

AMIT BHATIA

**THE ROLE OF SMART AND CROWD-SOURCED
PLATFORMS IN EMPOWERING RESPONSIBLE
TRAVELLERS: THE CASE OF TRIPDOODLER**



**FACULTY OF ECONOMICS
UNIVERSITY OF ALGARVE**

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TRAVELLERS: THE CASE OF TRIPDOODLER**

PhD in Tourism

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**UNIVERSITY OF ALGARVE
FACULTY OF ECONOMICS**

2025

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THE ROLE OF SMART AND CROWD-SOURCED PLATFORMS IN EMPOWERING RESPONSIBLE TRAVELLERS: THE CASE OF TRIPDOODLER

Statement of originality

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Amit Bhatia

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Declaration

In the later stages of development of this manuscript, the author employed an advanced AI (artificial intelligence) language model, ChatGPT 5, developed by OpenAI, to enhance the overall readability. The author declares that ChatGPT was used exclusively as a language support tool to revise the formal structure and clarity of English expressions in this thesis (proofreading). At no stage was ChatGPT employed to generate original academic content, ideas, or arguments. The research design, data collection, analysis, and interpretation were conducted entirely by the author, in full compliance with academic integrity and ethical standards. The author diligently reviewed and edited the content, acknowledging complete responsibility for the final substance of the thesis.

“The unexamined life is not worth living.” – Socrates
To everyone who has supported and guided me in living a life shaped by this belief, my deepest gratitude.

*To my family,
Mom, Dad and Shreya*

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ABSTRACT

This thesis explores how smart, crowdsourced platforms can empower responsible travellers. The research focuses on the case of TripDoodler, a digital platform that collects and displays user-generated sustainability ratings of businesses. Despite growing interest in sustainable tourism, behavioural shifts remain limited. Smart tourism technologies (STTs) offer new tools for encouraging responsible behaviour, but their design and adoption mechanisms require further study. This research comprises three interconnected studies that explore the platform's intervention model, traveller recognition of sustainability practices and psychological drivers of adoption and usage.

The first study examines how smart, crowdsourced platforms can encourage responsible behaviour of travellers, applying a Theory of Change (ToC) framework to map TripDoodler's intervention model, including its inputs, activities, outputs and intended outcomes. Stakeholder interviews and a participatory workshop inform the development of the conceptual framework. This offers insight into how features such as guided user ratings and structured sustainability parameters are designed to engage users and enhance visibility of sustainability practices. The study highlights how platform architecture, user motivations and underlying behavioural assumptions jointly shape the enabling conditions for responsible traveller behaviours. The study contributes to theory by introducing ToC as a structured approach for understanding smart tourism interventions, while offering practical insights for tourism professionals aiming to design more participatory and transparent sustainability tools.

The second study explores how travellers recognise sustainability practices across business types, utilising data from TripDoodler. Analysing 2,446 traveller ratings across 1,716 businesses, the study applies the CRISP-DM framework, thematic clustering and Chi-square test for independence. Findings suggest that recognition is highest for practices from businesses, such as plant-based meals and towel reuse, which may indicate that sustainability actions with higher visibility and contextual relevance are more likely to be acknowledged by travellers. Recognition patterns vary by business type, and a weak but significant association is observed between Google ratings and sustainability recognition. No significant association is found with formal sustainability certifications. The study offers a behavioural perspective on sustainability recognition and highlights the potential of smart platforms to capture sustainability engagement at scale in real-world travelling contexts.

The third study applies the extended Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) to examine user acceptance and utilisation of TripDoodler. A semi-structured online questionnaire was completed by 203 users and analysed using partial least squares structural equation modelling (PLS-SEM). The results indicate that Behavioural Intention is positively associated with Facilitating Conditions, Hedonic Motivation, Habit and Social Influence, while Behavioural Intention, Facilitating Conditions and Habit impact actual use. Effort Expectancy and Performance Expectancy showed no significant relationship with Behavioural Intention. Gender and age did not moderate relationships significantly. The study advances theoretical understanding of STT adoption and provides practical insights for technology developers in tourism-related contexts aiming to support responsible traveller behaviours through more human-centred design and implementation strategies.

Keywords: *Smart Tourism Technologies, Crowdsourced Platforms, Responsible Traveller Behaviour, Sustainability Recognition, UTAUT2, Theory of Change, TripDoodler*

RESUMO

A presente tese investiga de que forma plataformas inteligentes e colaborativas podem contribuir para comportamentos responsáveis por parte dos viajantes, recorrendo ao caso TripDoodler. O setor do turismo representa uma oportunidade económica significativa, exercendo simultaneamente forte pressão ambiental. Apesar de contribuir de forma relevante para o PIB e para o emprego a nível mundial, o turismo gera cerca de 8 % das emissões globais de gases com efeito de estufa. Embora a consciência sobre desafios de sustentabilidade tenha vindo a crescer, persiste uma dificuldade em transformar intenções em ações consistentes e relevantes. Muitos viajantes manifestam preocupação, mas enfrentam obstáculos práticos como lacunas infraestruturais, visibilidade limitada de soluções sustentáveis e barreiras psicológicas.

A investigação endereça esta questão explorando o potencial das plataformas digitais para encorajar escolhas mais responsáveis. O foco recai sobre a plataforma colaborativa e inteligente TripDoodler, que permite aos utilizadores identificar, avaliar e partilhar práticas de sustentabilidade de empresas nos destinos. O estudo estrutura-se em torno de três objetivos principais: o primeiro visa refletir sobre a abordagem do TripDoodler através de conceitos da *Theory of Change*; o segundo procura determinar quais as práticas de sustentabilidade das empresas que são mais reconhecidas pelos viajantes no uso da plataforma; o terceiro analisa os fatores psicológicos que influenciam a adoção e utilização da plataforma, utilizando o modelo UTAUT2 (Unified Theory of Acceptance and Use of Technology 2).

No primeiro estudo, desenvolve-se um modelo de *Theory of Change* para o TripDoodler. Com base em entrevistas ao fundador e a utilizadores, seguidas de um *workshop participativo*, mapeou-se o processo intencional de mudança. O modelo evidenciou elementos de design específicos, como *prompts* estruturados para avaliação, critérios alinhados com os ODSs (Objetivos de Desenvolvimento Sustentável) e contributos de pares, que visam moldar comportamentos responsáveis durante a viagem. Esta abordagem contribuiu metodologicamente ao clarificar como a plataforma pretende induzir mudança comportamental, nos viajantes, sublinhando a necessidade de explicitar a lógica de intervenção em tecnologias emergentes. O segundo estudo analisa dados gerados pelos utilizadores para compreender padrões de reconhecimento de práticas sustentáveis. A análise de 2446 avaliações referentes a 1716 empresas revela que práticas como oferta de refeições vegetarianas, reutilização de toalhas e controlo de temperatura são as reconhecidas mais frequentemente, devido à sua visibilidade e relevância direta na experiência do viajante. Já ações de caráter infraestrutural ou político, como a utilização de energias renováveis ou a conservação da biodiversidade, apresentam menor reconhecimento. Constatou-se uma associação fraca, mas estatisticamente significativa, entre classificações no Google e reconhecimento de sustentabilidade, enquanto o estatuto de certificação não mostrou efeito relevante. Estes resultados sugerem que sinais informais de credibilidade podem ter maior impacto do que certificações formais na perceção de sustentabilidade por parte dos viajantes. O terceiro estudo explora a adoção e utilização do TripDoodler com base no UTAUT2. Um inquérito respondido por 203 utilizadores, cujas respostas foram analisadas através de um modelo de equações estruturais. Os resultados indicam que a Intenção de Utilização da plataforma é impactada por Influência Social, Hábito, Condições Facilitadoras e Motivação Hedónica. A Expectativa de Esforço e a Expectativa de Desempenho não exibem relação significativa com a Intenção Comportamental. O Comportamento de Utilização está fortemente associado ao Hábito e às Condições Facilitadoras. Estes dados evidenciam que, num contexto orientado por valores, os viajantes são mais motivados por dinâmicas sociais, uso rotineiro e aspetos lúdicos do que por utilidade ou facilidade. O género e a idade não moderam relações de forma significativa.

Em conjunto, os três estudos ajudam a compreender como plataformas inteligentes e colaborativas podem apoiar comportamentos responsáveis dos viajantes. A tese contribui teoricamente de três formas principais: introdução da *Theory of Change* como ferramenta estruturada para perceber como tecnologias turísticas pretendem provocar alterações comportamentais; reconceptualização do reconhecimento de práticas sustentáveis como um ato situado, moldado pela visibilidade e relevância, em vez do mero alinhamento de valores; e extensão da aplicação do UTAUT2 a um contexto prosocial e participativo, demonstrando que motivações diferem em relação a plataformas estritamente funcionais.

A tese também produz contributos práticos. Para os responsáveis pelo desenvolvimento de plataformas colaborativas e inteligentes, os resultados indicam que formatos estruturados de input, validação social e elementos de entretenimento podem potenciar um compromisso mais profundo. As empresas podem reforçar a visibilidade dos seus esforços de sustentabilidade através de ações tangíveis integradas na experiência do viajante. As entidades certificadoras devem reconsiderar a forma de comunicar a certificação, uma vez que a sua mera existência não garante reconhecimento. Os gestores de destino podem utilizar dados colaborativos para informar estratégias de governação, identificar valores emergentes dos viajantes e adaptar intervenções de forma mais ajustada. Em termos mais amplos, a investigação apoia uma transição de modelos *top-down* para abordagens participativas, incluindo viajantes. Demonstra que as ferramentas digitais podem facilitar escolhas responsáveis ao tornar opções sustentáveis visíveis, relevantes e socialmente reforçadas. Os resultados contribuem para os Objetivos de Desenvolvimento Sustentável das Nações Unidas, especialmente o ODS 8 (trabalho decente e crescimento económico), 9 (indústria, inovação e infraestruturas) e 12 (consumo e produção responsáveis) estão ligados a temas de consumo responsável, acesso à informação e monitorização da sustentabilidade.

O estudo apresenta algumas limitações. Todos os três estudos se baseiam numa única plataforma, com uma comunidade de utilizadores predominantemente localizada no Norte da Europa, o que restringe a generalização dos resultados. A natureza transversal dos dados limita a observação de mudanças comportamentais ao longo do tempo. As dimensões de reconhecimento aplicadas no segundo estudo derivam de parâmetros predefinidos, que podem não abranger a totalidade das práticas sustentáveis em contexto. No terceiro estudo, o modelo não inclui variáveis potencialmente relevantes, como preocupação com o ambiente, confiança na plataforma ou gamificação. Investigações futuras podem dar continuidade a este trabalho mediante estudos comparativos entre plataformas e regiões, extensão da análise a padrões de comportamento ao longo do tempo e integração de constructos adicionais em modelos comportamentais. Abordagens mistas que combinem dados de utilizadores com entrevistas ou etnografia poderão proporcionar uma perspetiva mais profunda sobre como os viajantes interpretam e respondem aos sinais de sustentabilidade na prática.

Palavras-chave: *Tecnologias Turísticas Inteligentes, Plataformas Colaborativas, Comportamento Responsável do Viajante, Reconhecimento da Sustentabilidade, UTAUT2, Theory of Change, TripDoodler*

GENERAL INDEX

ACKNOWLEDGEMENTS	vii
ABSTRACT	ix
RESUMO	x
TABLE OF CONTENTS	xii
LIST OF TABLES	xiv
LIST OF FIGURES	xv
LIST OF ABBREVIATIONS	xvi
CHAPTER ONE	1
GENERAL INTRODUCTION	1
1.1. Research background and overview	1
1.2. Research aims and objectives	10
1.3. Significance of the study	10
1.4. Study design	12
1.5. Definition of key terms	14
1.6. Outline of the thesis	15
1.7 References	16
CHAPTER TWO.....	25
STUDY 1: THE ROLE OF SMART, CROWDSOURCED PLATFORMS IN EMPOWERING RESPONSIBLE TRAVELLERS: A THEORY OF CHANGE APPROACH.....	25
2.1. Introduction	25
2.2. Literature Review	27
2.3. Methodology	32
2.4. Applying the Theory of Change to a smart, crowdsourced platform: The case of TripDoodler	36
2.5. Discussion	43
2.6. Conclusion	46
2.7 References	47
CHAPTER THREE	57
STUDY 2: MAPPING TRAVELLER RECOGNITION OF SUSTAINABILITY: AN ANALYSIS OF CROWDSOURCED EVALUATIONS	57
3.1. Introduction	57
3.2. Literature Review	60

3.3. Methodology	64
3.4. Results	67
3.5. Discussion	79
3.6. Conclusion	83
3.7 References	84
CHAPTER FOUR	96
STUDY 3: UNDERSTANDING RESPONSIBLE TRAVELLERS' ENGAGEMENT WITH SMART CROWDSOURCED PLATFORMS: A UTAUT2 APPLICATION	96
4.1. Introduction	96
4.2. Literature Review	98
4.3. Methodology	105
4.4. Results	108
4.5. Discussion	116
4.6. Conclusion	119
4.7. References	119
CHAPTER FIVE	127
GENERAL CONCLUSION	127
5.1. Conclusion	127
5.2. Contributions and implications	128
5.2.1. Theoretical contributions and implications	128
5.2.2. Practical contributions and implications	133
5.3. Limitations	136
5.4. Direction for future research	136
5.5 References	137
APPENDICES	142
Appendix 1. List of questions - semi-structured interviews – ToC framework	143
Appendix 2. List of sustainability parameters by TripDoodler	145
Appendix 3. TripDoodler user questionnaire (adapted from Venkatesh et al., 2012)	149
Appendix 4. Harman Test – assessment of common method bias	151
Appendix 5. Cross-loading analysis of the measurement model	152
Appendix 6. Appendix 6. Parecer da Comissão de Ética da Universidade do Algarve (Ethical Committee Opinion)	153

LIST OF TABLES

STUDY 2

Table 3.1: Conceptual sustainability dimensions derived from TripDoodler's sustainability parameters through thematic clustering	66
Table 3.2: Top ten sustainability parameters acknowledged by travellers in eateries, categorised by sustainability dimensions	69
Table 3.3: Top ten sustainability parameters acknowledged by travellers in accommodations, categorised by sustainability dimensions	71
Table 3.4: Top 10 sustainability parameters acknowledged by travellers in shops, categorised by sustainability dimensions	73
Table 3.5: Top 10 sustainability parameters acknowledged by travellers in other businesses, categorised by sustainability dimensions	75
Table 3.6: Crosstabulation of sustainability certification and user-acknowledged sustainability	78
Table 3.7: Crosstabulation of Google ratings and user-acknowledged sustainability	79

STUDY 3

Table 4.1: Demographic profile of the sample	109
Table 4.2: Primary alternative platforms for finding and rating sustainable tourism businesses	111
Table 4.3: Reliability and convergent validity of measurement model	112
Table 4.4: Discriminant validity of measurement model	113
Table 4.5: Result of structural model and hypothesis testing	114
Table 4.6: Results of total effect	116

LIST OF FIGURES

CHAPTER 1

Figure 1.1: Outline of the thesis	15
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CHAPTER 2

Figure 2.1: Theory of Change framework example	32
Figure 2.2: Theory of Change applied to TripDoodler	35
Figure 2.3: The TripDoodler platform - 5 steps to complete the user rating	39

CHAPTER 3

Figure 3.1: Most frequently acknowledged sustainability parameters in eateries based on traveller ratings	68
Figure 3.2: Most frequently acknowledged sustainability parameters in accommodations based on traveller ratings	70
Figure 3.3: Most frequently acknowledged sustainability parameters in shops based on traveller ratings	72
Figure 3.4: Most frequently acknowledged sustainability parameters in other businesses based on traveller ratings	75

CHAPTER 4

Figure 4.1: Hypothesis research model	105
Figure 4.2: The path analysis results of Structural Equation Modelling.....	115

LIST OF ABBREVIATIONS

API — Application Programming Interface
BI — Behavioural Intention
CMB — Common Method Bias
COVID-19 — Coronavirus Disease 2019
CRISP-DM - Cross Industry Standard Process for Data Mining - Data Mining
EE — Effort Expectancy
EU — European Union
eWOM — Electronic Word of Mouth
FC — Facilitating Conditions
GDP — Gross Domestic Product
HB — Habit
HM — Hedonic Motivation
ICT — Information and Communication Technology
IoT — Internet of Things
IPCC — Intergovernmental Panel on Climate Change
IT — Information Technology
PE — Performance Expectancy
PLS-SEM — Partial Least Squares Structural Equation Modelling
QR — Quick Response
RFID — Radio Frequency Identification
SDG — Sustainable Development Goal
SDGs — Sustainable Development Goals
SI — Social Influence
SPSS — Statistical Package for the Social Sciences
STTs — Smart Tourism Technologies
TAM — Technology Acceptance Model
ToC — Theory of Change
UB — Use Behaviour
UN — United Nations
UNEP — United Nations Environment Programme
UNWTO — United Nations World Tourism Organisation
UTAUT — Unified Theory of Acceptance and Use of Technology
UTAUT2 — Unified Theory of Acceptance and Use of Technology 2
WEF — World Economic Forum
WTTC — World Travel and Tourism Council

CHAPTER ONE

GENERAL INTRODUCTION

1.1. Research background and overview

The travel and tourism industry operates at the intersection of economic opportunity and ecological vulnerability. According to the World Travel and Tourism Council (2024), the sector contributes significantly to the global GDP (Gross Domestic Product), totalling US\$10.9 trillion, or 10% of the global GDP. Plus, the industry supports approximately 357 million jobs worldwide, which is roughly one in every ten jobs created. However, its rapid expansion has heightened pressure on natural ecosystems, local communities and the global climate system (Tanrisever et al., 2024). The industry accounts for approximately 8% of global greenhouse gas emissions, which is primarily due to carbon-intensive transportation, energy consumption in accommodations and unsustainable production and consumption patterns (Lenzen et al., 2018). These impacts are often hidden beneath the surface of visitor experiences, yet they cumulatively contribute to devastating effects, such as biodiversity loss or unequal economic development. These challenges demand policy interventions, industry reform, technology alignment and a fundamental rethinking of the behaviours and values that underpin tourism practices.

In an effort to reorient tourism towards a more sustainable growth, leading global bodies are emerging to the forefront and issuing clear calls. The UN World Tourism Organisation (UNWTO) plays a central role in advancing the United Nations Sustainable Development Goals (SDGs) by positioning tourism as a strategic driver for sustainable development across economic, social and environmental dimensions (World Tourism Organisation & United Nations Development Programme, 2017). Although the 2030 Agenda makes limited explicit references to tourism, the UNWTO has interpreted and aligned its mandate with the SDGs by framing tourism's contribution through five thematic pillars (Berbeka et al., 2024). These pillars include sustainable economic growth; social inclusiveness, employment and poverty reduction; resource efficiency and environmental protection; cultural values and heritage; and mutual understanding, peace and security (World Tourism Organization, 2018). Simultaneously, the Intergovernmental Panel on Climate Change (2022) recognises tourism as highly vulnerable to climate change, as significant risks have already been observed and are projected to intensify even under 1.5°C warming. Destinations

dependent on seasonal assets, such as beaches, coral reefs and snow, face the greatest threats. The World Economic Forum (2025) highlights another reason why urgent action is needed. The institution warns that the time left to prevent irreversible climate tipping points is running out, with tourism caught both as a contributor and as a victim.

The COVID-19 pandemic became a key turning point in how travel is understood and practised today. The global shutdown exposed the deep vulnerability of tourism-dependent economies and illustrated the environmental benefits of reduced travel (Gounder & Cox, 2021). The occurrences also drew urgent attention to long-standing issues in the sector. These include the pressure of mass tourism on destinations and the unstable working conditions faced by workers in the informal tourism economy (Milano & Koens, 2021). As tourism gradually resumes, both travellers and providers appear more aware of sustainability issues, though this shift in attitude is not always reflected in consistent action (Eichelberger et al., 2021; Sigala, 2020).

According to research conducted in the post-pandemic tourism context, there was a noticeable shift in traveller priorities. For instance, according to a research report by Accor, Booking.com and University of Surrey (2025), 83% of travellers say sustainable travel is important, while 75% intend to travel more sustainably in the next 12 months. Additionally, 67% feel inspired to adopt more responsible behaviours after witnessing responsible practices, and 62% believe they are the best version of themselves when they travel more sustainably. Industry adaptations mirror this shift in demand. The study by Rodríguez-García et al. (2023) provides evidence that many large hotel companies are adopting sustainability certifications, and that heightened competition, reputation management and increasingly exigent customer expectations are among the core motivations for this adoption. Likewise, Deng et al. (2024) emphasise that carbon offsetting serves as an ecological and psychological tool for airlines to affect traveller behaviour. These patterns suggest that the tourism sector is gradually shifting its operations and communication strategies towards meeting heightened sustainability expectations.

While the terms "*sustainable tourism*" and "*responsible tourism*" are often used as synonyms, they reflect distinct conceptual foundations and practical aims, particularly in academic and policy contexts (Mihalič, 2016). Sustainable tourism refers to the strategic development and management of tourism that preserves environmental integrity, cultural heritage and economic viability over the long term (Miller & Torres-Delgado, 2023; Palacios-

Florencio et al., 2021; Streimikiene et al., 2021; Mihalič, 2016). This approach focuses on values and emphasises systemic planning, stakeholder cooperation and minimising negative impacts on destinations and host communities. Responsible tourism, on the other hand, focuses more directly on the conduct of individual travellers and the ethical dimensions of their behaviour (Mondal & Samaddar, 2022). The approach also emphasises personal accountability in travel choices, encouraging visitors to act respectfully and consciously towards local communities, cultures and ecosystems (Thi Thanh Nguyen et al., 2023; Cheer et al., 2021; Mihalič, 2016). While the concept supports the objectives of sustainable tourism, responsible tourism places greater emphasis on travellers and their role in promoting equitable benefit-sharing and cultural sensitivity. Therefore, this thesis will use responsible traveller behaviour to capture the behavioural and ethical dimensions of how travellers interact with destinations, communities and the environment.

Progress towards sustainable tourism continues to be challenged by underlying paradoxes. There are still doubts about the trustworthiness and regulation of green labels and eco-conscious marketing, particularly as they become more prevalent. Research has shown that sustainability certifications in tourism are not always precise or reliable. They often lack strong checks and can be used more for marketing than for real improvement (Nygaard, 2023; Rodríguez-García et al., 2023). The problem of greenwashing, where companies appear more sustainable than they are, further weakens trust and makes it harder for genuinely sustainable practices to stand out (Guix et al., 2022).

Travellers engaged in responsible tourism often struggle to align their values with their actions due to conceptual, systemic and behavioural barriers. This disconnect is widely referred to as the “attitude–behaviour gap” (Khan et al., 2024), primarily arising from a limited and fragmented understanding of sustainability. As Salinero et al. (2022) emphasise, the principal focus on environmental aspects often overshadows the economic, social and cultural dimensions. Such a scenario often leaves travellers without a holistic framework to guide their choices. Even when individuals demonstrate concern for sustainability in tourism, their behaviours are constrained by inadequate infrastructure, limited availability of ethical options, higher costs and time pressures (Confente & Scarpi, 2021). Moreover, external influences such as social media and peer behaviour may encourage symbolic rather than substantive engagement (Han et al., 2021). Whereas, the burden of responsibility is often shifted onto individuals despite systemic shortcomings, such as greenwashing and weak policy support (Sharma & Gupta, 2020; Han et al., 2017). The result is a form of internal dissonance,

particularly evident among Generation Z, where a high awareness of consequences fails to translate into consistent action (Salinero et al., 2022). As Juvan and Dolnicar (2021) note, travellers often rationalise unsustainable choices, citing a lack of control, the perceived insignificance of their actions or conformity with others, suggesting that behavioural intention, structural limitations and ingrained habits shape today's responsible traveller behaviour.

For the abovementioned reasons, the process of improving sustainability actions in travel-related contexts requires measures beyond awareness campaigns. Changing what individuals know or believe plays a role, but does not guarantee action. The core challenge lies in affecting what people do. Researchers and practitioners must pay closer attention to the conditions, tools and systems that help individuals make responsible travel choices. As Gössling and Hall (2021) argue, lasting change depends on combining information with strategies that shape behaviour at the point of decision-making. Behavioural change remains the key missing link in many responsible efforts. Without it, policies, certifications and education may have a limited effect.

In recent years, numerous scholars and industry professionals have begun to investigate how technology can help bridge this gap. Smart tools and digital platforms are offering new ways to guide, inform and impact traveller choices in real-time (Gu & Shakaraliyeva, 2025; Ni et al., 2025; Zhang & Bin, 2024; Fennell, 2020; Loureiro, 2019). These technologies are creating practical opportunities to move beyond awareness and support concrete action. The following section examines how such tools contribute to the advancement of responsible traveller behaviour and why this area deserves deeper attention.

Technology is playing a crucial role in shaping how travellers behave, particularly through what scholars refer to as smart tourism technologies (STTs). STTs encompass digital tools and systems that collect, process and deliver real-time information to enhance decision-making, improve service quality and support more sustainable travel outcomes (Elshaer & Marzouk, 2022; Zhang et al., 2022; Huang et al., 2017; Gretzel et al., 2015). These technologies span a wide range, from location-aware mobile applications and AI-powered itinerary planners to Internet of Things (IoT) devices embedded in accommodation infrastructure (Dhusnic Infant & Priyanka, 2025; García-Madurga & Grilló-Méndez, 2023). Many businesses now utilise smart sensors to monitor energy and water usage (Tiwari et al., 2022), while cities implement data-driven visitor management systems to reduce congestion and protect fragile heritage sites (Zubiaga et al., 2019). These tools help managers to make informed decisions using data,

providing travellers with personalised suggestions that align with their interests and sustainability values.

