAINABLE WATER MANAGEMENT

Water conservation is another critical aspect of green operations. Radisson Hotel Group implements AI-powered water management systems that:

- Detect leaks in real time to prevent unnecessary water waste.
- Optimize irrigation for hotel landscapes, using weather forecasts and soil sensors to minimize excess water use.
- Monitor guest water consumption patterns and suggest behavior-based conservation strategies.

WASTE REDUCTION AND CIRCULAR ECONOMY

AI and data analytics are also reshaping waste management. Radisson Hotel Group is reducing food waste through:

- **AI-Based Kitchen Monitoring:** Smart cameras and machine learning track food waste patterns, enabling chefs to optimize inventory and portion sizes.
- **Composting and Bio-Digesters:** Organic waste is converted into energy or fertilizer, supporting circular economy principles.
- **Recycling and Upcycling Initiatives:** Advanced sorting technology ensures waste is properly recycled, while repurposing materials within hotel operations further reduces environmental impact.

Radisson Blu Hotel, Bengaluru Outer Ring Road which is the first LEED ZERO CARBON certified hotel in Radisson Hotel Group's global portfolio including a photo of the biogas installation

THE FUTURE OF SUSTAINABLE HOSPITALITY

As we look ahead beyond the coming years, the integration of sustainable technology will continue to evolve. Emerging trends shaping the future of green hospitality include:

- **Move towards Carbon-Neutral Construction:** Utilizing carbon-negative materials such as bio-based concrete and 3D-printed sustainable structures.
- **AI-Driven Sustainability Reporting and compliance:** Automating ESG (Environmental, Social, and Governance) reporting to ensure real-time tracking and compliance.
- **Blockchain for Sustainability Tracking in the supply chain:** Enhancing transparency in carbon offset programs and green supply chain management.

CONCLUSION

Sustainable technology is rapidly evolving and is essential to the needed Net Zero transformation of hospitality. By investing in green buildings, renewable energy, and AI-driven operations, the hotel industry can become more sustainable and efficient in its resource-use without compromising guest service. As we move into 2025 and beyond, we need to cooperate, share experiences and learn from each other in our commitment to a NetZero industry and a liveable planet for future generations.

Unlocking Sustainability through Smart Collaboration

Bijan Khazai

CEO of Risklayer GmbH and Hotel Resilient

Sustainability is one of the most discussed trends in the hospitality industry today. However, it is far from being universally mandated. Upcoming regulatory changes, such as the Green Claims Directive, are set to increase the pressure on hotels and their travel partners to substantiate sustainability claims. Additionally, platforms like Booking.com are beginning to require evidence of sustainability practices in the form of certification. While certification can help to verify sustainable claims through an impartial 3rd party audit process, there is much critique given the current landscape of over 200 certification schemes. This proliferation of certification programs reflects both the growing emphasis on sustainability within the hospitality sector as well as the absence of a unified approach.

RETHINKING SUSTAINABILITY CERTIFICATION

Certification alone cannot be the sole measure of sustainability. Despite its merits, many certification schemes face criticism that warrants consideration. For one, certifications are often expensive and administratively complex, making them less feasible for smaller hotels. These properties may already be operating sustainably due to their integration with local communities and environments but lack the resources to document their efforts formally. Such properties need affordable, transparent alternatives that verify their compliance with international sustainability standards and showcase their efforts.

Additionally, certification programs can lack transparency, with limited visibility into what specific practices have earned a certification seal. By now, every major DMC and tour operator knows what it means to operate sustainably and responsibly. For hotels this includes practices like reducing waste, green energy, water conservation, zero tolerance on child labor, respecting animal welfare, and ensuring decent working conditions. While a certification seal may confirm compliance with a standard that addresses these topics, the information displayed to the public (often just a certificate) typically offers limited visibility into the specific actions being taken by the property to be sustainable. Yet in-depth 3rd party audits are often conducted as part of the certification process: so why not make that data transparent?

To build trust and foster true sustainability, alternative solutions must empower hotels to implement and report their practices clearly, without relying solely on certification. Tools and collaborative initiatives that prioritize transparency, inclusivity, and affordability can bridge these gaps and drive meaningful change.

LEVERAGING COLLABORATION FOR GREATER IMPACT

1. ENHANCED TRANSPARENCY AND TRUST

Traditional certification schemes often operate as *"black boxes,"* providing little visibility into the specific practices and metrics that lead to certification. While many schemes align with GSTC criteria, these certifications often fail to communicate critical details.

For instance, they rarely explain how the criteria are localized, what additional standards are included, or how hotels perform across different sustainability dimensions. Instead, everything is distilled into a single certificate, which can leave stakeholders—including DMCs, tour operators, and eco-conscious travelers—demanding greater transparency and specificity.

An open and collaborative approach emphasizes **clear and detailed reporting** of sustainability practices, going beyond simple compliance to showcase the specific actions taken by hotels. This open sharing of data not only builds trust among stakeholders but also aligns with emerging regulatory demands, such as those in the Green Claims Directive, which push for more rigorous and transparent communication of sustainability claims.

2. REDUCING FRAGMENTATION IN THE CERTIFICATION LANDSCAPE

The proliferation of over 200 sustainable certification schemes in the hospitality sector has resulted in significant fragmentation, creating inefficiencies and confusion. While some platforms have attempted to streamline sustainability data collection into centralized hubs, these solutions often serve a narrow set of stakeholders, such as online travel agencies, and do not address the broader challenges. For example, data collected through such platforms may not be accessible to other key players, like DMCs or tour operators, perpetuating the need for stakeholders to manage multiple standards and systems.

Open and collaborative models provide a more inclusive solution by facilitating **sustainability data sharing and validation** across a wider network of stakeholders. By consolidating efforts into a shared framework and ensuring data is openly accessible, these models reduce duplication and redundancy while ensuring that all relevant parties have access to the same verified information. This holistic and open approach addresses the root causes of fragmentation, fostering alignment and unity within the industry's sustainability efforts.

3. INCLUSIVITY FOR SMALLER HOTELS

The barriers to certification, including high costs and administrative burdens, often exclude smaller and mid-sized independent hotels from recognition. These properties, despite being inherently more sustainable due to their integration with local communities and efficient use of resources, struggle to showcase their efforts in a formalized way.

Open and collaborative initiatives tackle this challenge by removing financial and operational hurdles for smaller hotels. By leveraging partnerships with DMCs and tour operators, these models provide cost-effective pathways for hotels to validate and communicate their sustainability efforts. This democratization of access ensures that sustainability verification is inclusive, enabling a broader range of accommodations to participate in and benefit from the growing demand for sustainable travel.

4. FOSTERING INNOVATION AND CONTINUOUS IMPROVEMENT

Collaboration within the hospitality sector opens the door to **innovation** by bringing together diverse stakeholders to share knowledge, develop tools, and refine sustainability practices. Unlike traditional certification schemes, which often provide static assessments, open and collaborative models create dynamic environments where hotels, DMCs, and tour operators can experiment with new approaches and adapt to emerging challenges.

For example, stakeholders might jointly develop more precise sustainability metrics for a specific region or share strategies for improving energy efficiency and waste management. This continuous exchange of ideas fosters a culture of **continuous improvement**, ensuring that sustainability practices remain relevant and effective over time.

5. COLLECTIVE ADVOCACY THROUGH OPEN COLLABORATION

Collaboration among traditionally competitive entities, such as DMCs and tour operators, provides a unique opportunity for **collective advocacy**. By aligning their efforts, these stakeholders can amplify their influence, advocating for practical and inclusive sustainability policies at various levels. This unified approach contrasts with the fragmented advocacy seen in traditional certification models, where each entity often focuses solely on its own certification or agenda.

Through shared goals and mutual benefits, open and collaborative models enable the hospitality sector to present a stronger, more cohesive voice. This not only strengthens advocacy efforts but also drives systemic change in sustainability standards, benefiting the entire industry.

6. UNLOCKING OPEN DATA FOR UNDERSTANDING SUSTAINABILITY AND CLIMATE RISKS

A key critique of traditional certification schemes is their inability to address climate risks facing hotels and localized climate adaptation needs. One of the most significant advantages of open approaches lies in their ability to leverage **open data** on downscaled climate models and integrate these into relevant metrics and actionable insights for hotels. A wealth of climate and sustainability risk data—often locked away in universities, research institutions, or inaccessible websites—can be made available through open frameworks. However, raw data alone is insufficient for decision-making. Integrating this data with the specific characteristics of a hotel's site and building enables tailored recommendations and actionable insights.

CASE STUDY: THE HOTEL RESILIENT APPROACH

The Hotel Resilient model exemplifies how open and collaborative approaches can effectively address the key challenges in achieving sustainability in the hospitality sector. By fostering partnerships with Destination Management Companies (DMCs) and tour operators, Hotel Resilient has created a platform that drives meaningful change through collective action.

Collaborations with Khiri Travel, EXO Travel, Asian Trails, Trails of Indochina, and Jacada Travel in Southeast Asia highlight a unique model:

1. **Transparency and Trust**: Hotel Resilient ensures all sustainability claims are backed by detailed documentation and accessible data, addressing the opacity seen in traditional certifications. The collective effort of partnering DMCs helps to verify hotel practices, creating a trusted network of validated sustainability data.

2. **Reducing Fragmentation**: By integrating sustainability efforts across multiple stakeholders, Hotel Resilient simplifies the process for hotels, eliminating the need to engage with multiple certification schemes. Shared data ensures alignment among tour operators, DMCs, and other partners.

3. **Inclusivity for Smaller Hotels**: Through cost-free support, Hotel Resilient makes sustainability verification accessible to small and mid-sized hotels. These hotels benefit from tools and assistance that help them document and showcase their sustainability efforts effectively.

4. **Fostering Innovation**: The collaborative nature of Hotel Resilient encourages hotels and partners to co-create solutions, from enhancing energy efficiency to developing innovative waste reduction techniques, fostering continuous improvement across the network.

5. **Collective Advocacy**: With its global partnerships, Hotel Resilient amplifies the collective voice of its stakeholders, advocating for policies that promote practical, inclusive, and impactful sustainability measures across the hospitality sector.

6. **Technology and Open Data Integration**: Hotel Resilient leverages over 70 indicators of climate risks, natural hazards, water scarcity, food supply risks, and community health risks. This data is integrated with site-specific details of hotels, enabling the creation of tailored risk scores. Hotels receive actionable recommendations to mitigate risks, adapt to challenges, and build resilience through science-based decision-making.

A CALL TO ACTION FOR INDUSTRY COLLABORATION

The Hotel Resilient approach demonstrates the transformative power of collective action. By aligning efforts around transparency, inclusivity, and science-based analytics, the platform empowers the hospitality industry to adopt meaningful sustainability measures. Through its partnerships and open framework, the Hotel Resilient collaboration model with DMC and Tour Operator partners sets a benchmark for how collaboration can pave the way for a sustainable and resilient future.

