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CIRCULAR ECONOMY IN AIRPORT CATERING OPERATIONS

HAVALİMANI İKRAM OPERASYONLARINDA DÖNGÜSEL EKONOMİ

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Abstract: Airport catering operations encompass food & beverage (F&B) production and service within the airport, and in-flight catering. Considering the scale and volume of production and service, significant external and internal costs, circular economy practices may offer advantages towards sustainability of operations, through reducing, reusing and recycling waste and byproducts, sourcing locally and the delivery of quality service. The present research set out to explore the applicability of circular economy practices in airport catering operations. The case was selected as a multinational company that operates in over 200 outlets. Data was collected through preliminary research, interview and participant observation and analysed through thematic analysis. The "Integrated Circular Economy Model for Airport Catering Operations" (ICE-AC Model) was developed, and the findings were applied to it. The research established airport catering to be a suitable application area of circular economy, reaching individual examples of practices, mainly in recycling of waste and byproducts, raising awareness and corporate social responsibility. However, these were favoured to be mainly tools for cost savings and competitive advantage. For long-term advantages, a complete restructuring of managerial philosophy and the establishment of a circular business model within the industrial ecology is needed.

Keywords: Airport Catering, Circular Economy, Sustainability, Gastronomy

JEL: *L66, L83, L93, Q56*

Öz: *Havalimanı ikram operasyonları, terminal içi Y&İ üretimi ve sunumu ile uçak içi ikram hizmetlerini kapsar. Üretim ve sunumun kapsamı ve hacmi, kayda değer dışsal ve içsel maliyetler dikkate alındığında, döngüsel ekonomi uygulamaları, atık ve yan ürünleri azaltma, yeniden kullanma ve dönüştürme, yerel kaynak kullanımı ve nitelikli hizmet sunumu yoluyla, operasyonların sürdürülebilirliği için avantaj sağlayabilir. Mevcut çalışma, döngüsel ekonominin havalimanı ikram operasyonlarında uygulanabilirliğini araştırmayı amaçlamaktadır. 200'ün üzerinde noktada hizmet sunan çok uluslu bir havalimanı ikram şirketi üzerine bir örnek olay araştırması yapılmıştır. Veriler ön araştırma, görüşme ve katılımcı gözlem yoluyla elde edilmiş, tematik analiz yöntemiyle işlenmiştir. Çalışma için "Havalimanı İkram Operasyonlarında Entegre Döngüsel Ekonomi Modeli" (ICE-AC) geliştirilmiş, bulgular modele uygulanmıştır. Araştırma, havalimanı ikram operasyonlarının döngüsel ekonomi için uygun bir uygulama alanı olduğunu göstermiş, ağırlıklı olarak atık ve yan ürünlerin geri dönüşümü, farkındalık geliştirme ve kurumsal sosyal sorumluluk alanlarında bireysel uygulama örneklerine ulaşmıştır. Ancak, bunların genel olarak tasarruf ve rekabet üstünlüğü aracı olarak görüldüğü bulunmuştur. Uzun vadeli faydalar için, yönetim felsefesi tamamen yeniden yapılandırılmalı ve endüstriyel ekoloji içinde faaliyet gösteren bir döngüsel işletme modeli kurulmalıdır.*

Anahtar Kelimeler: *Havalimanı İkram, Döngüsel Ekonomi, Sürdürülebilirlik, Gastronomi*

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1. Introduction

Catering as an industrial activity encompasses the production, delivery and/or service of food and beverage to *cater for* the requirements of people, events, corporations etc. off-premise or at remote locations (Yıldız, 2015). A significant portion of catering activity takes place in terminals and transportation. Catering in airports offer characteristic challenges in purchasing, supply, delivery inspection and storage of ingredients, food and job safety, working conditions, cost management and pricing, guest satisfaction and operating in remote & isolated locations (Bucak, 2019). Airport catering has been growing and diversifying in proportion to the growth in air passenger transport and budget airlines (Castillo-Manzano & López-Valpuesta, 2013), since passengers may spend hours in airport terminals and demand speedy, high quality and diverse F&B service (Brechin, 1999).

These unique characteristics of airport catering and challenges that emerge, its scale, volume and geographical spread and the resulting comparative impact make it a rational research candidate for applications of sustainability. A systematic and global development of sustainability related thought and coordination of efforts should, rationally, prioritise higher-impact fields of production. Airport catering has traditionally been linked to excessive energy consumption and waste, land use, carbon emissions, air and noise pollution and resulting internal and external costs (Keskin & Erçoşkun, 2021; Öz & Erçoşkun, 2022; Koca & Turgut, 2024; Timuralp & Mercan, 2024); although opposing views exist (Sun, Gossling, & Zhou, 2022).

A systematic review of relevant literature *(based on keywords and impact)* revealed numerous publications on sustainability of general airport operations. These emphasise the use of sustainable practices as tools for adaptation, innovation & cost control for the sake of competitiveness and profitability (Demirci, Doğan, & Eroğlu, 2023; Gupta & Benson, 2011; Güney & Dinler, 2023). Other studies highlighted social responsibility, accessibility, waste reduction, water management and energy efficiency through innovative technologies (Çayalan & Rodoplu, 2025). Similarly, green airport approach (Keskin & Erçoşkun, 2021; Öz & Erçoşkun, 2022) and "Carbon-Free Airport Project", by the Turkish General Directorate of State Airports Authority (DHMİ) are proposed as guidelines for carbon neutralisation, renewable energy, air and noise pollution, waste and energy management, education and social responsibility (SHGM, 2019; Mızrak & Kızılcan, 2022; DHMİ, 2025). Other studies with a local development approach emphasised airports' impact on employment generation, added value and overall economic revival (Akca, 2020), local resource use and the resulting improved multiplier effects and passenger satisfaction (Nijkamp, Laschuit, & Soeteman, 1991; Bessière, 1998; Lacy & Douglass, 2002; Roberts, 2006; Jin Ahn & Juraev, 2023). Finally, airport-specific employment studies emphasise the importance of safer working conditions and automated systems, especially for food handling employees (Özşahin, Barışık, & Acar, 2024); job satisfaction (Şahin & Ünal, 2021; Yılmaz, 2022; Kızılcan, Hoşgör, & Güngördü, 2023); and corporate belonging (Bayat, 2024) as tools for sustainability and competitiveness of airport operations (Göv & Gün, 2022).

However, application of circular economy practices as sustainability tools specifically on airport catering was found to be an under-researched field, and the present paper aims to fill that gap in the literature. Improving energy and waste efficiency through reducing, reutilising or recycling waste and byproducts and prioritising local resource use will help lower costs (Corvellec, Stowell, & Johansson, 2022) and communication

of these efforts will also improve competitiveness and marketability of airport catering operations.