Importantly, STTs operate more than merely providing information. They intervene at the moment when choices are made. For example, navigation apps recommend walking routes over car travel (Sia et al., 2023). Hotel booking platforms can flag properties with strong environmental practices (Arzoumanidis et al., 2022). Some cities utilise real-time digital signage to direct visitors away from crowded areas, thereby helping to disperse foot traffic and reduce environmental pressure (Viñals et al., 2024). These examples illustrate how technology can encourage travellers to adopt actions with lower social and ecological impacts (Lee et al., 2021). By embedding sustainability into the digital layer of the travel experience, STTs can offer practical tools to make responsible choices easier and more accessible.

Alongside these developments, crowdsourcing and user-generated content have become central features of the tourism information ecosystem. Today, most travellers consult online reviews, ratings, photos and social media posts before making travel decisions (Sánchez-Franco & Rey-Tienda, 2024). This shift in information power, from formal institutions to everyday users, has changed how travellers assess quality, trustworthiness and relevance (Nguyen & Tong, 2022). Platforms such as TripAdvisor, Google Maps, Airbnb and Booking.com aggregate millions of data points that other travellers share, creating a collective knowledge base that others rely on. These peer-driven systems carry significance because they reflect lived traveller experiences (Wang et al., 2021) and help establish social norms (León et al., 2025). When users see repeated endorsements of sustainable practices, such as avoiding single-use plastics, supporting local artisans or staying in energy-efficient properties, they are more likely to consider those practices attractive and worth emulating (Han et al., 2021; Han et al., 2018). Likewise, user-generated input of sustainability practices serves as social proof that guides others to make more informed and values-driven decisions.

In response to this shift, many digital platforms have begun integrating sustainability-specific data into their offerings. Platforms like Booking.com now allow users to filter options by eco-certifications, while others highlight climate-friendly practices, and emerging models rely on community ratings of environmental and social responsibility (Arzoumanidis et al., 2022; Foris et al., 2020). This trend reflects a broader shift towards participatory governance in tourism. A scenario where travellers consume information and actively contribute to shaping

collective knowledge. The following paragraphs turn to one such platform, TripDoodler (Agapito et al., 2023), which places crowdsourced sustainability data at the centre of its model.

TripDoodler (app.tripdoodler.com) represents a new generation of digital platforms that prioritise sustainability at their core. Developed in Denmark, the platform empowers travellers to find, rate and share the sustainability practices of businesses, including places to eat, drink, shop and stay (TripDoodler, 2024). Unlike conventional rating and review platforms that focus mainly on comfort, service or location, TripDoodler centres its feedback mechanism around sustainable tourism information. In fact, the platform addresses a persistent and well-documented gap in the tourism sector. Many travellers report sustainability concerns but lack access to credible, timely and actionable information when making their travel decisions (Power et al., 2024; Tölkes, 2018; Penz et al., 2017). As previously discussed, existing platforms often focus on showcasing certification schemes or static labels. However, the challenge is that they do not adapt to real-time context or reflect user experiences. TripDoodler aims to intervene at this critical point. The platform helps users evaluate businesses against sustainability parameters aligned with the SDGs, covering key facets such as waste reduction, water conservation and community engagement. In return, this approach encourages businesses to become more transparent and accountable in their operations (Purnomo & Purwandari, 2025; Agapito et al., 2023).

Unlike platforms that display sustainability labels without disclosing their underlying data (Arzoumanidis et al., 2022), TripDoodler uses a transparent, participatory approach. The platform invites travellers to contribute sustainability information and gives them tools to validate what others have shared. The platform encourages participation from everyday users who may not have expert knowledge by simplifying contribution through structured prompts, visual cues and plain-language criteria. In doing so, TripDoodler promotes a more democratic approach to sustainability data and attempts to make responsible traveller behaviour more accessible (Tripdoodler, 2024; Agapito et al., 2023). As a case study, TripDoodler is both timely and relevant. The platform offers a clear example of how smart, crowdsourced technologies might support responsible behaviour change in travel contexts. The platform is still evolving, providing valuable access to research at the early stages of platform development in this subject matter. At the same time, its global scope and grounded parameter structure make it applicable to broader discussions on responsible travel, digital participation and sustainability communication.

The prevalent theoretical frameworks used in this thesis to understand how smart, crowdsourced technologies can support responsible traveller behaviour are the Theory of Change (ToC) (Connell & Kubisch, 1998) and the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) (Venkatesh et al., 2012). ToC provides a structured approach to understanding how and why digital travel platforms can achieve their intended goals (Michelini et al., 2020). This enables researchers and practitioners to map change logic by identifying the required resources, defining key activities, outlining expected outputs and linking these to short-, medium- and long-term outcomes (Warnholtz et al., 2020). In tourism, the ToC framework helps explain how platforms like TripDoodler structure their features to support responsible traveller behaviour. Instead of assuming that promoting sustainability will lead to impact, the framework traces how specific elements, such as guided sustainability parameters, peer-generated ratings, and user participation, create the conditions that may lead to the intended behavioural outcomes. By making these pathways explicit, the ToC deepens the understanding of how different elements connect and where challenges or opportunities may arise. By using this preliminary reflection with ToC, this thesis opens space to proceed with assessing empirically to what extent travellers recognise that companies implement specific sustainability parameters within collaborative and smart platforms such as the one under analysis.

Alongside this, the UTAUT2 provides a framework for exploring how travellers adopt and continue to engage with digital platforms. Developed by Venkatesh et al. (2012), UTAUT2 includes constructs such as Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation, Price Value and Habit. These dimensions help understand why users choose to adopt (or reject) a technology and what drives continued engagement. Applying UTAUT2 in this research helps identify which platform features matter most to users, what motivates them to rate businesses and what barriers limit adoption. Although UTAUT2 has been employed in tourism technology research (Timur et al., 2023; Yin et al., 2023; Gupta & Dogra, 2017), researchers are yet to apply it to platforms designed to support or understand responsible traveller behaviour. These two theories can provide a multi-layered perspective on how platforms like TripDoodler can contribute to their intended behavioural change. The ToC can frame these types of platforms as a form of behavioural interventions with an intended pathway of change, while UTAUT2 explains the user-level drivers that enable or constrain participation.

Although the use of digital tools in travel contexts has grown substantially, researchers have not sufficiently theorised how these platforms structure, facilitate or constrain responsible traveller behaviour. Much of the literature on tourism technologies draws heavily on functionalist models, such as the Technology Acceptance (TAM) Model (Davis, 1989) and the original Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), which frame users primarily as passive adopters who respond to perceived usefulness, ease of use or social influence. Scholars have yet to examine in a structured and measurable manner how smart technologies are designed to support responsible behaviour (Hu & Li, 2023; Shafiee et al., 2022; Arenas et al., 2019), including how their features and framing shape opportunities for participation. For instance, while digital tourism environments increasingly claim to support sustainability goals, researchers continue to prioritise adoption and performance-related outcomes rather than examining how these systems impact learning, engagement or long-term behavioural change (Balakrishnan et al., 2021; Andersson et al., 2018). Phi et al. (2016) argue that the dominance of outcome-focused evaluation approaches in tourism innovation research has created a "black box" scenario, where little is known about the causal mechanisms underlying success or failure. In this context, the absence of planning-oriented frameworks, such as the ToC, reflects a broader neglect of intentional, process-driven methodologies that could make these internal dynamics more explicit and actionable (Montano et al., 2023; Michelini et al., 2020). Assessing whether smart tourism platforms contribute meaningfully to sustainability transitions or merely digitise existing consumption patterns remains challenging without this conceptual grounding. Moreover, recent critiques emphasise the need to look beyond techno-centric assumptions and adopt more reflective, user-centred models that consider tourism a space for digital mindfulness, ethical choice and critical engagement (Koo et al., 2023; Stankov & Gretzel, 2021; Stankov & Filimonau, 2020).

Beyond acceptance theory, a second area of concern is how sustainability is conceptualised and operationalised. Despite the growing visibility of sustainability in tourism discourse, research remains predominantly supply-oriented, centred primarily on provider claims, certifications and business strategies, while giving comparatively limited attention to travellers' preferences, behaviours or decision-making processes (Pham et al., 2025; Font & McCabe, 2017). Even when studies address traveller perceptions, they rely on attitudinal or intention-based survey methods, with little engagement with actual behaviour (Confente et al., 2024; Viglia et al., 2024). Most scholars treat user-generated reviews as proxies for trust or booking intent rather than as behavioural indicators. However, a small but growing body of

work, including D'Acunto et al. (2024), Kim et al. (2021), and Mariani and Borghi (2021), has begun to recognise green eWOM as indicative of travellers' environmental priorities. In particular, Kim et al. (2021) suggest how environmentally framed reviews can shape travel behaviour, underscoring the value of analysing such data to understand what travellers actually notice, acknowledge or ignore. However, only limited studies have explored how travellers might co-produce knowledge, hold tourism providers accountable or impact social norms through peer-to-peer interaction (Nguyen et al., 2024; Gu & Zhu, 2023). Consequently, the participatory potential of crowdsourced platforms in advancing sustainability remains under-theorised and empirically neglected.

This theoretical underdevelopment also extends to motivation. While platforms like TripDoodler invite users to co-create sustainability data, researchers have not adequately explored why travellers engage in such practices. Studies of digital participation in tourism have primarily focused on convenience, entertainment or informational utility, providing limited insight into altruistic, community-based or value-driven motivations (Cheung et al., 2022; Cheung & Lee, 2012). Researchers have periodically applied behavioural frameworks, such as the Theory of Planned Behaviour or the Norm Activation Model, to the sustainable tourism context (Han, 2021). However, these frameworks have rarely been applied to understand participation within smart, crowdsourced platforms. In this respect, UTAUT2 provides a more comprehensive lens, as it captures multiple technology-specific constructs, including Hedonic Motivation, Social Influence, Facilitating Conditions and Habit, which are highly relevant to user behaviour in these environments (Chuang et al., 2018). However, these constructs remain underexplored in tourism research where sustainability is the main concern. Consequently, we still do not know which features, such as transparency, feedback mechanisms, recognition or ease of contribution, make users more likely to share sustainability input or act on peer insights.

By following a thesis by papers structure (three studies), this thesis contributes to closing these research gaps by pursuing three interconnected objectives, which are discussed in the next subsection.

1.2. Research aims and objectives

This research aims to understand the role of smart, crowdsourced platforms in empowering responsible travellers, using the case of TripDoodler. The research addresses key gaps in the literature on tourism, sustainability and technology. These include a lack of research on how platform features and underlying assumptions are structured to enable responsible behaviours, limited insight into travellers' recognition of sustainability practices across business types when using such platforms, and an insufficient understanding of the psychological factors that shape user motivation to adopt and use these technologies. Previous studies have typically focused on business-led sustainability efforts or general patterns of technology use. In contrast, this research foregrounds the traveller's perspective and explores how users contribute to sustainability through participation, informed choices and interaction with platform features. Grounded in a combination of methods, the thesis draws on conceptual modelling, survey-based data collection and statistical analysis, including structural equation modelling, with results presented across three interrelated studies. Accordingly, the research aims to fulfil the following objectives:

1. To examine TripDoodler through the lenses of Theory of Change, identifying the platform's mechanisms, assumptions and interventions that can contribute to responsible traveller behaviour (Study 1);
2. To explore the sustainability practices travellers most frequently acknowledge across different types of businesses using platforms like TripDoodler (Study 2);
3. To examine the psychological factors underpinning travellers' adoption and use behaviour on smart, crowdsourced sustainability platforms, with a focus on TripDoodler (Study 3).

1.3. Significance of the research

This research addresses key theoretical gaps at the intersection of sustainable tourism, behavioural change and smart technology adoption. Tourism represents a highly complex social phenomenon in which behaviours emerge from interconnected cultural, environmental and economic factors (Sharpley, 2018). Existing evaluation methods often fail to capture these non-linear dynamics (Gertler et al., 2016). Therefore, the thesis introduces the ToC framework to tourism technology research, offering a more sophisticated way of understanding how digital

interventions aim to impact traveller behaviour (Inmor et al., 2025). ToC provides a structured method for mapping the assumptions, activities and outcomes needed for responsible travel decisions to emerge (Montano et al., 2023). This theoretical grounding, as also discussed by Inmor et al. (2025), enables a clearer view of how digital platforms can actively move beyond awareness-raising to drive behavioural change.

The research also addresses important gaps in understanding how travellers recognise and respond to sustainability practices in real-world contexts. Existing studies largely focus on provider claims (Waligo et al., 2013), subjective reviews (Filiari et al., 2021) or intention-based surveys (Viglia et al., 2024). These approaches often overlook the traveller's perspective and fail to capture criteria-based evaluations in natural settings. Crowdsourced platforms focused on sustainability, such as TripDoodler, offer a novel opportunity to collect systematic and objective traveller feedback based on specific criteria-based parameters across diverse businesses. Analysing these data advances the theoretical understanding of how eco-conscious travellers evaluate sustainability actions and how external factors, such as sustainability certifications and Google ratings, impact these perceptions. This work moves beyond broad attitudinal models, as critiqued by Viglia et al. (2024), and introduces a more empirical, behaviourally grounded approach to studying sustainable practices of businesses in travel contexts.

Technology adoption theories have provided strong foundations for understanding how users interact with digital tools. However, models such as TAM and the original UTAUT have prioritised utilitarian outcomes like ease of use and performance benefits (Mogaji et al., 2024; Venkatesh et al., 2003), resulting in a critical gap in explaining how crowdsourced, value-driven platforms operate. To the best of the author's knowledge, this thesis applies the UTAUT2 to a sustainability-oriented platform for the first time in tourism research. UTAUT2 extends previous frameworks by incorporating factors such as Hedonic Motivation, Habit and Social Influence. These are crucial elements in the context when participation is driven by community values rather than convenience alone. The research investigates these dimensions and constructs a more reflective, user-centred model for understanding traveller adoption and usage with smart sustainability platforms.

Practically, the findings provide actionable insights for platform developers, businesses and destination management organisations. The analysis of traveller recognition patterns reveals which sustainability practices travellers most value and how credibility indicators, such

as certifications and online ratings, impact their perceptions. These insights can inform the design of smarter, more transparent digital platforms that aim to empower responsible travellers. Businesses can align their practices and communication strategies with what travellers actually notice and reward rather than relying solely on formal sustainability certifications. Destination managers and policymakers can leverage crowdsourced sustainability data to monitor progress, promote sustainability practices and design interventions that better resonate with traveller values.

Beyond its academic and practical contributions, the thesis seeks to address broader societal challenges within the tourism sector. The research encourages travellers to play a more active role in identifying and promoting sustainability practices, supporting a more participatory and democratic model of responsible tourism. The thesis highlights the potential of smart, crowdsourced platforms to operationalise responsible traveller behaviours and to complement traditional top-down sustainability initiatives. In doing so, the approach contributes to advancing global sustainability goals, particularly those related to the United Nations Sustainable Development Goal #8, Target 8.9: “By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products.” Additionally, the research supports several dimensions of SDG 12: Responsible Consumption and Production, especially Target 12.6, which encourages businesses to adopt sustainable practices and integrate sustainability information into their reporting cycles; Target 12.8, which focuses on ensuring that people have access to information and awareness for sustainable lifestyles; and Target 12.b, which calls for the development of tools to monitor sustainability impacts in tourism (United Nations, Department of Economic and Social Affairs, 2023).

1.4. Thesis design

This thesis employs a combination of methods, guided by a pragmatist paradigm, and progresses through three distinct yet interconnected studies. Each study builds upon the previous one to deepen the understanding of the role of smart, crowdsourced platforms in empowering responsible travellers.

The first study is focused on building a foundation for understanding the case of TripDoodler. A descriptive, theory-driven case study approach was adopted to conceptualise the ToC behind the platform's intervention model. Data collection began with semi-structured interviews conducted with the platform's founder and a group of active users. Based on these insights, a participatory workshop was organised where stakeholders worked together to develop the ToC conceptual framework. This process mapped TripDoodler's long-term goals, key activities, outputs, outcomes and underlying assumptions. This activity helped clarify how the platform's design features seek to support responsible traveller behaviour and established the conceptual grounding for the next studies of the research.

Building on this foundation, the second study leveraged the existing TripDoodler database to examine travellers' recognition of sustainability practices across businesses. The dataset comprised 2,446 traveller ratings covering 1,716 businesses. Sustainability parameters were categorised into nine thematic dimensions aligned with environmental, social and economic sustainability pillars. After completing a detailed data cleaning process, the research used Microsoft Power BI to visualise traveller responses across different types of businesses and sustainability dimensions, according to the CRISP-DM (Cross Industry Standard Process for Data Mining - Data Mining) Methodology (Bokrantz et al., 2024). The study then conducted statistical testing to examine variations in sustainability recognition based on business type, as well as the presence of credibility indicators such as sustainability certifications and Google ratings. This study offered empirical insights into which sustainability practices travellers most frequently acknowledged and how credibility indicators impacted their input.

The third study focused on analysing the behavioural and technological factors impacting travellers' adoption and usage of TripDoodler. A structured questionnaire was developed based on the UTAUT2 and adapted to the platform's sustainability context. The survey was distributed to TripDoodler's registered users and yielded 203 valid responses. Data analysis followed a two-stage process. SPSS software (version 28.0.1.0) was used to generate descriptive statistics about the sample, and SmartPLS 4 was employed to perform structural equation modelling (PLS-SEM). The study evaluated the measurement model for reliability and validity and tested the structural model to uncover the psychological drivers behind traveller participation on smart, crowdsourced platforms.

1.5. Definition of key terms

Responsible Traveller Behaviour: Responsible traveller behaviour refers to the conscious and value-driven conduct of individuals who seek to minimise the negative social, cultural, economic and environmental impacts of their travel while maximising positive contributions to destination communities. This behavioural orientation involves informed decision-making, cultural sensitivity and a commitment to fairness and respect. Travellers adopting this approach actively support local livelihoods and contribute to the preservation of natural and cultural heritage (Weeden, 2013).

Smart tourism technologies: Smart tourism technologies are digital tools and systems that help travellers, businesses, and destinations connect and create more personalised, efficient and meaningful travel experiences. These technologies include mobile apps, location-based services, augmented reality, cloud computing and social media platforms. They make it easier for travellers to navigate, book services, find information and communicate during their trips. At the same time, they help businesses customise their offerings, improve service and create stronger relationships with travellers (Neuhofer et al., 2015).

Crowdsourced platforms in tourism: Crowdsourcing platforms in tourism are digital systems that engage large and diverse groups of individuals to contribute knowledge, ideas, services or resources, enabling businesses and destinations to co-create, innovate and enhance value through collective participation. Examples include TripAdvisor for reviews and ratings, Wikitravel for collaboratively created travel guides and Airbnb for peer-to-peer accommodation offerings (Füller et al., 2016).

Theory of Change: A Theory of Change (ToC) is a structured framework that explains how and why a project is expected to achieve its outcomes by mapping the causal links between activities, outputs, outcomes and impacts. Developed through a participatory and iterative process, it encourages reflection on the mechanisms of change and contextual influences. A robust ToC combines programme theory, which identifies causal mechanisms, and implementation theory, which addresses the operational requirements for success (Weiss, 1998).

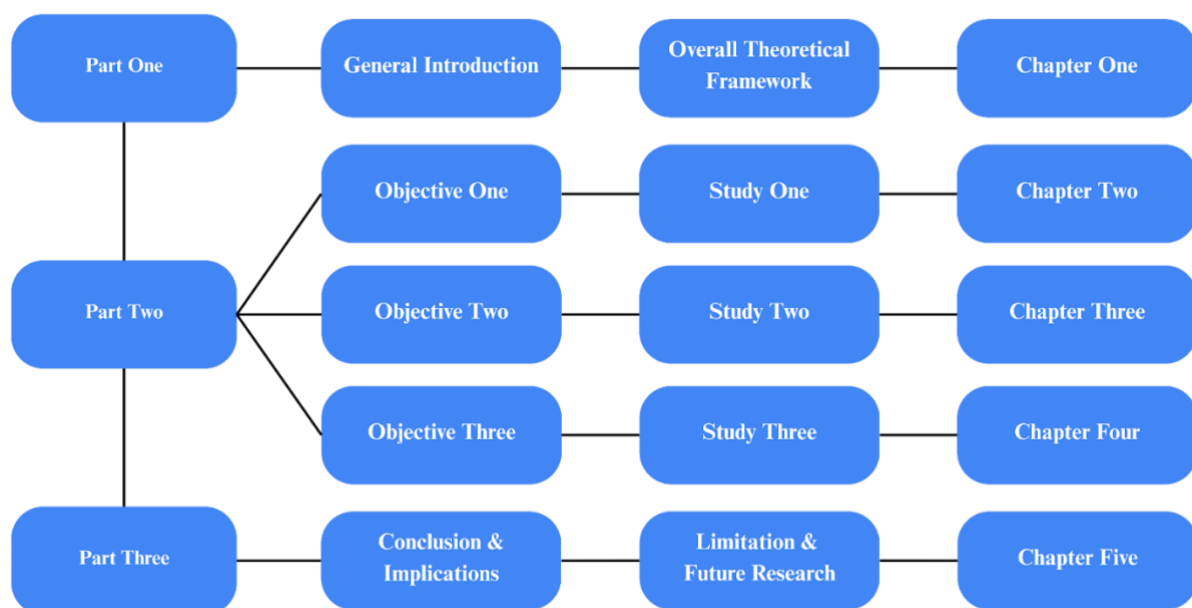
UTAUT2: The Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) explains how consumers accept and use technology by adding Hedonic Motivation, Price Value and Habit to the original UTAUT model. The theory builds on Performance Expectancy, Effort

Expectancy, Social Influence and Facilitating Conditions, while recognising that age, gender and experience shape these relationships. UTAUT2 provides a stronger and more practical understanding of the factors that drive Behavioural Intention and technology use in consumer settings (Venkatesh et al., 2012).

1.6. Outline of the thesis

The structure of this thesis is organised into three main parts, as showcased in Figure 1.1. Part One provides a general introduction and theoretical foundation, including the research background, aims and objectives, the significance of the research, the research design and definitions of key terms. Part Two presents the three research studies developed to address the specific objectives outlined in Chapter One. Each study stands as an independent research article structured to meet publication standards. Part Three synthesises the main findings and discusses their theoretical and practical implications, followed by a reflection on the study's limitations and proposes directions for future research.

Figure 1.1: Outline of the thesis



Source: Own elaboration.

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CHAPTER TWO

STUDY 1: THE ROLE OF SMART, CROWDSOURCED PLATFORMS IN EMPOWERING RESPONSIBLE TRAVELLERS: A THEORY OF CHANGE APPROACH

Abstract

This study examines how smart, crowdsourced platforms can empower responsible travellers, focusing on the case of TripDoodler, an online platform that collects and displays user-generated sustainability ratings of businesses. Through a case study, the research applies a Theory of Change (ToC) framework to map the platform's intervention model, including its inputs, activities, outputs and intended outcomes. Stakeholder interviews and a participatory workshop inform the development of this framework. They offer insight into how platform features such as guided user ratings and structured sustainability parameters are designed to engage users and enhance visibility of sustainability practices. The study highlights how platform architecture, user motivations and underlying behavioural assumptions jointly shape the conditions for enabling responsible behaviours of travellers. The research contributes to theory by introducing ToC as a structured approach for understanding smart tourism interventions. Practical insights emerging from this work can support destination managers and tourism professionals aiming to design more participatory and transparent sustainability tools.

Keywords: *Smart Tourism, Responsible Traveller Behaviour, Crowdsourced Data, Theory of Change, Case Study*

2.1. Introduction

Digital innovations are steadily transforming the tourism industry. Among the most significant changes is the rise of smart tourism, which builds on earlier digital tools to offer more responsive and data-driven contributions (Zhang et al., 2022). Within this context, crowdsourced platforms have also emerged as pivotal resources, facilitating the exchange of open data and socially shared knowledge (Leal et al., 2020). These smart, user-driven platforms

leverage advanced information technologies to provide travellers with real-time, personalised decision-making tools (Kong et al., 2019). As these resources become more accessible, travellers are also changing. Many are now more aware of how their choices affect the environment and local communities; they want their travel behaviours to reflect their personal values (Hernández-López et al., 2023). According to Booking.com (2024), three in four travellers say they are interested in making more responsible decisions while travelling.

However, despite increasing awareness and interest, the attitude–behaviour paradox remains a persistent concern in tourism. Many travellers express a desire to act responsibly but often do not follow through in practice (Viglia & Acuti, 2023; Font & McCabe, 2017). This gap stems from several factors, which include the complexity of sustainability information (Bučar et al., 2019; Gössling, 2017), the proliferation of eco-labels that confuse rather than guide consumer choices (Moon et al., 2016) and the limited availability of user-friendly tools to support informed decision-making (Booking.com, 2024). In response to these challenges, smart tourism technologies are increasingly seen as having the potential to support more responsible behaviour of travellers (Inmor et al., 2025). One such platform is TripDoodler (app.tripdoodler.com), a smart, crowdsourced tool that relies on user-generated content to identify and highlight the sustainability efforts of businesses. Unlike traditional certification systems that rely on third-party validation (Arbelo et al., 2025), TripDoodler employs a peer-based model informed by crowdsourced input. To explore how platforms like TripDoodler might contribute to shifts in traveller awareness and decision-making, it is useful to explore frameworks that trace intended pathways of change.

Tourism is considered a prominent example of social interventions in complex settings (Minnaert & Schapmans, 2009). Understanding the intended effects of such interventions requires engagement with frameworks that capture the multiple processes, actors and assumptions involved (Roodbari & Olya, 2024). One such approach is the Theory of Change (ToC), which serves as both a participatory process and a conceptual tool to trace how specific actions are expected to lead to desired outcomes (Montano et al., 2023; Taplin et al., 2013). ToC enables researchers and practitioners to map assumptions, define intermediate changes and reflect on the pathways that underpin broader behavioural shifts. Researchers have widely applied ToC in fields like public health and development, but its use in tourism, especially in the context of smart, digital platforms, remains limited.