We call on industry partners to join collaboration efforts with a focus on the following collective actions to drive sustainability in more meaningful and effective ways:

- **Empower Hotels**: Support hotels of all sizes in their efforts to adopt eco-friendly and socially responsible practices that benefit both the environment and local communities.

- **Prepare for Future Challenges**: Equip hotels and tourism industry partners with the tools and resources to assess crisis and climate risks and prioritize impactful solutions.

- **Enable Sustainable Collaboration**: Facilitate the joint collection and exchange of sustainability and resilience data between travel partners, collectively achieving greater results.

- **Showcase Efforts**: Identify and showcase hotels that excel in sustainable practices, making it easier for travelers to select responsible accommodation.

CONCLUSION

As regulatory pressures grow and consumer demands evolve, sustainability must move beyond a trend to becoming an integral, measurable part of the hospitality industry. Hotel Resilient's work demonstrates the transformative power of collaboration between industry partners. By providing an environment that simplifies reporting, fosters transparency, and supports smaller hotels, we are addressing critical gaps in the sustainability narrative. Our partnerships with DMCs and tour operators demonstrates how the industry can work together to elevate sustainability and resilience standards while reducing barriers of entry for all stakeholders.

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HYB

The Hospitality Paradox: Embracing Automation While Protecting Jobs

Klaas Koerten

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For years now, the most pressing issue in hospitality has been employment shortages, and housekeeping gets stated as being most critically understaffed. Research has also been published about the low job satisfaction experienced with hospitality employees in general, and housekeepers specifically.

Simultaneously, AI and digitization has seen a massive burst in recent years, and the <u>WEF even predict</u> that by 2030, the majority of repetitive tasks will have been taken over by some sort of automation. Views like this have been <u>emerging as early as 2019</u>, when it was already speculated that robots could be deployed to take over heavy, repetitive tasks in hospitality. However, what is viewed as simple and repetitive for humans might be very complex and diverse for a robot. The most recent developments in automation rely heavily on <u>software and AI</u>, but the tasks this entails are not essential to hospitality operations. In the 5 years that robots have become more popular, hospitality hasn't changed as drastically as expected, and the employment problems persisted. The promised change might therefore be coming more slowly than expected.

<u>Adopting a pro-automation view has been dubbed as technochauvinism</u>, meaning that it holds the belief that technology can do any task better than human employees, and because of that will inevitably take over these tasks one day. While it is important to keep our eye on developing technology because it has done amazing things in the past, when a technochauvinistic view is adopted, it might lead to the disregard of human employees and their issues. If we start viewing cooks, cleaners, and housekeepers as people whose jobs will probably be replaced in the near future, it will undoubtedly have negative effects on relationships between employees and decision makers.

CHALLENGES IN AUTOMATING HOSPITALITY TASKS

It is currently still unclear for many tasks how easy it would be for machines to take over. The automation case in hospitality is different from the one in factories. In manufacturing, an assembly process gets broken up and each operation gets executed by a dedicated robot. A job like housekeeping, the most critically understaffed department in hospitality, consists of many small physical tasks with great variety. A room cleaning operation as short as 20 minutes consists of up to 10 tasks like vacuuming, general tidying up, restocking items, wiping curved surfaces, changing bed linen etc. Automating this would require a very complex robot that currently does not exist. The analogy with factory environments also breaks here because this would require a different robot for each task and therefore up to 10 robots for each housekeeper that gets replaced. Also, to move in and out of every room, the robots would need to be mobile on top of its complex functions, something that factory robots seldomly are.

For cooking, this reasoning also holds true, and <u>robot applications</u> have been developed that demonstrate this pulling apart of the process to produce food automatically and at comparable speeds to human cooks. However, the resulting machines are big, take a large initial investment and are often only capable of cooking one specific dish, making them very suitable in fast food contexts, but difficult to use in more high end kitchens, where different items are on the menu and menus change frequently.

SUSTAINABLE EMPLOYMENT

When we imagine a hotel stay, we think about the quality of the room we were assigned, the employees we interacted with and the quality of the food we eat. Most of the tasks that deliver any hotel service, still require many actions executed by human employees. Because of this, it is important to also look at hotels as employers responsible for the wellbeing of the employees delivering their product.

Unfortunately, the hotel industry has started to outsource various operations, a process sometimes referred to as <u>fissuring</u>. When this happens, many employment issues don't fall under the responsibility of the hospitality companies anymore. They don't need to consider themselves with hiring practices and simply buy the services required from third parties. However, this fissuring also leads to increased competition among subcontractors, which often affects workers negatively. At the same time, the hospitality companies don't have the direct power to influence compensation for the people executing their tasks. This outsourcing process therefore might come back to bite the industry.

The issue of sustainable employment is not on the top of hospitality's agenda, and in discussions about increasing environmental sustainability and digitization, it is sometimes disregarded. An illustrative example of this is the *"Do not clean my room"* policy that has become popular across the industry, where hotel guests that stay in a room for more than one night can choose whether they want their room cleaned every day. This practice clearly saves unnecessary cleaning resources, <u>making it environmentally more sustainable than cleaning every room daily by default</u>. However, it does introduce an element of uncertainty into housekeeping operations, because whether the room should be cleaned only becomes clear on the day of the cleaning. If there then are too few or too many housekeepers, the amount of time per room will decrease or the housekeepers will finish early and get compensated less. We are not advocating for taking away these waste saving programs, but the uncertainty that they introduce should not fall on the shoulders of operational workers.

WHAT CAN AUTOMATION DO TO INCREASE SUSTAINABLE EMPLOYMENT

The hotel industry therefore continues to suffer from staffing issues while the technology to take over operations isn't ready yet. At Hotelschool The Hague, we are currently researching hospitality technology in a different way. We start by looking at which parts of employees' jobs are most uncomfortable and look for technological solutions to battle these issues. We hope that this way of innovating will eventually improve job quality.

An exciting start has already been made with the DuvetLifter, a simple tool to battle shoulder pain experienced by housekeepers when replacing duvet covers. During first field tests, the tool showed that it was able to reduce pain, even though it is not a perfect product yet. Taking away occupational pain might reduce the number of employees calling in sick and reduce turnover, thereby battling the employee shortages experienced in hospitality directly.

HYB

Food waste: Tech supporting Accor Hotels

AI in Sustainability

Brune Poirson
Chief Sustainability Officer Accor

ACCOR

Accor, a global leader in hospitality with more than 5,600 hotels and 10,000 food and beverage (F&B) venues, serving 200 million meals worldwide every year, is leveraging technology tools to reduce food waste.

MEASUREMENT IS KEY

This massive F&B supply chain represents 17 percent of Accor's overall carbon footprint, 40 percent of its water usage, and 80 percent of its impact on land use and biodiversity. Accor's sustainability efforts help minimize this impact. Indeed, Accor encourages its properties to measure their food waste because reduction can only be achieved through precise measurement. To accurately quantify food waste and comply with shared standards, each property is encouraged to measure its waste using Gaïa, an online reporting tool integrated to Accor hotels. This technology-based solution makes it easier for hotels to measure and monitor their energy, water, waste and carbon footprint performance, so that they can accurately track the impact of their sustainability initiatives. To date, 93% of the Group's affiliate, managed and franchised hotels, spread across +5,600 properties, have adopted this platform to measure their energy and water consumption.

THE ROLE OF AI

Accor has long been committed to transforming the way it works and to supporting hotels to improve their extra-financial performance and offer guests sustainable and desirable experiences. To go even further, Accor is a committed member of the WRAP EU (ex-International Food Waste Coalition), which is working to define and implement a methodology and targets for measuring and reducing food waste at an industry level. Secondly, it is essential to roll out working, reporting and analysis methods based on a rigorous scientific approach. To achieve this, Accor is now leveraging the latest technological advances in Artificial Intelligence. Thanks to these two levers, the Group aims to exceed its targeted 50% reduction in food waste by 2030.

On average, almost 20 tons of food waste are generated per hotel each year, accounting for around 43% of a hotel's total waste. While 45% of food waste in hotels comes from processing and excess preparation, 34% is due to food left on plates. The remaining 20% is the result of poor inventory management.

Accor has joined forces with three start-ups that leverage Artificial Intelligence to accelerate its transformation: to help reduce waste at source, 200 pilot programs have been launched in properties that generate significant F&B sales.

Since 2016, Winnow Vision has been scanning and visually recognizing surplus food to obtain detailed data on its quantity and type, enabling teams to adjust menus and reduce food waste. The solution is currently being used in more than 180 properties, including at Fairmont Jakarta, which has reduced its food waste by 16% (1.6 tons) in a single year, and Novotel London Excel, which has reduced waste by 39%, a reduction of 12 tons.

Using Artificial Intelligence, Orbisk, a startup awarded the Accor Challenge at Viva Technology 2021, scans leftover food to obtain clear data on the amount and type of food being thrown away, helping to adjust menus and thus reduce waste. This has been used at Sofitel The Palm in Dubai, which has reduced its food waste by 13% in five months, corresponding to 3 tons annually, and Novotel Amsterdam Schiphol Airport, which has cut its waste by 35%, the equivalent of 8 tons over two years.

Lastly, Fullsoon is an AI-powered predictive restaurant management startup helping Accor chefs to adopt more sustainable ingredients and to clearly indicate the carbon impact of the meals on restaurant menus.
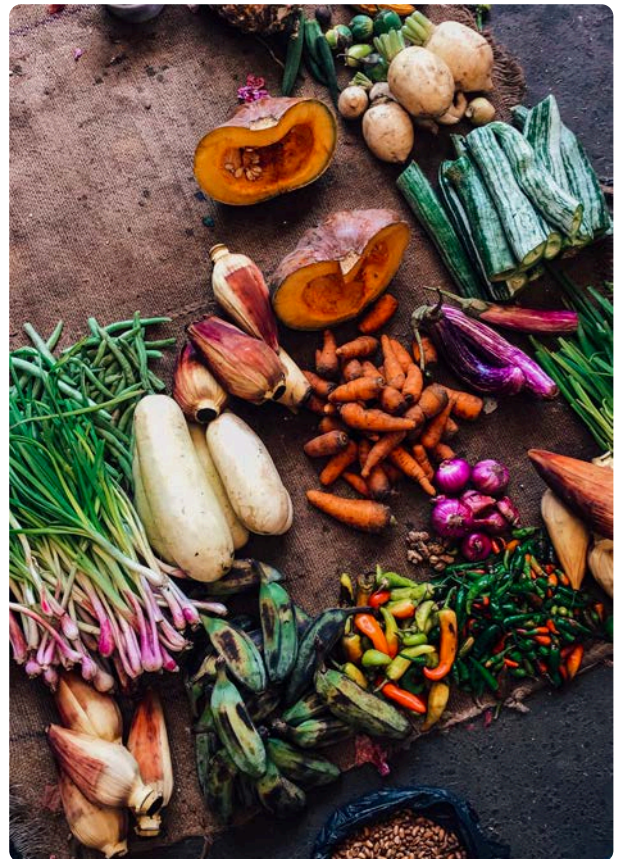
No such thing as ugly vegetables, these are beautiful and tasty!

