Empowering Your Journey: From End-to-End Sustainability to Elevated Travel Experiences

IATA Innovation Hub

As we leave the Covid-19 pandemic behind, environmental awareness has reached an all-time high. This shift underscores the urgent need to further integrate sustainability in post-pandemic business strategies.

In a recent survey by MMGY Global, 81% reported they were ready to change their travel behavior to minimize environmental impact. And recently, the 2023 IATA Global Passenger Survey showed that 65% of air travelers would be willing to pay a premium to fly on a Sustainable Aviation Fuel (SAF) powered aircraft, and almost two-thirds of travelers questioned would be willing to pay extra to compensate for carbon emissions.

Why is this important ?

It's no secret that travel is a significant contributor to our carbon footprint. A 2019 UNWTO article revealed that all transport related emissions from global tourism are expected to make up to 5.3% of man-made $C0_2$ emissions by 2030.

However, a change is on the horizon. As the airline industry strives to reach net-zero carbon emissions by 2050, the future of travel is being shaped by sustainable initiatives that promise a greener and more efficient experience. Efforts to implement sustainability measures in the industry will be visible from the moment passengers step out of their homes to the time they touch down at their destination.

Airlines recognize that prioritizing sustainability throughout the end-to-end customer journey is crucial to meeting consumer demands, gaining a competitive advantage, and driving innovation in the industry. Simultaneously, the need to elevate customer experiences in such a competitive industry with tightening market shares is more important than ever.

Here are some changes to your travel experience that promise a more enjoyable and sustainable journey!

Efficiency in Catering: Redefining Inflight Dining

According to a 2023 IATA report, the average passenger generates around 1.43kg of waste per flight, equating to almost 6 million tonnes annually in cabin waste at full capacity levels. Over 20% of this waste consists of untouched foods and drinks, which usually find their way to landfills, as reusing in-flight catering is highly regulated and carries operational challenges.

With an in-flight catering market of $15 billion, this represents a significant incentive to improve planning and logistics. Adding to this concern, current in-flight catering systems are outdated, heavy, and fuel inefficient. The typical aircraft catering trolley weighs between 15-30kg. Consider that the largest commercial aircraft can accommodate up to 100 trolleys, which can mean an additional 1,500 to 3,000 kg of dry operational aircraft weight, incurring what's known as the Cost of Weight (COW) for each flight. Intriguingly, studies demonstrate that shedding just one kilogram of weight saves 0.02 – 0.03 kg of fuel per 1,000 km. Thus, curbing in-flight catering's weight can also become a strategic edge for airlines while being a testament to the sector's efforts to reduce emissions.

Queue Lumitics, a startup specializing in food waste management solutions, has unveiled a product, which takes the form of a bin, tailored for food and beverage departments within airlines. The product employs artificial intelligence to precisely measure and identify food waste, offering recommendations to optimize waste reduction based on passengers' consumption trends. Airlines can now adjust meal portions and offerings, ensuring an efficient reduction in food waste without compromising the quality of in-flight catering.

1: Tracking Inflight Catering. Image Source: Airbus

Some airlines have already embarked on this journey, with Singapore Airlines working closely alongside Lumitics to transform their catering services and minimize unnecessary food waste. The airline also plans to even further reduce their use of single-use plastics, and provide fresh products using aeroponic technology in large indoor vertical farms.

The incorporation of AI in solutions like Lumitics' presents a dual advantage for airlines. Firstly, it facilitates the reduction of food waste while maintaining optimal service levels during flights. Secondly, the collected data enables airlines to make personalized recommendations for meal types and serving portions, positioning them strategically in the market by meeting passengers' preferences.

2: Ottonomy and PIT xBridge Partner to Install Delivery Robots. Image Source: PR Newswire

But how can we take in-flight catering one step further? Rather than relying on traditional in-flight

catering, passengers may soon have the option to pre-order your meal onsite at your restaurant of choice. Powered by advancements in robotics, your chosen meal arrives directly to you at the terminal before your flight. One recently launched example is the partnership between the PGHxBridge Innovation Center at Pittsburgh Airport (PIT) and Ottonomy. Leveraging robotics, they've successfully pioneered meal delivery from all terminal restaurants to passengers' seats, wherever they may be. This innovation stands to evolve into a standard practice, where airlines and restaurants partner to prepare and deliver meals based on passenger preferences. This not only eradicates the need for airlines to lug excessive catering weight but also minimizes food waste, reduces costs, and ultimately translates to happier travelers. Additionally, passengers now wield the power of choice, selecting from a diverse array of options available at the airport, far removed from the days of monotonous in-flight meals.

Optimizing the Inflight Entertainment Experience: A Weight off the Wings

3: With JetBlue's FlyFi, you can stream in the sky, for free. Image Source: TravoBravo

A growing trend amongst airlines has been the adoption of free inflight WI-FI for passengers as a form of IFE (In-Flight Entertainment). JetBlue, easyJet, Aegean Airlines and Scoot have all begun offering their passengers free wifi, some to keep up with the demand from travelers for connectivity in the skies, but also as a solution to replacing seat-back TVs as a form of entertainment, all while the WI-FI quality will continue to improve over the years. And, not to mention, current IFE seat-back TVs are equally expected to become lighter and with richer functionalities, which should improve the sustainability calculus.

With all these factors in mind, rethinking the concept of inflight entertainment systems becomes a strategic imperative.

Why? Because not only do 80% of travelers now bring their phones or laptops onboard, but 54% of travelers according to Inmarsat would sacrifice their inflight meal for free wi-fi. A more sustainably friendly and personalized alternative could render the traditional form of inflight entertainment systems increasingly obsolete.