The present paper aims to explore the applicability of circular economy practices in airport catering, as well as actual and potential examples, in order to reach theoretical and practical outcomes for relevant managers, policy makers and researchers alike. To this end, literature on airport catering, sustainability and circular economy has been reviewed. The following section presents the literature review that outlines the conceptual framework for the article.

A comprehensive case study was conducted on a multinational airport catering company that offers services through several outlets at the airport, the airport hotel and in-flight catering. A field research comprising interviews and participant observation was designed. A question form was devised for the research, and an in-depth group interview with relevant managers and employees was held. Key F&B production and service stations were also visited, accompanied by managers.

The research resulted in various examples of actual circular economy applications, as well as challenges, limitations and missed opportunities. A model has been developed to propose possible pathways. A notable implication is the evident benefit of governmental regulations, certification processes and outsider consultants towards sustainability measures. Circular economy practices were seen as cost control and corporate responsibility tools. Ensuring passenger and employee awareness and satisfaction was also found to be an integral part in managerial sustainability philosophy.

2. Airport Catering

Airport catering is one of many non-aeronautical endeavours that airport management aims to supplement passenger service, increase revenues, and compensate for the loss of revenue per passenger due to budget air travel (Mocica-Brilha, 2008). Consumption of F&B is linked to the overall shopping & consumption at the airport (Castillo-Manzano & López-Valpuesta, 2013). The airport catering service encompasses casual pubs, coffee, patisserie or fast-food outlets, fine dining restaurants and similar establishments on airport grounds and also airline and employee catering.

A broad research on passengers' F&B purchasing decision found physiological factors were the main drivers, while social status was a lesser determinant *(probably due to temporariness & absence of social pressures)*. Research also concluded that budget airline passengers consumed less, due to time constraints, and variety of F&B offer did not necessarily increase consumption. Increased waiting time was naturally found to increase F&B consumption. Larger groups tended to consume more, unless there are children (Castillo-Manzano & López-Valpuesta, 2013).

While guest satisfaction is by no means less important than it is for any F&B service operation, there are critical time and cost constraints. Increased competition, scale and range of airport catering services, higher prices and tight schedules all raise guest expectations, making it harder to satisfy them (Erdoğan, 2020; Kıpçak & Uyar, 2021). Constant assessment of perceived service quality has necessitated the development of innovative measurement tools geared for passengers (Sarıgül, Ünlü, & Yaşar, 2023). Airport catering service provision should be viewed as a co-created experience. Transparent dialogue between the passenger and the catering service will create trust, value, and long-term passenger commitment / loyalty (Sesliokuyucu & Polat, 2020).

Location of the airport as well as complexity of the service usually imposes significant strain on catering operations. The longer distances ingredients need to be transported (within the cold chain), the heavy passenger traffic, complexity and scale of service, larger number of food handling employees, less than ideal or limited food delivery, storage and processing facilities at remote locations are only few of the food safety risks. The risk of foodborne disease spreading globally only adds to these. Furthermore, multinational chains need to observe the legislation of the country they operate in (Hamid & Khalil, 2018).

Post Covid-19 conditions have further increased the importance attached to passenger safety. While airport catering management already had to endure increasing costs and stricter safety regulations, longer health inspection procedures only heightened passengers' stress levels, making them less patient to be served (Baştuğ, Akan, & Kiracı, 2021). Increased time pressure may cause unruly passenger behaviour, adding to employee stress (Şahin & Ünal, 2021).

3. Circular Economy

Nature sustains a circular production process, continually reutilising, recovering, recycling matter and energy, whilst producing no waste. Circular economy is the *"imitation of the macroenvironment in the microscale"* (Yıldız, 2024: 395). This suggests a departure from the conventional production philosophy, which is linear, and inputs factors of production, transforms them, and outputs products of economic value, and starts over. Every production process creates byproducts and waste, which get *rid of*.

Production process in a circular economy setting, however, progresses in multiple individual and interconnected loops, where the byproduct / waste of a previous loop re-enters the following one as input. These loops are interlocked and should be closed, through innovative solutions that generate / extract commercially meaningful value from byproduct & waste, as suggested by Stahel's (2016) loop model. Once the economic entities are simplified into household (consumers) and establishments (producers), byproduct & waste emerge from both parties, which may be reused, repaired or remanufactured by the household, recycled or taken back by the producers to extract resources through innovation and industrial collaboration to be distributed to the household again, to create new value.

The "industrial ecology" model may offer preliminary foundations for circular economy discussions. An industrial ecosystem affects surrounding ecosystems, through creating byproducts & waste, which become inputs for the other systems. This necessitates approaching the whole production line, including the supply chain, to achieve a compromise between sociocultural / technological advancements and nature (Mitra, Elhaj, & Rahman, 2024). Another relevant thought is the "doughnut economy" model, which argues that "a safe and just place for humanity" is possible through inclusive and sustainable economic development. This safe zone lies between the social foundation, the realisation of inclusion and accessibility for all, and the ecological ceiling, and progress above that puts life supporting systems at risk (Raworth, 2017).

However, wholistic sustainability ideal refers to an overall symbiosis of all environmental entities, rather than localised solutions towards compromise. As such, circular economy is offered as *"a new sustainability paradigm"* (Geissdoerfer, Savaget, Bocken, & Hultink, 2017: 766). The overlap cannot be ignored, and

applications of circular economy will obviously improve sustainability. Still, it would be prudent to note the ongoing discussions on and search for definition for circular economy, while it argues subjects that are neither new or original (Corvellec, Stowell, & Johansson, 2022). Pre-industrial revolution production offers a vast number of examples (Kirchherr, Reike, & Hekkert, 2017).

Circular economy, in a business model setting, largely (but not exclusively) falls within the scope of sustainability. The sustainable and circular business models suggest that a business model should primarily achieve sustainability through sustainable value generation and adopting a pro-active and long-term approach. Afterwards, through closing, intensifying, slowing, dematerialising and narrowing resource loops, a circular business model can be achieved. Although this requires devising innovative solutions toward sustainability and resource efficiency, developing a circular business model will necessitate an overall corporate change to embrace a wholistic philosophy towards sustainability (Geissdoerfer, Vladimirova, & Evans, 2018).

Common themes contained within definitions include resource and energy efficiency, and local resource use. Resource efficiency is mostly centred on multiple R models of reduce / reuse / recycle (+recover / repair) of waste and byproduct (resource extraction) (Stahel, 2016). Energy efficiency dictates an internalisation of external costs (Schaltegger, Müller, & Kapsar, 1996). Quality of goods & service produced, and their utility are also included in definitions (Geissdoerfer, Savaget, Bocken, & Hultink, 2017).

Circular economy necessitates redesigning, rethinking and restructuring production facilities and processes (Kirchherr, Reike, & Hekkert, 2017). Smart strategies, technologies and innovative methods will help in waste & resource extraction, energy efficiency, reduce emissions and waste, however, every process will require individualised, situational solutions (Stahel, 2016). Circular economy does not offer a clear set of rules; successful innovative methods will add to its wealth of knowledge.