This start-up emerged from our intrapreneurship program launched by the Innovation Lab. Through this initiative, Accor enabled a Group employee to devote 100% of his time to bringing his idea to life, financing his project and creating his start-up before ultimately leaving the Group so that Fullsoon could take off.

Sharing best practices for positively influencing the behavior of employees – and particularly chefs – is another point of action. The Group has designed specific training modules for its kitchen teams on the topic of food waste. Improving customer awareness of the need to combat food waste is also an essential daily task for our teams: interacting, raising awareness and embarking on our journey to encourage them to adopt more responsible habits.

ADVANCING SUSTAINABILITY & RESOURCE MANAGEMENT

As AI adoption grows, so does its environmental impact. Accor is committed to leveraging AI responsibly. AI plays a critical role in optimizing energy consumption, water usage, and food waste reduction, aligning with Accor's sustainability goals. However, the growing reliance on AI raises concerns about data center energy consumption, with projections showing AI could account for 10% of global data center energy use in the coming years. Balancing AI-driven innovation with environmental responsibility remains a priority.

Now Is The Time To Embrace Eco-Technology

Sustainable Tech

Greg M. Poirier

MBA, Global Director, Hospitality Certification Programs, Audubon International

Audubon International

While the hospitality market's sustainability ambitions have hit the launchpad here in the USA, they haven't quite reached a sustained orbit. But we're on our way, and to get there, our nation must first acknowledge that, at this moment, we're trailing much of the world in this vital stewardship movement throughout. We've got a way to go. The commercial asset class of hospitality is still trailing behind much of the developed world to date.

So, what in the world does that mean for our industry in 2025 and 2026?

TECHNOLOGY, CIRCULAR ECONOMY INNOVATORS, AND RESISTANCE

Many great sustainability technologies are now available, and more innovations enter the market daily. For instance, in-room smart thermostat solutions] can reduce most hotels' energy bills by 30% on average and work well with most existing HVAC systems in the field today. They have been widely available for at least a decade now–*"table stakes"* as a no-brainer investment. Still, they have less than 15% global hotel market penetration, perhaps a few points less here in the USA. With energy costs alone representing the second highest expense for a hotel or resort, this simple-to-implement solution is clearly a key to implementing sustainable best practices, with many others to follow.

There are also partnerships that embrace what's called *"Circular Economic Innovation,"* a fancy phrase for *"recycling"*. For instance, RoomOneSolutions.com is in the innovative recycling space. They focus on the waste often ending up in landfill, including old HVAC/PTAC equipment. During renovations, when discarding used PTACs, they offer *"3 Easy Steps Towards Responsible and Dependable PTAC Disposal Service."* Reach out to them and let them pay to collect your old PTAC equipment which they will strip, recycle and reuse what they can, eliminating vast amounts of metals otherwise going to a landfill.

Yes, there remain plenty of friction points along this transition path. One is hotel developers' resistance: They don't always build a hotel with ongoing operating assets and monthly expenses as a primary focus. That may be surprising to those who aren't aware, but a common concern to those in the business–penny-wise, pound-foolish, and widespread.

Another market friction point: The track record of deployment of this technology with respect to user practices, or lack thereof. Having worked at two primary manufacturers of this technology, I can share first-hand that, just a year or two after deployment, all too many hotel teams no longer consistently monitor nor maintain critical platforms, sometimes to the point where no one on property knows a system's login information.

To be fair, Directors of Engineering and Chief Engineers historically are not selected for their technological proficiencies, which are generational. That's even more in play at smaller or select service hotels operating with smaller staff who simply cannot keep up with every technological requirement as they juggle other needs to perform their basic day-to-day jobs.

A third friction point: Those companies developing and selling these solutions are often not nuanced in the art and science of hospitality, however much they may consider themselves *"hoteliers"* for serving the industry. Therefore, the User Interface involved is not as fully developed or thoughtfully created to make it as fun and easy to use as possible by hotel team members.

BETTERING THE BOTTOM LINE

Even with today's ever-increasing energy costs–the average hotel's second-highest expense category - we are starting to see true cost savings through technology. Companies like Connecticut-based Smartcon offer best-in-class ongoing support for all top-tier guest room energy systems available on the market today. They demonstrate clearly that investing solely in manufacturer support is often not the best way to go. Smartcon specializes in handling common friction points at a reasonable cost to a hotel. With their 2024 acquisition of Neuro Building Systems, they added additional capability to manage and maintain water and indoor air quality as well as reporting key metrics in sustainability required in most of the world and will eventually become *"table stakes"* in the USA as well. Smartcon is now better armed to accelerate the adoption of sustainable technology in the hotel sector, assuming owners and developers commit to their sustainability responsibilities in the *"commercial real estate, hospitality"* asset class.

Alongside today's new focus on broader sustainability initiatives comes the need to manage and report on sustainability metrics. After all, you can't change what you don't measure.

As a professional community, hoteliers are extremely effective in accomplishing complex tasks once they have the right tools in hand–and clear direction to use them.

A GLOBAL COMMITMENT

Geopolitically, hotel operators in the USA should acknowledge that our international guests are now used to, and expect to follow, new rules and regulatory requirements established around the globe. Indeed, several of the largest states and major cities are taking effective and achievable regulatory steps in the absence of uniform federal leadership. We are truly a global industry, and no one wants to have to manufacture different solutions to fit different locations, nor do hotel operators want to have disparate systems and solutions based solely on geography.

So, are we there yet? I think we can conclude that we now have access to more complete, scalable sustainable systems and solutions–along with support teams who can ensure a return on the investment while enhancing the user experience for all emerging technology.

How can ownership and management make sustainable best practices fun and entertaining for hotel staff? I don't have that answer quite yet, but getting guests involved is key, as is, perhaps, adding a *"gamification dimension"* to the end-user interface. That seems to fit the current new generation of tech-savvy team members. Stay tuned. There's definitely more to come.

Smart Tech Meets Sustainability: The Future of Hospitality

Glenn Mandziuk

CEO, Sustainable Hospitality Alliance

World Sustainable Hospitality Alliance

The Hospitality industry stands at a pivotal crossroads. As one of the world's most vibrant and economically significant sectors, it contributes approximately 10% of global GDP and employs millions worldwide. However, this industry is also a significant driver of resource consumption and carbon emissions, making sustainability not just an ethical imperative but a strategic necessity. The convergence of smart technology and sustainable practices offers a transformative path forward, empowering hotels, resorts, and other players in the sector to thrive while safeguarding our planet.

At the World Sustainable Hospitality Alliance (the Alliance), we are leading the industry towards Net Positive Hospitality, most recently having demonstrated this through our partnership with UN Tourism, ensuring alignment of ESG frameworks across the sector. As the leading global charity that unites Hospitality companies, we work with our value chain, and strategic partners to tackle pressing challenges impacting the planet, people, and places worldwide. Our aim is to ensure that the Hospitality industry contributes positively to destinations, embodying the principle of giving back more than it takes. Smart technology plays a key role in the majority of our strategic partners' products and services, showcasing how valuable technology is within our industry for advancing sustainability.

THE CASE FOR SMART AND SUSTAINABLE SOLUTIONS

Hospitality's environmental footprint is considerable. Energy-intensive operations, extensive water usage, and substantial waste generation highlight the need for a paradigm shift.

Simultaneously, guest expectations are evolving. Today's travelers are more environmentally conscious than ever, with a growing preference for sustainable and tech-forward experiences. A report revealed that 81% of global travelers believe sustainable travel is important, and 73% are more likely to choose accommodations implementing sustainable practices.

This dual pressure from operational demands and customer requests, sets the stage for smart, sustainable solutions to play a transformative role. By leveraging innovative technologies, Hospitality businesses can reduce costs, improve operational efficiency, and deliver experiences that align with modern values.

THE ROLE OF TECHNOLOGY IN SUSTAINABLE HOSPITALITY

1. ENERGY EFFICIENCY THROUGH AI
Energy consumption is one of the largest contributors to the sector's carbon footprint. Smart energy management systems, powered by AI, can optimize energy use across properties.

For example, AI-powered platforms analyze usage patterns to forecast energy needs and suggest further efficiencies. These systems not only decrease emissions but also cut costs—a win-win for businesses and the environment.

Case studies from major hotel brands demonstrate the potential. Marriott International, for instance, has implemented these types of systems across its properties, resulting in significant reductions in energy use and utility costs.

2. WATER MANAGEMENT INNOVATIONS
Water scarcity affects billions globally, and the Hospitality sector must take its role seriously. Advanced technologies like smart water meters and low-flow fixtures can help businesses monitor and reduce water consumption.

Additionally, water recycling systems are gaining traction, particularly in luxury resorts and large urban hotels. These systems capture and treat greywater from showers and sinks for reuse in landscaping or cooling systems, minimizing the strain on freshwater resources.

3. WASTE REDUCTION THROUGH DIGITAL SOLUTIONS
Waste is another critical issue for the sector, encompassing food, plastics, and general refuse. Technology offers solutions at every stage of the waste management cycle.

AI-driven inventory management systems can predict demand more accurately, reducing food waste in hotel kitchens. Similarly, apps like Too Good To Go or OLIO connect hotels with local communities to redistribute surplus food, ensuring it doesn't go to waste.

For non-organic waste, smart recycling bins equipped with sensors can track waste levels and ensure timely disposal or recycling. These systems also generate data that businesses can use to refine their sustainability strategies.

BEYOND TECHNOLOGY: CREATING A HOLISTIC APPROACH

While technology is a critical enabler, it cannot operate alone. A truly sustainable Hospitality operation requires a holistic approach encompassing culture, partnerships, and education.

1. EMBEDDING SUSTAINABILITY INTO CORPORATE CULTURE
Leadership must prioritize sustainability as a core value, embedding it into every level of the organization. This includes training staff on best practices, establishing green committees, and setting clear, measurable sustainability goals. Our Net Positive Hospitality Academy plays a crucial role in driving transformative change within the industry. It equips the sector with knowledge, tools, and training programs to accelerate sustainability.

2. PARTNERING FOR PROGRESS
Collaboration is essential for scaling solutions. Partnerships with technology providers, local Governments, and non-profits can amplify impact. For example, working with renewable energy suppliers or waste management companies can streamline the implementation of green initiatives.