Building on this foundation, the present study uses the ToC framework to examine the TripDoodler platform. A ToC pathway is constructed to explore how the platform's core components, user interactions and design features align with the intended behavioural outcomes. Although the platform is designed to promote responsible tourism, effectiveness may vary across contexts and users. Several factors impact this, including how easily users can find information, how clearly the content is presented, the motivation of users to participate and the overall accessibility of the platform. These dimensions are well established in technology adoption and use behaviour research, including the UTAUT2 model (Venkatesh et al., 2012). Accordingly, the study focuses on how such technologies are conceptualised to support responsible behaviour, without aiming to measure the behavioural impact.

Based on this, the research addresses two questions: (a) How are smart, crowdsourced platforms such as TripDoodler conceptually structured to articulate their intended role in contributing to the responsible behaviour of travellers? and (b) What mechanisms, assumptions and interventions underpin the intended behavioural pathway of such platforms, as represented through a Theory of Change conceptual framework?

To address these questions, the literature review focuses on four key areas: smart tourism, crowdsourced platforms, responsible traveller behaviour and the ToC. This provides the foundation for the study's conceptual framework. The methodological approach is presented, following a ToC-informed case study that investigates the platform's internal mechanisms, intended outcomes and the conditions under which it seeks to operate. The final sections outline the theoretical and managerial implications of the study. These include insights for businesses and destination management organisations, particularly concerning participatory sustainability tools and data-informed decision-making. The paper concludes with directions for future research on behaviour-oriented design in the context of smart tourism technologies.

2.2. Literature Review

2.2.1 Understanding smart tourism and technologies

The evolution of traditional e-tourism has paved the way for a modern concept called smart tourism, emphasising technology-first innovations that promote open data interchange and social knowledge exchange (Pencarelli, 2020). The concept of smart tourism blooms from

that of smart cities (Rodrigues et al., 2023) and involves the integration and interaction of multiple stakeholders using information and communication technology (ICT) to augment and co-create real-time and personalised tourism experiences (Leung, 2022; Buhalis & Amaranggana, 2015; Gretzel et al., 2015b).

Gretzel et al. (2015a) define smart tourism as a concept where destinations collaboratively seek innovative methods to gather and utilise data. This data is sourced from various elements, including physical infrastructure, social interactions, governmental and organisational inputs, human activities and thoughts. This approach utilises advanced technologies to transform data into enhanced experiences and deliver meaningful business value. The focus remains on driving efficiency and sustainability alongside enriching the travel experience. In other words, smart tourism is characterised by the establishment of intelligent and meaningful tourism relationships (Leung, 2022), improved resource management (Femenia-Serra & Neuhofer, 2018), enhanced destination competitiveness (Cimbaljević et al., 2018) and holistic and sustainable tourism development (Gursoy et al., 2024; Sedarati et al., 2022; Bastidas-Manzano et al., 2021; Femenia-Serra et al., 2019; Gretzel et al., 2015a).

Cloud services and computing (such as Dropbox and crowdsourcing platforms), the Internet of Things (IoT) (including smart sensors and RFID devices) and the End-User Internet Service System (such as smartphones) formulate the fundamental technologies in the smart tourism ecosystem (Novera et al., 2022; Bulti et al., 2019). Such Smart Tourism Technologies (STTs) enable tailored, enhanced tourism experiences across the five dimensions of a tourism destination, including transportation, accommodations, gastronomy, attractions and ancillaries, as well as throughout all phases of travel, including prospective, active and reflective phases (Buhalis & Amaranggana, 2015).

2.2.2. Crowdsourcing data - types and platforms

The term crowdsourcing was introduced by Howe (2006) through the combination of the words "crowd" and "outsourcing." Crowdsourcing describes a method of delegating tasks to a large, undefined group of individuals through a specialised IT-based platform (Zhang et al., 2021; Blohm et al., 2018). Blohm et al. (2018) categorise crowdsourcing platforms into four distinct types: Microtasking, Information Pooling, Broadcast Search and Open Collaboration. Microtasking involves breaking a complex task into smaller, repetitive

components that many individuals can complete. This approach is particularly effective for data classification and short text translation. Information Pooling brings diverse perspectives and opinions together for a more comprehensive understanding. Researchers have recognised this method as a valuable market evaluation and study tool. Broadcast Search enables users to solve problems by submitting ideas and solutions from a broad pool of contributors. This model proves effective when addressing complex challenges. Open Collaboration combines the expertise and insights of various contributors to co-create solutions, often as part of a collective effort. Developers use this model in open-source software projects (Blohm et al., 2018).

Understanding the functionality of these crowdsourced platforms is essential to examining how and why users intend to contribute. Two main factors shape user engagement in crowdsourcing: intrinsic motivation and extrinsic motivation (Yang et al., 2020; Michail & Gavalas, 2019). Intrinsic motivation arises from internal drivers, including personal satisfaction, curiosity and the desire to engage socially. Extrinsic motivation stems from external incentives, including recognition and tangible rewards.

This foundation has become particularly relevant in tourism, where smart crowdsourcing platforms, such as TripAdvisor, Expedia, Yelp and Booking.com, are shaping traveller intentions and behaviour (Van der Zee & Bertocchi, 2018). These platforms create a digital space where users voluntarily share feedback (Leal et al., 2020). Travellers use peer-generated ratings and reviews to inform their choices (Guo et al., 2021; Zhu et al., 2020; Filieri et al., 2015), which leaves a digital footprint. Tourism applications utilise this footprint to provide personalised recommendations and enhance the travel experience. Platforms such as TripDoodler (Agapito et al., 2023) now refine this model by aggregating reviews that showcase the sustainability practices of businesses. In doing so, they attempt to promote more responsible traveller behaviour.

2.2.3. Bridging the challenge of responsible traveller behaviour

Krippendorff (1987) introduced the concept of responsible tourism in the 1980s. He emphasised the need for the tourism industry to better align with environmental concerns and social responsibility. Since then, researchers such as Ting et al. (2020), Mihalič (2016), Goodwin (2011), and Frey and George (2010) have continued to emphasise the role of tourism stakeholders in not only mitigating negative impacts but also enhancing the positive economic,

environmental and socio-cultural outcomes of tourism. These three dimensions form the foundation of sustainable tourism development (UNEP & UN Tourism, 2005).

Responsible tourism shares strong conceptual and practical ties with related approaches such as ecotourism and sustainable tourism. However, scholars have pointed out the absence of a universally agreed-upon definition for these overlapping concepts (Bausch et al., 2022; Manente et al., 2014). Mihalič (2016) distinguished sustainable and responsible tourism using the 3-A model. In this framework, stakeholders first identify sustainability issues (Awareness), then translate them into strategic objectives (Agenda), and finally carry them out (Action). According to this model, sustainable tourism occurs at the Agenda stage, whereas responsible tourism occurs in the Action phase. This aligns with Goodwin's (2011) claim that responsible tourism emphasises the responsibility of all actors to promote tourism sustainability through their own actions and decisions.

Travellers, on the other hand, represent one of the most essential stakeholders in tourism. Their behaviour at destinations can significantly reduce negative impacts (Shen et al., 2020). Weeden (2011) defines responsible travellers as those who respect local customs, understand their travel-related impacts and support local economic development. However, despite the importance of such behaviour, not all travellers act responsibly. Juvan and Dolnicar (2014) note that travellers often care about the environment and do not wish to harm it; nevertheless, the very act of going on vacation can lead to environmental damage. Several studies have explored this persistent attitude–behaviour gap in tourism, often referred to as the intention–action gap. Sadiq et al. (2022) focused on eco-friendly hotel stays. Martins et al. (2021) examined public transport use, while Mkono and Hughes (2020) investigated eco-guilt and shame. Tölkes (2018) analysed the role of sustainability communication in addressing this gap. More recently, Power et al. (2024) conducted a longitudinal study on judgment-based approaches to sustainability paradoxes in tourism. In response to this intention–action gap, scholars have increasingly examined the role of digital technologies in shaping and supporting more responsible traveller behaviour.

Recent literature highlights how such technologies can inform, prompt and guide travellers toward more sustainable choices (Loureiro & Nascimento, 2021). Empirical studies have explored a range of tools, including Big Data analytics (Blanco-Moreno et al., 2024), virtual reality simulations (Talwar et al., 2022), social media platforms (Îştin, 2020; Shen et al., 2020) and platform-based interventions (Naramski, 2020). Within this context, smart

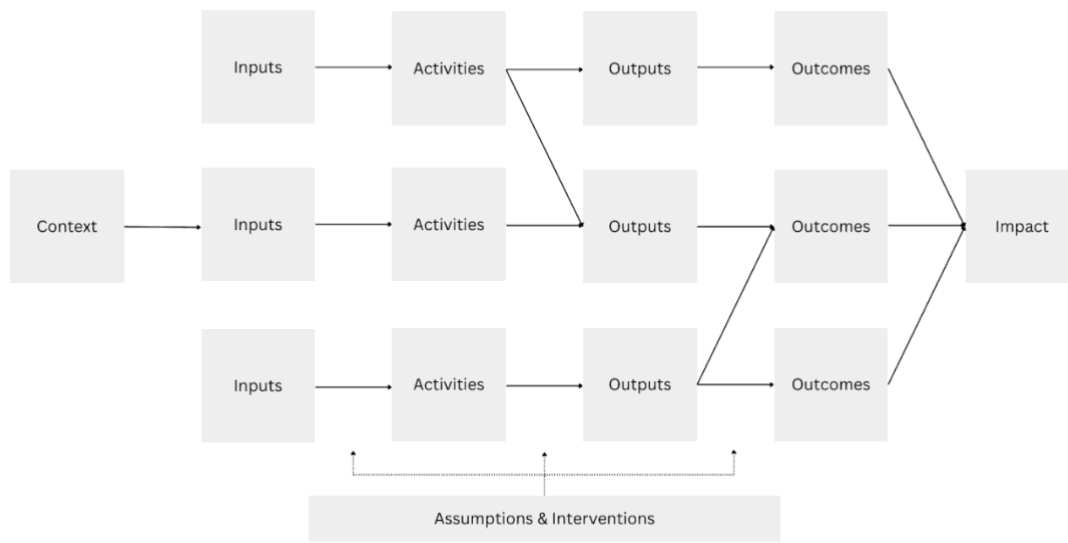
tourism technologies (STTs) are increasingly seen as practical enablers of responsible behaviour. Research suggests that STTs help translate sustainable intentions into action by providing real-time information, personalised suggestions and feedback during travel (Inmor et al., 2025; Kiatkawsin et al., 2020; Shen et al., 2020). These functions may lower barriers such as a lack of awareness or perceived inconvenience. Nonetheless, given the limited research in this area (Inmor et al., 2025; Zheng et al., 2024; Shen et al., 2020), further investigation is required to understand the key factors driving STTs' ability to promote responsible traveller behaviour.

2.2.4. Theory of Change in evaluating the impact on behaviour

The ToC approach was introduced to enhance evaluation processes in comprehensive community initiatives (Connell & Kubisch, 1998). This theory gained prominence through the work of Carol Weiss (1995) with the Aspen Institute and the Roundtable on Community Change (Anderson, 2005). The primary goal was to assess and evaluate the impact of community initiatives on both interim and long-term results while also understanding the causal mechanisms leading to these outcomes (Taplin et al., 2013; Weiss, 1998). Unlike Complexity Theory (Kernick, 2006) or the Theory of Planned Behaviour (Ajzen, 1991), ToC is not a sociological or psychological theory, but a pragmatic framework that explains how interventions drive change (De Silva et al., 2014).

From an application perspective, the ToC process involves developing the theory through group sessions led by a facilitator or by gathering diverse perspectives via personal interviews. The product of this process is typically a visual diagram that outlines how and why a specific goal will be achieved (Reinholz & Andrews, 2020). The approach begins by identifying long-term goals and then tracing backwards to map out the necessary conditions and causal relationships (Vogel, 2012). This process facilitates the selection of interventions that meet these preconditions, thereby enhancing the understanding of the linkages between resources, activities, outputs, outcomes and long-term goal achievements, as illustrated in Figure 2.1. Weiss (1998) identifies two critical components of ToC: programme theory and implementation theory. The former uncovers causal links between project mechanisms and outcomes, while the latter underpins the physical resources and activities required to translate objectives into practice.

Figure. 2.1 Theory of Change framework example



Source: Adapted from Montano et al. (2023: 655)

This iterative, participatory evaluation method serves multiple purposes, including strategic planning, monitoring and evaluation, documentation and learning (Taplin et al., 2013; Stein & Valters, 2012). From an academic perspective, ToC has been widely adopted across various social fields, including public health (Breuer et al., 2016), finance (O’Flynn et al., 2022) and environmental sustainability (Allen et al., 2017). Although the application of ToC in travel contexts remains relatively limited, recent studies have increasingly utilised this approach (Roodbari & Olya, 2024). Notable works include Montano et al. (2023) on a large-scale EU-funded intervention, Corr et al. (2023) on a sustainable transportation intervention, Warnholtz et al. (2020) on exploring sustainable development in protected areas and Phi et al. (2016) on evaluating anti-poverty tourism interventions.

2.3. Methodology

This research employs a single-case study design (Yin, 2009) centred on the TripDoodler platform (app.tripdoodler.com) to explore how smart, user-driven platforms

facilitate responsible traveller behaviour through crowdsourced sustainability data. The aim is to understand how platform components, user interactions and design intentions are aligned within a conceptual pathway of change. To guide this analysis, the ToC framework (Montano et al., 2023) is employed to examine the assumptions, mechanisms and contextual conditions under which the platform aspires to support more informed and responsible travel decisions.

TripDoodler (app.tripdoodler.com) is a Danish startup that seeks to empower travellers to make more responsible choices by providing accessible, smart technology for crowdsourcing sustainability information about businesses (Agapito et al., 2023). The platform enables travellers to rate the sustainability efforts of businesses. Thereby, creating a feedback loop that helps these establishments understand how their practices are perceived. This visibility can incentivise businesses to improve their sustainability performance and communicate their actions more transparently. TripDoodler's mission is closely aligned with United Nations Sustainable Development Goal 8 (Target 8.9). This target promotes sustainable tourism that generates employment and supports local culture and products (United Nations Department of Economic and Social Affairs, 2023).

TripDoodler presents a distinctive case within the sustainable tourism landscape. Unlike traditional certification systems that rely on third-party validation, TripDoodler employs a traveller-led model, where sustainability ratings are conducted in real-time through user input (Agapito et al., 2023). This peer-based, participatory approach remains underexplored in the responsible tourism literature, offering a compelling rationale for a case study. The platform's user-driven design provides a valuable context for close, critical examination. In this study, TripDoodler is classified as a smart crowdsourced platform due to its capacity to facilitate voluntary contributions from travellers, who rate and share sustainability insights that are then aggregated to support informed decision-making. This aligns with the information pooling and open collaboration typologies outlined by Blohm et al. (2018), in which users collectively generate and validate knowledge to enhance shared understanding and guide choices.

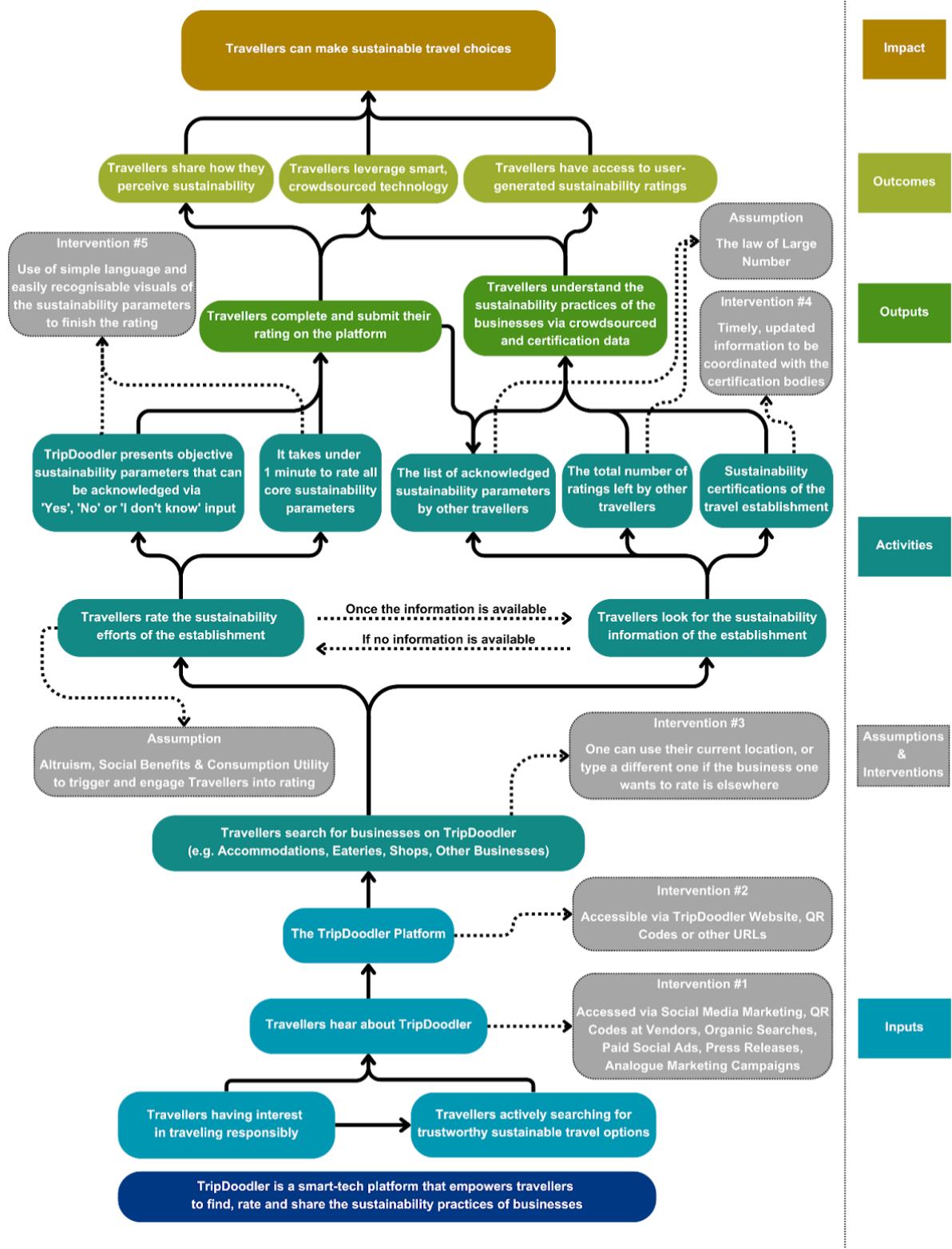
Descriptive or explanatory case studies require a structured approach to analyse real-world systems in context (Yin, 2009). This study adopts a theory-informed lens to examine how TripDoodler's design and functional features are intended to support responsible traveller behaviour, rather than assessing retrospective success or failure. Such an approach is particularly suitable for emerging business models, where behavioural outcomes are shaped by

dynamic interactions among user engagement, technology adoption and broader market conditions (Javaid et al., 2022). Importantly, the framework does not presume effectiveness. Instead, it identifies the necessary preconditions for impact, serving as a basis for critically examining the enabling mechanisms, embedded assumptions and potential limitations of the platform.

One of the first essential steps in building the ToC framework was to identify key stakeholders involved with the platform, as also recommended by Taplin et al. (2013). The focus was on capturing their individual perspectives and interpretations of how the platform might contribute to responsible traveller behaviour. Stakeholder selection was guided by relevance to the platform's operations and accessibility for participation. The founder and CEO of TripDoodler was included as a central informant, given their strategic role and ongoing engagement with the platform's development. In addition, four travellers who had previously used the platform were interviewed to incorporate a range of user perspectives. Stakeholder insights were gathered through semi-structured interviews (Appendix 1), allowing for flexibility while ensuring consistency in thematic coverage (Bryman, 2016).

The subsequent research phase involved co-designing and documenting the ToC framework through a participatory workshop (Figure 2.2). Participants began by articulating the platform's long-term impact objective, then worked backwards to identify the intermediate outcomes required to achieve it. They subsequently defined the necessary inputs and activities, making explicit the assumptions that linked these elements to the intended changes. This collaborative process facilitated the systematic alignment of TripDoodler's core activities, expected outputs and behavioural outcomes. The framework also embedded key assumptions and strategic interventions, further strengthening its relevance to the platform's broader impact ambitions.

Figure. 2.2 Theory of Change applied to TripDoodler



Source: Own elaboration.

2.4. Applying the Theory of Change to a smart, crowdsourced platform: The case of TripDoodler

2.4.1. User engagement and digital discovery

As outlined in Figure 2.2, the ToC framework for the TripDoodler platform (app.tripdoodler.com) illustrates how it envisions enabling travellers to find, rate and share responsible travel options through a structured, user-driven model. Engagement with sustainability ratings, however, does not occur in a single step but unfolds across various digital touchpoints and behavioural stages. To reflect this complexity, TripDoodler's team identifies five user engagement scenarios. Passive Browsers explore sustainability ratings but do not actively contribute data, while Active Contributors engage with the platform by rating businesses and sharing their experiences. These two types of user engagement reflect broader patterns identified in previous research on consumer co-creation, such as the distinction between passive observers and active participants (Roberts et al., 2014). Influenced Decision-Makers adjust their travel choices based on sustainability insights provided by TripDoodler. This form of behavioural adjustment aligns with evidence from decision science, where users are more likely to select a pre-identified or endorsed option, commonly known as the 'default effect' (Jachimowicz et al., 2019). In contrast, Sceptical Users remain cautious about the validity of crowdsourced ratings and prefer alternative sources of information, such as third-party sustainability certifications. Similar user behaviour has been noted in other studies, such as Jones et al. (2019), where sceptical participants showed low trust in experimental digital tools. Finally, Re-engaged Users return to the platform to check for updated sustainability ratings after their initial exposure. Re-engagement patterns have also been observed in longitudinal studies using social media, where follow-up participation improved through targeted recontact strategies (Bennetts et al., 2020). These user types help contextualise how the platform's design features interact with varied levels of motivation, trust and behavioural intent.

Interview findings revealed that the TripDoodler platform is generally encountered through a range of digital and physical touchpoints, rather than being actively sought out by travellers. These include the TripDoodler website, search engine results, newsletter subscriptions, online articles and social media channels, particularly the paid campaigns. Some participants also recalled seeing the platform through QR codes displayed at businesses. Additionally, traditional marketing materials, such as brochures, stickers and badges, serve as

offline entry points. These touchpoints vary in their visibility and timing and may shape user engagement in different ways. For instance, QR codes placed at tourism vendors create the possibility for immediate interaction following an experience, while engagement through social media may occur across longer or more fragmented journeys.

2.4.2. Balancing ease of use and integrity

TripDoodler aims to serve as an accessible platform that supports a broad spectrum of users, regardless of their familiarity with sustainable tourism or responsible travel. Insights from the platform layout and traveller interviews indicate that its user flow is straightforward to navigate. Users are not required to have prior expertise in sustainability to engage with the platform's core functions. Nonetheless, the platform seeks to create a more objective and comparable framework for recognising responsible tourism practices (app.tripdoodler.com). This is attempted by employing a standardised set of sustainability parameters to guide user ratings, aiming to constrain subjectivity and enhance consistency in the rating process. In the context of TripDoodler, sustainability parameters refer to predefined criteria, framed as questions, that help users identify and assess specific environmental, social and economic practices associated with a business. These parameters are discussed in greater depth in the sections that follow. However, the platform operates under the assumption that aggregated user-generated ratings can provide a reasonable approximation of sustainability performance. Interview data suggest that users bring varying levels of awareness, experience and understanding to their evaluations, which introduces a risk of inconsistency. According to the CEO of the platform:

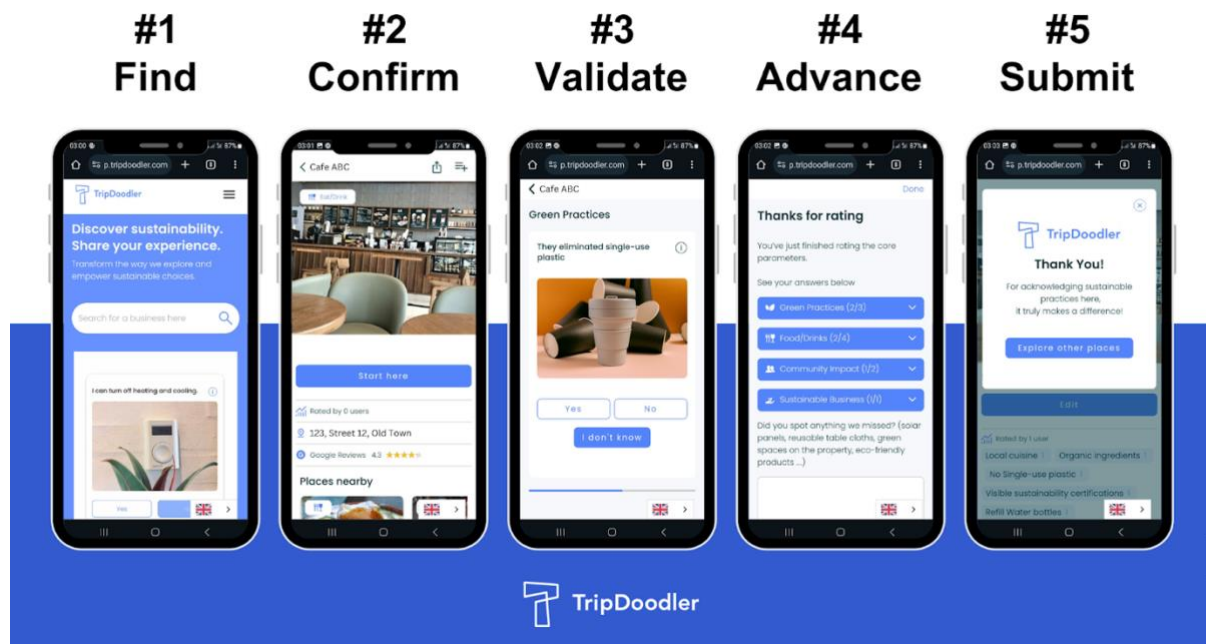
“One of the biggest lessons we have learned is that making it easy is difficult. We initially thought one level of ease would be sufficient, but it proved to be more challenging than expected. We constantly strive to find a balance between integrity and ease of use. It is a challenge because if we make it too easy, we risk compromising integrity, and those knowledgeable about sustainability may question our approach. On the other hand, if we make it too complex and detailed, travellers may lose interest. Their attention span is typically short, around 10 seconds to half a minute if we are lucky. Finding the optimal solution is also subjective and personal, so we may never achieve a hundred percent ideal approach. We continuously navigate the balance between ease of use and integrity.”