3.1. Circular Economy and Airport Catering

Remembering the need for airport catering to reduce external and internal costs, to improve competitiveness and marketability, all the while operating at remote locations to provide a wide scale, diversified and complex service, circular economy may offer valuable solutions. It is necessary to consider the share of catering operations in the amount of energy consumed and waste produced, in discarded packaging, non-recyclable or non-compostable waste, wastewater and even hazardous waste (e.g. discarded frying oils). Waste created in airports are classified in two categories, the first category is toxic waste and includes waste generated by refrigeration and storage processes. The second, biodegradable, non-hazardous waste is mostly water and food waste (Mızrak & Kızılcan, 2022).

Purchasing, or if possible growing, F&B ingredients that respect the soil and natural cycles, sourcing locally, recovery of biodegradable food waste, composting and similar practices within the context of circular economy aim to preserve ecological balance and offer healthy F&B items to passengers (Cataldo, Fucile, & Mattii, 2021). Byproducts and waste can be transformed, as much as circumstances allow, into inputs for the next loop, or extracted to other functional food or health products that may even be sold on the premises for additional economic value and further passenger appreciation (Kovacs, et al., 2022; Nicolescu, et al., 2022).

Use of smart technologies and artificial intelligence for energy efficiency have proven to be effective tools. These can adjust the energy consumed for climatization, lighting etc. to maximise efficiency, which would otherwise be impossible (Imbardelli, 2019). Utilisation of these systems and their integration into the overall automation may even improve communications with passengers, enhance their experience and satisfaction.

Artificial intelligence and internet of things (IoT) are able to estimate future sales in production planning with much more precision than humans. This is invaluable in preventing overproduction and unnecessary waste. These systems also track stocks much more efficiently than humans, further improving stock efficiency that ensures the continuity of service delivery and prevents overstocking and unnecessary waste (Sharma & Sharma, 2019). These systems are able to streamline F&B production and service processes to ensure the least possible energy, materials, employee time and effort, and passenger waiting time. All this means that higher quality F&B items at the correct amount will be served promptly and at correct temperatures to improve passenger experience. These applications of circular economy will necessitate novel working principles and skills, in which employees need to be trained. Management needs to make sure that employees embrace these practices and are not further burdened.

Sourcing locally offers multiple benefits in the context of circular economy. Sourcing locally produced F&B ingredients will reduce transportation related carbon emissions and ensure fresher raw materials. Further, airport catering will be supporting local agricultural production and economy (Yıldız, 2017). Recruitment of local labour will similarly reduce transportation of employees, develop local resource base and reduce leakages (Nijkamp, Laschuit, & Soeteman, 1991).

Finally, the practices related to circular economy and sustainability should be effectively communicated to the passengers to improve competitiveness and marketability. Utilisation of local ingredients and recipes will also enhance passenger experience (Sims, 2010).

Overall, an integrated and holistic circular economy application model for airport catering operations may be proposed below:

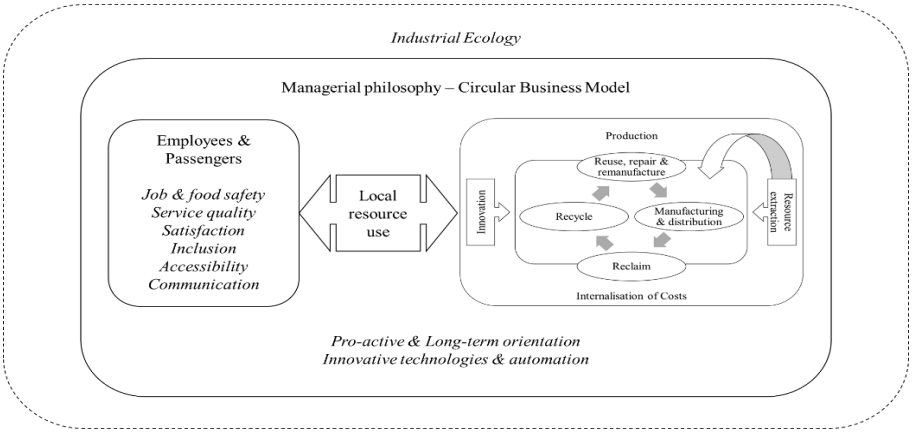

Figure 1. ICE-AC Model (Integrated Circular Economy Model for Airport Catering Operations)

Source: Compiled by the author

The model places the airport catering firm within the industrial ecology (Mitra, Elhaj, & Rahman, 2024). Every operation impacts, and is impacted by the external parties, including competitors, global markets, airport management and general aviation regulations, supply chain, local communities (cultural environment), natural environment etc. Overall sustainability and applicability of established circular economy applications will depend on an overall managerial philosophy that prioritises implementation of innovative technologies & automation that improve / ensure resource efficiency. Establishment of the circular business model (Geissdoerfer, Vladimirova, & Evans, 2018) implies that applications are not at random or incidental; but rather a continuation of an overall managerial philosophy that requires redefinition / reconfiguration of approaches, procedures, equipment, buildings etc. (Kirchherr, Reike, & Hekkert, 2017). The production process embraces Stahel's (2016) loop model. Innovative methods are applied to extract resources through each production loop, which get reintroduced to create added value and diminish / internalise costs. The model places employees and passengers at its centre. This approach aims at "a safe and just place for humanity", inclusion and accessibility offered by the doughnut economy (Raworth, 2017). Effectıve and transparent communication will ensure satisfaction as well as awareness. Finally, local resource use bridges value created for the employees & guests and the production loops, improving economic, social and natural sustainability of operations (Nijkamp, Laschuit, & Soeteman, 1991).

4. Study Methodology

The present research set out to analyse the applicability of circular economy in airport catering operations, as well as actual and potential applications, based on a case study. Relevant literature on airport catering, F&B production processes, circular economy and sustainability was reviewed to construct a solid conceptual framework.

4.1. Study Context – Airport Catering Company

The study was conducted on a single company, which, due to their corporate ethical standards and copyright of commercial knowledge, requested to remain anonymous. They will be referenced as "the company" hereinafter to ensure confidentiality of data.

The company operates on (more than) 200 outlets in 16 airports (7 abroad), plus operating the airport hotel, handling in-flight catering as well as industrial catering services for around a hundred brands. All outlets *(national & international)* operate under the same managerial philosophy and principles, which improves the generalisability of the research's findings.

Added to the geographical spread of operations, their advertised corporate philosophy and efforts towards sustainability of the operations and the wide scale of services were the main reasons for the selection.

Aside from scrutinous and comprehensive reporting policy due to strict airport safety regulations, the company has recently been granted full GSTC *(Global Sustainable Tourism Council)* certificate by the TGA *(Türkiye Tourism Promotion and Development Agency)*.