Organizations like the Alliance act as platforms for knowledge sharing, helping the industry collectively accelerate its sustainability journey towards Net Positive Hospitality.

3. EDUCATING AND ENGAGING GUESTS

Guests are crucial stakeholders in sustainability efforts. By educating them on the environmental impact of their choices and offering convenient options for eco-friendly behavior, hotels can create shared responsibility.

Interactive apps and in-room displays can showcase a property's sustainability metrics, such as water saved or carbon offset. Loyalty programs can also incentivize eco-conscious actions, such as reusing towels or selecting green transportation options.

THE BUSINESS CASE FOR SUSTAINABILITY

Smart and sustainable technology solutions are not just good for the planet—they're good for business. Cost savings from energy and water efficiency, increased revenue from eco-conscious travelers, and enhanced brand reputation are just a few of the tangible benefits.

Moreover, sustainability initiatives align with investors' growing emphasis on ESG criteria. A commitment to sustainable practices can open doors to funding opportunities and strengthen relationships with stakeholders.

THE ROAD AHEAD

The Hospitality industry has a unique opportunity to lead the global shift toward a sustainable future, one that is giving back more than it takes. By embracing smart technology and creating a culture of innovation, businesses can set a powerful example of environmental stewardship while delivering exceptional guest experiences.

The road ahead requires bold action and collaboration. I am optimistic about the industry's ability to rise to this challenge. Together, we can unlock the full potential of smart and sustainable solutions, ensuring a vibrant and resilient future for Hospitality and the planet.

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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

- Martin-Rios, C., Rogenhofer, J., & Alvarado, M. S. (2022). The true cost of food waste: Tackling the managerial challenges of the food supply chain. *Trends in Food Science & Technology*, 131, 190-195 Access to article

- 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

HYB

Building a Seamless Guest Experience: Tech's Role in Sustainable Hospitality

Smart Sustainable Hotels

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Sabre

The hospitality industry is undergoing a transformation. Today's travellers, particularly the influential millennial and Gen Z demographics, are seeking more than just a comfortable stay; they expect experiences that align with their values, including a growing emphasis on sustainability. Hotels that proactively address environmental concerns are contributing to a more sustainable future, reducing waste and saving costs, and also positioning themselves for long-term success in a market where sustainability is becoming a hygiene factor – not just a nice-to-have. Let's look at how technology, within the next five years, will become indispensable in creating a seamless and sustainable guest experience, offering innovative solutions that minimise environmental impact while enhancing the overall stay and driving business value.

SEAMLESS SUSTAINABILITY: FROM BOOKING TO CHECK-OUT

The sustainable guest journey begins long before arrival. Booking platforms will increasingly feature hotels' sustainability credentials, including certifications (e.g., LEED, Green Key, Travalyst-compliant certifications) and specific sustainability attributes and initiatives. Hotel chains like Six Senses are already highlighting their commitment to sustainability on their websites and booking platforms, showcasing their efforts in areas like water conservation and renewable energy. We'll likely see increased transparency on the environmental impact of a stay, at guest-level.

In fact, the new EU-wide Product Environmental Footprint Category Rules (PEFCR) for hotel accommodation will come into play in this time frame. This initiative aims to create a harmonised methodology for measuring and communicating the environmental footprint of a stay at a hotel. The intended outcome is greater transparency and comparability, empowering consumers to make informed choices and driving hotels to improve their environmental performance. Public consultation on the draft PEFCR has just closed. This is a positive step towards measuring the environmental impact of hotel stays. However, some challenges have been identified. For example, the current scope is limited to the hotel room and doesn't include other facilities like restaurants, swimming pools and conference facilities. This limited scope may not fully address the issue of greenwashing in the EU.

Pre-arrival communication will leverage AI-powered chatbots to provide personalised recommendations for sustainable travel choices, such as public transport options and community-led tours, further incentivising responsible travel. Imagine a chatbot suggesting train routes instead of flights for shorter distances or highlighting vegetarian or sustainable restaurants near the hotel.

Mobile check-in, already gaining traction, will become ubiquitous within the next five years, further reducing paper waste and streamlining the arrival process. Digital room keys, accessed via smartphone, will become the norm, minimising plastic consumption and offering a contactless, hygienic experience – a trend accelerated by health and safety concerns during the pandemic.

Hotels will increasingly integrate their Property Management Systems (PMS) with guest apps, offering personalised welcome messages highlighting the hotel's sustainability commitments and inviting guests to participate, or in some cases, opt out as the default will be the lower impact option.

IN-ROOM EFFICIENCY AND PERSONALISATION

Smart room technology is becoming increasingly sophisticated. Beyond basic energy management systems, systems such as AI-powered thermostats are learning guest preferences and automatically optimising room temperature for comfort and energy efficiency. For example, hotels like the Cosmopolitan of Las Vegas are using smart room technology to adjust lighting and temperature based on guest occupancy. Occupancy sensors will not only control lighting and temperature but also manage other energy-consuming devices, such as appliances and entertainment systems, minimising waste when rooms are unoccupied. Interactive in-room tablets will provide real-time feedback on guest energy and water consumption, encouraging mindful resource usage through gamification and personalised tips. These systems will integrate with hotel loyalty programmes, rewarding guests for sustainable choices. Imagine a system that tracks water usage during showers and suggests ways to conserve water, offering loyalty points for guests who opt for shorter showers.

ENHANCING THE DINING EXPERIENCE

Digital menus, already prevalent in many establishments, will become even more dynamic. They will not only reduce paper waste but also provide detailed information on the origin and sustainability certifications of ingredients, empowering guests to make informed choices. For example, restaurants are increasingly using QR codes to provide detailed information about the sourcing of their ingredients, highlighting local farms and sustainable practices. AI-powered menu planning tools will help hotels optimise food purchasing and minimise waste by predicting demand and adjusting portion sizes. Winnow, for example, offers technology that helps chefs track and reduce food waste in their kitchens. Vertical farming and on-site hydroponics, facilitated by technology, will become more common, allowing hotels to source fresh, local produce while reducing transportation emissions. Some hotels are already experimenting with on-site gardens and hydroponic systems to grow their own herbs and vegetables.

BEYOND THE ROOM: SMART HOTEL OPERATIONS

Smart building management systems will optimise energy and water usage across the entire hotel. Predictive maintenance, enabled by IoT sensors and AI, will identify potential equipment failures before they occur, preventing costly downtime and resource waste. For example, hotels are using sensors to monitor water leaks and energy consumption in real-time, allowing them to address issues proactively. Waste management systems will leverage data analytics to optimise recycling and composting programmes, minimising landfill waste. For instance, some hotels are using smart bins that track the amount of waste generated and provide data on recycling rates.

Hotels are likely to increasingly adopt blockchain technology to ensure transparency and traceability in their supply chains, verifying the sustainability claims of their suppliers and building trust with their guests. This could involve tracking the journey of ingredients from farm to table or verifying the sustainable sourcing of linens and amenities.

ENGAGING GUESTS; AN ONGOING REVOLUTION

Gamification will evolve beyond simple rewards programmes. Augmented reality (AR) experiences could be integrated into hotel apps, allowing guests to explore the hotel's sustainability initiatives in an engaging way, such as visualising the water savings achieved through towel reuse programmes. Social media integration will allow guests to easily share their sustainable travel experiences, amplifying the hotel's message and building brand advocacy. Hotels can use social media platforms to showcase their sustainability efforts and encourage guests to share their own eco-friendly travel tips.

THE FUTURE OF SUSTAINABLE HOSPITALITY

The convergence of AI, IoT, and big data will enable hyper-personalisation of the sustainable guest experience. Hotels should increasingly be able to anticipate guest needs and proactively offer sustainable options, creating a seamless and effortless eco-conscious stay. For example, AI could analyse guest preferences and suggest personalised itineraries that include sustainable activities and dining options. Virtual reality (VR) could be used to showcase the hotel's sustainability efforts and educate guests about environmental issues in an immersive and impactful way, such as a VR experience that transports guests to a local nature reserve that the hotel is supporting through its conservation efforts.

ETHICAL CONSIDERATIONS AND RESPONSIBLE REPORTING

As hotels increasingly rely on technology to drive sustainability, it's crucial to address potential ethical concerns. Data privacy and security must be prioritised, ensuring that guest data is collected and used responsibly. The environmental impact of technology itself, including increased pressure on data centres due to AI use, as well as the manufacturing and disposal of electronic devices, must also be considered. Hotels should strive to adopt circular economy principles, prioritising repair, reuse, and recycling of electronic equipment.

In short, technology is not just a tool for improving efficiency; it's a key enabler of more sustainable hospitality. Within the next five years, we expect to see a significant acceleration in the adoption of smart and sustainable technologies across the hospitality sector. Hotels that embrace these innovations will not only minimise their environmental footprint but also enhance the guest experience, attract environmentally conscious travellers, and build a more resilient and sustainable business. By embracing a holistic approach to sustainability, hotels can create a positive impact on both the planet and their bottom line.

Fragmentation to Transformation: Sustainability Data and the Future of Hospitality

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aMaDEUS

Sustainability has become a defining priority across the travel and hospitality industries, driven by increasing consumer awareness and urgent global climate concerns. As hotels and hospitality providers strive to reduce their environmental impact, data has emerged as a powerful tool to guide decision-making, improve efficiency, and meet evolving sustainability goals. The ability to collect, analyze, and act upon sustainability data is no longer optional but essential for businesses looking to remain competitive in an era in which travelers demand transparency and ac countability.

THE ROLE OF DATA IN SUSTAINABLE HOSPITALITY

Data is the backbone of any successful sustainability initiative in the hospitality industry. Our recent survey revealed that more than a third of senior sustainability decision-makers identified technolog ical advancements – particularly those that enhance operational efficiencies and improve data acces sibility – as the most significant drivers of environmental progress. By measuring key sustainability

metrics such as energy consumption, waste management, water usage, and carbon footprint, hotels can pinpoint inefficiencies, optimize resource use, and implement cost-effective solutions to mini mize their environmental impact.

Operational optimization is essential for reducing a hotel's ecological footprint. For example, real time dashboards, risk and compliance management tools, and scheduled equipment maintenance can empower hotels to take a proactive approach to environmental sustainability. Preventative maintenance extends equipment lifespan, reduces waste, and enhances efficiency. These data-driven strategies not only lower operational costs but also support long-term environmental sustainability goals, ensuring that hotels operate more responsibly and efficiently.

THE CHALLENGE OF DATA FRAGMENTATION

One of the most significant challenges on the path to net-positive hospitality over the next few years will be the management of sustainability data and the technology needed to measure, aggregate, and standardize this information effectively. Currently, sustainability data is scattered and fragmented, making the decision-making process difficult. Without standardized data, hotels struggle to establish cohesive sustainability strategies, and travelers lack the necessary transparency to make informed choices about their stays.