TripDoodler, therefore, incorporates several structural features designed to limit potential bias in user-generated sustainability ratings. Users respond to each predefined sustainability parameter by choosing from fixed options: ‘Yes,’ ‘No’ or ‘I don’t know.’ This guided rating system limits subjective interpretation and helps minimise ambiguity, a gap also recognised in prior studies (Liu et al., 2024). Each parameter is accompanied by a short explanatory text and a visual cue, which aim to clarify intent and promote a common reference point among users (Tölkes, 2018). Instead of relying on single-user inputs, the platform aggregates responses across multiple users. This crowdsourced approach aims to mitigate the impact of individual variability and provide a broader perspective (Law et al., 2017). In some instances, TripDoodler presents third-party sustainability certifications alongside user-generated content. While these serve as a secondary reference, they do not replace the platform’s core reliance on user input. The sustainability parameters used in assessments are periodically revised in response to user feedback and updates in sustainability standards. This suggests an iterative design process aimed at maintaining relevance. Nevertheless, the extent to which these features yield reliable and valid sustainability ratings remains an open empirical question.

2.4.3. TripDoodler platform and functionalities

TripDoodler is accessible via both mobile and desktop devices through a web-based interface. The platform supports English and Danish languages, thereby catering to a broader user base. Upon accessing the platform, users encounter a search function (see Figure 2.3, screen #1: “Find”), designed to facilitate the discovery of businesses. This feature enables travellers to search for places to stay, dine or shop, either in their current location or in any location of interest. The search function operates through an integration with the Google Maps Platform API, which allows for accurate geolocation and identification of the searched businesses (Yang & Hsu, 2016).

Figure. 2.3 The TripDoodler platform - 5 steps to complete the user rating



Source: app.tripdoodler.com (2024)

Travellers can also use the platform to identify nearby businesses based on their current geographic location. Search results display each business's name along with a location marker. Selecting a result directs users to a dedicated vendor-card page (see Figure 2.3, screen #2: "Confirm"), which serves as the central reference point for information about that establishment. The page presents structured details, including the business name, complete address, photographs and a Google Maps pin to verify its physical location. The platform also suggests additional nearby listings aligned with the user's original query. Each vendor card features an option for business owners to claim the listing, which activates a separate workflow. Once claimed, owners gain access to user-generated sustainability insights and can engage with feedback mechanisms.

2.4.4. TripDoodler's sustainability rating framework

In addition to the confirmation and functionality components, the vendor-card page provides travellers with access to sustainability-related information about the listed business. This content is organised around three core indicators, the first of which is the user-generated sustainability rating. This rating reflects the specific sustainability actions or practices

recognised by other travellers and is based on a set of predefined sustainability parameters. These parameters are derived from TripDoodler's proprietary algorithm, which evaluates a range of environmental, socio-cultural and local economic factors. The algorithm filters these parameters through four dimensions: impact, visibility, user interest and alignment with the anticipated EU implementation baseline. To ensure comparability across similar categories, the platform assigns a tailored set of parameters to each business type, such as accommodations, eateries, shops and other service providers. Furthermore, these parameters are grouped into two distinct categories: core and additional. Upon visiting a business listing, users are initially presented with a limited number of core parameters. This curated selection is designed to highlight the most essential and broadly applicable sustainability parameters. Once a user has completed this initial assessment, the platform then offers the option to explore and respond to additional parameters. These supplementary parameters are intended for users with a deeper interest in responsible travel, providing a more nuanced view of the establishment's practices.

The second indicator presented on the vendor-card page is the number of user-generated sustainability ratings associated with a particular establishment. This metric provides a proxy for reliability, grounded in the law of large numbers (Vasa et al., 2012). As the volume of user ratings increases, the impact of outliers or manipulated inputs tends to diminish. High-volume user-generated content, therefore, signals a more trustworthy representation of observed sustainability practices (Flanagin & Metzger, 2013). The third indicator involves displaying verified sustainability certifications. While travellers contribute observational insights based on their experience, formal certifications serve as an external validation mechanism (Kizanlikli et al., 2023). On the TripDoodler platform, these accredited certifications appear alongside user-generated ratings, creating a complementary layer of information. Examples of certifications integrated into the platform include EarthCheck, Green Key, Green Sign, Nordic Swan Eco-Label and Organic Cuisine Label.

If no existing rating appears for a searched business, travellers can initiate the rating process directly from the vendor-card page. Screen #3: "Validate" in Figure 2.3 illustrates how this function is presented. The interface invites users to rate observed responsible actions using a set of clearly defined core parameters. Each parameter is supported by three guiding elements designed to ease comprehension and promote informed participation. First, a brief textual explanation is written in simple, accessible language, ensuring that users without prior sustainability knowledge can still engage meaningfully. Second, each parameter includes a representative image, helping users visually identify the type of sustainability action being

assessed. Third, a hyperlink directs users to a credible source, which clarifies the rationale behind the parameter and provides evidence of its relevance within established sustainability frameworks. Collectively, these elements facilitate ease of participation and promote informal learning among users. Most travellers complete the rating in under one minute, responding to each parameter using fixed options, ‘yes’, ‘no’ or ‘I don’t know,’ which helps streamline the experience and maintain consistency across responses.

As an example, the distinct core parameters for evaluating the sustainability practices of an accommodation-type establishment in 2024 include (TripDoodler, 2024):

1. Recycle bins are available, or I know that the hotel is sorting my room waste
2. They have implemented food waste initiatives (doggy bags, "save a meal", etc.)
3. They offer vegan /vegetarian /plant-based food options
4. I am encouraged to reuse towels
5. They have water-efficient toilets (e.g. dual flush)
6. I can turn off the heating and cooling in my room
7. I can opt out of room cleaning
8. They have automated light sensors in all public areas and/or rooms
9. They actively provide guests with information regarding local heritage and culture
10. They actively promote activities and places in the local community (posters, business cards, etc.)
11. They have clear signage of sustainability certifications (e.g. Green Key, Ecolabel, GreenSign, etc.)

2.4.5. User motivation and crowdsourced engagement

A key assumption underpinning TripDoodler’s ToC is that travellers are primarily driven by intrinsic motivations when engaging with the platform to acknowledge sustainability efforts. These motivations include altruism, social benefit, and consumption utility—constructs that have been well-documented in the literature on user-generated content. Altruism, categorised as a focus-related utility, refers to the voluntary act of sharing information to benefit others, without expectation of personal gain (Cheung & Lee, 2012). Social benefit arises when users gain satisfaction or a sense of recognition from being active contributors within a like-minded community (Cheung & Lee, 2012), especially when they are the first to

rate a business on its sustainability performance. Consumption utility, the third construct, relates to the practical value users derive from existing ratings to inform their own choices. This, in turn, motivates them to reciprocate by contributing ratings that benefit others (Hennig-Thurau et al., 2004). While these intrinsic drivers form the foundation of TripDoodler's design, the assumption that they alone are sufficient to motivate sustained engagement warrants further empirical validation. In real-world settings, traveller motivation is often shaped by additional external factors such as incentive mechanisms (Ihle et al., 2023). Nonetheless, TripDoodler has made a conscious decision to exclude financial incentives from its engagement model. This design choice stems from concerns that monetary rewards may compromise the integrity of the sustainability recognition process (Mandago et al., 2018). Introducing economic incentives could encourage performative or transactional behaviour, where users participate primarily for extrinsic gain (Zeiske et al., 2021). By contrast, TripDoodler aims to foster a more authentic and values-driven form of participation, wherein sustainability efforts are acknowledged because users perceive them as meaningful and relevant to responsible travel. One traveller reflected on their experience with TripDoodler, stating:

“Yeah, I trust browser validations and user recommendations more than information from hotels, restaurants or individuals who have been paid to visit a place. When it comes to ratings, I find them more reliable because people have no incentive to manipulate them. You cannot change your rating based on incentives or dishonest practices. In some cases, there are instances where people are paid to provide positive reviews, which has become a problem. Conversely, you might also notice instances where an influencer visits a place they dislike, resulting in many people giving it a one-star rating, even if they have not been there themselves. This kind of behaviour can be misleading and should be considered.”

Once travellers complete their ratings of the core parameters, the platform invites them to share any additional sustainability practices they may have observed but were not included in the predefined list. This open-ended input option is shown in Figure 2.3, screen #4: “Advance”. This serves a dual purpose: enabling TripDoodler to identify emerging or context-specific practices that travellers recognise independently. Additionally, this allows users the space to contribute their own subjective insights based on personal observations. After adding these reflections, travellers proceed to submit their rating, as depicted in screen #5: “Submit” of Figure 2.3. Upon submission, the data is published in real-time, making it immediately accessible to the broader TripDoodler community. Through this structure, TripDoodler aims to

support travellers in making more informed decisions by drawing on peer-generated sustainability insights.

2.5. Discussion

A central insight of this study concerns the value of making platform functionality visible and critically understood. The current tourism landscape includes an increasing number of digital tools claiming to support sustainability goals (Fatema et al., 2024). However, there remains a limited understanding of how these platforms are structured to engage users, what behavioural pathways they assume and how they operationalise sustainability concepts. This gap is also acknowledged by Calabrese et al. (2021), who propose a conceptual model but note the absence of empirical insights into the user engagement mechanisms and governance processes that underpin sustainable digital platforms. Crowdsourced sustainability-based tools, in particular, face scrutiny over the credibility and usefulness of their content (Schiavo et al., 2017). In a context where travellers increasingly rely on peer ratings and digital prompts to guide their choices (Van der Zee & Bertocchi, 2018; Zhang et al., 2009), it becomes essential to examine how these platforms are designed to function. This study contributes by making these internal mechanisms visible through a ToC conceptual framework.

A key dimension emerging from this case concerns the challenge of subjectivity in traveller-led sustainability inputs and the platform's effort to organise this subjectivity within a consistent framework. Personal experiences (Zelenka et al., 2021), levels of awareness (Wang et al., 2024) and contextual interpretations (Filieri et al., 2015) inherently shape traveller inputs. However, the lack of standardisation in how such observations are typically reported has limited their comparability and practical utility (La Barbera et al., 2024). TripDoodler addresses this managerial gap by providing a structured rating framework that is based on predefined sustainability parameters and fixed response options. This design attempts that, while individual responses may vary in interpretation or depth, the format through which data is collected remains stable across users.

Another essential insight lies in the balance between information accessibility and consistency. The platform prioritises ease of use, allowing users, even with limited sustainability knowledge, to participate meaningfully. At the same time, TripDoodler attempts

to safeguard the comparability of responses through guided sustainability parameters and designated response choices. This balance between simplicity and structure reflects an underlying challenge in digital sustainability tools (Inmor et al., 2025). Platforms must be accessible enough to engage casual users while still offering reliable and credible insights. The TripDoodler case illustrates that achieving both remains difficult, particularly when users vary in their familiarity with sustainability practices.

The study also discusses the granular user typology derived from engagement patterns. The identification of Passive Browsers, Active Contributors, Influenced Decision-Makers, Sceptical Users and Re-engaged Users offers a more differentiated view of how travellers can interact with responsible travel content. These behavioural modes mirror broader trends in digital participation (Jachimowicz et al., 2019; Roberts et al., 2014), but their application within a sustainability-specific context introduces a novel lens for understanding platform-user dynamics. Importantly, these user types reflect differing levels of motivation and the varying degrees of trust in peer-generated versus expert-led information. These dynamics warrant deeper investigation, particularly considering recent concerns over misinformation and trust in digital reviews (La Barbera et al., 2024; Flanagin & Metzger, 2013).

The discussion around motivation highlights a further assumption embedded in the platform's design. TripDoodler relies on intrinsic motivations such as altruism, social value and reciprocity. These motivations are consistent with prior research on user-generated content (Cheung & Lee, 2012); however, they may not apply uniformly to all users. The platform deliberately avoids financial incentives, believing that these could undermine authenticity (Mandago et al., 2018). While this approach supports the platform's values, it also limits the appeal for users who are less intrinsically motivated. In practice, motivation is often shaped by a mix of internal and external factors (Ihle et al., 2023), and further research is needed to assess which combinations sustain long-term engagement.

2.5.1. Theoretical and managerial implications

Although the ToC framework has been widely adopted across social development, public policy and health systems (Montano et al., 2023; Taplin et al., 2013), its use within tourism research remains limited. By employing a conceptual framework like the ToC, this research moves beyond conventional retrospective evaluations (Gertler et al., 2016), which

often focus on end outcomes without systematically exploring the causal pathways through which those outcomes are expected to arise. The study focuses instead on mapping platform assumptions, design intentions and the mechanisms through which behavioural impact is anticipated. In doing so, it offers a structured lens for conceptualising how digital tourism interventions operate within complex socio-technical environments. This approach responds to recent academic efforts, such as those by Inmor et al. (2025), which highlight the need for context-sensitive evaluations of smart tourism technologies and their differential impacts on tourist intentions, authenticity and sustainability outcomes. The study also extends methodological discussions around ToC development. By incorporating stakeholder interviews and a participatory workshop, the ToC pathway in this study was shaped by both platform developers and users. This helped surface assumptions and identify the preconditions for the intended impact. In contrast to earlier applications of ToC in tourism, which have primarily focused on expert-led workshops (Montano et al., 2023), this study exhibits that semi-structured dialogues with end-users can also yield insights. Responding to the call by Phi et al. (2016) to involve a broader range of stakeholders in ToC development, this approach surfaces context-specific perspectives that are essential for understanding the mechanisms through which digital interventions operate.

This study also opens further reflection on the role that smart, user-facing technologies may play in addressing the well-documented gap between sustainable intentions and tourism behaviours (Viglia & Acuti, 2023; Font & McCabe, 2017; Gössling, 2017). Existing literature broadly examines the barriers, whether structural, informational or cognitive, that prevent tourists from acting on their responsible values. The present research draws attention to how smart platforms might participate in shaping the conditions for more aligned behaviour. While the actual behavioural outcomes remain to be validated, the case invites a broader theoretical consideration of how such platforms' structural, utility and participatory features may be conceptualised as part of an enabling environment. In doing so, it encourages a shift from diagnosing constraints to exploring potential catalysts within smart tourism ecosystems.

The study also offers practical insights that may inform the work of destination management organisations, tourism policymakers and private-sector actors. Platforms such as TripDoodler illustrate how smart, crowdsourced systems can contribute to greater transparency in sustainability communication. These tools present a structured mechanism through which stakeholders may observe how travellers engage with, interpret and report on sustainability practices (Garcia de los Salmones et al., 2025). The integration of standardised user-generated

ratings helps collect perception-based data in real-time, supporting a more dynamic understanding of on-the-ground experiences. These insights may help identify behavioural trends and uncover dimensions of sustainability performance. For destination authorities and policymakers, such aggregated traveller feedback can support more granular assessments of local sustainability initiatives. These data sources offer scope for adaptive governance and may inform evidence-based interventions that encourage wider adoption of sustainability practices among businesses. From an enterprise perspective, smart, crowdsourced platforms such as TripDoodler offer businesses a structured way to showcase their sustainability practices through guided traveller feedback. Rather than relying solely on marketing claims, enterprises can gain recognition based on actions observed and rated by guests. These platforms also generate comparative data that can inform internal assessments of the business's performance across environmental, social and governance dimensions. Enterprises can utilise these insights to refine their sustainability and communication strategies, identify areas for improvement and respond to evolving consumer expectations with greater agility.

2.6. Conclusion

In conclusion, this research demonstrates that digital innovations, particularly smart and crowdsourced platforms, are emerging as potential instruments to help bridge the gap between intention and behaviour in responsible tourism. Through the TripDoodler case study, it became apparent that these platforms can structure subjective user-generated data into a more standardised and comparable format, offering accessible, real-time information that supports decision-making. Their conceptual effectiveness, however, is intrinsically dependent on a balance between ease of use and data integrity, as well as on the ability to motivate and engage travellers through intrinsic incentives without compromising credibility. The identified user typology, from more passive users to more active ones, underscores the complexity of engagement and the need for platform designs that appeal to diverse behavioural profiles.

Additionally, the application of the Theory of Change proved to be a valuable conceptual framework for unpacking the assumptions, mechanisms and behavioural pathways underpinning a digital platform like TripDoodler. This approach enabled the systematic mapping of how technical and functional components, such as the sustainability parameters framework, aggregation of ratings and integration with certifications, interact to produce

behavioural outcomes. The implications extend both theoretically, by advancing the use of ToC in tourism contexts (Montano et al., 2023), and practically, by offering destination managers and businesses a model to strengthen transparency, traveller participation and informed decision-making (Garcia de los Salmones et al., 2025). Such an approach could ultimately contribute to a more responsible and data-driven travel ecosystem.

Building on the discussion of conceptual frameworks and stakeholder perspectives, several limitations and areas for future exploration emerge. One limitation concerns the modest sample size of interview participants. TripDoodler, as a relatively young and emerging platform, had a limited pool of active and engaged users during the study period. While the interviews provided valuable insights for developing the ToC framework, future research could build on these findings by engaging a broader and more diverse sample. A second limitation relates to the application of a single ToC framework. While the model provides a coherent representation of intended behavioural outcomes, its generalised structure may underrepresent the diversity of user experiences and engagement trajectories. Further research might explore differentiated ToC frameworks tailored to specific user typologies or platform interaction modes. Such refinements could offer more granular insight into the mechanisms that shape responsible traveller behaviour within digital environments. The study also advances assumptions regarding user motivation. Clarifying the motivational drivers that encourage the adoption and sustained use of platforms such as TripDoodler presents a promising direction for expanding both theoretical and practical knowledge in the field of responsible tourism.

2.7. References

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CHAPTER THREE

STUDY 2: MAPPING TRAVELLER RECOGNITION OF SUSTAINABILITY: AN ANALYSIS OF CROWDSOURCED EVALUATIONS

Abstract

This study explores how travellers recognise sustainability practices across business types, utilising data from TripDoodler, a smart, crowdsourced platform. The research investigates which practices are most frequently acknowledged and whether this recognition is associated with credibility indicators such as sustainability certifications and Google ratings. Analysing 2,446 traveller ratings across 1,716 businesses, the study applies the CRISP-DM framework, thematic clustering and chi-square testing. Findings suggest that recognition is highest for practices such as plant-based meals and towel reuse, which may indicate that sustainability actions with higher visibility and contextual relevance are more likely to be acknowledged by travellers. Recognition patterns vary by business type, and a weak but significant association is observed between high Google ratings and sustainability acknowledgement. No significant association is found with formal sustainability certifications. The study offers a behavioural perspective on sustainability recognition by examining how travellers respond to observable sustainability practices. The analysis also highlights the methodological potential of smart platforms to capture sustainability engagement at scale in real-world tourism contexts.

Keywords: *Sustainable Tourism, Traveller Recognition, Smart Crowdsourced Platforms, Sustainability Visibility, Sustainability Certifications*

3.1. Introduction

Travellers play a central role in advancing sustainability efforts within tourism. Contemporary research increasingly recognises them as participants whose actions shape the sustainability performance of destinations and service providers (Fernández Gallardo & Hernandez Rojas, 2025; Salinero et al., 2022). Many travellers today express a growing

concern for environmental and ethical issues and indicate a willingness to engage in more responsible forms of tourism (Wani et al., 2025; Cavagnaro et al., 2021). However, their ability to make informed decisions in real settings often depends on how sustainability efforts are communicated within the tourism environment (Bhattacharyya et al., 2023; Acampora et al., 2022). Although numerous tourism businesses adopt sustainability initiatives, these actions are not always noticeable to travellers (Font et al., 2016). For example, energy-efficient systems, food waste strategies or local community promotion may exist within a business but remain outside the realm of guest perception unless made explicit. Recognition of such efforts, therefore, becomes essential for understanding how travellers interpret and respond to sustainability in practice (Miller et al., 2010). Insights from visual recognition research suggest that perception and interpretation may co-occur, rather than as separate steps (Grill-Spector & Kanwisher, 2005). In travel-based contexts, this may imply that recognition of sustainability practices depends as much on their visibility (Wang et al., 2017) as on how they are framed within the guest experience (Acampora et al., 2022). However, existing studies have generally focused on awareness, intention or post-visit attitudes (Viglia et al., 2024). There remains a need for more empirical clarity on what travellers observe and acknowledge while engaging with tourism services.

A central challenge in studying how travellers access sustainability practices lies in the type of data typically used to investigate this process. Much of the existing research relies on unstructured, post-experience data, particularly in the form of open-ended reviews left on platforms such as Google and TripAdvisor (Filieri et al., 2015). These reviews offer anecdotal insight into traveller experiences and are often used to infer general preferences, including sustainability-related responses (Filieri et al., 2021). However, they rarely provide structured feedback on which specific sustainability practices were recognised, with only a handful of studies attempting a more systematic analysis, such as Lee et al. (2016). Without standardised prompts or criteria, it becomes difficult to determine whether specific sustainability actions, such as energy conservation, waste reduction or support for local communities, were acknowledged at all, and whether recognition patterns vary by business type or sustainability parameters. This limitation is compounded by the reliance on credibility indicators, such as sustainability certifications and Google ratings, which are often used by businesses to signal sustainability practices and convey trust to prospective travellers (Velaoras et al., 2025; Lee et al., 2016). However, their effectiveness in facilitating the recognition of sustainability practices remains unclear. Certifications may be present but go unnoticed due to low visual prominence

or lack of explanation (Godovykh et al., 2024). Similarly, high Google ratings do not necessarily reflect sustainability performance, as they aggregate multiple service aspects and lack thematic specificity (Brazytė et al., 2016).

Addressing these gaps requires a more systematic, structured approach to collecting traveller feedback. Smart, crowdsourced platforms offer a promising alternative. One such platform is TripDoodler (app.tripdoodler.com), which enables travellers to find, rate and share sustainability efforts across a wide range of businesses (Agapito et al., 2023). By guiding users through clearly defined sustainability parameters, TripDoodler encourages focused recognition of businesses' sustainability practices.

Therefore, by utilising TripDoodler's database of 2,446 ratings by 355 travellers across 1,716 businesses, the study aims to address two research questions with respect to this smart, crowdsourced platform: a) Which sustainability practices are most frequently acknowledged by travellers, and how does this acknowledgement vary across different types of businesses (e.g., accommodations, eateries, shops)? b) Are credibility indicators, such as sustainability certifications and Google ratings, associated with travellers' recognition of sustainability practices in businesses?

By analysing large-scale, structured evaluations, the study contributes to ongoing discussions on visibility, recognition and standardisation across different informational and operational contexts in sustainable tourism (Acampora et al., 2022). The research also opens possibilities for improving how businesses communicate sustainability to travellers and allocate resources toward the practices that are most likely to be noticed. The findings are also relevant for sustainability managers, tourism operators and platform designers aiming to make sustainability practices more visible and actionable.

The study proceeds with a review of existing literature, outlining how sustainability has been managed in tourism and how recognition, visibility and credibility have emerged as focal points for understanding traveller engagement. This is followed by a detailed description of the methodology, which applies the CRISP-DM framework to structure data preparation and analysis. The results section then presents findings from the analysis, showing which practices are most often acknowledged by travellers and how this recognition varies across business types and external credibility indicators. The discussion section reflects on these findings in relation to existing literature, offering insights into behavioural patterns, theoretical contributions and implications for future research. Finally, the conclusion summarises the

study's contributions, considers practical applications for tourism stakeholders and outlines directions for future work.

3.2. Literature Review

3.2.1. Evolving approaches to sustainable tourism management

Sustainable tourism refers to a set of practices intended to support the long-term health of destinations, communities and ecosystems by addressing environmental, social and economic concerns (Kusumah, 2024). Earlier approaches to sustainable tourism management primarily focused on operational measures, with service providers and public institutions taking responsibility for managing sustainability within their frameworks (Hashemkhani Zolfani et al., 2015). These approaches, as discussed by Stoddard et al. (2012), often centred on internal management practices and isolated initiatives but lacked substantive integration with broader accountability or community engagement. Waligo et al. (2013) further reinforce this critique by highlighting how such top-down strategies frequently overlook social dimensions and fail to meaningfully involve all stakeholders, ultimately limiting the effectiveness and longevity of sustainable tourism initiatives. More recent developments in research, however, are now highlighting the role of travellers as participants in these systems (Amoako et al., 2022; Salinero et al., 2022).

3.2.2. Positioning travellers as active contributors to sustainability

Travellers today are often framed in literature as contributors to sustainability in tourism, rather than just recipients of services (Cavagnaro et al., 2021; Juvan & Dolnicar, 2016; Miller et al., 2010). The study by Seyfi et al. (2024) reveals that Gen Z travellers often express ethical, environmental and cultural preferences in their travel decisions. They seek clearer communication from tourism businesses (Tölkes, 2018) and express interest in options that support local economies or reduce ecological pressure (Wani et al., 2025; Raza et al., 2024). Studies have examined how travellers engage with sustainability certifications (Nelson et al., 2021), value-based marketing (Yang et al., 2025) and participatory experiences (Liburd et al., 2020). These studies tend to focus on how travellers evaluate services, the kinds of narratives

they respond to or the factors that shape their sense of environmental responsibility. However, much of this work assesses behavioural intent rather than actual behaviour, which limits the validity of conclusions about how travellers act in real settings (Viglia et al., 2024). Viglia et al. (2024) advocate for a methodological shift, emphasising that research aiming to understand behaviour must prioritise the measurement of actual behaviour, which can be achieved through methods such as biometric tracking, field observation, experimental design or post-experience user feedback.