4.2. Research method and philosophy

To explore the applicability of circular economy in airport catering operations, a qualitative design was employed. The aim and scope of the research necessitated in-

depth analysis of real-world applications of theory; therefore, case study approach was adopted (Yıldırım & Şimşek, 2021). The case study was designed around preliminary research, an interview around semi-structured questions and participant observation. Participant observation allowed the author to engage with / immerse in the processes and interact with the participants personally.

Since themes from the literature were applied to questions, a deductive thematic analysis approach was embraced to analyse qualitative data. To reduce the risk of researcher bias and to improve the objectivity of data, especially when researcher intervention is present, data confirmation followed crosscheck of data sources; preliminary research, participant observation, documents and research notes. Interview questions were designed and sorted in a way to revisit certain points, aiming to reach confirmation and data saturation.

4.3. Data Collection

After the literature review and preliminary research on the company, the central points of interest emerged *(as illustrated in Figure 1)*. Main themes were deducted from studying the extent of literature on circular economy. Primarily, application of the multiple R principle from Stahel's (2016) loop model formed the *"resource & energy efficiency"* theme and resulting cost savings. Geissdoerfer et al.'s (2018) circular business model and the emphasis on innovation formed the *"managerial philosophy"* theme. Final two themes, *"local resource use"* and *"employee & passenger satisfaction"* were also mentioned in numerous sources noted above.

The questions were formulated based on themes, after extensive consultations with professors of economy, F&B production and cost control. The long process was conducted to improve validity and reliability. After the question list was finalised, in order for the data to be collected, necessary ethics committee approval was applied for, and granted by the Social Sciences and Humanities Scientific Research and Publication Ethics Committee of Dokuz Eylul University, Izmir, Turkey, by the approval paper number 1300604, decision number 22, on 18.02.2025. The question list and guide are included in Appendix 1.

An extensive face to face group interview with relevant managers was held at a meeting room on company grounds on 05.03.2025, and replies were simultaneously noted. The meeting lasted more than three hours to allow the managers to play out their responses, instead of the researcher leading the answers. The company presented slides and documents during the interview. Operations Manager (55, M), Hotel General Manager (49, M) were present at the interview, frequently consulting their Ethics and Quality Manager (38, F). The participants volunteered based on their managerial control over and knowledge of operations, authority and initiatives. Key F&B production and service stations were also visited and employees (informally) interviewed, accompanied by managers. Observation notes were held separately.

4.4. Data Analysis

Principles of thematic analysis were employed for the analysis of the qualitative data gathered. The analysis started the same day as the interview, while the information was still fresh, and continued during the writing of the article. Additional information was requested after the interview date, when necessary.

Sources of data were individually written down and crosschecked. All the notes were re-read to further familiarise with the data. Significant or recurring keywords were

grouped into codes, which were eventually grouped under relevant themes (Naeem, Ozuem, Howell, & Ranfagni, 2023). The processing of the sizeable volume and complexity of qualitative data, highlighting keywords, coding and thematic mapping were done on paper. The grouping was aided by Microsoft Excel.

The findings are presented below.

5. Findings

The keywords, frequencies, corresponding codes and themes are given in Table 1:

Table 1. Research Keywords, Frequencies, Codes and Themes

Keywords	***f***	**Codes**	**Themes**
Security & Safety	*4*	Quality Management	T1 Managerial Philosophy
Quality	*6*		
Consultation	*6*	External Assurances	
Inspection	*6*		
Certification	*15*		
Automation	*10*	Innovation	
Recycle	*5*	Waste Management	T2 Resource & Energy Efficiency
Waste	*10*		
Sustainability	*9*	Long-Term Cost Savings	
Cost (Savings)	*18*		
Local	*8*	Local supply chain	T3 Local Resource Use
Supply / Transportation	*10*		
Raw Materials	*4*		
(Employee) Satisfaction	*13*	Working Conditions	T4 Employee & Passenger Satisfaction
Job safety	*6*		
(Passenger) Satisfaction	*4*	Service Quality	
Food safety	*3*		
Accessibility	*5*	Communication	
Social Responsibility	*8*		
Public	*5*		

The findings are expanded, based on the relevant themes:

T1 – Managerial philosophy

This theme reflects an overall, holistic managerial approach to sustainability that devises innovative solutions on various fields of circular economy. This theme did not materialise as singular questions, but was deducted from the overall approach.

Since the company operates on public domain, the operations are more closely and frequently inspected by relevant authorities, including provincial directorate of health, ministry of agriculture and forestry etc.

> *"We operate [potent] equipment that consume heavy loads of energy and may be extremely hazardous. Their operation, display screen and energy consumption are continually monitored and reported [to the authorities]."*

The company expressed an initiative for a concrete and conscious restructuring of operations and general approach to ensure certification, exhibited by the choice to employ external consultants to oversee and redesign all operations.

> *"As the necessity to obtain GSTC [Global Sustainable Tourism Council] Certificates, we did not opt to fulfil obligations [for the sake of it]. We wanted to do it properly. We saw this as an opportunity for corporate growth and adaptation. We hired an external consultant. We wished to perform the modifications from the ground up, to establish lasting changes for the better." (HGM)*

The airport hotel was fully certificated before the mandated deadline. The company already had had ISO 9001, 10001, 22001 and are about to receive ISO 14001 and 45001 certificates. An outlet operated by the company further received the "Food Made Good" certification by the "Sustainable Restaurant Association".

> *"We employ separate automation systems […] that are in-house developed. These monitor energy efficiency, savings on costs, performance reports etc. We are in the process of developing new ones for new functions" (OM)*

These external assurances may offer a supporting base on which to build a circular business model and an overall managerial philosophy towards sustainability.

Added to the automation systems, the company presented some examples of innovative methods for resource & energy efficiency, presented below.

T2 – Resource & Energy Efficiency

This theme directly refers to the loop model. Both individual, innovative solutions, as well as established processes were included. Direct questions were asked about waste management / extraction / efficiency, energy efficiency, recycling, reducing, restructuring, remanufacturing etc.

While F&B and hotel operations are conducted independently by the company, they are integrated within the overall airport management, which regulates some company practices and provides certain general services, including, but not limited to, security, energy distribution, waste handling, heating, hot water and climatization.

Airport management further provides sustainability guidelines. All waste is source-separated and sent to the main waste handling facility, at which point airport management takes over. Waste is separated under the guidelines of the ministry of environment and forestry; recyclable, bio-degradable and toxic waste. Hazardous waste (including discarded frying oil) is then handled by a certified third party. Most technical equipment are inspected and serviced by outsider specialists regularly. The airport is one of the carbon-free airports in the country. All the greenhouse gas produced throughout the airport, including catering operations is continually monitored. The airport management was reported to install solar panels above open car parks. Tri-generation units supply around 3% of all the electric consumed, through natural gas waste.