Access to this data is essential not just for hotels to refine and implement sustainability strategies but also for travelers who increasingly prioritize environmentally conscious options. The standardi zation of sustainability data will be critical in enabling hospitality providers to track progress, com pare performance, and make data-driven improvements that align with regulatory requirements and consumer expectations.

Industry collaborations, such as the World Sustainable Hospitality Alliance and Travalyst, are ac tively working to create unified sustainability criteria that allow hotels to consistently report their environmental and social impact.

LEVERAGING TECHNOLOGY TO ENHANCE ENVIRONMENTAL SUSTAINABILITY DATA

Technology is playing a pivotal role in accelerating environmental sustainability efforts. Energy effi ciency remains a top priority, with Amadeus data revealing that 36% of hotel leaders identify tech nology-driven operational efficiencies as a significant catalyst for sustainability, while 29% plan to integrate energy-efficient practices into their operations. However, for these initiatives to succeed,

hotel leaders have emphasized the need for sustainability training, clear budget allocations, access to technological solutions, and guidance on enabling travelers to make more sustainable choices.

Cloud-based solutions, data-driven analytics, and automation are transforming how hotels manage energy use, reduce waste, and streamline operations. Yet, despite these advantages, many hotels face barriers such as cost concerns, limited knowledge, and resource constraints. Overcoming these re quires strategic investments in technology and greater industry collaboration to make sustainable solutions more accessible and cost-effective.

One innovative initiative demonstrating the power of environmental sustainability data is the HRS Green Stay label, which allows businesses to select hotels based on sustainability criteria. By provid ing transparency around environmental impact, corporations can encourage hotels to adopt more environmentally conscious solutions, reinforcing the value of environmental sustainability data in decision-making.

SOCIAL SUSTAINABILITY AND THE ROLE OF DATA IN ACCESSIBILITY

Sustainability in hospitality extends beyond environmental considerations; it also encompasses so cial sustainability. Hotels play a critical role in fostering inclusive and accessible environments for all travelers, and data can be used to identify accessibility gaps to enhance the guest experience. By tracking customer feedback and accessibility-related service requests, hotels can better understand the needs of diverse guests and implement targeted improvements.

Social sustainability also extends to equitable pay, professional development, and employee well being. Many hotels are growing their efforts beyond their properties by engaging with local communities and promoting responsible tourism. Data analytics play a crucial role in these initiatives, helping hotels address workforce challenges, reduce over-tourism, and promote more conscious travel choices. According to our research, 98% of ESG leaders believe technology has the potential to drive social progress within the travel sector, with 20% emphasizing the importance of using big data to identify and address skill shortages.

PROMOTING ENVIRONMENTAL AND SOCIAL SUSTAINABILITY

Sustainability is not a challenge that can be tackled in isolation. Industry leaders must collaborate with stakeholders and partners, building alliances that drive meaningful progress. The journey toward sustainability is ongoing, requiring continuous innovation, investment, and commitment.

Collecting data is only the first step. Its true value lies in how it is used to drive change. Hotels that effectively leverage data can reduce their environmental impact, enhance guest experiences, and improve financial performance. Beyond environmental efforts, data also plays a crucial role in social sustainability initiatives, fostering inclusivity, accessibility, and supporting employee well-being.

By embracing a data-driven approach, hotels can move beyond good intentions and take tangible actions that benefit both the planet and their business.

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A Vision for Hospitality Business Schools: Bridging Technology and Tradition

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HOTELSCHOOL
THE HAGUE
Hospitality Business School

Hospitality Business Schools' long tradition in operational excellence and service quality is no longer sufficient to navigate the future of technology-enabled hospitality. While Hospitality Schools successfully trained generations of professionals in living the human-centric nature of hospitality, the industry faces a rapid digital transformation. This transformation creates a unique opportunity for Hospitality Schools to serve as a bridge between the innovative potential of emerging technologies and the deeply rooted social fabric and human touch of personalized hospitality. With a vision to become innovation hubs, Hospitality Business Schools can become crucial players in maneuvering the hospitality sector in a tech-enabled, human-centric era.

THE EVOLVING ROLE OF HOSPITALITY BUSINESS SCHOOLS

Traditionally, Hospitality Schools focused on mastering service excellence, ensuring that future professionals understood every facet of hospitality operations and guest interaction. Over the years, curricula expanded to include business management, financial expertise, and leadership skills. However, digital transformation is not merely an operational upgrade—technology is reshaping the very nature of service, requiring a fundamental shift in how future hospitality professionals are educated.

Consequently, Hospitality Schools must evolve into institutions that facilitate technological adoption without compromising the social essence of hospitality. This requires acting as the linking pin between technology and human-centered service design, ensuring that future professionals can seamlessly integrate digital opportunities while maintaining the essence of hospitality: caring for the guest while creating a warm and welcoming atmosphere.

THE CHANGE GAP: TECHNOLOGICAL VS. SOCIAL CHANGE

Technological change is accelerating at an incredible pace. The recent revolutions in AI—from generative AI to agentic AI—automation technologies, and data management shape technological opportunities that were unimaginable a few years ago. In fact, AI-driven personalization, automated service robots, smart check-in solutions, and data analytics for revenue management are becoming the norm. However, unlike the rapid progression of technology, social change within hospitality takes much longer. Cultural shifts, guest expectations, and workforce adaptation evolve much more slowly than, for instance, developments in AI or robotic deployments. This gap presents both a challenge and an opportunity for Hospitality Schools.

Hospitality Schools hold a unique position in bridging this gap between technological progression and social change. Unlike many industries, the hospitality sector has sector-specific academic institutions that train its workforce. This well-established legitimacy enables Hospitality Schools to act as trusted hubs where technological innovation meets human hospitality operations.

To drive meaningful digital transformation, Hospitality Schools must build on this credibility, ensuring that technological opportunities are sustainably materialized by hospitality businesses. Training programs must embed digital literacy, AI integration, automation strategies, and data-driven decision-making, all while reinforcing the social intelligence essential for hospitality professionals.

HOSPITALITY BUSINESS SCHOOLS AS AN INNOVATION HUB

To truly drive digital transformation, Hospitality Business Schools must move beyond being knowledge transmitters and position themselves as innovation hubs. A shift that is clearly explicated by recent policy visions for the hospitality sector.

Hotelschool The Hague is taking a leading position in spearheading this transformative process. Hotelschool The Hague collaborates closely with technology providers and hospitality businesses to prototype emerging technological solutions and test their impact in real-world projects. Therefore, the school leverages its own hospitality concepts (hotels, restaurants, bars, cafes) as testing grounds for prototyping and testing. Through these simulation labs, future professionals co-create new realities of tech-driven hospitality together with industry partners to assess the real-world impact of emerging tech trends.

CASE STUDY: ROBOTICS FOR HOSPITALITY

A strategic partnership between Hotelschool The Hague and Technical University Delft combines robotics expertise with hospitality insights to develop innovative applications for a tech-driven, human-centered future of hospitality. By leveraging its strong sectoral credibility, the Hospitality Business School facilitates co-creation between engineering specialists, hospitality professionals, and students, ensuring that emerging robotic technologies align with industry needs while maintaining the human-centric service ethos.

Many promising robotic solutions exist or are under development, from automated concierge services to housekeeping assistance, yet their adoption remains slow due to operational challenges and resistance from hospitality professionals. A key concern is that robots may undermine the human essence of hospitality, shifting the focus away from personal guest interactions.

Hotelschool The Hague is addressing this challenge by providing a real-world prototyping and testing environment where innovative robotic solutions can be evaluated for their practical benefits and guest acceptance. The school's ongoing research on transforming hotel housekeeping highlights how robotics and automation can enhance employee well-being rather than replace human workers. By leveraging its academic credibility and sector-specific expertise, the school plays an important role in demonstrating how robotic technology can enhance service quality while preserving the industry's fundamental human touch.

CASE STUDY: VR TRAINING FOR HOSPITALITY

Hotelschool The Hague is partnering with technology providers in the field of Virtual Reality (VR) training and future-oriented hospitality businesses to revolutionize hospitality training and education. The partners prototype and test VR training for, e.g., housekeeping, guest relations, and F&B operations. This new form of training enhances experiential learning, allowing students to refine decision-making skills in realistic, controlled environments. By utilizing VR training, hospitality professionals can practice handling real-world service scenarios without the constraints of a physical setting, leading to improved confidence and competence.

Despite VR's potential, there remains a significant gap between its technological capabilities and widespread application in hospitality businesses. Resistance often stems from concerns about its practicality, cost, and integration into existing training structures. The partnership between technology providers, hospitality business schools, and hospitality businesses addresses this challenge by providing a real-world prototyping and testing environment where innovative VR training solutions can be evaluated for their impact on learning outcomes and industry adoption.

VISIONING: REDEFINING HOSPITALITY BUSINESS SCHOOLS AS PIONEERS OF SERVICE INNOVATION

Hospitality Business Schools will be the driving force behind technological hospitality innovation. Positioned at the crossroads of industry and academia, hospitality schools will serve as hubs where emerging technologies meet human expertise, ensuring that digital transformation enhances—not erodes—the essence of hospitality.

Hospitality Business Schools can leverage their legitimacy in the sector to accelerate meaningful change. As trusted institutions, they can unite IT pioneers, hospitality leaders, and policymakers to co-create the future of tech-enabled, human-centric service. Through strategic partnerships, research-driven experimentation, and cutting-edge curricula, Hospitality Business Schools can shape a workforce that is both digitally fluent and deeply rooted in hospitality traditions.

Thereby, the role of Hospitality Business Schools in digital transformation is not just about teaching technology. The identity of Hospitality Business Schools must become one of co-creating a tech-driven future of hospitality in a way that preserves its fundamental human ethos.

The hospitality industry's future lies in mastering the balance where technology enhances hospitality, enabling professionals to deliver exceptional, efficient, and deeply personal guest experiences. Hospitality Business Schools must take the lead in this transformation, ensuring that the next generation of hospitality professionals is both tech-savvy and human-centric.

Readings:

- Busulwa, R., Pickering, M., & Mao, I. (2022). Digital transformation and hospitality management competencies: Toward an integrative framework. International Journal of Hospitality Management, 102, 103132. https://doi.org/10.1016/j.ijhm.2021.103132

- Nederlands Bureau voor Toerisme & Congressen. (2024). Digitale expeditie—Landelijke visie op de digitale transformatie van het gastvrijheidsdomein.