3.2.3. Recognition as a lens for understanding traveller engagement

Understanding this behavioural gap between intention and action may require further attention to the role of recognition, specifically the extent to which travellers are able to notice and assign meaning to sustainability practices within tourism settings. As Miller et al. (2010) argue, even environmentally concerned tourists often fail to recognise the impacts of tourism activities or distinguish sustainable choices while on holiday. Their findings underscore the importance of making sustainability more visible and tangible within tourism experiences (Paatlan & Ranga, 2024). In such contexts, recognition becomes a valuable analytical lens (Acampora et al., 2022). Recognition, in psychological terms, involves a multi-stage process that begins with perceptual detection and moves rapidly toward categorical identification (Grill-Spector & Kanwisher, 2005). Once an object or cue is detected, individuals tend to categorise it almost instantaneously, suggesting that what is seen is often interpreted in line with pre-existing schemas or mental models. In the tourism context, this highlights the importance of visibility (Font & McCabe, 2017), language and context (Proi et al., 2023) in shaping how sustainability is perceived and understood. For example, a hotel may install energy-efficient systems or reduce single-use plastic, but the value of such actions partly rests on whether guests notice these changes and associate them with sustainability (Moscardo, 2019).

3.2.4. Visibility of sustainability through design and communication

The visibility of sustainability practices depends on how they are communicated through infrastructure, signage, storytelling and decision points within a tourism service environment (Mansoor et al., 2025). For instance, Mansoor et al. (2025) and Gunduz Songur

et al. (2023) demonstrate that hotels adopting green practices, such as energy-efficient lighting, refill stations or reusable amenities, provide guests with tangible cues of environmental commitment when these features are made noticeable and meaningful. Sharma et al. (2024a) and Tölkes (2018) emphasise the role of signage and informational materials, such as symbols, menu descriptions or in-room guides, in conveying messages related to conservation, local sourcing or waste reduction. Guest choices can also be shaped through design features that highlight sustainable options, including the visibility of vegan meals (Voss et al., 2024), opt-in participation in towel reuse programmes (Dimara et al., 2017) or rewards for eco-friendly actions (Dolnicar et al., 2017). Recognition may be more likely when cues are clear, contextually appropriate and supported by social influence or personal environmental values (Mansoor et al., 2025; Leal & Pinho, 2024; Acampora et al., 2022). While studies such as Mansoor et al. (2025), Bilynets et al. (2021), Han (2021), and Font and McCabe (2017) recognise the importance of making sustainability practices more visible within tourism settings, the emphasis in these works remains largely supply-driven. However, the question of what travellers recognise as sustainability within these environments has received comparatively limited empirical attention. Without understanding which sustainability practices are most frequently acknowledged and how this varies across different business contexts, efforts to enhance visibility risk being misdirected or ineffective (Huh & Chang, 2017).

3.2.5. Credibility indicators: sustainability certifications and peer-based feedback

Credibility indicators, such as sustainability certifications (Velaoras et al., 2025) and peer-based feedback mechanisms (Lee et al., 2016), are frequently discussed as tools for signalling sustainability practices and trust to travellers. According to Velaoras et al. (2025) and Kizanlikli et al. (2023), sustainability certifications or eco-labels are issued by recognised institutions to indicate that a business meets specific sustainability standards. These labels are typically displayed on property websites, at reception areas or via booking platforms (Singh et al., 2025; Godovykh et al., 2024). However, as studies like Godovykh et al. (2024) and Kizanlikli et al. (2023) observe, the extent to which travellers notice and interpret these certifications remains inconsistent, with guest awareness and understanding varying significantly across contexts. Peer-generated indicators, such as Google reviews and online ratings, also contribute to the way travellers interpret tourism experiences (Baniya et al., 2023;

Riswanto et al., 2023). Some studies, such as Filieri et al. (2021) and Borrajo-Millán et al. (2021), suggest that high ratings are associated with greater trust, while others caution that sustainability-specific recognition is not necessarily correlated with overall popularity (Brazytė et al., 2016). Recognition, in this context, may be shaped by a combination of formal signals and informal cues. Although studies such as Velaoras et al. (2025) and Baniya et al. (2023) touch upon themes related to recognition and credibility, there is limited empirical clarity on the extent to which certifications or peer-based reviews actively shape traveller recognition of specific sustainability actions. This highlights the need for a more in-depth examination of how such credibility indicators operate across various types of businesses.

3.2.6. Smart, crowdsourced platforms as tools to understand travellers' recognition of sustainability practices

Recent developments in smart tourism have created opportunities to gather structured feedback from travellers on their experiences, including sustainability-related elements (Alghamdi et al., 2023). These platforms, as also discussed by Lee and Jan (2023), are built to collect traveller inputs in real-time and can offer insight into what visitors observe, how they interpret it, and which features they choose to highlight. Crowdsourced data evaluations introduce a wider range of perspectives and may help capture dimensions of sustainability that are context-specific or operationally subtle (León et al., 2025; Levin et al., 2017). This approach supports a distributed form of evaluation, where the inputs of individual travellers are aggregated to form broader patterns (Leal et al., 2020). TripDoodler (app.tripdoodler.com), for example, is one such platform that enables users to find and acknowledge sustainability practices in accommodations, eateries, shops and other tourism-related businesses (Agapito et al., 2023). While still evolving, platforms like TripDoodler help broaden the methodological possibilities for tourism research by offering alternatives to conventional reliance on self-reported behavioural intentions or general satisfaction metrics, an area of conceptual and empirical limitation identified by Viglia et al. (2024). Nonetheless, the extent to which these platforms capture nuanced or consistent insights remains an open area for further examination.

While the literature on sustainable tourism has grown, several conceptual and methodological gaps remain. Recognition is still an underdeveloped concept in the field. Few studies have analysed what travellers notice and acknowledge across business types, or how this recognition varies when external signals such as ratings or certifications are present (Viglia

et al., 2024; Font & McCabe, 2017). Large-scale data from smart platforms and traveller evaluations could support more integrated analyses, but such approaches are still emerging (León et al., 2025; Alghamdi et al., 2023; Lee & Jan, 2023). This study addresses these limitations by adopting a structured, data-driven method grounded in the CRISP-DM framework (Bokrantz et al., 2024; Singgalen, 2024). By leveraging real-time traveller evaluations from TripDoodler and applying thematic clustering, dashboard analytics and statistical testing, the research offers a systematic means to explore recognition across sustainability dimensions, business types and credibility indicators, bridging the gap between visibility and behavioural insight in sustainable tourism.

3.3. Methodology

This study adopted the CRISP-DM (Cross-Industry Standard Process for Data Mining) methodology as a guiding framework to structure the data preparation and analysis process. Although originally designed for predictive analytics, CRISP-DM has also been widely applied in exploratory and descriptive data contexts due to its systematic approach to handling complex datasets (Bokrantz et al., 2024; Singgalen, 2024; Martínez-Plumed et al., 2019). The framework comprises six iterative phases: business understanding, data understanding, data preparation, modelling, evaluation and deployment. However, the study did not involve predictive modelling and deployment, as these stages were not aligned with the study's analytical intent. Instead of forecasting traveller behaviour, the research aimed to explore patterns of sustainability recognition within a defined dataset. Therefore, a deployment phase was considered, which complemented the methodology with statistical testing to analyse the relationship between variables through the Chi-Square Test for Independence.

The dataset used for this study was provided by TripDoodler. The research focused on examining which specific sustainability practices travellers recognised, and how this recognition varied based on external credibility indicators, including third-party sustainability certifications and Google ratings. The dataset covered a five-month period between 20 November 2023 and 19 April 2024 and was shared directly by TripDoodler's senior management team. Originally, it comprised 2,504 traveller ratings, profile data for 646 users and information on 8,807 businesses. Each entry included variables such as sustainability parameters ($N = 67$), business type (accommodation, eatery, shop or other businesses, such as

tour operators, cultural centres, activity providers, nature reserves, social enterprises, etc.), Google Maps ratings and certification status from recognised schemes, including EarthCheck, Green Key and GreenSign. A complete list of the 67 sustainability parameters is included in Appendix 2.

The first step in data preparation involved cleaning procedures to ensure the analytical integrity of the data. Inconsistencies were corrected, and missing values were examined. Given the categorical structure of the dataset and the exploratory nature of the analysis, no statistical imputation was applied. Potential outliers were assessed through descriptive analysis and retained unless clear data errors were identified. The research team standardised variable formats, including categorical values for business types and sustainability practices, to establish internal consistency across the dataset. Following refinement, the working dataset comprised 2,446 ratings submitted by 355 travellers, covering 1,716 businesses. A majority of user profiles ($n = 82$) originated from Denmark, consistent with TripDoodler's operational base and primary user demographic. Other origins included countries such as Portugal, India, Germany, the Netherlands, Spain, Italy and a wider spread across Europe.

Next, the 67 sustainability parameters were systematically reviewed and conceptually clustered using a thematic analysis approach. Although TripDoodler had initially categorised these parameters for internal operational use, this study conducted an independent review to identify thematic overlaps and organise the data into coherent sustainability dimensions. This process followed established thematic analysis protocols (O'Connor & Joffe, 2020), wherein parameters were coded, grouped iteratively based on semantic similarity and mapped to broader constructs. The resulting nine dimensions were aligned with the UNWTO's three core pillars of sustainable tourism: environmental, social and economic sustainability (UN Tourism, 2012). To ensure reliability and minimise researcher bias, the thematic categorisation was validated through a practitioner debriefing process, involving sustainability experts familiar with both operational tourism practices and academic frameworks. Table 3.1 outlines the final nine dimensions, their descriptions and supporting references from the literature.

Table 3.1: Conceptual sustainability dimensions derived from TripDoodler’s sustainability parameters through thematic clustering

#	Sustainability Dimension	Description	UN Tourism Pillar	Supporting Literature
1	Carbon Management	Practices that reduce, manage or offset carbon emissions	Environmental Sustainability	Sun and Higham (2021); Gössling (2015); Strasdas (2010)
2	Social Responsibility	Initiatives that support local communities and ethical business conduct	Social Sustainability	Chilufya et al. (2019); Lund-Durlacher (2013); Kasim (2006)
3	Energy Efficiency	Use of technologies or methods that reduce energy consumption	Environmental Sustainability	He et al. (2021); Tang et al. (2018); Pace (2016)
4	Water Conservation	Efforts aimed at minimising water use and preventing waste	Environmental Sustainability	Casado-Díaz et al. (2023); Han et al. (2018); Kasim et al. (2014)
5	Awareness and Education	Activities that promote sustainability knowledge and cultural understanding	Social Sustainability	Šimková et al. (2023); Lekaota (2017); Miller et al. (2010)
6	Waste Reduction	Strategies that limit waste generation and promote recycling	Environmental Sustainability	Obersteiner et al. (2021); Ramirez and George (2019); Pirani and Arafat (2014)
7	Economic Sustainability	Support for local economies and financially responsible business operations	Economic Sustainability	Vasilakakis et al. (2023); Jurigová et al. (2016); Roberts and Tribe (2005)
8	Sustainable Food Options	Availability of food choices with a lower environmental footprint	Environmental Sustainability/ Economic Sustainability	Abdelhaleem et al. (2025); Voss et al. (2024); Antonschmidt (2019)
9	Biodiversity & Natural Resource Management	Actions that responsibly protect ecosystems and manage resources	Environmental Sustainability	Fischer (2023); Boley and Green (2015); Lim and McAleer (2005)

Source: Own elaboration.

For the analytical phase, Microsoft Power BI was employed as the primary data visualisation and analysis business intelligence tool. Power BI was selected for its accessibility, custom visualisation capabilities and strong integration with large datasets (Bussa, 2023), making it suitable for pattern recognition and interactive exploration (Franco et al., 2024; Ordóñez-Martínez et al., 2024). A custom interactive dashboard was developed to explore the distribution and recognition of sustainability practices across business types. In line with standard business intelligence practices, dashboards are structured interfaces that enable users to track key variables, detect trends and derive insights from complex datasets in a visually accessible manner (Gonçalves et al., 2023).

The dashboard comprised six components: (1) the complete list of sustainability parameters and their thematic clustering, (2) business categories, (3) traveller responses, particularly the number of affirmative recognitions marked as “Yes,” (4) the presence or absence of third-party sustainability certifications, and (5) Google ratings. For comparative analysis, Google ratings were classified as either ‘High’ or ‘Low.’ This classification was derived from the dataset’s overall mean rating of 4.26. Taking into consideration this mean rating, a distinction was made between high (≥ 4.3) and low (< 4.3) ratings, thus providing a basis for exploring how perceived credibility, as indicated by user-generated ratings, may be associated with travellers’ acknowledgement of sustainability practices.

To assess whether such recognition varied systematically across business types and credibility indicators, the study employed the Chi-Square Test for Independence, results obtained through the SPSS software (version 28.0.1.0). This non-parametric statistical method is appropriate for determining whether a statistically significant association exists between two categorical variables (McHugh, 2013). Specifically, the test was used to evaluate whether traveller recognition of sustainability (Yes vs. No) was associated with the business category, the presence or absence of third-party sustainability certification, and the classification of Google ratings as high or low.

3.4. Results

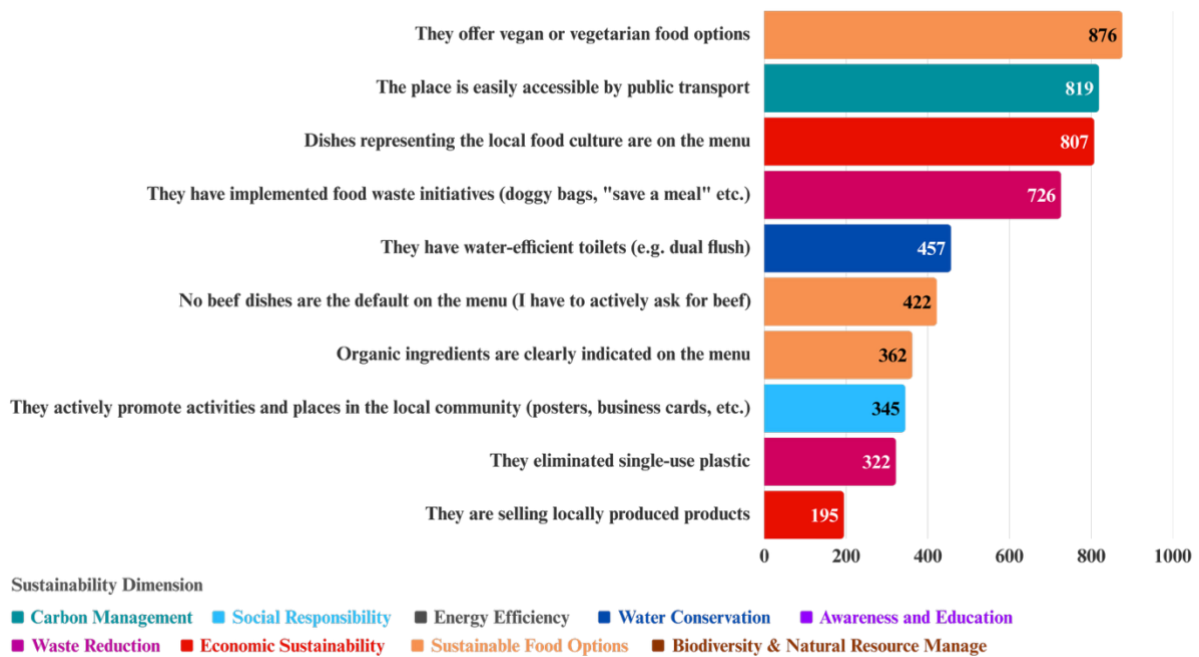
3.4.1. Most frequently acknowledged sustainability parameters and how they vary across different types of businesses

The most frequently acknowledged sustainability parameters across accommodations, eateries, shops and other businesses form a core part of this analysis. The study focuses on all 67 sustainability parameters, organised under 9 key sustainability dimensions and highlights those that received a ‘Yes’ from travellers.

3.4.1.1. Eateries

Considering the total of user ratings (N=2446), Figure 3.1 and Table 3.2 show the ten most recognised sustainability parameters categorised by their sustainability dimensions across places to eat and drink.

Figure 3.1: Most frequently acknowledged sustainability parameters in eateries based on traveller ratings



Source: Own elaboration. Graph created in Power BI, formatted in Canva.

Figure 3.1 and Table 3.2 show that the sustainability indicator most associated with eateries is “They offer vegan or vegetarian food options” (35.8%), which falls under the dimension “Sustainable Food Option”. Businesses that offer plant-based and organic meals are often associated with health-conscious and environmentally aware travellers (Sharma et al., 2024b). Travellers often identify such indicators with ease, as they tend to rely on familiar cues like menu labels, dish descriptions or dedicated sections (Bacon & Krpan, 2018). The component “Carbon Management” is reflected through the indicator “Accessibility by Public Transport” (33.5%). When businesses are accessible via public transport, they may be perceived as environmentally conscious and better integrated with the local community (Zhou et al., 2024). With tools such as Google Maps facilitating low-emission route planning (Meena et al., 2025), public transport access emerges as a visible and commonly acknowledged feature in urban areas.

Table 3.2: Top ten sustainability parameters acknowledged by travellers in eateries, categorised by sustainability dimensions

#	Sustainability Dimensions	Sustainability Parameters	Yes
1	Sustainable Food Options	They offer vegan or vegetarian food options	876 (35.8%)
2	Carbon Management	The place is easily accessible by public transport	819 (33.5%)
3	Economic Sustainability	Dishes representing the local food culture are on the menu	807 (33.0%)
4	Waste Reduction	They have implemented food waste initiatives (doggy bags, "save a meal" etc.)	726 (29.7%)
5	Water Conservation	They have water-efficient toilets (e.g. dual flush)	457 (18.7%)
6	Sustainable Food Options	No beef dishes are the default on the menu (I have to actively ask for beef)	422 (17.3%)
7	Sustainable Food Options	Organic ingredients are clearly indicated on the menu	362 (14.8%)
8	Social Responsibility	They actively promote activities and places in the local community (posters, business cards, etc.)	345 (14.1%)
9	Waste Reduction	They eliminated single-use plastic	322 (13.2%)
10	Economic Sustainability	They are selling locally produced products	195 (8.0%)

Source: Own elaboration.

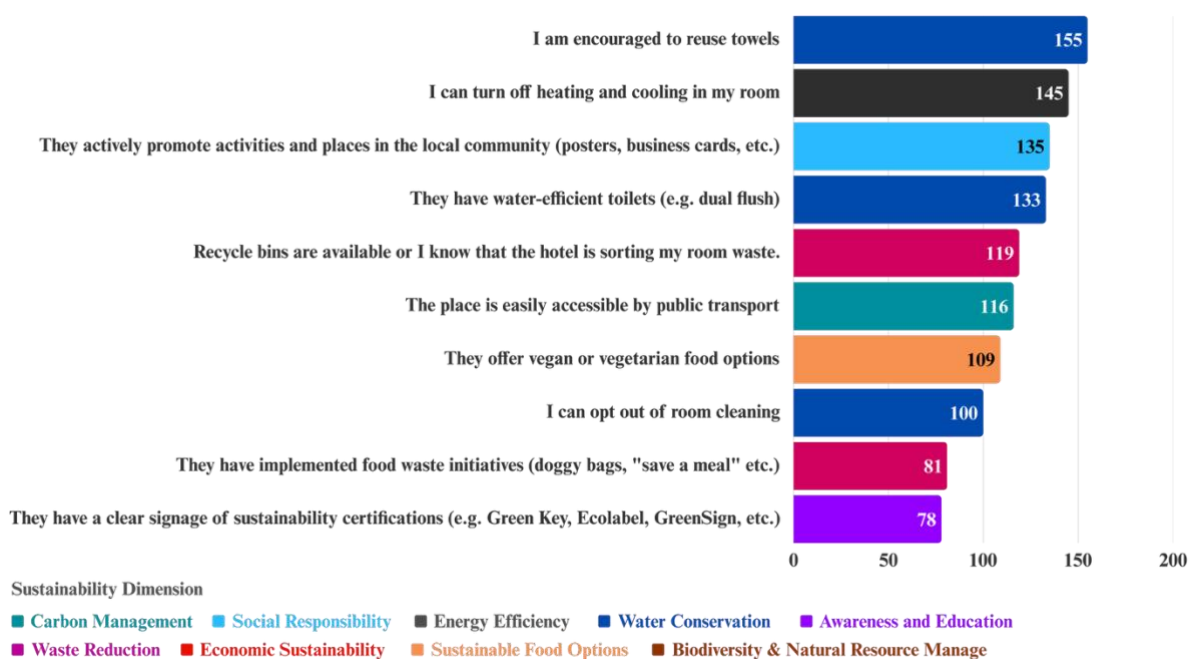
Serving “Dishes representing the local food culture” (33.0%) and “Selling locally produced products” (8.0%) are practices frequently viewed as contributing to the preservation of culinary identity and support for the regional economy. Travellers often interpret these elements as signals of authenticity (Sims, 2009) and as indications that the business is locally embedded and attentive to community livelihoods (Zhang et al., 2019). Initiatives to reduce food waste are also widely recognised. The parameter “They have implemented food waste initiatives (doggy bags, ‘save a meal’ etc.)” (29.7%) is often associated with responsible consumption and growing traveller interest in reducing edible waste (Naidoo & Gasparatos, 2018). Water conservation is also reflected in specific infrastructure choices. The parameter “They have water-efficient toilets (e.g. dual flush)” (18.7%) may be recognised directly by guests or learned about through facility listings. Given its environmental relevance and relatively low visibility threshold, it is more likely to be acknowledged (Leal Filho, 2013). Menus that indicate sustainability credentials support more informed choices. For instance, “Organic ingredients are clearly indicated on the menu” (14.8%) provides visual cues that can stand out when labelling is standardised (Filimonau & Krivcova, 2017). Lastly, the parameter “No beef dishes are the default on the menu (I have to actively ask for beef)” (17.3%) reflects a less common, yet notable, approach to menu structuring. Travellers already aware of food-

related environmental impacts may interpret this design as a deliberate effort to promote lower-carbon options (Taufik et al., 2022).

3.4.1.2. Accommodations

Based on the total number of user ratings (N = 2,446), Figure 3.2 and Table 3.3 present the ten most frequently acknowledged sustainability parameters across accommodation and lodging facilities, organised by sustainability dimension.

Figure 3.2: Most frequently acknowledged sustainability parameters in accommodations based on traveller ratings



Source: Own elaboration. Graph created in Power BI, formatted in Canva.

Water conservation emerges as a prominent theme in accommodation-related sustainability practices, as illustrated in Table 3.3 and Figure 3.2. Three parameters, “I am encouraged to reuse towels” (6.3%), “They have water-efficient toilets (e.g. dual flush)” (5.4%), and “I can opt out of room cleaning” (4.1%), are commonly associated with reduced water usage in routine operations. These practices typically require minimal behavioural effort from guests and are often introduced through in-room signage or booking communications, which increases their visibility and ease of interpretation (Dolnicar et al., 2017).

Table 3.3: Top ten sustainability parameters acknowledged by travellers in accommodations, categorised by sustainability dimensions

#	Sustainability Dimensions	Sustainability Parameters	Yes
1	Water Conservation	I am encouraged to reuse towels	155 (6.3%)
2	Energy Efficiency	I can turn off heating and cooling in my room	145 (5.9%)
3	Social Responsibility	They actively promote activities and places in the local community (posters, business cards, etc.)	135 (5.5%)
4	Water Conservation	They have water-efficient toilets (e.g. dual flush)	133 (5.4%)
5	Waste Reduction	Recycle bins are available or I know that the hotel is sorting my room waste.	119 (4.9%)
6	Carbon Management	The place is easily accessible by public transport	116 (4.7%)
7	Sustainable Food Options	They offer vegan or vegetarian food options	109 (4.5%)
8	Water Conservation	I can opt out of room cleaning	100 (4.1%)
9	Waste Reduction	They have implemented food waste initiatives (doggy bags, "save a meal" etc.)	81 (3.3%)
10	Awareness and Education	They have a clear signage of sustainability certifications (e.g. Green Key, Ecolabel, GreenSign, etc.)	78 (3.2%)

Source: Own elaboration.