The company expressed some examples of recycling / reducing:

- *Bread (and other starchy food) waste is recycled into single use utensils, 345000 pieces in 2024.*

- *Leftover coffee grounds are recycled into coffee flasks.*
- *All the paper napkins used are FSC (Forest Stewardship Council) certified, made from recycled and unbleached paper and eco-friendly dye.*
- *Food packaging is minimal, using paper and cardboard.*
- *(Worn) textiles are repaired and reused.*

A major challenge was expressed to be centralised climatization of all airport buildings.

> *"All windows, including guestrooms are permanently closed, for security reasons. The air is centrally filtered. This was unsuitable to grow vegetables. We had a for indoor vertical farming, but we had to abandon. We do not have sufficient open space for such project. Space is highly regulated, too expensive [and already polluted by air traffic]." (HGM)*

GSTC conducts confidential inspections through secret guests, to evaluate sustainability practices including accessibility, energy and waste efficiency etc.

The company expressed some examples of waste management:

- *Faucet aerators and shower heads are regularly renewed to save water.*
- *Flush tanks store grey water.*
- *All lighting uses LED lamps and additional electronic devices in rooms and room cards are conditioned to save energy.*
- *Energy consumption is continuously monitored against any fluctuation, to ensure secure and efficient operation.*
- *Cold rooms are organised in a manner that some may remain empty to save on storage energy and costs.*
- *Purchasing and production managers at the headquarters coordinate operations in a manner that minimises waste.*
- *Individual units perform their own recipe planning and sales forecasts that pass through central approval and directed accordingly.*
- *24-hour production process eliminates the need for overproduction. Shortage, surplus and leakage is continually monitored and reported monthly and reviewed in annual board meetings.*
- *Individual units perform cost control duties and review these in weekly board meetings.*
- *In-house developed automation systems regulate purchasing, stock control and overall functions.*
- *Each action is documented, including waste disposal, as per requested by certification bodies.*

These efforts towards resource & energy efficiency include a few innovative examples and look promising. However, these are generally perceived as individual cost control / saving tool. Most initiatives are also noted to be hindered / challenged by the airport management. One of the main challenges were security inspections at the entry and exit points, applied to passengers, employees and suppliers alike. This prolongs transportation and delivery inspection times. Dependence on overall airport management operations present another challenge. The company operates on a 24-hour basis, ensuring the continuity of production and service. However, this depends

on the continuation of airport traffic, which may be hindered in times of crisis, including Covid-19.

T3 – Local resource use

This is a bridging theme, reducing transportation, energy use, improving locality, social sustainability and passenger experience. Direct questions were asked.

The company expressed to source locally as much as possible to ensure timely delivery of ingredients.

> *"We always explore nearby [agricultural] producers. Their quality is inspected by our food safety & quality department. We sign annual contracts with selected ones. Our criteria include environmental friendliness, too. But we keep inspecting them. We visit them unannounced and take samples to analyse." (HGM)*

The company's centralised & contractual purchasing procedure is said to ensure financial sustainability, both for the company and local agricultural producers. It may further ensure the sustainability of quality of service offered to passengers.

Local resource base was reported to be highly sufficient, since the airport is located rather close to a metropolitan centre, as well as productive agricultural centres.

> *"We work with a total of 51 suppliers. F&B raw materials are fully sourced locally, except for specialist products for the recipes from other regions. All our employees are locals." (OM)*

The decision to source F&B ingredients locally was mainly found to be financial. However, the company expressed a clear concern for sustainability of suppliers' production as well.

> *"We only purchase cage-free eggs. All the seafood is supplied from sustainable fishing certified suppliers." (HGM)*

Food and work safety practices are also inspected by external bodies.

T4 – Employee & guest satisfaction

This theme covers the benefits created for the main stakeholders. It also includes internal and external communication towards competitiveness and awareness.

The company expressed to continually inform passengers about their efforts toward sustainability, mostly through QR codes located in general areas.

> *"We place guest evaluation forms in rooms and main areas. They include questions on sustainability. We ask their thoughts and recommendations. The results are gathered and analysed by the guest relations department at the headquarters." (OM)*

Ongoing corporate social responsibility projects include support for child education, wheelchairs, marine protection, sapling planting, animal welfare, cultural heritage preservation etc.

> *"Such [accessibility] facilities are also listed on travel intermediaries' web pages. We found that this increases preferability. To provide more accessibility, we provide [specialised] ramps and tables, spoken menus and audio navigation through the airport." HGM*

Proper charity and non-profit organisations are supported through donations.

The company noted examples of education & training programmes for employees, including general and departmental seminars and on-the-job training. Subjects include food and job safety, energy efficiency and zero waste. Training is also provided towards suppliers for their own development, including food safety, delivery chain management and nutritional science. Lastly, vocational training in F&B service is provided towards local youth to improve employment.

Such programmes may improve social sustainability (through local employment), service quality and guest satisfaction.

> *"We try to get feedback from our teammates as much as possible. There are regular surveys and interviews. Quite a few employees requested complementary health insurance. We discussed and decided to grant this. We provide [sports & recreation] facilities, social rights, round the clock emergency medical assistance etc. Because we believe employee satisfaction leads to [passenger] satisfaction." (OM)*

Finally, the company expressed an equal opportunity and equal access workplace, as well as providing healthy nutrition for employees & passengers.

The efforts toward employee & guest satisfaction, as well as communication of sustainable practices (through public relations) were found to be the company's most prominent area. Such efforts may be perceived as a reflection of an overall managerial philosophy.

Overall examples from the findings are placed on the ICE-AC Model and illustrated on Table 2 below:

Table 2. Examples of the ICE-AC Model:

Model Item	***Examples***
Industrial Ecology	Competition Budget airlines Challenges of operating in the airport: • *Safety & security inspections* • *Centralised air conditioning* • *Centralised waste handling* • *Continuity of air traffic* • *24-hour production & service* • *Public space*
Circular Business Model	External consultants Redesign / restructuring of processes Certification & documentation Development of automation systems
Employees & Passengers	
Job & food safety	Training (employees, suppliers & local youth)
Service quality	Guest evaluation forms 24-hour production & service Quality raw materials
Satisfaction	Social rights, recreation & health benefits

	Healthy nutrition
Inclusion	Equal access Local employment
Accessibility	Specialised ramps & tables Spoken menus Audio guides
Communication	QR Codes *(communication of sustainable practices)* Corporate social responsibility projects
Local resource use	Local (quality) raw materials Local employment Local recipes
Production Loops	Constant monitoring of stocks & energy consumption Recycling examples (utensils, coffee flasks made of waste) Reducing examples (24-hour monitoring to minimise waste) Repairing examples (repaired & reused textile)
Innovative technologies & automation	In-house automation (tracking) systems Monitoring systems Reporting & evaluation

Source: Compiled by the author

6. Discussions and Conclusions

The present research set out to explore the applicability of circular economy practices for airport catering operations, as well as actual and potential examples, based on a case study. The research resulted in innovative examples and applications of circular economy, but also certain limitations & challenges (mainly due to operating within the airport). A significant implication is the evident motivation granted by governmental regulations, certification processes and outsider consultants.