- Pijls, R., Groen, B. H., Galetzka, M., & Pruyn, A. T. H. (2017). Measuring the experience of hospitality: Scale development and validation. International Journal of Hospitality Management, 67, 125–133. https://doi.org/10.1016/j.ijhm.2017.07.008

- Schmidt, A. L., Koerten, K., Tuomi, A., El-Manstrly, D., & Wiegerink, K. (2025). Human Versus Robot: Comparing Service Agents in Hospitality Settings—Insights From a Field Study. Strategic Change, jsc.2637. https://doi.org/10.1002/jsc.2637

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The Power of LCA: Navigating the Green Claims Directive in Hospitality

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As sustainability continues to dominate the agenda for hospitality leaders worldwide, aligning operations with evolving regulatory frameworks has never been more critical. The EU's proposed Green Claims Directive represents a bold step towards ensuring transparency and accountability in environmental information used in marketing and on booking platforms, requiring businesses to substantiate their eco-friendly claims with robust evidence.

The directive must be implemented by January 2027. For the hospitality industry, this dovetails with the increasing adoption of Life Cycle Assessment (LCA) methodologies to measure the environmental impact of hotel operations comprehensively, as LCA is the preferred methodology in the Green Claims Directive. This article explores the future role and power of LCA in shaping the industry's path towards authentic, measurable, and impactful practices and how this will help booking platforms, hotels and travelers. The article will exploit the key learnings from ClimateScore as to how LCA is implemented at the hotels and what value this has provided to hotels, guests and buyers as well as a future outlook on how this can drive change and help hotels who engage in LCA stand out in a crowded market.

THE BOOKING PLATFORMS CHALLENGE

The majority of hotel bookings are made through booking platforms, where hotels are compared to support travelers' purchasing decisions. Under EU law, any environmental information displayed on platforms should be backed by Life Cycle Assessment (LCA), while separate regulations apply to certification schemes. This means hotels and platforms can only present environmental claims if they comply with LCA standards, ensuring comparability and alignment with purchasing intent.

Existing EU regulations enforce these requirements, and in 2024, authorities demonstrated strict enforcement against non-compliance. Simultaneously booking platforms are experiencing growing demand for transparent environmental data and are pushing for LCA metrics to be available for all listed hotels. As a result, hotels will likely soon need to provide their sustainability data to remain competitive.

ARE THERE LCA SOLUTIONS IMPLEMENTED? KEY STEPS TO TAKE

To ensure the credibility and comparability of environmental data to be used for purchase decisions, the hospitality industry should adopt Life Cycle Assessment (LCA) methodologies. For the Green Claims Directive to be meaningful, hotels need a set of shared standards based on similar datasets and data processing tools. To ensure LCA methodologies are developed correctly they must adhere to ISO-14040 and ISO-14044.

These ISO standards clearly state the steps, process and requirements to what must be described in an LCA. This goes from Goal and Scope Definitions, the functional unit and system boundaries, to the life cycle inventory and impact assessment where inputs and outputs are defined and the necessary data quality established. One example of LCA methods implemented in the hotel industry is ClimateScore.

ClimateScore, a Danish scale-up based in Copenhagen, has developed a scalable and global Life Cycle Assessment (LCA) methodology specifically for hotels, which adheres to ISO-14040 and ISO-14044 and has undergone a thorough critical review process by an independent panel of LCA experts, representing leading international LCA institutes, to ensure that scope, data quality, transparency, and comparability meet the highest standards. Since 2019, it has been tested on over 200 hotels from international hotel chains to small family owned hotels worldwide, revealing critical insights into the adoption and implementation of LCA across the sector.

An ISO approved LCA method has gone through the critical step of defining a functional unit, which serves as the basis for measuring and comparing impacts. In hospitality, a logical functional unit is 'one guest night', 'one meal served,' or 'occupied room' enabling consistent assessment of energy use, food and beverage consumption, and waste generation across properties. A key feature of ClimateScore's methodology is its focus on the guest as the functional unit, more precise kg of CO_2 per guest. Unlike property-based metrics, which also exist in the industry, ClimateScore evaluates the environmental impact of a single guest's stay, accounting for different guest types and purposes of visits. This approach not only enables fair comparisons across accommodation types but also provides a simple communicable methodology and framework that supports informed decision-making for leisure travelers, business clients, and procurement professionals alike. At the same time, it provides hotels with valuable insights for operational improvements, balancing scientific rigor with real-world applicability.

The choice of LCA creates opportunities and demands transparency in data and methodology. The same set of data can be utilized for different LCA methodologies and different functional units, as long as it is applied consistently for all hotels being compared. To meet guests and buyers demand for environmental data, high data quality is important. This requires the data to be complete and validated so the guest, hotels and platforms can trust the data quality has been ensured very thoroughly, the ISO-standards ensure this. A schematic overview is shown in Figure 1 below.

Figure 1: Schematic overview of how to implement LCA in the hospitality sector from the first step of establishing an ISO adhering LCA methodology , through data collection, verification and processing to the generation of LCA data to be distributed for both booking platforms and hotels for travelers and decarbonization.

KEY LEARNINGS AND EXPERIENCES FROM APPLYING LCA TO HOTELS

By integrating LCA into operations, hotels and management are empowered to drive value across multiple areas: enhancing branding and marketing, improving employee engagement, increasing operational efficiency to achieve significant cost reductions, identifying targeted initiatives, and achieving tangible reductions in climate impact. All while also meeting the guests' and buyers' need for environmental information to choose from. Leadership plays a central role here—industry executives must champion LCA as the standard for credible and actionable sustainability. Regarding the Green Claims Directive, this would mean that hotels who work actively with the LCA and use it as a tool will have significant competitive advantage when the data is integrated into booking platforms to meet the demand for environmental information presented to travelers.

A critical learning involves educating hotel staff. Employees at all levels must understand their roles in influencing the hotel's environmental footprint and encouraging guests to adopt more sustainable behaviors. From housekeeping to management, aligning teams with sustainability goals creates a culture of accountability and progress.

The final aspect is data collection. ClimateScore's experience shows significant variability in how hotels manage operational data, reflecting different levels of maturity. Data collection often begins with identifying available data, uncovering gaps, and implementing systems to measure key metrics, like weighing food waste or categorizing procurement data. Some hotels rely on manual readings, invoice tracking, or supplier engagement, while more advanced properties use data management systems to extract and analyze data seamlessly. Hotels found that once they identified their data sources, gaps, and responsible staff, data collection and verification took only a few hours.

The experience shows that hotels are eager to advance their sustainability efforts but often lack the guidance needed to create lasting value, communicate their initiatives effectively—both internally and externally—and manage sustainability data.

Another experience was that adopting an LCA with a guest-centric perspective unlocked greater opportunities for reducing impacts compared to focusing on property-related emissions. The metric was easily understandable, a need which is well documented for eco-conscious travelers. By leveraging the scientific rigor of an LCA method, hotels gain access to actionable insights and countless key performance indicators (KPIs) from consistent data sources allowing them to take confident action and communicate their results with trust and credibility, free from uncertainty and fear of greenwashing. Read a hotel case on ClimateScore LCA here.

To address these challenges and reach the full potential of LCA, the industry needs stronger industry leadership to provide guidance on data collection and management and increase LCA capabilities. Establishing clear frameworks or knowledge centers will help hotels at all levels of data maturity document, analyze, and act on their sustainability metrics effectively.

ClimateScore's work underscores that while hotels are at varying stages of readiness, adopting a systematic approach to LCA is a crucial step toward achieving meaningful and measurable environmental progress.

WHAT THE FUTURE ENABLES WITH LCA

Legislation, such as the EU's Green Claims Directive, alongside existing marketing regulations, has set the stage for widespread adoption of LCA. The industry needs LCA, and hotels and travelers need LCA. However, this transformation requires the sector collaborates to implement and evolve the use of LCA in the industry. By embracing a unified, data-driven approach and applying the same thorough metrics year after year, the hospitality industry can achieve long term value—not only by advancing sustainability goals but also as a strategic means to enhance operational efficiency, guest satisfaction, and long-term profitability.

If the industry takes a collective leap forward, there is strong reason to believe that hotels will embrace this change. Hotels are not unwilling; rather, they are often overwhelmed by the scale of the challenge and lack the expertise or resources to drive systemic change independently. Achieving meaningful progress requires a unified purpose, clear measurement standards, and guidance that empowers all stakeholders.

Furthermore, the vast quantities of CO_2 data generated through LCA and large-scale data collection will enable the development of centralized data hubs and monitoring systems. These tools will ensure continuous improvement across the industry, facilitating transparency, benchmarking, and measurable progress toward global sustainability goals. The industry's path forward is clear: those who invest in credible, science-based sustainability reporting today will lead the market tomorrow.

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Plastics – And Why Hotels Should Still Care

Plastic Pollution

Jeffery Smith
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SIX SENSES

Let's start with what we all already know. The wellness tourism sector is experiencing substantial economic growth, with significant impact and opportunities for the hotel industry. In 2023, the global wellness economy reached a record $6.3 trillion, accounting for 6.03% of global GDP, and is projected to grow at an annual rate of 7.3%, potentially reaching nearly $9 trillion by 20281. Overall, wellness tourism is projected to reach $1.4 trillion by 2027, with significant growth in spending and trips.2 This surge underscores the importance for hotels to invest in wellness amenities to capture this expanding market and drive economic growth.

But what does wellness tourism have to do with hotel plastics? Scientists are sounding alarms and any wellness driven industry (like hotels) needs to prepare for what is approaching.

For example, in a discussion on *The Joe Rogan Experience*, environmental epidemiologist Dr. Shanna Swan highlights the impact of chemicals in plastics on human health, stating, *"By every measure, our sperm counts, fertility rate, and testosterone levels – are all decreasing by about 1% per year."* She attributes this decline to endocrine disruptors called phthalates, which are prevalent in our environment and food supply due to plastics.[3]

If that doesn't raise concern, how about all the plastics now being found inside human bodies, with health impacts yet to be understood. Recent studies have detected microplastics—tiny plastic particles less than 5 millimeters in size—in various human tissues and fluids, raising concerns about potential health implications. Notable findings include:

- **Brain:** A 2025 study published in *Nature Medicine* analyzed brain tissue samples from individuals who died between 2016 and 2024, finding that microplastic concentrations in the frontal cortex were up to 30 times higher than in the liver or kidneys. Notably, brains of individuals diagnosed with dementia contained up to ten times more plastic particles.[4]
- **Blood**: A 2022 study found microplastics in the blood of 80% of participants, indicating these particles can circulate within the human body.[5]
- **Placenta**: Research published in 2020 identified microplastics on both maternal and fetal sides of the human placenta, suggesting potential exposure to developing fetuses.[6]
- **Breast Milk**: A 2022 study reported microplastics in the breast milk of 75% of the sampled mothers, raising concerns about infant exposure during lactation.[7]

Plastics are not good for wellness. And missing out on wellness is bad for your hotel business. And what may be news to the reader: We don't know exactly how bad the health impacts are, but we know they aren't good. These concerns come with all plastics. It's not just the straws and the shampoo bottles. Those microplastics scientists are finding in our bodies come from every type of plastic, big and small, single-use and multiple-use. Plastic factories shed microplastics into the environment before we even see the products. There is leakage throughout the whole supply chain.