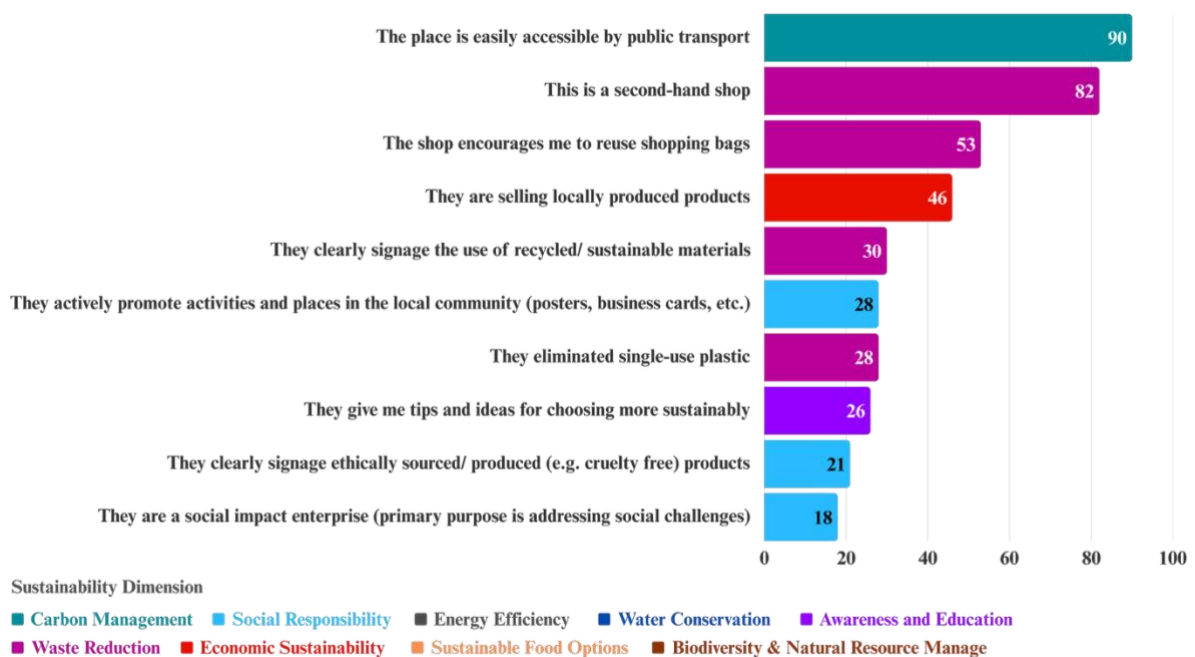
The presence of dual flush toilets, whether encountered directly or mentioned in room descriptions, is frequently seen as an indicator of resource-conscious infrastructure (Orynycz & Tucki, 2021). Collectively, these measures reflect operational approaches that incorporate guest participation in water conservation with limited disruption to the overall stay experience (Sheth, 2017). Energy efficiency is represented through the parameter “I can turn off heating and cooling in my room” (5.9%). Allowing guests to manage temperature controls supports energy-conscious use, particularly in destinations with variable climate conditions (AlFaris et al., 2016). This feature is typically encountered during routine room use and may be interpreted as part of a practical, user-centred sustainability design. In some contexts, user-friendly systems are also associated with improved guest comfort and operational efficiency (Pace, 2016). The parameter “They actively promote activities and places in the local community (posters, business cards, etc.)” (5.5%) highlights the role of accommodations in supporting local engagement. Information displays, brochures or verbal suggestions made during check-in direct guests toward nearby cultural offerings, independent businesses or less-visited sites (Xiang et al., 2022). These materials are often found in lobbies or shared spaces, where they are likely to be noticed. Such practices can reinforce the accommodation’s connection with its locality and resonate with travellers interested in more grounded and culturally aware

experiences (Paulauskaite et al., 2017). Waste reduction efforts are acknowledged through “Recycle bins are available, or I know that the hotel is sorting my room waste” (4.9%) and “They have implemented food waste initiatives (doggy bags, ‘save a meal’, etc.)” (3.3%). Recycling stations in guest rooms or communal areas indicate waste sorting processes, particularly when accompanied by colour coding or explanatory signage (Soon, 2024; Singh et al., 2014). Food waste measures such as reusable takeaway options or redistribution efforts are often seen in dining areas, reflecting practical steps taken by properties to minimise environmental impact (Lee & Huang, 2023). Lastly, “They have clear signage of sustainability certifications (e.g. Green Key, Ecolabel, GreenSign, etc.)” (3.2%) reflects a focus on transparency and third-party validation. When certifications are displayed in visible locations such as the reception or digital listings, they can serve as reference points for guests seeking confirmation of sustainable practices (Heras-Saizarbitoria et al., 2020). These indicators help contribute to the perceived credibility of the accommodation’s environmental commitments (Preziosi et al., 2019).

3.4.1.3. Shops

From the dataset of 2,446 user ratings, Figure 3.3 and Table 3.4 outline the ten most often cited sustainability parameters in shops, arranged by respective sustainability category.

Figure 3.3: Most frequently acknowledged sustainability parameters in shops based on traveller ratings



Source: Own elaboration. Graph created in Power BI, formatted in Canva.

Table 3.4: Top 10 sustainability parameters acknowledged by travellers in shops, categorised by sustainability dimensions

#	Sustainability Dimensions	Sustainability Parameters	Yes
1	Carbon Management	The place is easily accessible by public transport	90 (3.7%)
2	Waste Reduction	This is a second-hand shop	82 (3.4%)
3	Waste Reduction	The shop encourages me to reuse shopping bags	53 (2.2%)
4	Economic Sustainability	They are selling locally produced products	46 (1.9%)
5	Waste Reduction	They clearly signage the use of recycled/ sustainable materials	30 (1.2%)
6	Social Responsibility	They actively promote activities and places in the local community (posters, business cards, etc.)	28 (1.1%)
7	Waste Reduction	They eliminated single-use plastic	28 (1.1%)
8	Awareness and Education	They give me tips and ideas for choosing more sustainably	26 (1.1%)
9	Social Responsibility	They clearly signage ethically sourced/ produced (e.g. cruelty free) products	21 (0.9%)
10	Social Responsibility	They are a social impact enterprise (primary purpose is addressing social challenges)	18 (0.7%)

Source: Own elaboration.

Figure 3.3 and Table 3.4 indicate that “The place is easily accessible by public transport” (3.7%) is the most frequently acknowledged sustainability parameter in shops. Accessibility appears to shape how visitors engage with retail locations, particularly in urban settings where public transport plays a key role in mobility patterns. This characteristic is often included on digital maps or business listings and may be interpreted by travellers as an environmentally considerate feature (Zientara et al., 2024). Several waste reduction practices also emerge within shops. The parameters “This is a second-hand shop” (3.4%) and “The shop encourages me to reuse shopping bags” (2.2%) are frequently associated with circular consumption. These features are typically visible through signage or product layout and are often linked with broader narratives around sustainable retail (Hedegård, 2024). They may be interpreted as reflecting efforts to minimise resource extraction and promote more conscious consumer behaviour (D’Adamo et al., 2022). Additional actions, such as “They clearly signage the use of recycled/sustainable materials” (1.2%) and “They eliminated single-use plastic” (1.1%), further reinforce a waste-conscious approach. Communicating the use of eco-friendly packaging or plastic alternatives tends to increase the visibility of such efforts within the shop environment (Shimul & Cheah, 2023). Economic sustainability is also reflected in “They are selling locally produced products” (1.9%). These offerings are often associated with reduced transport distances, regional distinctiveness and local supply chain support (Engelseth, 2016).

Travellers may perceive such products as more meaningful or place-specific, which aligns with broader interest in locally grounded consumption (Duan et al., 2023). Awareness and education emerge through “They give me tips and ideas for choosing more sustainably” (1.1%). Signage, shelf labels or sustainability-themed messages contribute to visitors’ understanding of sustainable choices available in-store (Penz et al., 2017). When these materials are presented clearly and accessibly, they may support knowledge-building among travellers (Turunen & Halme, 2021). Social responsibility is visible in several additional practices. “They actively promote activities and places in the local community (posters, business cards, etc.)” (1.1%) reflects efforts to strengthen local ties and encourage community-based exploration. Further, “They clearly signage ethically sourced/produced (e.g. cruelty-free) products” (0.9%) and “They are a social impact enterprise (primary purpose is addressing social challenges)” (0.7%) point to ethical priorities beyond environmental considerations. These practices are aligned with increasing interest in fairness, transparency and mission-led business models (Gartenberg, 2022). When such commitments are clearly communicated, they typically resonate with travellers who are attentive to both social and environmental impact (Carrigan et al., 2011).

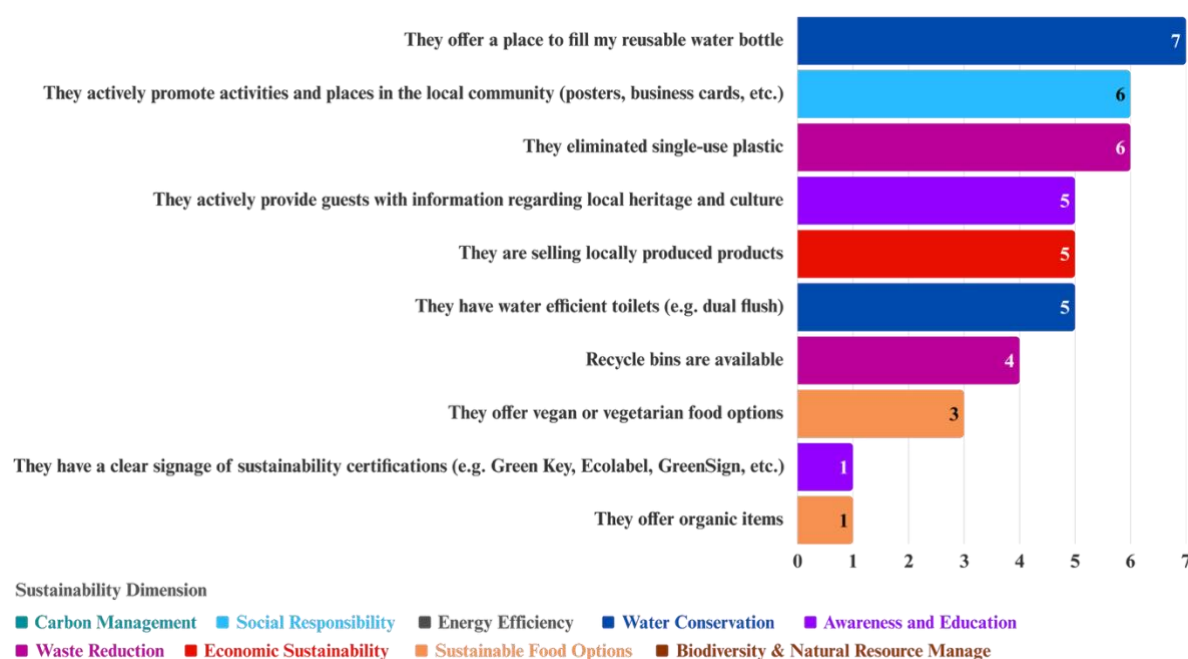
3.4.1.4. Other Businesses

Considering the total of user ratings (N=2,446), Figure 3.4 and Table 3.5 show ten most recognised sustainability parameters categorised by their sustainability dimensions across other businesses, including tour operators, cultural centres, activity providers, nature reserves, social enterprises, etc.

The most recognised parameter is “They offer a place to fill my reusable water bottle” (0.3%), categorised under Waste Reduction. This practice responds directly to travellers’ on-the-go needs and is often visible at entrances, reception areas or near restrooms. Refill stations require minimal explanation and are increasingly familiar, making them easy to spot and appreciate (Willis et al., 2019). As Willis et al. (2019) suggest, their presence may signal a basic commitment to reducing plastic waste, and is often aligned with broader efforts to encourage sustainable visitor behaviour. Two additional parameters, both acknowledged by 0.2% of users, are “They eliminated single-use plastic” and “They actively promote activities and places in the local community”. These fall under Waste Reduction and Social Responsibility, respectively. The elimination of single-use plastic is often operationalised

through changes in packaging, take-away items or service materials, and can be communicated through signs or verbal explanations (Diprose et al., 2022).

Figure 3.4: Most frequently acknowledged sustainability parameters in other businesses based on traveller ratings



Source: Own elaboration. Graph created in Power BI, formatted in Canva.

Table 3.5: Top 10 sustainability parameters acknowledged by travellers in other businesses, categorised by sustainability dimensions

#	Sustainability Dimensions	Sustainability Parameters	Yes
1	Waste Reduction	They offer a place to fill my reusable water bottle	7 (0.3%)
2	Social Responsibility	They actively promote activities and places in the local community (posters, business cards, etc.)	6 (0.2%)
3	Waste Reduction	They eliminated single-use plastic	6 (0.2%)
4	Awareness and Education	They actively provide guests with information regarding local heritage and culture	5 (0.2%)
5	Economic Sustainability	They are selling locally produced products	5 (0.2%)
6	Water Conservation	They have water efficient toilets (e.g. dual flush)	5 (0.2%)
7	Waste Reduction	Recycle bins are available	4 (0.2%)
8	Sustainable Food Options	They offer vegan or vegetarian food options	3 (0.1%)
9	Awareness and Education	They have a clear signage of sustainability certifications (e.g. Green Key, Ecolabel, GreenSign, etc.)	1 (0.0%)
10	Sustainable Food Options	They offer organic items	1 (0.0%)

Source: Own elaboration.

Meanwhile, promoting community activities, whether through posters, brochures or staff suggestions, is often interpreted as a sign of a business's embeddedness in the local context (Rozanis et al., 2024). Similarly, several businesses were acknowledged for practices falling under Awareness and Education and Economic Sustainability. "They actively provide guests with information regarding local heritage and culture" (0.2%) suggests a focus on interpretation and place-based learning. Such efforts often appear in guided narratives, exhibits or informational displays (Rozanis et al., 2024). "They are selling locally produced products" (0.2%) may reflect an interest in supporting local value chains. When these products are accompanied by clear labelling or storytelling, they are often perceived as more authentic or meaningful by visitors (Vujko et al., 2025). Other practices such as "They have water-efficient toilets (e.g. dual flush)" (0.2%) and "Recycle bins are available" (0.2%) relate to infrastructural improvements under Water Conservation and Waste Reduction. While such features may not define the core of the visitor experience, they are frequently noticed during routine use and may contribute to perceptions of environmental commitment (Soon, 2024; Orynycz & Tucki, 2021). Less commonly acknowledged parameters include "They offer vegan or vegetarian food options" (0.1%), "They offer organic items" (0.0%) and "They have a clear signage of sustainability certifications" (0.0%). These lower figures may reflect the supporting, rather than central, role of food services and certification communication in these settings. Their visibility likely varies across business types and operational contexts, which may affect how travellers notice and interpret them.

3.4.2. Sustainability recognition by type of business

Pearson's chi-square test of independence was used to assess associations between business type and sustainability recognition components, provided that test assumptions regarding expected cell frequencies were met. Considering the nine sustainability components, it is possible to observe statistically significant differences across different types of businesses. Economic recognition is more recognised (*Yes*) in other businesses (31.3%), followed by shops (25.7%) ($\chi^2=21.077$; $p\text{-value}<0.01$). Practices around awareness and education are more visible in other businesses (31.3%), shops (23.9%) and accommodations (23.8%) ($\chi^2=178.919$; $p\text{-value}<0.01$). Social responsibility is higher in other businesses (37.5%) and accommodations (33.6%) ($\chi^2=34.104$; $p\text{-value}<0.01$). Users associate more carbon management-related practices with eateries (45.8%) ($\chi^2=53.067$; $p\text{-value}<0.01$). Energy

efficiency is considered to be almost absent from businesses, except for accommodations (43.6%). Conversely, the parameter sustainable food options is highly related to eateries (76.7%) ($\chi^2=624.347$; $p\text{-value}=<0.01$). Waste reduction is more visible in eateries (58.3%) and shops (57.8%) ($\chi^2=45.795$; $p\text{-value}=<0.01$). Regarding water conservation practices, users perceive them to be more implemented in accommodations (53.1%) and they are absent in shops ($\chi^2=221.586$; $p\text{-value}=<0.01$). Biodiversity and natural resources sustainable-based component is almost absent in all types of businesses as perceived by travellers, only being indicated by some users with respect to accommodations (11%). The chi-square test for independence was not calculated for the latter component because more than 20% of the cells had an expected count lower than 5. In general, since 8 chi-squares tests were performed, it is important to interpret the results with caution. In these cases, an adjustment, such as Bonferroni, to control the risk of Type I error, is recommended (Field, 2024). In so doing, the original alpha used to assess the level of significance ($p\text{-value}=0.05$) was divided by 8 ($p\text{-value}=0.0063$). Considering this study is exploratory and all $p\text{-values}$ are <0.01 , it was deemed relevant to retain the results of the chi-squares in the analysis.

3.4.3. Association between credibility indicators (sustainability certifications and Google ratings) and sustainability recognition

3.4.3.1. Sustainability certification and sustainability recognition

Crosstabulation (Table 3.6) was undertaken to explore the association between companies having a sustainability certification and receiving sustainability recognition from users of the platform. Pearson-chi-square test of independence showed no statistically significant association between the two variables ($\chi^2=0.234$; $p\text{-value}=0.628$). Similarly, Fisher's Exact Test produced a non-significant result ($p\text{-value}=0.620$), confirming the robustness of the finding. Based on row percentages, the proportion of vendors receiving sustainability-related recognition was similar among certified (12.0%) and non-certified businesses (12.9%). Given that the expected cell frequencies satisfied the chi-square assumptions, Pearson's chi-square test was considered appropriate. These findings suggest that, within this sample, holding a formal sustainability certification does not *per se* significantly increase the likelihood of being recognised for sustainability efforts. These results may indicate that sustainability recognition is impacted by factors beyond formal certification,

such as internal practices, reporting transparency or reputation, but also the way the companies are communicating their certifications and practices (Elhoushy et al., 2025).

Table 3.6: Crosstabulation of sustainability certification and user-acknowledged sustainability

			Sustainability Recognition		Total
			No	Yes	
Sustainability Certification	No	Count	358	1790	2148
		Expected Count	360.9	1787.1	2148
		% within Sustainability Recognition	87.1%	88.0%	87.8%
		% of Total	14.6%	73.2%	87.8%
	Yes	Count	53	245	298
		Expected Count	50.1	247.9	298
		% within Sustainability Recognition	12.9%	12.0%	12.2%
		% of Total	2.2%	10.0%	12.2%
Total		Count	411	2035	2,446
		Expected Count	411	2035	2,446
		% within Sustainability Recognition	100.0%	100.0%	100.0%
		% of Total	16.8%	83.2%	100.0%

Source: Own elaboration.

3.4.3.2. Google Ratings and sustainability recognition

Table 3.7 shows that although a majority of users (63.3%) recognise at least one sustainability parameter in businesses with a high (≥ 4.3) Google rating, the proportion of sustainability recognition is higher among those who observe that the company has a high Google rating (56.8%) than among those with a low rating (43.2%). Pearson's chi-square test of independence indicated that the association between the two variables is statistically significant at the 5% level ($\chi^2=5.931$; p-value=0.015). Therefore, despite measuring different aspects (for example, Google ratings may be impacted by the level of employee friendliness), the results suggest there is an association between Google ratings and the perception of implementation of sustainability practices (Foris et al., 2020).

Table 3.7: Crosstabulation of Google ratings and user-acknowledged sustainability

			Sustainability Recognition		Total
			No	Yes	
Google Rating	High	Count	260	1155	1,415
		Expected Count	237.8	1,177.2	1,415
		% Sustainability Recognition	63.3%	56.8%	57.8%
		% Total	10.6%	47.2%	57.8%
	Low	Count	151	880	1,031
		Expected Count	173.2	857.8	1,031.0
		% Sustainability Recognition	36.7%	43.2%	42.2%
		% do Total	6.2%	36.0%	42.2%
Total		Count	411	2035	2,446
		Expected Count	411	2035	2,446
		% Sustainability Recognition	100.0%	100.0%	100.0%
		% Total	16.8%	83.2%	100.0%

Source: Own elaboration.

Nevertheless, it is important to consider that Cramér's V of 0.049, assessing the strength of the association, indicates a weak association between the variables analysed.

3.5. Discussion

3.5.1. Revisiting traveller engagement through recognition

The results indicate that recognition of sustainability is highly uneven across business types and sustainability dimensions. This aligns with prior critiques of visibility as a key condition for recognition (Font & McCabe, 2017; Miller et al., 2010), as travellers are more likely to acknowledge sustainability practices when they are made tangible, contextually relevant and embedded in the service experience.

In eateries, sustainability parameters related to food choices, such as the presence of vegan/vegetarian meals and local dishes, received high levels of recognition. These findings resonate with earlier studies by Tölkes (2018) and Wani et al. (2025), which suggest that sustainability becomes more salient when embedded in habitual consumer decisions, such as eating. The frequent identification of parameters such as “accessible by public transport” also

supports Salinero et al.'s (2022) observation that tangible and easily observed features could enhance the likelihood of recognition.

Towel reuse programmes and in-room temperature controls were among the most frequently acknowledged practices in accommodations, echoing findings by Dolnicar et al. (2017), who highlight the effectiveness of operational nudges in prompting more responsible behaviour. However, the overall recognition levels across accommodation-related sustainability practices remained modest. This outcome suggests that many actions, while present, may not be sufficiently visible or salient to guests, as also raised by Paatlan and Ranga (2024) and Moscardo (2019), who emphasise that the perceptibility of sustainability efforts depends on how they are foregrounded within the guest experience.

In the case of shops and 'other' businesses, recognition focused primarily on waste reduction and social responsibility. The conspicuousness of second-hand retail, recycled materials and local products echoes themes in the work of Hedegård (2024) and Duan et al. (2023), who note a growing interest among travellers in circular and place-sensitive consumption. Nevertheless, the relatively small proportion of affirmative responses across most sustainability parameters suggests a broader conceptual issue. Recognition may depend less on the existence of sustainable practices and more on how these are signalled in contextually appropriate and easily digestible ways (Leal & Pinho, 2024; Proi et al., 2023).

3.5.2. Interpreting business type differences and novel patterns

The chi-square analysis demonstrates statistically significant associations in recognition across business types, particularly in dimensions such as sustainable food options, waste reduction and awareness and education. The marked dominance of sustainable food-related recognition in eateries (76.7%) is consistent with the idea that sensory and habitual cues facilitate engagement with food-related sustainability (Taufik et al., 2022; Bacon & Krpan, 2018). In contrast, biodiversity-related recognition was nearly absent across all businesses, reinforcing critiques that specific sustainability pillars remain underrepresented or inadequately communicated within tourism environments (Fischer, 2023). Another interesting pattern emerged in the case of energy efficiency, which was virtually absent from user recognition outside of accommodations. This observation supports arguments by Pace (2016) and AlFaris et al. (2016), who note that energy management systems tend to be less visible

unless linked to direct user interaction, such as room temperature controls. This raises methodological questions around how certain dimensions of sustainability, particularly those embedded in infrastructure or back-of-house operations, can be effectively made recognisable without disrupting guest experience.

3.5.3. Reassessing credibility indicators

The lack of significant association between sustainability certification and traveller recognition challenges a dominant assumption in the literature that third-party certifications enhance visibility and credibility (Singh et al., 2025; Velaoras et al., 2025). While this does not contradict the utility of certification schemes *per se*, it suggests that their communicative impact may be limited unless paired with clearer signage, guest-facing storytelling or operational transparency. This finding aligns with Heras-Saizarbitoria et al. (2020), who argue that the value of certification is not intrinsic but performative, dependent on how it is mobilised and interpreted within user experience.

Conversely, the statistically significant, although weak, association between Google ratings and sustainability recognition points towards a potentially overlooked credibility pathway. While Google ratings do not explicitly represent sustainability, their perceived trustworthiness and impact on first impressions may indirectly shape recognition. These findings echo the arguments by Filieri et al. (2021) and Foris et al. (2020), who suggest that digital ratings shape traveller perception even when sustainability is not the central criterion. Thus, peer-based credibility indicators might serve as latent signals for sustainability perception when other cues are ambiguous or absent.

3.5.4. Theoretical implications

This study contributes to theoretical developments in sustainable tourism by offering an empirical lens into what travellers recognise as sustainability in practice. Much of the earlier literature has focused on intentions, attitudes or motivations (Li et al., 2024b; Wang et al., 2024), with less attention to the behavioural markers that travellers observe and acknowledge in real settings. By using a smart, crowdsourced platform, TripDoodler, to analyse recorded traveller ratings, the findings offer a more grounded understanding of how sustainability is

perceived across different business types. This adds behavioural depth to existing models that largely rely on hypothetical responses.

The findings extend current conceptualisations of recognition. While earlier literature has largely treated recognition as a by-product of awareness or intention (Font & McCabe, 2017; Miller et al., 2010), this study positions it as an observable behavioural response affected by spatial cues, context and communicative framing. In doing so, it builds on Viglia et al.'s (2024) call to examine responsible behaviour through data-rich, behaviour-focused methods. Recognition, as interpreted here, may function as a bridge between sustainability implementation and user experience. This reframing allows for more precise inquiry into how travellers in situ interpret sustainability.

The inclusion of credibility indicators, like sustainability certifications and Google ratings, further deepens the theoretical relevance of this study. Although formal certifications are designed to communicate environmental responsibility, their association with recognition was limited. This suggests that their effectiveness may depend more on how they are communicated than on their mere presence. At the same time, the observed association between high Google ratings and sustainability recognition suggests a form of informal, peer-based validation that may shape perceptions in subtle yet meaningful ways (Filiari et al., 2021; Foris et al., 2020). These findings encourage a re-evaluation of how trust signals operate within tourism environments, particularly in an age where digital platforms shape both information access and guest decision-making.

Finally, the application of a CRISP-DM framework to crowdsourced smart platform data demonstrates a structured method for investigating recognition at scale. While such approaches remain underutilised in tourism research, this study shows their potential for capturing behavioural data across multiple sustainability dimensions. This may offer directions for future theoretical and empirical work on sustainability perception and recognition.

3.5.5. Managerial implications

Businesses, including cafés, accommodations, shops and activity providers, may benefit from integrating sustainability practices into moments of direct guest interaction. Examples include referencing relevant actions on menus, booking confirmations, in-room materials or product labels (Liu et al., 2024). Framing practices using clear and concise

language, situated within the service experience, may help ensure their relevance to the guest. Businesses may also consider reviewing which sustainability dimensions align most closely with their operational model and the expectations of their visitors. Adjusting communication strategies to reflect these priorities can support greater clarity and alignment.

For destination managers, considering investments in shared systems that support consistent sustainability communication across business types and locations can be of interest (d'Angella et al., 2025). Regional directories, local signage schemes and digital maps that highlight verifiable sustainability practices may contribute to more coherent destination-level messaging. In addition, mechanisms that facilitate the collection and interpretation of visitor-facing sustainability feedback could support more responsive and coordinated planning.

On the other hand, certification bodies may reflect on how certified businesses present their credentials within customer-facing environments. Offering structured guidance on effective placement, framing and integration of certification information across digital and physical settings may support clearer guest interpretation (Elhoushy et al., 2025). Developing consistent messaging formats or display templates could further assist vendors in communicating the relevance of certification within the broader visitor experience.