Most of the challenges were attributable to the industrial ecology (Mitra, Elhaj, & Rahman, 2024). The airport catering operations function within critical regulations. The remote location and strict safety inspections result in higher costs and longer times for transportation. Airport and governmental regulations were found to offer limitations as well as opportunities.

Concrete willingness to redesign operations through the employment of external consultants, adherence to certification and development of automation systems was found. Certification, regulation and inspection requirements were treated as opportunities to develop. However, a fully established circular business model (Geissdoerfer, Vladimirova, & Evans, 2018) is not established, as efforts were found to be both individual and mostly motivated by cost savings & competitive edge.

Acknowledgement of employee & passenger satisfaction was notable. Also, the links to overall sustainability were well established and expressed. Especially, importance given to communication was frequently emphasised. These findings largely relate to the doughnut economy model (Raworth, 2017) in their emphasis on social & environmental responsibility, accessibility, inclusion, added social value etc. Also, these findings emerged as outcomes of a long-term philosophy rather than incidental cases, however motivated by competitive advantages.

Regarding Stahel's loop model (2016), examples of resource & energy efficiency practices are perceived two-fold; both as cost control and corporate responsibility tools. A number of (innovative) applications were noted that support the potential applicability of circular economy practices in airport catering operations. Through time, examples of such practices may be expected to multiply

The findings lastly highlight the cost & quality advantages of local resource use, minimising transportation related costs and improving control over supply continuity and quality. Ultimately, these benefits are expected to be improve passenger experience & satisfaction.

Findings point to an overemphasis of cost control / savings function of relevant practices. Other functions were not completely neglected, but, for instance, a frequency of 18 for the keyword cost (savings) and overall research notes indicate a clear priority. Incidentally, circular economy practices do present additional costs and companies may be inclined to weigh these against benefits.

For a (wider) adoption of circular economy practices, the cost advantages may be utilised as a leverage. However, long term overall sustainability benefits require a pro-active and long-term adoption, which in turn requires a holistic restructuring of managerial philosophy, to establish a circular business model.

Conclusively, circular economy principles were found to be have a clear application area in airport catering operations. But their unique characteristics present certain challenges and limitations that require innovative solutions. The scope of applications was found to generate direct and induced benefits. Raised awareness of guests & employees seems to create a global ripple effect, with added benefits of competitive advantages. While singular applications serve to save costs and ensure certification, a wider and long-term effect is yet to be observed.

Managerial Implications: The research concludes that the sustainability of any relevant application depends on a wholistic restructuring of managerial philosophy. This approach should be embraced by managers and effectively communicated to employees & passengers through awareness programs, training etc. to improve adoption.

Companies in similar line of production may adopt existing practices as examples towards resource & energy efficiency, guest & employee satisfaction and local resource use, and raise their own, to improve the wealth of knowledge in circular economy. But it must be noted that establishing a circular business model is case-specific. Companies can't copy existing models. They must evaluate their unique characteristics within the industrial ecology. Only then can they draw up a realistic roadmap.

Research Implications: The research is based on a single case. While the same principles apply to more than 200 outlets and spread through the supply chain and countless international travellers, the limitation of generalisability of findings should be conceded.

While noted methods were employed to diminish researcher bias, the findings relate to a single study, and should be treated as such. The ICE-AC model was based on various other models in the relevant literature that are perceived pivotal by the author.

The case study allowed a comprehensive and in-depth analysis of the company's catering operations, further research on different cases will result in findings that may

be more readily generalised. Research on circular economy in airport catering was found to be limited, and the present paper aims to create awareness in the relevant literature.

The necessity to respect the privacy of the company presented minor challenges.

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References

Akca, M. (2020). Bölgesel kalkınmada havalimanı rolleri: işleticiler için öneriler (Airport roles in regional development, recommendations for operators). *Doğu Anadolu Sosyal Bilimlerde Eğilimler Dergisi, 4*(1), 27-39. Retrieved from https://dergipark.org.tr/en/pub/dased/issue/55372/745850

Annaç Göv, S.A., & Gün, S. (2022). Psychological capital level of airport employees and the relationship between workplace happiness. *Uluslararası İktisadi ve İdari İncelemeler Dergisi, 36*, 193-208. doi:https://doi.org/10.18092/ulikidince.1041484

Baştuğ, S., Akan, E., & Kiracı, K. (2021). Covid-19 sürecinde havalimanı hizmet kalitesi: Türkiye havalimanları analizi (Airport service quality in the Covid-19 Process: Analysis of airports in Turkey). *Hacettepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 39 (Covid 19 Özel Sayısı)*, 15-37. doi:10.17065/huniibf.907174

Bayat, F. (2024). Nepotizmin örgütsel güven ve örgütsel bağlılık algısına etkisi: Mardin Prof. Dr. Aziz Sancar Havalimanı örneği (The impact of nepotism on perceptions of organizational trust and organizational commitment: The case of Mardin Prof. Dr. Aziz Sancar Airport). *Sosyal Bilimler Akademi Dergisi, 7*(2), 72-91.

Bessière, J. (1998). Local development and heritage: Traditional food and cuisine as tourist attractions in rural areas. *European Society for Rural Sociology (Sociologia Ruralis), 38*(1), 21-34.

Brechin, M. (1999). Airport catering. *Travel & Tourism Analyst, 2*, 87-104.

Bucak, T. (2019). *Yiyecek içecek işletmeciliği (F&B management)*. Detay Yayıncılık.

Castillo-Manzano, J. I., & López-Valpuesta, L. (2013). Analysing passenger behaviour towards the catering industry: Implications for airport management. *International Journal of Hospitality Management, 35*, 258–260. doi:http://dx.doi.org/10.1016/j.ijhm.2013.06.010

Cataldo, E., Fucile, M., & Mattii, G. (2021). A review: Soil management, sustainable strategies and approaches to ımprove the quality of modern viticulture. *Agronomy , 11*, 2359. doi:https://doi.org/10.3390/agronomy11112359

Corvellec, H., Stowell, A. F., & Johansson, N. (2022). Critiques of the circular economy. *Journal of Industrial Ecology, 26*, 421-432. doi:10.1111/jiec.13187

Çayalan, N., & Rodoplu, H. (2025). Sürdürülebilir havaalanı uygulamaları: Enerji verimliliği ve karbon ayak izi azaltma stratejileri. *Iğdır Üniversitesi Sosyal Bilimler Dergisi, 38*, 102-117. doi:10.54600/igdirsosbilder.1605490

Demirci, S., Doğan, T. G., & Eroğlu, E. (2023). Havalimanlarında sürdürülebilirlik: Singapur Changi Havalimanı (Sustainability in airports: Singapore Changi Airport). *Düzce Üniversitesi Süs ve Tıbbi Bitkiler Botanik Bahçesi Dergisi, 2*(1), 14-26.