Every plastic item ever made in history has either been burnt (thus releasing toxic chemicals into the air), or is most likely still on earth today and releasing micro-plastics into the environment.

But we recycle, so it's all taken care of right? Wrong…

While recycling is often promoted as a solution to plastic pollution, it has significant limitations in effectively addressing the crisis. Globally, only about 9% of plastic waste is actually recycled.[8] Despite all our recycling efforts an alarming 11 million metric tons of plastic is estimated to enter the oceans each year, equivalent to a garbage truck full of plastic every minute.[9] The recycling process faces challenges due to the complexity and cost of sorting and processing various plastic types, making it economically unfeasible compared to producing new plastics.[10] We've been sold recycling as a solution but the way it currently exists it's set to fail. The plastics industry has historically promoted recycling to shift responsibility onto consumers, despite knowing its inefficacy, thereby enabling continued mass production of plastics.[11] Leaked documents have exposed covert PR campaigns by the plastic industry aimed at deflecting blame onto consumers and perpetuating myths about recycling's effectiveness.[12] Addressing plastic pollution requires systemic changes, including reducing plastic production and consumption, rather than relying solely on recycling efforts. We must stop the flow of plastics from the source.

So governments will solve this problem for us right? Wrong…

In March 2022, the United Nations Environment Assembly (UNEA) initiated a landmark resolution to develop a legally binding treaty aimed at addressing plastic pollution across its entire lifecycle, from production to disposal.[13] Despite multiple negotiation sessions, including the fifth round in Busan, South Korea, in November 2024, consensus remains elusive. Key challenges include disagreements over limiting plastic production and implementing global controls on toxic chemicals used in plastics. Notably, over 100 countries advocate for production caps to curb environmental and health concerns, while major plastic-producing nations oppose such measures. And in recent news, President Trump is rolling back legislation restricting single use plastics.[14]

Sorry for the bad news, but there are of course solutions and options we can all take. Ours is an industry of optimism. Travel implies moving forward, finding new places, achieving goals, making connections. It places people in a state of growth, where they're open to trying new experiences. Travel should inspire.

Purposeful travel is gaining momentum as travelers seek experiences that offer deeper meaning and positive impact. 83% of Americans surveyed desire a sense of discovery when they travel, and 70% consider it important to have a purposeful experience during their trips.[15] Additionally, 87% of respondents emphasized the importance of feeling fulfilled after their purpose-inspired journeys.

This trend reflects a growing preference for travel that not only enriches the individual but also benefits the communities and environments visited. Hotels and destinations are adapting to this demand by offering authentic, responsible travel experiences. Whether through learning, giving back, or personal transformation, purposeful travel enriches both the traveler and the communities they visit, making every journey more impactful and fulfilling.

When these purposeful travelers arrive at their wellness destination, will they want to see plastic? Perhaps at this moment in time, the awareness isn't quite there yet. Maybe the irony has yet to sink in. Maybe some hotels are still getting a free pass on serving up their wellness offerings all wrapped in plastic, or delivered on plastic, or infused with plastic. But after reading this article and understanding some of the unfortunate (even horrible …sorry) facts presented, the reader knows better. It won't be long before travel influencers and wellness gurus catch up with the science. Plastics are the antithesis to wellness and purposeful travel. The best time to ramp up efforts to avoid plastic at your hotel is right now.

Plastic free supplies
Photo Credit: Six Senses

Looking to future trends we need to face facts and prepare for the changes to come. The work that we all began years ago to remove plastic straws and single use plastic from rooms must continue, and expand to remove all types of unnecessary plastics. To help any hotel avoid plastic, no matter where they are on their journey, Six Senses has openly shared a resource: *Journey to Plastic Freedom, 82 Solutions for Hotels.* This doesn't hold all the answers and Six Senses is far from perfect, but we do have specific examples that have been tried and tested, and worked, for at least one of our hotel locations.

Plastic free requires supplier engagmenet
Photo Credit: Six Senses

It can be downloaded for free here:
https://www.sixsenses.com/en/sustainability/plastic-freedom/.

1. *globalwellnessinstitute.org*
2. *skift.com*
3. *podcastnotes.org*
4. *nature.com*
5. *The Guardian*
6. *PubMed*
7. *Health.com*
8. *Our World in Data*
9. *Pew Trusts*
10. *National Ocean Service*
11. *Oceana*
12. *RTS*
13. *United Nations*
14. *Associated Press*
15. *multivu.com*

HYB

The Future of Hospitality Is Waste-Free—But Technology Alone Won't Get Us There

Marc Zornes
Founder & CEO, Winnow Solutions

winnow

The hospitality industry is at a tipping point. Costs are rising, sustainability commitments are under greater scrutiny, and hotel operators are being held to higher standards by regulators, corporate clients, and guests alike.

Food waste, long seen as an unavoidable part of running a hotel, is now recognized as one of the industry's largest hidden costs. Winnow tracks food waste in over 3000 locations worldwide: our data shows that 5-15% of all food purchased ends up in the bin. We're seeing progress in policy, too. This February, the EU Parliament and Council agreed to the first-ever legally mandated EU-level targets to reduce food loss and waste. Once formally adopted, member states will need to cut food waste at the retailer and consumer levels by 30% by 2030. The message is clear: businesses that cannot measure and reduce waste face financial, reputational and regulatory threats.

Thankfully, our industry has the solutions. Forward-thinking groups like Hilton, Marriott, and Mandarin Oriental are already proving the value in tackling food waste - and tackling it at scale. Ten years ago, tackling food waste at scale was far more difficult. The technology wasn't there yet. Most kitchens relied on manual tracking, guesswork, and outdated processes to manage waste. Today, we're in a completely different world. AI has transformed what's possible. Winnow's own technology now operates using a dataset of over 500 million images of food waste, built up over 10 years and providing chefs with unprecedented insight into their kitchens.

And yet, despite these advancements, technology alone isn't the answer. The hotels making the biggest strides in cutting waste are those where food waste reduction is embedded in company culture, from senior leadership to chefs on the ground. Hilton and Marriott are prime examples - where a combination of AI-powered solutions and a relentless, organization-wide focus on food waste reduction has led to some of the best results in the industry. Owning groups, too, are recognizing that to make real progress across diverse hotel portfolios, they need both the right tools and the right leadership mindset.

TECHNOLOGY AND CULTURE: A WINNING COMBINATION

AI-powered food waste tracking has changed the game. Kitchens no longer need to rely on chefs manually recording what's being wasted. With automated image recognition and real-time data, hotels can now pinpoint where waste is happening, why it's happening, and how to stop it. But as powerful as technology is, the hotels seeing the biggest impact are those where waste reduction isn't just a sustainability initiative - it's a business priority.

Hilton's approach is a case in point. Campaigns such as Green Breakfast and Green Ramadan have seen waste reductions scaled across multiple hotels, with a network of chefs and stakeholders sharing learnings to create a blueprint for success.

The results speak for themselves. Green Breakfast saw a 62% reduction in breakfast waste across 13 hotels in 4 months. In 2023, Green Ramadan saw waste at Iftars and Suhoors reduced by over 60% in 3 hotels in the UAE. In 2024, the initiative was scaled to 32 hotels in seven countries, with waste reduced by a further 21%.
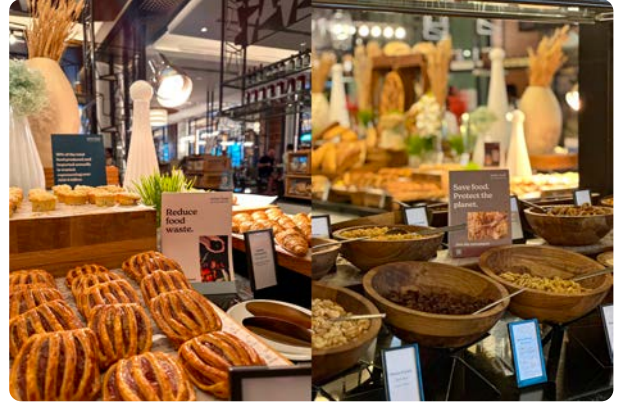
At Hilton's recent EMEA Food & Beverage Conference in Istanbul, food waste was front and center. A challenge was set to scale Hilton EMEA's food savings from 4 million meals per year to 10 million. By equipping chefs with the best technology while embedding food waste reduction into leadership strategy, Hilton is proving that major reductions can be achieved at scale.

Marriott has taken a similar approach. In early 2024, the company rolled out Winnow's AI-driven food waste tracking across 53 hotels in the UK, Ireland, and Nordics, achieving a 25% reduction in just six months. But beyond the numbers, it's the engagement from teams on the ground that's made the difference. *"It's been incredible to see the progress we've made,"* Anna Pazdera, Executive Chef at Marriott Heathrow told us. *"The insights we're getting allow us to make immediate adjustments in the kitchen, which not only helps us reduce waste but also gives us the opportunity to get creative with surplus ingredients - like turning banana peel into pulled pork for our signature vegetarian burgers."* A highlight for me was seeing David Marriott share a video on LinkedIn of himself cooking that very burger. Undoubtedly, Marriott's progress on food waste is because the commitment runs all the way to the top.

OWNING GROUPS: OVERCOMING COMPLEXITY TO DRIVE CHANGE

It's not just brand-managed hotels leading the way. Hotel owning groups are increasingly recognizing that food waste reduction is a direct driver of profitability and ESG performance. They're also under increasing pressure from investors to meet net-zero commitments. But implementing food waste initiatives at scale can be more complex for owners than it is for brands. Owning groups often manage a diverse mix of hotels operating under different systems, brands, and management structures. Rolling out centralized sustainability guidelines is more challenging, which is why many have historically been slower to act.

However, the most forward-thinking owning groups are now proving that progress is possible - and that when executed well, waste reduction delivers measurable financial returns. Winnow is currently being piloted by Pyramid Global Hospitality in North America. James Messinger, Corporate Director of Culinary Operations for the group, emphasizes that success isn't just about installing the right tools - it's about creating buy-in across teams.

> *We've engaged teams by connecting Winnow to our broader sustainability goals. We have created a sense of ownership and pride among staff through training, clear communication, and celebrating successes - like measurable reductions in waste.*

Pandox, one of the largest hotel owners in Europe, has taken a similarly structured approach, mandating food waste tracking across all the kitchens they operate and setting clear group reduction targets. While standardizing sustainability measures across a portfolio with different operating brands can be challenging, leadership buy-in and clear accountability help to ensure the initiative's success.