Recognizing and Offsetting Your Footprint: A Step Towards Responsible Travel

Carbon compensation plays a pivotal role in the realm of sustainable travel. In a bid to empower travelers with informed choices, the International Air Transport Association (IATA) unveiled the Passenger CO2 Calculator in 2022.

This calculator enables passengers to accurately measure and understand their carbon footprint throughout the travel experience. By expanding the distribution of this tool in 2024 and working towards introducing *Passenger CO2 Offsets*, travelers will have the opportunity to understand their impact when flying and potentially offset parts of their emissions. While 60-airlines currently display their CO2 data on their website, the industry still has a long way to go in providing accurate data and offsetting options.

We envision future developments in offsetting tools to include expanding initiatives beyond carbon credits and SAF, as well as including the option to choose offsetting parts of your journey at various touchpoints throughout the customer's travel journey.

Behind the Scenes: Airport Operations

Reducing carbon emissions in the aviation industry is a pressing concern to address climate change. A crucial step towards this goal is the transition to SAF which will represent over 60% of the industry's

path to net zero by 2050. Vienna-Schwechat Airport (VIE) takes this target one step further, aiming to achieve carbon neutrality by the end of 2023.

4: VIE Airport Now Claims to be Officially Carbon Neutral. Image Source: Flughafen Wien

Their solution to achieving carbon neutrality involves converting waste through anaerobic digestion into SAF, essentially transforming airports into hubs that generate fuel from organic materials like food waste. These efforts are essential in significantly reducing the industry's carbon footprint and offer an innovative solution for airlines and airports to follow suit.

Reinventing the Concept of Travel

The push for sustainability is challenging traditional personal travel habits and prompting a shift towards alternative forms of travel. Cited by the Lufthansa Innovation Hub, in addition to conventional business and leisure travel, the industry is witnessing a rising trend in cyber travel enabled by innovative technologies like Virtual Reality. This exciting development offers travelers a unique opportunity to reduce their carbon footprint while still experiencing the joy of exploration through alternative experiences such as 'Try Before You Buy'.

Furthermore, the concept of 'bleisure' travel is revolutionizing the way people approach business and leisure trips. In addition to reducing emissions, the escalating costs of travel have led many business travelers to reconsider the viability of separate leisure and business trips. By combining the two, individuals can enhance sustainability efforts and achieve cost savings simultaneously. This approach not only optimizes resources but also aligns with the growing emphasis on responsible travel practices.

5: This is Bleisure Travel, the Future of Work-Life Balance. Image Source: Hotel News Resource

Can Artificial Intelligence Help in Reducing Contrails?

While it may seem like just another use of the AI 'buzzword' that has been flying around lately, there are real use cases being implemented to increase sustainability using AI/ML and Generative AI.

For example, the recent interest in aviation-induced condensation trails, or contrails, has drawn the attention of aviation stakeholders, technologists, and scientists alike. In response to these initiatives, such as the ones being tried at MIT or Google, there is a focus on using satellite imagery of clouds to teach an algorithm to differentiate aircraft-borne contrails from naturally occurring cirrus clouds. This can assist scientists, airlines, and Air Navigation Service Providers (ANSPs) to identify contrail-prone hot spots in the future and determine potential strategies to avoid them.

A full-scale trial between Google and American Airlines utilizing these technologies captivated aviation news cycles a few weeks ago. The announcement highlighted the work between the two companies, alongside satellite imaging and contrail modeling by Breakthrough Energy to test these new technologies.

With 70 test flights over 6-months, Google AI predictions and Breakthrough Energy's contrail modeling gave pilots suggestions on avoiding altitudes conducive to contrail formation. Their joint press release claims a 54% reduction in contrail length.

Now, what might this mean from the perspective of your customer journey itself, you might ask?

Well, probably nothing... But it's telling of the times to come.

Simply put, AI can be a technology that can be most certainly leveraged at various points in your journey to make traveling more ecologically efficient. It is probable that it will become even more oriented towards consumers in the future.

AI and its Unintended Consequences

While AI holds promise in aiding contrail measurement, as well as optimizing catering efficiency, the negative impact it can pose to the climate also cannot be ignored.

The rapid adoption of Generative AI technologies such as ChatGPT have significantly increased energy use from AI-powered technologies. Should these trends persist, global AI-related consumption alone could reach 134 TWh by 2027, comparable to annual energy consumption rates of entire countries like Argentina and Sweden.

In response to this, tech providers like Google, Microsoft and Amazon have adjusted their climate goals. Google has reported to be climate neutral since 2007 and plans to be fully supplied with carbon-free electricity by 2030, Microsoft envisions their operations to be net-negative by 2030, and Amazon has set a goal of carbon neutrality by 2040.

However, it is important to keep in mind that carbon neutrality is multi-faceted and involves both reducing emissions and increasing offsetting spending. Net-neutrality efforts have primarily been the sequestering and offsetting of operational emissions.

While this is a step in the right direction, it will be become increasingly important for the reduction of emissions alongside carbon sinks. Further, the lack of adoption of renewable energy sources globally, the over-adoption of AI technologies can impose further sustainability challenges.

Future Innovation Efforts at IATA

Part of the Innovation Team's responsibilities at IATA is to stay up to date on innovative technologies and emerging industry trends. That's how we make our industry-oriented programs run successfully! Our research leads directly to collaboration in our programs such as The Lab, Innovation Days, as well as defining themes for Accelerate@IATA.