DHMİ. (2025). *Republic of Türkiye Ministry of Transport and Infrastructure General Directorate Of State Airports Authority*. Retrieved from Carbon-Free Airport Project: https://www.dhmi.gov.tr/Sayfalar/Havalimani/Ataturk/karbonsuzHavalimaniProjesi.aspx

Erdoğan, D. (2020). Havaalanı hizmet kalitesinin önem-performans analiziyle değerlendirilmesi: Gaziantep Havalimanı örneği (Measurement of airport service quality by ımportance-performance analysis: The case of Gaziantep Airport). *Journal of Aviation Research, 2*(2), 82-100.

Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017). The circular economy: A new sustainability paradigm? *Journal of Cleaner Production, 143*, 757-768. doi:http://dx.doi.org/10.1016/j.jclepro.2016.12.048

Geissdoerfer, M., Vladimirova, D., & Evans, S. (2018). Sustainable business model innovation: A review. Journal of Cleaner Production, 198. doi:10.1016/j.jclepro.2018.06.240

Gupta, N., & Benson, C. C. (2011). Sustainability and competitive advantage: An empirical study of value creation. *In Competition Forum, 9*(1).

Güney, S., & Dinler, S. (2023). Türkiye'de havayolu firmaları için algılanan kurumsal sürdürülebilirlik ve müşteri bağlılığı ilişkisi: Erzurum havalimanı örneği (Perceived corporate sustainability and customer loyalty relationship for airline companies in Türkiye: the case of Erzurum ai. *Balıkesir Üniversitesi Sosyal Bilimler Enstitüsü Dergisi BAUNSOBED, 26*(50).

Hamid, R. M., & Khalil, S. M. (2018). Assessment of hygiene conditions in Sudanese Airlines catering at Khartoum International Airport. *Journal of Food Research, 7*(4), 149-157. doi:10.5539/jfr.v7n4p149

Imbardelli, A. P. (2019). *How smart rooms can transform hotel brands.* Retrieved from Hotel Management: https://www.hotelmanagement.net/tech/how-smart-rooms-can-transform-hotel-brands

Jin Ahn, Y., & Juraev, Z. (2023). Linking Keynesian theory to economic geography. *International Journal of Multidisciplinary: Applied Business and Education Research, 49*(9), 3071 – 3078. doi:10.11594/ijmaber.04.09.01

Keskin, B. N., & Erçoşkun, Ö. Y. (2021). Covid-19'un havacılık sektörüne çevresel etkisi: Adnan Menderes Havalimanı örneği (Environmental impact of Covid-19 on the aviation industry: The case of Adnan Menderes Airport). *Akıllı Ulaşım Sistemleri ve Uygulama Dergisi, 4*(1), 74-86. doi:10.51513/jitsa.880466 2021

Kıpçak, M., & Uyar, B. (2021). Havaalanlarında müşteri memnuniyetinin sağlanması: Van Ferit Melen Havaalanı örneği (Ensuring customer satisfaction at airports: Van Ferit Melen Airport example). *Pamukkale Journal of Eurasian Socioeconomic Studies , 8*(2), 1-26.

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation & Recycling, 127*, 221-232. doi:http://dx.doi.org/10.1016/j.resconrec.2017.09.005

Kızılcan, S., Hoşgör, H., & Güngördü, H. (2023). Havalimanı yer hizmetleri çalışanlarında teknostres ve iş performansı ilişkisi (The relationship between technostress and work performance in airport ground handling employees). *Akşehir Meslek Yüksekokulu Sosyal Bilimler Dergisi, 15*, 21-30.

Koca, Y. K., & Turgut, Y. Ş. (2024). Tarım arazilerinin amaç dışı kullanımı örneği: Çukurova Uluslararası Havalimanı (Example of misuse of agricultural lands: Çukurova International Airport) . *Çukurova Tarım Gıda Bil. Der. (Çukurova J. Agric. Food Sci.), 39*(2), 417-424. doi:10.36846/CJAFS.2024.161

Kovacs, E., Hoaghia, M.-A., Senila, L., Scurtu, D., Varaticeanu, C., Roman, C., & Dumitras, D. (2022). Life cycle assessment of biofuels production processes in viticulture in the context of circular economy. *Agronomy, 12*, p. 1320. doi:https://doi.org/10.3390/agronomy12061320

Lacy, J. A., & Douglass, W. A. (2002). Beyond authenticity: The meanings and uses of cultural tourism. *Tourist Studies, 2*(1), 5–21.

Mızrak, K., & Kızılcan, S. (2022). Environmentally sensitive management approach within the scope of carbon-free airport: The case of Sivas Nuri Demirağ

Airport. *Journal of Economics and Administrative Sciences, 23*(3), 623-634. doi:https://doi.org/10.37880/cumuiibf.1063147

Mocica-Brilha, N. (2008). Airport requirements for leisure travellers. In A. P. Graham (Ed.), *Aviation and Tourism* (167–176). Ashgate Publishing, Hampshire.

Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2023). A step-by-step process of thematic analysis to develop a conceptual model in qualitative research. International Journal of Qualitative Methods, 22. doi:https://doi.org/10.1177/16094069231205789

Nicolescu, C. M., Bumbac, M., Radulescu, C., Buruleanu, L. C., Olteanu, R. L., Gorghiu, L. M., . . . Holban, C. G. (2022). Romanian organic and conventional red grapes vineyards as potential sources of high value-added products, in a circular economy approach. In A. Morata (Ed.), *Grapes and Wine* (107-138). 10.5772/intechopen.95210. doi:10.5772/intechopen.98972

Nijkamp, P., Laschuit, P., & Soeteman, F. (1991). *Sustainable development in a regional system.* (Serie Research Memoranda; No. 1991-93). Faculty of Economics and Business Administration, Vrije Universiteit Amsterdam.