Finally, smart, crowdsourced platforms may continue to enhance how sustainability-related content is structured, displayed and made searchable. Features that allow users to filter by sustainability dimensions, view standard practices or access peer-generated recognition insights may support more informed choices. Presenting aggregate recognition data through visual summaries or dashboards could provide additional value for both travellers and tourism providers engaged in sustainability communication and planning.

3.6. Conclusion

The findings from this study suggest that traveller recognition of sustainability practices varies substantially by business type and dimension. Eateries received the highest levels of recognition, particularly for sustainable food options and accessibility by public transport, while accommodations were more associated with water conservation and operational prompts. In contrast, dimensions such as biodiversity and energy efficiency appeared less frequently recognised, likely due to limited guest-facing visibility. While third-party sustainability certifications showed no significant association with traveller recognition, the analysis

indicates a weak but consistent association between higher Google ratings and increased recognition, highlighting the potential role of informal, peer-based signals in shaping sustainability perception. These patterns reinforce the importance of communication design, environmental cues and digital feedback mechanisms in understanding how travellers recognise sustainability practices across tourism settings (Mansoor et al., 2025).

While this study aims to give insights into how travellers recognise sustainability practices through a smart, crowdsourced platform, there are a few limitations to note. The analysis used data only from TripDoodler, a single platform with a strong regional user base, mainly in Denmark. The findings may reflect patterns and behaviours particular to this platform. This can limit how far the results can be applied to other or more diverse traveller groups. Future research could use data from multiple platforms to improve validity and capture a broader range of tourism contexts. In addition, this study did not examine regional or cultural variability in sustainability recognition. Given that recognition may be affected by local norms, expectations or infrastructure (Proi et al., 2023; Font & McCabe, 2017), future studies should consider comparative analyses across countries or regions to better understand contextual effects. The dataset also covered a fixed five-month period, which limits the ability to observe seasonal dynamics or shifts in traveller perception over time. Longitudinal studies could help identify whether recognition patterns change in response to evolving sustainability norms, regulatory developments or shifting traveller preferences (Power et al., 2024). Finally, mixed-method approaches, which combine behavioural data with interviews or psychological profiling, may offer a more holistic understanding of how travellers interpret and respond to sustainability signals (Li et al., 2024a). These directions present opportunities for advancing theory and practice in sustainable tourism by capturing a more comprehensive and context-sensitive view of traveller recognition.

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CHAPTER FOUR

STUDY 3: UNDERSTANDING RESPONSIBLE TRAVELLERS' ENGAGEMENT WITH SMART CROWDSOURCED PLATFORMS: A UTAUT2 APPLICATION

Abstract

Smart tourism technologies (STTs) are rapidly transforming the travel industry, yet limited research explores the factors impacting their adoption for responsible travel. Existing research often prioritises technical features while overlooking the psychological and behavioural drivers of adoption. The study addresses this gap by applying the extended Unified Theory of Acceptance and Use of Technology (UTAUT2) to examine user acceptance and utilisation of the TripDoodler platform. This smart, crowdsourced platform enables travellers to find, rate and share sustainability practices of businesses. Incorporating age and gender as moderating variables, the study used a semi-structured online questionnaire completed by 203 users and analysed the data using partial least squares structural equation modelling (PLS-SEM). The findings suggest that Facilitating Conditions, Hedonic Motivation, Habit and Social Influence are positively associated with Behavioural Intention to use the platform, while Behavioural Intention, Facilitating Conditions and Habit impact actual use. Effort Expectancy and Performance Expectancy showed no significant relationship with Behavioural Intention. Gender and Age did not moderate the relationship between Behavioural Intention and User behaviour significantly. By focusing on a real-world, sustainability-oriented platform, this study advances the theoretical understanding of STT adoption and provides practical insights for tourism technology developers aiming to support responsible traveller behaviours through more human-centred design and implementation strategies.

Keywords: *Crowdsourced Data, Responsible Travellers, Smart Tourism Technology, Sustainability, Technology Acceptance Model, UTAUT2*

4.1 Introduction

The growing use of technology in tourism is changing how travellers plan, experience and reflect on their journeys. The rise of smart tourism, supported by mobile applications,

social media and crowdsourced platforms (Zheng et al., 2024), is reshaping the sector by offering quick access to information and building stronger links between travellers and local communities (Rosário et al., 2024; Gretzel et al., 2015). Well-known platforms such as TripAdvisor provide large-scale reviews and ratings that guide travellers through collective experiences (Filieri et al., 2021). Niche platforms such as HappyCow crowdsource information on vegetarian and vegan food options, offering more tailored and value-driven travel choices (Giraud, 2023). These tools improve travel experience and help tourism providers operate more efficiently and sustainably (Sigala, 2020), which is especially important in today's climate of rising environmental awareness following the pandemic (Talwar et al., 2022).

Despite these benefits, we still know little about the psychological factors that drive travellers to adopt smart tourism technologies (STTs) for responsible travel. Most studies focus on the technical and operational features of these tools, often ignoring the human factors that impact their use in real-world settings (Zhang et al., 2022; Tajeddini et al., 2020; Buhalis et al., 2019). This is a significant gap because the success of STTs in promoting responsible tourism depends on travellers' willingness to engage with them. While researchers such as Wang et al. (2023) and Li et al. (2023) note the growing demand for sustainable options, there is still limited understanding of how attitudes, social norms and perceived control affect the adoption of these technologies (Bano & Siddiqui, 2024; Lu et al., 2022; Zhang et al., 2022). To promote responsible tourism more effectively, we must understand how psychological factors shape travellers' technological choices (Font & McCabe, 2017). This study explores some of the latter factors by focusing on how travellers adopt smart, crowdsourced technologies to support responsible travel.

As technology grows across industries, researchers have worked to understand what drives people to accept and use it. The Technology Acceptance Model (TAM), introduced by Davis (1989), marked an early step in this direction. TAM shows that perceived usefulness and ease of use shape users' willingness to adopt technology (Karahanna & Straub, 1999). However, critics argue that TAM's focus on psychological and social factors alone is too narrow to explain adoption behaviour fully (Mogaji et al., 2024; Chang et al., 2019; Venkatesh et al., 2003).

In response to these limitations, Venkatesh et al. (2003) introduced the Unified Theory of Acceptance and Use of Technology (UTAUT), combining several earlier models, including TAM, the Theory of Planned Behaviour and the Motivational Model. The model incorporates

moderators such as age, gender, experience and voluntariness of use, making it more adaptable to different user groups (Legris et al., 2003). Later, UTAUT2 extended the model further by including Hedonic Motivation, Price Value and Habits, which are important in consumer technology use (Venkatesh et al., 2012). UTAUT2 explains up to 74% of the variation in Behavioural Intention in consumer contexts, offering strong predictive power (Venkatesh et al., 2016). However, researchers have yet to fully explore how UTAUT2 applies to tourism technologies and their use in promoting responsible behaviour. This study uses UTAUT2 to understand better the psychological barriers and motivations that impact travellers' decision-making in relation to adopting smart technologies for sustainable travel.

In so doing, this study focuses on TripDoodler (app.tripdoodler.com), a smart, crowdsourced sustainability platform that enables travellers to find, rate and share the sustainability practices of businesses in real time (TripDoodler, 2024). The platform combines mobile accessibility, user-generated input and algorithmic integration. In doing so, it transforms individual ratings into collective knowledge. Through this feedback-loop design, businesses can understand how their sustainability practices are perceived (Agapito et al., 2023). Unlike traditional certification systems that rely on periodic third-party audits, TripDoodler uses technology to enable immediate, participatory assessments that are continuously updated and globally accessible. This technologically intervened, peer-driven model provides a unique context for applying UTAUT2. This approach allows for a deeper examination of the psychological factors that underpin travellers' adoption and use of smart tourism technologies aimed at encouraging responsible behaviour.

4.2. Literature Review

Crowdsourced technologies play an important role in responsible tourism by enabling travellers to find, acknowledge and share sustainability information (Shen et al., 2020). They rely on collective input to address gaps that traditional providers and certification schemes often leave unfilled (Sigala, 2020; Blohm et al., 2018). Platforms such as TripAdvisor, Booking.com and Google Maps aggregate millions of reviews and ratings that assist travellers in assessing service quality and identifying sustainable practices of service providers (Filiari et al., 2021; Wang et al., 2021). Moreover, platforms like Couchsurfing and Workaway emphasise cultural exchange and community engagement, offering models of peer-to-peer participation that extend beyond simple consumption (Irimiás, 2023; Decrop et al., 2018). In

addition, apps like HappyCow and abillion provide a more specialised focus on vegetarian and vegan dining. They guide travellers towards ethical food options and support the sustainability practices of local businesses (Giraud, 2023). More recent initiatives, such as TripDoodler, place sustainability at the centre of their design by enabling travellers to rate and share environmental and social practices in real time (Agapito et al., 2023). Collectively, these platforms can impact traveller decision-making (Shen et al., 2020) and encourage businesses to operate with greater transparency and accountability (Blohm et al., 2018). Understanding the factors that underpin the adoption and continued use of such platforms calls for a theoretical framework (Zhang et al., 2021; Leal et al., 2020). The Unified Theory of Acceptance and Use of Technology 2 offers a robust basis for this analysis as it consolidates and extends earlier models of technology acceptance (Venkatesh et al., 2012).

The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) is a comprehensive framework designed to extend the original UTAUT model, which focused on understanding technology acceptance in organisational contexts. Introduced by Venkatesh et al. (2012), UTAUT2 adapts the original model to better suit consumer contexts by incorporating additional constructs that reflect individual motivations and behaviours. This enhanced framework has demonstrated applicability across various fields, including education, healthcare and tourism, showcasing its broad applicability (Avci, 2022; Duarte & Pinho, 2019; Gupta & Dogra, 2017).

UTAUT2 comprises seven core constructs: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), Hedonic Motivation (HM), Price Value (PV) and Habit (HB). Each construct plays a pivotal role in shaping an individual's Behavioural Intention (BI) to adopt technology, which subsequently impacts their actual Use Behaviour (UB) (Tamilmani et al., 2021). Furthermore, the theory acknowledges the moderating effects of demographic variables such as age, gender and experience, proposing that these factors impact the strength of the relationships between the core constructs and technology usage outcomes (Venkatesh et al., 2012).

The following sections present the hypotheses based on UTAUT2. The hypotheses are based on how the model helps explain the adoption and use of smart, crowdsourced technologies that shape travellers' responsible intentions and behaviours.

4.2.1. Performance Expectancy (PE) and Behavioural Intentions (BI)

Performance Expectancy refers to how individuals believe using a specific technology will improve their performance (Venkatesh et al., 2012). In tourism, PE reflects the belief that technology can enhance travel experience or simplify travel tasks. Research shows a strong link between PE and Behavioural Intention (BI) in adopting tourism technologies. For instance, Ali et al. (2024), using a modified UTAUT model, found that PE impacted travellers' intention to adopt technology. Similarly, Kuo et al. (2019) also showed that perceived usefulness and ease of use shape travellers' willingness to use digital platforms. Moreover, Lu et al. (2022) found that PE positively affects travellers' intentions to engage in sustainable travel. Chaudhuri et al. (2024) analysed blockchain use in tourism and found that the perceived benefits, such as transparency and transaction efficiency, impacted travellers and industry stakeholders. These findings suggest that travellers are more likely to adopt technology when they see it as a way to improve sustainability through better resource use or by reducing environmental harm. Based on this discussion, the following hypothesis is proposed:

H₁: Performance Expectancy is positively related to travellers' Behavioural Intentions to use smart, crowdsourced technologies for responsible tourism.

4.2.2. Effort Expectancy (EE) and Behavioural Intentions (BI)

Effort Expectancy is a core element of the UTAUT2 model and refers to how easily individuals believe technology is used (Venkatesh et al., 2012). Studies show a strong positive link between EE and BI, especially in the context of smart, crowdsourced technologies in tourism. Assaker et al. (2019) extended UTAUT2 to explore how travellers engage with online travel reviews. The authors found that travellers are more likely to adopt a technology when they perceive it as simple and accessible, which improves their overall travel experience. Likewise, Uphaus et al. (2019) also confirmed that travellers are more inclined to use location-based services when these tools are easy to operate, particularly when they offer real-time information. Tamilmani et al. (2022) also found similar results in their study of Airbnb use among Indian travellers. Their research showed that ease of use strongly impacts travellers' intention to use the platform. Similarly, Wu and Lai (2021) studied augmented reality in tourism and found that EE plays a key role in travellers' willingness to adopt new digital tools.

These studies highlight that EE is important for encouraging travellers to engage with smart technologies. Based on this, the following hypothesis is proposed:

H2: Effort Expectancy is positively related to travellers' Behavioural Intentions to use smart, crowdsourced technologies for responsible tourism.

4.2.3. Social Influence (SI) and Behavioural Intentions (BI)

Social Influence refers to how much individuals believe that important others think they should use a specific technology (Venkatesh et al., 2012). Recent studies show a positive relationship between SI and BI in the context of tourism technologies. Kundan et al. (2024) found that SI indirectly affects travellers' intention to revisit a destination by encouraging them to adopt smart technologies. This suggests that travellers are more likely to use these tools when they see approval from peers or social networks. Similarly, Shen et al. (2020) found that social networking sites impact responsible behaviour among smart travellers. The researchers stress that SI plays a strong role during the early stages of adoption, showing that social approval matters most initially. Timur et al. (2023) explored the use of digital apps in Halal tourism and identified SI as a key predictor of BI. Their results support that peer support and social norms drive technology use. Chuang et al. (2018) also found that SI positively shapes travellers' intentions to act sustainably. The authors' study showed that support from others helps promote responsible behaviour. Therefore, based on these findings, the following hypothesis is proposed:

H3: Social Influence is positively related to travellers' Behavioural Intentions to use smart, crowdsourced technologies for responsible tourism.

4.2.4. Facilitating Conditions (FC), Behavioural Intention (BI), and Use Behaviour (UB)

Facilitating Conditions refers to the resources and support individuals believe they have when using technology (Venkatesh et al., 2012). Research consistently shows a strong relationship between FC and BI and Use Behaviour (UB). Assaker et al. (2019) examined travellers using online travel reviews and found that FC, such as internet access and platform usability, affected both BI and UB. In sustainable tourism, Ogi et al. (2022) found that travellers are more likely to participate in sustainable activities when they have access to valuable

resources and receive support from service providers. Castañeda et al. (2019) explored mobile tourism apps and found that strong FC encourages loyalty by helping travellers continue using the apps. The researchers' findings reveal that travellers are more willing to use and keep using tourism technologies when they perceive enough support. The process of improving the design of these tools by making them easier to navigate can also help reduce the effort needed to use them. This idea supports the findings by Tamilmani et al. (2022), who emphasised the role of user experience in technology adoption. Based on this evidence, the following hypotheses are proposed:

H_{4a}: Facilitating Conditions are positively related to travellers' Behavioural Intentions to use smart, crowdsourced technologies for responsible tourism.

H_{4b}: Facilitating Conditions are positively related to travellers' actual Use Behaviour of smart, crowdsourced technologies for responsible tourism.

4.2.5. Hedonic Motivation and Behavioural Intention (BI)

Hedonic Motivation, a distinctive addition to the UTAUT2 model, is recognised as a key determinant in shaping BI. The term refers to the pleasure or enjoyment of using technology (Venkatesh et al., 2012). In the tourism sector, HM is often linked to the pursuit of enjoyment, novelty and emotional satisfaction, which can strongly impact travellers' intentions to adopt and utilise new technologies or services. Empirical studies consistently highlight the impact of HM on BI within the tourism context. For example, Chang et al. (2020) found that HM positively impacts browsing behaviour and engagement within online travel communities. This indicates that users are more likely to interact with entertainment and enjoyment technologies. Ali et al. (2024) suggested that HM works with Performance Expectancy and Habit to shape travellers' intentions to use information and communication technologies. Tamilmani et al. (2022) also found that HM strongly impacts BI, especially when people act based on personal enjoyment. Casado-Díaz et al. (2020) found that HM can be stronger than moral concerns in shaping actions like water conservation in hotels. The latter study suggests that enjoyment can also lead travellers to act sustainably. Based on these insights, the following hypothesis is proposed:

H₅: Hedonic Motivation is positively related to travellers' Behavioural Intentions to use smart, crowdsourced technologies for responsible tourism.

4.2.6. Habit (HB), Behavioural Intention (BI), and Use Behaviour (UB)

Habit refers to how often people act automatically based on past use and repetition (Venkatesh et al., 2012). This idea is especially relevant in tourism, where many travellers now use technology regularly for planning and experiences. Literature shows that HB strongly affects both BI and UB when travellers adopt new technologies. Gupta et al. (2018) found that HB is important in using smartphone apps for travel planning and navigation. Paiva et al. (2022) studied how augmented reality (AR) improves the travellers' experience and showed that repeated use of AR builds Habits that impact future behaviour. Yin et al. (2023) also used the UTAUT2 model to show that HB affects both BI and UB in travellers' use of AR tools. Moreover, Ogi et al. (2022) found that using e-tourism tools helps promote eco-friendly travel. Based on this, the following hypotheses are proposed:

H_{6a}: Habit is positively related to travellers' Behavioural Intentions to use smart, crowdsourced technologies for responsible tourism.

H_{6b}: Habit is positively related to travellers' actual Use Behaviour of smart, crowdsourced technologies for responsible tourism.

4.2.7. Behavioural Intention (BI) and Use Behaviour (UB)

Behavioural Intention, as defined by Ajzen (1991), is the likelihood that a person will carry out a specific behaviour. Use Behaviour refers to the actual action in a given setting (Venkatesh et al., 2012). Many studies in tourism have examined the link between BI and UB, helping to explain what drives travellers' choices and actions. Ali et al. (2024) studied Information and Communication Technology (ICT) in tourism. They found that elements from the UTAUT model, such as PE and EE, shaped travellers' BI. Hameed et al. (2022) looked at mobile payment systems in tourism and found that travellers who saw clear benefits were more likely to use these tools. Consequently, this intention led to actual use. Lu et al. (2022) added social factors to the UTAUT model to study what motivates responsible travel. Their findings showed that BI plays a key role in driving UB. These discoveries reinforce the idea that intention often leads to behaviour. Based on this discussion, the following hypothesis is proposed:

H7: Behavioural Intention is positively related to travellers' actual Use Behaviour of smart, crowdsourced technologies for responsible tourism

4.2.8. Moderating effects of Gender and Age within UTAUT2

The UTAUT2 framework is widely used to study how individual differences such as age, gender and experience impact technology acceptance and use. While experience is often included as a moderator, this study does not examine it. This choice is deliberate. Experience is context-specific and often challenging to measure without detailed knowledge of users' familiarity with a particular tool (Ma et al., 2024). In smart tourism, travellers have different exposures to different platforms. This variation makes it hard to draw clear and general conclusions. Sustainability knowledge also plays a role in how people use these tools, but it is highly personal. One traveller may understand sustainable travel well, while another may not, even if both have experience with tourism apps. These differences make treating experience as a single, measurable variable hard.

Gender shapes how people adopt technology. In tourism, women tend to focus more on SI and FC when using mobile apps for trip planning (Balakrishnan et al., 2021). While Chang et al. (2019) showed that gender affects the relationships between PE-BI and SI-BI, Wong et al. (2019) found that gender moderates the link between HM and BI, making this effect more substantial for women. These findings suggest that gender can shape people's intentions to use technology.

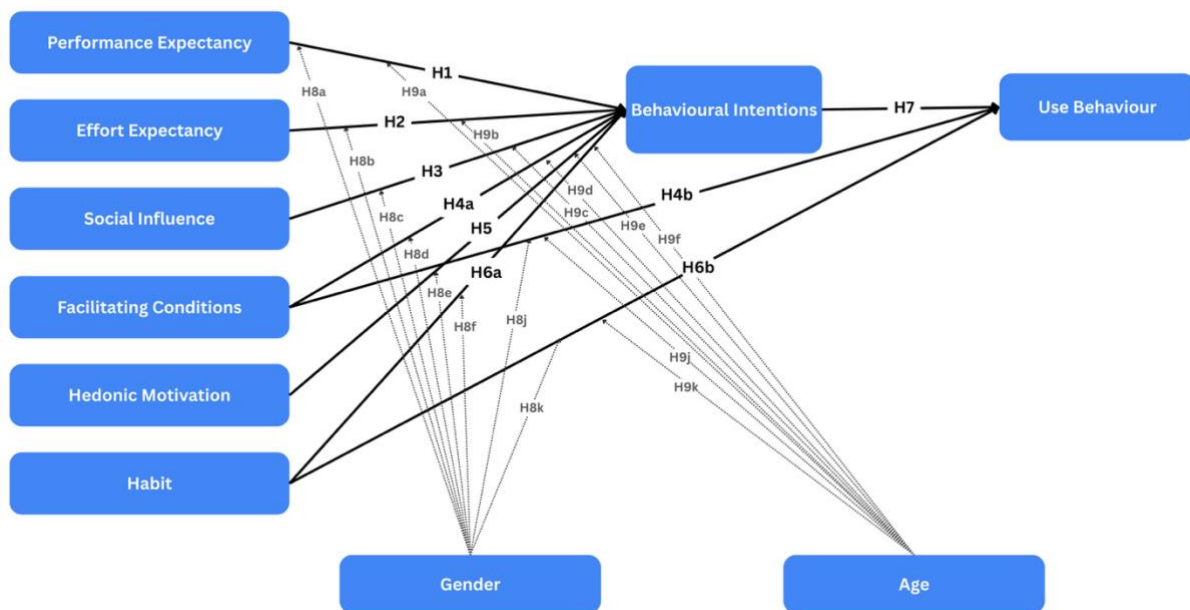
Age is also a recognised potential moderator. Studies show that younger users are more likely to adopt new technologies. Chang et al. (2019) found that age affects the strength of relationships between EE and BI, SI and BI, and HB and BI in online hotel bookings. Wang (2024) also revealed that younger travellers are more likely to use new tools like augmented reality to improve their travel experience.

However, contrasting evidence suggests that the effects of age and gender on BI or use UB may be limited or context-dependent, as seen in studies on restaurant recommendation adoption (Romero-Charneco et al., 2025). Still, given the wider body of research that identifies age and gender as relevant moderators in technology adoption, it remains important to test their potential impact in the context of smart, crowdsourced platforms and responsible travel. Accordingly, the following hypotheses are proposed:

H₈: Gender moderates the relationships between (a) Performance Expectancy, (b) Effort Expectancy, (c) Social Influence, (d) Facilitating Conditions, (e) Hedonic Motivation, (f) Habit and travellers' Behavioural Intentions to use smart, crowdsourced technologies for responsible tourism. Additionally, gender (g) moderates the relationship between (g) Facilitating Conditions and (h) Habit with Use Behaviour.

H₉: Age moderates the relationships between (a) Performance Expectancy, (b) Effort Expectancy, (c) Social Influence, (d) Facilitating Conditions, (e) Hedonic Motivation, (f) Habit and travellers' Behavioural Intentions to use smart, crowdsourced technologies for responsible tourism. Additionally, age (g) moderates the relationship between (g) Facilitating Conditions and (h) Habit with Use Behaviour.

Figure 4.1: Hypothesis research model



Source: Own elaboration adapted from Venkatesh et al. (2012)

4.3. Methodology

4.3.1. Research setting

This research examines how users interact with TripDoodler (app.tripdoodler.com), a smart crowdsourced platform that allows travellers to find, rate and share the sustainability

efforts of businesses (Agapito et al., 2023). The platform gives users a set of objective parameters to evaluate each business based on its sustainability practices. Each parameter uses fixed response options - 'Yes,' 'No,' or 'I don't know.' These parameters help assess how travellers perceive the visible implementation of sustainable practices. For example, one parameter may ask whether "organic items are indicated on the menu." If users see this feature, they can confirm it by selecting 'Yes.' These individual ratings contribute to a shared database created by travellers for travellers. The platform uses advanced API integrations with services like Google to help users locate and identify the businesses they want to rate. The collected data serves two key purposes: it gives businesses customer-driven insights into how their sustainability efforts are perceived and provides feedback that can guide future marketing and operational improvements.

4.3.2. Data collection

This study used a questionnaire as the primary data collection tool. The questionnaire was created using a Google Forms platform and shared with the 646 registered users of the TripDoodler platform through email and WhatsApp communities (Appendix 3). A non-probabilistic convenience sampling approach with self-selection was adopted. This approach was considered appropriate given the exploratory nature of the study and its focus on active users of the platform. The data collection process followed the General Data Protection Regulations. All participants provided electronic informed consent after reading a clear explanation of their rights and the confidentiality of their responses. Data was collected between October and November 2024. A total of 203 valid responses were obtained for analysis.

4.3.3. Survey instrument

This study used a survey questionnaire developed initially by Venkatesh et al. (2012) and adapted it to fit the context of the TripDoodler platform. The questionnaire had two sections. The first section followed the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) and included 25 items grouped under seven constructs: Performance Expectancy (4 items), Effort Expectancy (4 items), Social Influence (3 items), Facilitating Conditions (4 items), Hedonic Motivation (3 items), Habit (4 items) and Behavioural Intention (3 items). The

second section collected demographic and situational information from participants. Each item in the UTAUT2 section was measured using a five-point Likert scale, ranging from “strongly disagree” to “strongly agree.” The questionnaire was pre-tested with ten participants to check for clarity and relevance. Feedback from this phase was used to make final adjustments before full distribution.

4.3.4. Data analysis

The data analysis began with a descriptive analysis using SPSS (version 28.0.1.0) to examine the socio-demographic profile of the respondents and summarise their responses to the constructs in the proposed model. The next step involved estimating the conceptual model using Partial Least Squares Structural Equation Modelling (PLS-SEM) in SmartPLS 4 (Cheah et al., 2024). PLS-SEM was selected due to its strength in theory development and suitability for exploratory research involving complex models. This method is particularly useful when data do not follow a normal distribution, as in this study (tests of normality: $p = 0.00$) (Hair et al., 2019; Shmueli et al., 2019). PLS-SEM is also widely used in research on information systems, especially in studies applying the UTAUT and UTAUT2 frameworks (Ali et al., 2024; Gupta & Dogra, 2017).