A NEW ERA OF LEADERSHIP AND ACCOUNTABILITY

The future of hospitality is waste-free. The question is no longer whether hotels should take action, but how fast they can move. The industry is shifting from seeing waste reduction as an operational challenge to recognizing it as a key business opportunity.

At a time when food costs are volatile, margins are under pressure, and sustainability credentials are increasingly tied to commercial performance, the business case for waste reduction is stronger than ever. And while technology has removed many of the historical barriers to tackling waste, culture, leadership, and urgency will determine who succeeds and who gets left behind.

Technology provides the foundation. But it's people - from the leaders who set bold ambitions, to the chefs who embrace change and creativity - who will ultimately determine success.

■

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Harnessing Technology for Biodiversity Management

Dr. Anne-Kathrin Zschiegner
Executive Director at The Long Run

THE LONG RUN

As the world grapples with biodiversity loss, tourism businesses in protected areas are leveraging technology to monitor, protect, and restore these vulnerable ecosystems.

> " *The global decline in biodiversity has reached a critical juncture. Over half the world's total GDP is moderately or highly dependent on nature. Yet, the true value of nature remains unaccounted for in the global economy. The success of nature-positive investments will hinge on a crucial, less glamorous foundation: good data.*
>
> — Suzan Craig, Founder – Tahi (New Zealand)

Members of The Long Run operate at the forefront of biodiversity management. This article explores how diverse technological solutions are being applied to daily conservation practices. From decades of marine ecology data collection in Zanzibar to the impact of drones on forestry management in the Philippines and New Zealand, these solutions are as creative as they are diverse, and notably they're engaging guests in a deeply meaningful way.

1. DIGITAL MONITORING AND DATA COLLECTION

CITIZEN SCIENCE AND AI FOR SPECIES TRACKING
There has been a global uptake in harnessing citizen science apps to record species sightings and contribute to broader conservation databases. Six Senses Laamu (Maldives), Nay Palad Hideaway (Philippines), Nikoi Island (Indonesia) and Masungi Georeserve (Philippines) all use iNaturalist to document biodiversity, involving guests and staff in species identification. This data feeds into scientific research, supporting better conservation action plans and deeper guest engagement in the mission of these pioneering projects.

At Tiger Mountain Pokhara Lodge (Nepal), Marcus Cotton and his team have followed a disciplined species monitoring methodology since 2004. Recently, they introduced Cornell's eBird platform to train staff in bird call recognition, ensuring high-quality data for BirdLife International and local conservation organisations.

Proving the case for consistent, credible data collection, Chumbe Island Coral Park (Zanzibar, Tanzania), the first self-sustaining Marine Protected Area in the world, has developed a dataset that spans three decades on the coral reef sanctuary and forest reserve under their custodianship. Their tourism-funded conservation model supports consistent learning and informs global best practice acting as an exemplary case study when it comes to marine ecology worldwide.

**DRONES AND AI FOR LANDSCAPE MONITORING**
Tahi (New Zealand) integrates advanced technology into their conservation efforts to enhance data accuracy and ecological understanding. Utilising LiDAR and multi-spectral imagery via drones to assess forest structure, monitor ecosystem health, and calculate carbon sequestration. These technologies enable precise mapping of terrain and vegetation, supporting comprehensive species inventories and data-driven conservation decisions. Tahi have taken their work a step further by open-sourcing their knowledge and best practice, utilising digital channels to share and engage.
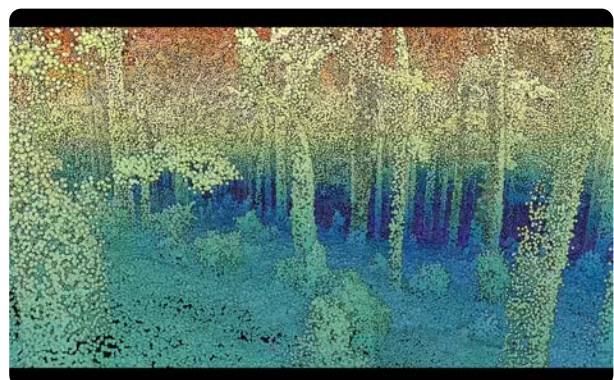

Tahi New Zealand - Drone Flight Dashboard - LiDAR Forest Mapping
Photo credit: @Tahi
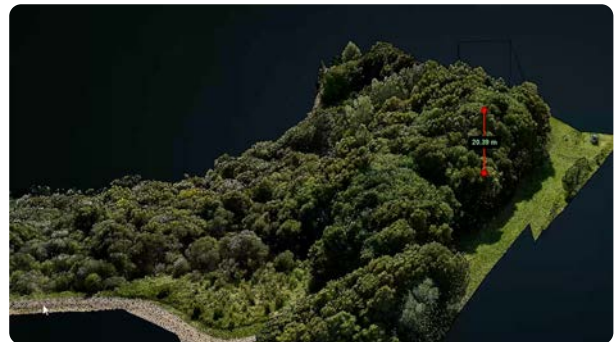
Tahi New Zealand - LiDAR - Forest Dots to 3D Forest
Photo credit: @Tahi
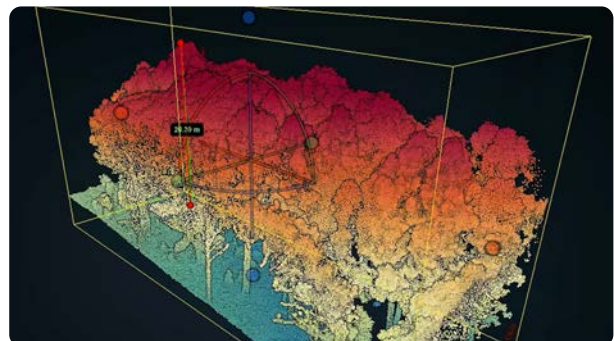
Tahi New Zealand - LiDAR Forest Mapping 3D render
Photo credit: @Tahi

Tahi New Zealand - LiDAR Forest Mapping
Photo credit: @Tahi

Similarly the team at Masungi Georeserve (Philippines) are utilising drones to monitor forest cover changes and detect encroachments, allowing for rapid responses to conservation threats. The GainForest platform adds another dimension to biodiversity management by developing AI tools to catalogue indigenous ecological knowledge, further bridging the gap between traditional wisdom and modern technology.

EARTHRANGER FOR WILDLIFE AND ECOLOGICAL MONITORING IN AFRICA

Tswalu Kalahari Reserve (South Africa), Borana Conservancy (Kenya), and Sala's Camp (Kenya) use EarthRanger for ecological monitoring. This tool tracks predator populations, identifies invasive species, and records mortalities to assess ecosystem health. Staff use EarthRanger to monitor herbivore demographics, report den sites, and track elusive species like pangolins and leopards. Integrated wildlife collar data provides real-time insights into animal movements and habitat use. The system is customizable, allowing sites to adapt based on evolving conservation objectives.

The Safari Collection - Earth Ranger- a partnership effort

The Safari Collection - Earth Ranger sightings

EXPLORING EDNA AND MARINE ACOUSTIC MONITORING IN INDONESIA

Emerging technologies such as environmental DNA (eDNA) and marine sound recordings are gaining traction. Led by Andrew Dixon, The Island Foundation (Indonesia) is exploring how these innovations could help monitor marine biodiversity without direct human interference. eDNA, offers the potential to identify species presence from genetic material found in water samples.

2. TECHNOLOGY IN MARINE CONSERVATION

SEA TURTLE CONSERVATION AND TRACKING

There are a myriad of technology solutions from software to IoT and industrial processes currently employed to safeguard endangered marine species. Tengah Island Conservation (TIC) (Malaysia), is developing an IoT-enabled sea turtle hatchery management system, integrating weather stations, CCTV, and solar panels to improve hatchery success rates. Expanding on this they are also exploring satellite tagging to map sea turtle migration patterns.

Augmenting national databases with localised data is critical to informing environmental policy. TIC contributes to the Malaysian Sea Turtle Face ID Network, while Nay Palad Hideaway submits marine turtle data to the Philippines National Turtle Catalogue Project, using photo-ID techniques to track marine turtle movements across regions.

CORAL REEF MONITORING AND RESTORATION

Coral health is a key indicator for the health of marine ecosystems. Nay Palad Hideaway uses CoralWatch to monitor reef conditions and detect bleaching events. Long-term datasets inform conservationists about climate change impacts and support the development of resilience strategies.

3. CIRCULAR ECONOMY AND SUSTAINABLE RESOURCE USE

UPCYCLING MARINE WASTE

TIC (Malaysia) is leading a pioneering initiative to convert ghost nets into filament, which can then be used by local communities for alternative livelihoods. Their project, recognised by the UNDP Malaysia Island Waste Innovation Challenge, exemplifies how technology can drive circular economy solutions in marine conservation.

GAMIFICATION FOR SUSTAINABLE BEHAVIOUR

On the hospitality front, Vicky Smith from Earth Changers (UK) highlights how My Green Butler uses gamification to encourage resource conservation among guests. By displaying real-time energy and water consumption data and ranking guests against others, hotels leverage behavioural psychology to reduce environmental impact.

4. THE FUTURE OF TECH-DRIVEN CONSERVATION

DE-EXTINCTION AND THE ETHICS OF GENETIC ENGINEERING

Looking ahead, Rebecca Cook from Journey's With Purpose (UK) recently discovered a controversial but intriguing use of technology: de-extinction. Colossal is working on reviving extinct species like the Tasmanian tiger through cutting-edge genetic engineering. While this raises ethical and ecological questions, it also signals the expanding role of biotechnology in conservation and species restoration.

CONCLUSION

The members of The Long Run work at the intersection of nature conservation and sustainable tourism and understand the delicate balance and connection between human and natural ecosystems and how they co-exist. The use of technology to enhance biodiversity management has a significant role in ensuring tourism is harnessed as a force for good. Whether through AI-driven species identification, IoT-enabled hatcheries, gamified guest experiences, or genetic research, as these tools evolve, they will play an even greater role in protecting fragile ecosystems.

Looking to find out more?

Visit the Hospitality Net World Panel

In the **Sustainability in Hospitality** World Panel, over 90 industry experts share their insights, solutions, and strategies to help the industry navigate growing environmental and societal challenges.

Sustainability Gives Hotels An Edge In The War For Talent. Or Does It?

How can sustainability be communicated beyond clichés and greenwashing?

Hotel Sustainability: Top 3 Technologies to Implement in 2020

Who makes hospitality sustainability happen: Governments, Industry, Consumers?

Climate Emergency And The Hospitality Industry: Are We On Track?

www.hospitalitynet.org/panel