Öz, E., & Erçoşkun, Ö. Y. (2022). Covid-19 pandemisinin Esenboğa Havalimanı hava trafiğine ve uçak emisyonlarına etkisi (Effect of Covid-19 pandemic on Esenboğa Airport air traffic and aircraft emissions). *Akıllı Ulaşım Sistemleri ve Uygulamaları Dergisi, 5*(1), 45-59. doi:10.51513/jitsa.1069097

Özşahin, O., Barışık, T., & Acar, H. H. (2024). Bir havalimanı bünyesinde gıda elleçleme işlerinde BAUA yöntemleri kullanılarak ergonomik risklerin değerlendirilmesi (Assessment of ergonomic risks using BAUA methods in food handling works in an airport). *Ergonomi, 7*(2), 172 – 185. doi:10.33439/ergonomi.1418292

Raworth, K. (2017). Why it's time for doughnut economics. IPPR Progressive Review, 24(3), pp. 2573-2323. doi:https://doi.org/10.1111/newe.120583

Roberts, P. (2006). Evaluating regional sustainable development: Approaches, methods and the politics of analysis. *Journal of Environmental Planning and Management, 49*(4), 515-532. doi:10.1080/09640560600747786

Sarıgül, S. S., Ünlü, M., & Yaşar, E. (2023). A new MCDM approach in evaluating airport service quality: MEREC-based MARCOS and CoCoSo methods. *Uluslararası Yönetim Akademisi Dergisi, 6*(1), 90-108. doi:https://doi.org/10.33712/mana.1250335

Schaltegger, S., Müller, H., & Kapsar, H. (1996). *Corporate Environmental Accounting.* John Wiley & Sons.

Sesliokuyucu, S., & Polat, İ. (2020). Dialogue and transparency in value co-creation: An empirical analysis of airline passengers. *Journal of Aviation Research, 2(2),*, 168-181.

Sharma, A., & Sharma, A. (2019). Effect and impact of IoT (Internet of Things) on supply chain management. *Journal of Emerging Technologies and Innovative Research, 6*, 302-310. Retrieved from https://www.researchgate.net/publication/336251787_Effect_and_Impact_of_IoT_Internet_of_Thing_on_Supply_Chain_Management

SHGM. (2019). *Directorate General of Civil Aviation.* Retrieved from Green Aırport Project Sectoral Crıterıa Document: https://web.shgm.gov.tr/documents/sivilhavacilik/files/pdf/kurumsal/projeler/Yesil_Havaalani_Projesi_sektorel_kriterler.PDF

Sims, R. (2010). Putting place on the menu: The negotiation of locality in UK food tourism, from production to consumption. *Journal of Rural Studies, 26*(2), 105-115. doi:10.1016/j.jrurstud.2009.09.003

Stahel, W. R. (2016). Comment - Circular economy. *Nature, 531*, 435-438.

Sun, Y.-Y., Gossling, S., & Zhou, W. (2022). Does tourism increase or decrease carbon emissions? A systematic review. *Annals of Tourism Research, 97*. doi:https://doi.org/10.1016/j.annals.2022.103502

Şahin, D. R., & Ünal, S. D. (2021). Havayolu müşterilerinin olumsuz davranışlarının havalimanı yer hizmetleri ekip sorumluları ve yönetim açısından değerlendirilmesi (Evaluation of airline customers misbehaviours in terms of ground services team leaders and management). *International EUropean Journal of Managerial Research Dergisi (EUJMR), 5*(9).

Timuralp, Ç., & Mercan, F. R. (2024). Uçaklardan kaynaklanan karbon emisyonunun Eskişehir Hasan Polatkan Havalimanı için belirlenmesi (Determination of carbon emissions from airplanes for Eskisehir Hasan Polatkan Airport) . *ESOGÜ Müh. Mim. Fak. Dergisi (J ESOGU Eng. Arch. Fac.), 32*(2), 1335-1342.

Vural, M. F., & Vural, V. (2024). A bibliometric review on the sustainability of airport and airline businesses. *Marmara Üniversitesi İktisadi ve İdari Bilimler Dergisi, Sustainability and Green Economics Special Issue*, 59-73. doi:DOI: 10.14780/muiibd.1461083

Yıldırım, A., & Şimşek, H. (2021). Sosyal bilimlerde nitel araştırma yöntemleri *(Qualitative research methods in social sciences)* (12th ed.). Seçkin Yayıncılık.

Yıldız, Ö. E. (2015). Catering işletmeciliği (Catering management). In A. Timur, & Ö. Bardakoglu (Eds.), *Turizm İşletmeciliği (Tourism Management).* Detay Yayıncılık. ISBN:978-605-9189-12-5

Yıldız, Ö. E. (2017). Sourcing local and sustainable tourism: The case of Yesilyurt. *International Journal of Contemporary Economics and Administrative Sciences, 7*(3-4), 80-95. Retrieved from http://ijceas.com/index.php/ijceas/article/view/186

Yıldız, Ö. E. (2024). Applications of circular economy and wine tourism in viniculture: A case study. *International Journal of Contemporary Economics and Administrative Sciences, 14*(1), 394–410. doi:https://doi.org/10.5281/zenodo.13932186

Yılmaz, M. (2022). Yer hizmetlerinde mesleki tükenmişlik sorunsalı: havalimanı yolcu hizmetleri çalışanları üzerine bir araştırma (The problem of occupational burnout in ground handling: A study on airport passenger services employees). *International Journal of Social and Humanities Sciences (IJSHS), 6*(3), 11-36.

Appendix 1. Question Form and Guide

1. What is the extent of airport catering operations?
   (Confirm the extent of operations. Confirm the extent of questions. Establish contact)
2. How does the location of the airport affect the production processes?
   (Confirm the challenges in literature. Ascertain individual challenges. Revisit challenges. Ask case-specific solutions to these challenges.)
3. Is the local resource base (F&B ingredients, raw materials, labour force etc.) adequate?
   (Revisit on later questions.)
4. How do you measure the sustainability awareness of the passengers?
   (Try to reach concrete procedures and methods. Try to get an impression on the importance attached to it.)
5. What are the measures taken for energy efficiency in purchasing, storage, production and service?
   (Revisit on later questions. Try to reach concrete procedures and methods. Revisit Q3.)
6. What are the measures taken to reduce, reuse or recycle waste and byproducts in purchasing, storage, production and service?
   (Try and confirm answers to Q5. Try to reach additional applications.)
   - *a.* Which data for production planning / sales forecast is available to reduce overproduction?
     (Revisit later. Try to establish a base for production planning and whether that reduces waste.)
   - *b.* What are the measures taken to reduce packaging waste?
     (Crosscheck Q5)
   - *c.* Which practices are employed to reduce, reuse or recycle byproducts?
     (Crosscheck Q5)
   - *d.* How is toxic waste handled?
     (Try to reach relevant CE applications)
7. What are the methods and technologies employed for stock control, optimum stock levels and purchasing?
   (Crosscheck Q6a & 3. Establish a base for innovation)
8. What are the certificates received / applied, applied methods and technologies to this end?
   (Crosscheck Q5. Establish a base for circular business model)
   - *a.* Automation systems, smart technologies or AI applications employed to ensure time and energy efficiency in purchasing, storage, production and service
     (Crosscheck Q7. Establish a base for innovation)
9. What are the education and training programmes provided for the employees?
   (Establish base for employee satisfaction, sustainability related procedures)
10. How is communication with passengers managed? How are sustainability efforts communicated?
    (Establish base for corporate communication, public relations, corporate social responsibility etc.)
11. Is communication in the subject of sustainability perceived as important for competitive advantage?
    (Try to isolate motivations)