Firstly, the assessment of common method bias (CMB) is important in order to detect the existence of a substantial amount of common method variance in the sample, with one factor responsible for the majority of the covariance between the indicators. This analysis is relevant because the main constructs under analysis were measured using the same scale (five-point Likert scale), which can be a source of CMB (Kock et al., 2021). In such cases, participants are more likely to be consistent in their responses. This aspect can affect the results by increasing the covariances between the variables. If, from the test, a first factor emerges that explains more than 50% of the total variance, bias is present (Aguirre-Urreta & Hu, 2019; Podsakoff et al., 2012). The PLS-SEM analysis followed two stages. The first stage evaluated the measurement model to ensure the constructs were reliable and valid (Cheah et al., 2024). This step included testing individual and composite reliability and convergent and discriminant validity. Factor loadings were checked to confirm that each item exceeded 0.7 and was statistically significant, showing that item variance related more to its construct than to error (Haji-Othman & Yusuff, 2022; Hair et al., 2019). Composite reliability and Cronbach’s Alpha

were assessed, with values above 0.7 indicating good internal consistency (Cheung et al., 2024). Convergent validity was confirmed if the Average Variance Extracted (AVE) for each construct was greater than 0.5 (Hair et al., 2019). Discriminant validity was examined using the Fornell and Larcker criterion and the Heterotrait-Monotrait Ratio (HTMT). The Fornell and Larcker method compared the square root of each construct's AVE with its correlations with other constructs. The HTMT ratio tested whether mean correlations between constructs stayed below 0.85 and significantly differed from 1 (Purwanto & Sudargini, 2021).

In the second stage, the structural model was evaluated for its ability to explain and predict outcomes. This step involved the process of analysing R^2 and Q^2 values to assess the model's explanatory and predictive strength. Hypothesis testing relied on the direction and significance of the path coefficients, which provided insights into the relationships between constructs in the proposed model. Moderation effects were assessed using multi-group analysis (MGA) within the PLS-SEM framework in SmartPLS 4. Prior to conducting MGA, measurement invariance across groups was examined to ensure comparability. Group-specific path coefficients were then compared using a bootstrapping procedure with 5,000 subsamples to test for statistically significant differences between groups.

4.4. Results

4.4.1. Sample characteristics

Table 4.1 presents the demographic profile of the sample. The data reflects TripDoodler's target audience, which is composed of young, educated travellers interested in responsible travel. The gender distribution is nearly equal. The average age is 33 years old, with a standard deviation of 9.789, a minimum of 19 years old and a maximum of 77 years old. The median age is 30 years old, indicating the sample shows a strong presence of the millennial demographic. More than 90% of respondents have completed formal education, indicating a well-informed user base. Most of the respondents are employed, with about two-thirds working full-time. In terms of location, most users come from Denmark, India and Portugal. This aligns with TripDoodler's marketing focus in these regions.

Table 4.1: Demographic profile of the sample

Sample (<i>n</i> = 203)	Frequency	Percentage (%)
Gender		
Female	98	48.3%
Male	100	49.3%
Other	1	0.5%
Prefer not to say	4	2.0%
Education		
Basic Level	1	0.5%
High School	2	1.0%
Bachelor	89	43.8%
Master	101	49.8%
PhD	8	3.9%
Other	2	1.0%
Occupation		
Self-Employed	40	19.7%
Employee on behalf of others	139	68.5%
Unemployed	2	1.0%
Student	20	9.9%
Retired	0	0.0%
Other	2	1.0%
Nationality		
India	37	18.2%
Portugal	34	16.7%
Denmark	28	13.8%
USA	16	7.9%
UK	14	6.9%
Italy	11	5.4%
Germany	8	3.9%
Poland	7	3.4%
Spain	6	3.0%
The Netherlands	6	3.0%
Others	36	18.0%

Source: Own elaboration.

Based on the theory of Emerging Adulthood proposed by Arnett (2000) that defines the ages approximately between 18 and 30 as a distinct period of the life cycle characterised by exploration, instability and identity focus, the division of participants into two groups (above

and below or equal 30 years of age) for a structural equation analysis is methodologically sound. This delimitation creates two conceptually distinct moderator groups. One group primarily represents individuals in the final stage of emerging adulthood or in transition (≤ 30 years, with 106 respondents). The other group represents established adults (>30 years with 97 respondents). It is more likely that these individuals have greater stability in their careers, relationships and identities. By isolating these two groups the researcher can more accurately test whether the paths and relationships in the structural model (for example between social support and well-being) differ significantly between a life stage still marked by exploration and transition and one of greater consolidation.

The average score of 6.8 (on a scale of 0 to 10) for the likelihood of recommending TripDoodler to others indicates generally moderately positive intentions amongst users. The median and mode are 7, the minimum is 2 and the maximum is 10. In general, it seems the platform meets expectations but has substantial ground to cover in order to encourage more robust loyalty and enthusiastic recommendations.

Table 4.2 shows that Google Reviews is the dominant alternative platform for finding and rating sustainable tourism businesses, which is used by more than a third of respondents (37.9%). A relevant finding is that over a quarter of users (27.1%) do not use any other platform. This result can point to strong primary loyalty to TripDoodler or a lack of awareness of alternatives. TripAdvisor is the second most popular dedicated travel platform at 24.6%. Niche players like HappyCow (6.4%) and EcoBnB (2.0%) cater to a specific sustainable travel segment but have limited overall reach. Very few users rely on platforms like Yelp and Foursquare (1.5% combined). This aspect shows their limited relevance in this market. These findings highlight an opportunity for TripDoodler to attract users from Google Reviews by emphasising its specialised sustainability focus while also strengthening its role as the main platform for its loyal user base.

Table 4.2: Primary alternative platforms for finding and rating sustainable tourism businesses

Apart from TripDoodler, which other platform do you primarily use to find or rate/review the sustainability efforts of tourism businesses?	%
Google Reviews	37.9%
I do not use another platform	27.1%
TripAdvisor	24.6%
HappyCow	6.4%
EcoBnB	2.0%
Yelp	1.0%
FourSquare	0.5%
Friend's recommendation	0.5%
Total	100.0%

Source: Own elaboration.

4.4.2. Testing Common Method Bias

Before estimating the model, Common Method Bias was assessed using the Harman test. The Harman test was performed by applying exploratory factor analysis with the extraction of a single extracted factor (Appendix 4). In the present study, it was found that this factor explains 33.3% of the total variance, below the maximum limit of 50% recommended in the literature. On the other hand, six factors account for 70% of the variance. These results suggest that the Common Method Bias is not a critical aspect for the study and, therefore, the data are suitable for the estimation and evaluation of the structural equation model (Aguirre-Urreta & Hu, 2019; Podsakoff et al., 2012). The results confirmed the suitability of the data, with a high Kaiser-Meyer-Olkin measure of sampling adequacy ($KMO = 0.878$) and a significant Bartlett's test of sphericity ($\chi^2(465) = 4039.833$; $p < 0.001$).

Additionally, considering the recommendations of Kock (2015) for detecting common method bias and collinearity in PLS-SEM models, a full collinearity assessment was conducted. All Variance Inflation Factor (VIF) values for the indicator items were below the conservative threshold of 3.3, ranging from 1.433 to 4.224. Although one item (HB2 = 4.224) approached the more permissible limit of 5.0, as suggested by Hair et al. (2019), its value is still considered acceptable, indicating that collinearity among the constructs and the potential threat of common method bias do not reveal a critical problem for the robustness and validity of the model proposed in this study. However, the value of an item (for SI2=10.031) greatly exceeds the indicated value, so it will be eliminated from the model.

4.4.3. Measurement model

In the study's assessment of the measurement model, several statistical measures were employed to ensure the reliability and validity of the constructs using SmartPLS (Wong, 2013). Reliability was assessed using both Cronbach's Alpha and Composite Reliability (rho_c and rho_a). Each method confirmed that the constructs were consistently represented by their indicators, with values exceeding the 0.7 threshold (Henseler et al., 2015), indicative of acceptable reliability (Table 4.3).

For Convergent Validity, the study calculated the Average Variance Extracted (AVE) for each construct, successfully demonstrating that each construct explained more than 50% of the variance in its indicators (Table 4.3), whose minimum recommended value is 0.5 (Henseler et al., 2015), thereby confirming that the constructs were well captured by their respective indicators.

Table 4.3: Reliability and convergent validity of measurement model

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
BI	0.863	0.864	0.916	0.785
EE	0.838	0.856	0.890	0.669
FC	0.718	0.726	0.825	0.543
HM	0.881	0.889	0.927	0.808
HB	0.901	0.908	0.932	0.774
PE	0.788	0.807	0.863	0.612
SI	0.946	0.949	0.965	0.903
UB	0.897	0.897	0.928	0.764

Source: Own elaboration.

Note: BI: Behavioural Intentions; EE: Effort Expectancy; FC: Facilitating Conditions; HM: Hedonic Motivation; HB: Habit; PE: Performance Expectancy; SI: Social Influence; UB: Use Behaviour. AVE: Average Variance Extracted; CR^{rho_a}: Composite Reliability (rho_a); CR^{rho_c}: Composite Reliability (rho_c); α : Cronbach's Alpha

The study tested discriminant validity using multiple methods. The Fornell-Larcker criterion confirmed that each of the eight constructs correlated more strongly with its indicators than with other constructs (see Table 4.4). The cross-loadings analysis, presented in Appendix 5, supported this finding. All indicators loaded more highly on their assigned constructs than on any others. The HTMT matrix also confirmed discriminant validity. All HTMT ratios were

below the accepted threshold of 0.90 (Henseler et al., 2015), showing that the constructs were clearly distinct and well separated from each other (Table 4.4).

Table 4.4: Discriminant validity of measurement model

	BI	EE	FC	HM	HB	PE	SI	UB
BI	0.886							
EE	0.311	0.818						
	0.354							
FC	0.471	0.353	0.737					
	0.598	0.446						
HM	0.547	0.371	0.470	0.899				
	0.626	0.417	0.595					
HB	0.520	0.244	0.422	0.582	0.880			
	0.590	0.260	0.511	0.651				
PE	0.268	0.422	0.307	0.268	0.142	0.782		
	0.322	0.525	0.412	0.331	0.174			
SI	0.430	0.221	0.276	0.441	0.467	0.205	0.945	
	0.486	0.249	0.339	0.466	0.522	0.239		
UB	0.580	0.301	0.522	0.575	0.663	0.232	0.485	0.874
	0.659	0.324	0.645	0.645	0.734	0.271	0.545	

Source: Own elaboration.

Note: Diagonal values corresponding to the Fornell-Larcker criterion appear in **bold**. The HTMT values are in regular type.

4.4.4 Structural model

The evaluation of the structural model provides important insights into the factors impacting BI and UB. The path coefficient from BI to UB is 0.247, with a p -value of 0.000, presented in Table 4.5 and Figure 4.2. This indicates that stronger Behavioural Intentions are positively related to higher technology use. In contrast, PE shows a minimal impact on BI; its path coefficient is 0.067 with a p -value of 0.387, indicating no significant effect in this context. Similarly, EE does not significantly impact BI. Its coefficient is 0.042 with a p -value of 0.655, suggesting that ease of use is not a key driver of initial intention to use the platform. FC are positively associated with both BI and UB. The path coefficients are 0.196 and 0.219, p -values of 0.008 and 0.000, respectively. These results underline the important role of available support and resources in promoting technology adoption. HM also contributes to BI, with a coefficient

of 0.230 and a p -value of 0.002. This shows that enjoyment and pleasure derived from technology impact the intention to use it. HB emerges as a powerful predictor, affecting BI with a coefficient of 0.213 and has a robust direct effect on UB with a coefficient of 0.442, both with statistically significant p -values. The F-square value for HB's effect on UB is 0.3, which is considered significant. This highlights the importance of Habit as a key predictor of actual use. Finally, SI has a significant effect on BI. The path coefficient is 0.152 with a p -value of 0.017, confirming that social approval and peer input play a meaningful role in technology adoption decisions.

A multi-group analysis was conducted to assess whether age and gender moderated the relationships between the UTAUT2 constructs, BI and UB. The results indicate that no statistically significant differences were observed in the structural paths between the age groups (≤ 30 years vs. > 30 years). Similarly, no significant differences were found between male and female respondents. These findings suggest that neither age nor gender moderates the relationships proposed in the structural model. The effects of PE, EE, SI, FC, HM and HB on BI and UB appear to be consistent across demographic groups within this sample.

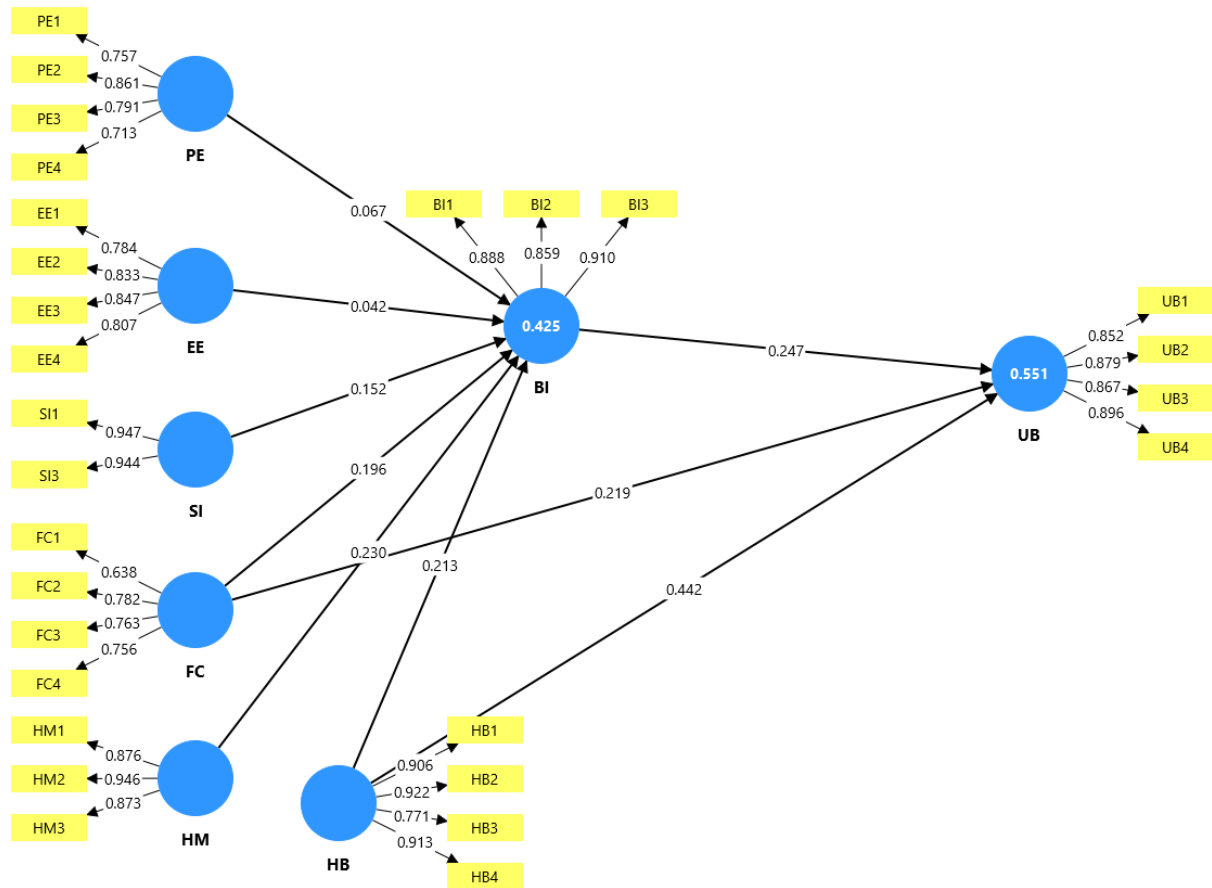
Table 4.5: Result of structural model and hypothesis testing

Hypothesis	Paths	Path Coefficient	t Statistics	p-Value	Supported?
H ₁	PE → BI	0.067	1.000	0.387	No
H ₂	EE → BI	0.042	0.655	0.513	No
H₃	SI → BI	0.152	2.390	0.017	Yes
H_{4a}	FC → BI	0.196	2.642	0.008	Yes
H_{4b}	FC → UB	0.219	3.626	0.000	Yes
H₅	HM → BI	0.230	3.079	0.002	Yes
H_{6a}	HB → BI	0.213	3.188	0.001	Yes
H_{6b}	HB → UB	0.442	7.794	0.000	Yes
H₇	BI → UB	0.247	4.324	0.000	Yes

Source: Own elaboration.

Note: PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; FC: Facilitating Conditions; HM: Hedonic Motivation; HB: Habit; BI: Behavioural Intention; UB: Use Behaviour

Figure 4.2: The path analysis results of Structural Equation Modelling



Source: Own elaboration in Smart PLS.

Note: PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; FC: Facilitating Conditions; HM: Hedonic Motivation; HB: Habit; BI: Behavioural Intention; UB: Use Behaviour

The analysis of indirect and total effects in the structural model offers deeper insight into how different factors shape UB. Indirect effects, especially along the pathway from BI to UB, show strong impact from FC, HM, HB and SI. These findings, as listed in Table 4.6, suggest that some constructs do not directly impact UB but affect it through their impact on BI. This highlights the role of BI as a mediator in technology adoption. The total effects analysis shows that HB has the strongest total effect on UB of 0.495. This includes both direct effects and those that operate through BI, underlining the significant association between Habit and technology use. FC also shows a notable total effect of 0.268 on UB. In contrast, EE and PE have relatively small total effects.

Table 4.6: Results of total effect

Paths	Total effects
BI → UB	0.247
EE → BI	0.042
EE → UB	0.010
FC → BI	0.196
FC → UB	0.268
HM → BI	0.192
HM → UB	0.057
HB → BI	0.230
HB → UB	0.495
PE → BI	0.067
PE → UB	0.017
SI → BI	0.152
SI → UB	0.037

Source: Own elaboration.

The R-square values show that the model explains a substantial portion of the variance in BI and UB. An R-square of 0.425 for BI and 0.551 for UB indicates that the predictors in the model play a strong role in explaining both intention and actual use. These values confirm that the identified factors are meaningful in understanding how and why travellers adopt smart technologies. The adjusted R-square values, 0.408 for BI and 0.544 for UB, are slightly lower but still indicate a strong model fit. This adjustment accounts for the number of predictors and helps ensure the model avoids overfitting.

4.5. Discussion

4.5.1. Theoretical contributions

This study makes several theoretical contributions by advancing the understanding of psychological factors underpinning travellers' adoption and use behaviour on smart, crowdsourced sustainability platforms, such as TripDoodler. The research extends the model beyond its everyday use in consumer-oriented contexts (Al-Adwan et al., 2024) by applying the UTAUT2 to a setting focused on community-driven and sustainability goals. The findings

show that constructs like HM, HB and SI play a key role in shaping user behaviour within platforms designed to promote responsible travel.

Worth noting is the strong impact of HB on UB. Once users incorporate a platform into their routines, they may tend to use it out of habit. This finding aligns with Yin et al. (2023), who noted the impact of habitual use in tourism technology. However, when it comes to adopting unfamiliar or disruptive technologies, this impact may be weakened, as suggested by Gupta et al. (2018). In fact, Habit can play a lesser role in such contexts. The study also deepens the understanding of HM in responsible tourism. Even when a platform's primary purpose is encouraging responsible traveller behaviour and fostering sustainability in destinations, user enjoyment can still strongly impact BI. This supports the findings by Ali et al. (2024), which stress the importance of enjoyment in technology adoption for tourism. However, when users prioritise practical benefits over experiential value, the impact of Hedonic Motivation may be limited, as observed by Tamilmani et al. (2022). FC also significantly impact both BI and UB. This result suggests that external support, such as easy access to tools and seamless integrations, may help drive adoption. The result supports earlier research by Assaker et al. (2019). These authors found that similar impact of FC in tourism-related apps.

In contrast, PE and EE have a limited impact on BI in this context. These finding challenge early UTAUT2 assumptions (Venkatesh et al., 2012), posing PE and EE as strong predictors of intention. For platforms like TripDoodler, which focus on sustainability and community engagement, users seem to prioritise social and emotional factors over ease of use or expected outcomes. This idea is consistent with the findings by Kundan et al. (2024). The authors highlighted the importance of social impact in technology adoption among travellers. Following this idea, the present study also confirms that SI has a strong effect on BI. This suggests that peer feedback and perceived social approval may shape adoption, reinforcing earlier research by Shen et al. (2020), who found a similar effect in adopting smart tourism platforms.

The study also examines the role of demographic factors. Age and gender do not significantly affect BI or UB, in accordance with the work of Romero-Charneco et al. (2025), which work intends to understand the drivers that predispose regular consumers to restaurant recommendation adoption. The absence of age and gender effects may suggest that sustainable tourism platforms can appeal broadly across different user groups. One possible explanation is that adoption in this context may be shaped more by shared values and social motivations than

by demographic traits (Seyfi et al, 2025; Tan et al., 2025). As digital literacy becomes widespread and the platform's functions remain largely gender-neutral, factors such as social influence, habit and enjoyment may carry greater weight, which could reduce the moderating role of demographic variables.

Methodologically, the study applies Partial Least Squares Structural Equation Modelling (PLS-SEM) with rigorous reliability and validity testing. This sets a useful benchmark for future research using complex models in tourism technology studies. The approach offers a framework for examining adoption in other platforms focused on sustainability, altruism or community participation.

4.5.2. Managerial contributions

The findings of this study offer several important managerial implications for businesses, technology developers and sustainability advocates aiming to increase adoption and engagement with smart, crowdsourced platforms like TripDoodler. Since HB strongly impacts UB, developers should design features that encourage regular use. Strategies such as gamification (Yu et al., 2024), personalised content (Eswaran et al., 2025) and push notifications (Alghizzawi et al., 2023) can help build routine interaction and long-term engagement. The strong effect of SI highlights the value of peer recommendations and social proof. Businesses and platform providers should invest in building communities through user-generated content and collaborations with eco-conscious influencers (Iqbal et al., 2025). These efforts can increase visibility and encourage wider adoption. The findings also show that enjoyment and emotional satisfaction shape BI. Managers should incorporate interactive elements, such as storytelling, augmented reality tools and gamified sustainability challenges, to make these prosocial tourism platforms more appealing (Ghandour et al., 2021). These features make the experience enjoyable and meaningful. Seamless integration with tools like Google Maps and certification databases can improve usability and encourage adoption. Developers should ensure mobile compatibility, simple access, easy user flow and smooth interaction with other travel technologies. Since PE and EE did not strongly affect BI in this study, platform developers may need to shift focus. Instead of emphasising technical efficiency, they should highlight social engagement and the user's contribution to collective sustainability efforts. Messaging should focus on how individual actions support a broader cause.

4.6. Conclusion

This study strengthens the understanding of technology adoption in responsible tourism by applying the UTAUT2 model to a smart, crowdsourced platform. Key psychological and behavioural factors shaping user engagement are identified, with results highlighting the central role of HB, SI and HM in adoption and continued use. At the same time, the study questions the relevance of traditional constructs such as PE and EE in this context. These insights provide practical guidance for platform developers, businesses and sustainability advocates working to improve user engagement. Future research should examine behavioural patterns over time and explore how new technologies can expand both theoretical models and real-world applications in responsible tourism.

While this study offers valuable insights, it has several limitations that suggest directions for future research. The focus on TripDoodler users, who are likely already interested in sustainability and responsible tourism, narrows the scope of applicability. Future research should include a broader and more diverse range of travellers to explore how adoption varies across different tourism segments (Li, 2025). The cross-sectional design also limits the ability to observe changes in behaviour over time (Wang & Cheng, 2020). Longitudinal studies could provide a deeper understanding of how habits form and impact the continued use of smart technologies in sustainable tourism (Li, 2025). Although UTAUT2 offers a solid theoretical framework, scholars like Neves et al. (2025) suggest incorporating factors such as environmental concern, trust and gamification could strengthen understanding of what drives technology adoption in this context.

4.7. References

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CHAPTER FIVE

GENERAL CONCLUSION

5.1. Conclusion

The present thesis aimed to explore how smart, crowdsourced platforms can empower responsible travellers by examining the case of TripDoodler. The research responded to a pressing need within the sustainable tourism and responsible travel literature: to better understand the psychological mechanisms, recognition patterns, and adoption and usage factors that shape how travellers interact with digital sustainability tools. While awareness of sustainability issues has grown across the sector, action remains inconsistent and constrained by gaps in infrastructure, visibility and user motivation. This thesis contributes a behavioural, user-focused perspective to these challenges by combining platform analysis, recognition data and technology adoption theory within a combination of research methods. The findings suggest that platforms such as TripDoodler hold potential to support empowerment by giving travellers greater visibility of sustainable practices and opportunities to contribute their own knowledge. Although the analysis is case-specific, some of the patterns identified may be relevant to other crowdsourced platforms with similar objectives, though caution is required in generalising beyond the context studied.

Study 1 used a Theory of Change approach to map how TripDoodler's design and functionality features, such as structured sustainability parameters and guided user ratings, aim to create enabling conditions for responsible traveller behaviour, by making more informed choices. The participatory research process demonstrated how assumptions, platform architecture and stakeholder inputs interact to structure intervention logic. Study 2 analysed a large dataset of user-generated ratings to examine how travellers recognise sustainability practices across different types of businesses in these kinds of platforms, considering a CRISP-DM methodology to obtain insights about the sustainability recognitions. The findings of this empirical study revealed that travellers are more likely to acknowledge practices that are visible and embedded in their immediate experience. In contrast, actions that are infrastructural or less directly observable tend to receive lower recognition. Study 3 applied the UTAUT2 framework to examine the psychological drivers of platform adoption and use. The results of the third study in this thesis suggested that Habit, Social Influence and Hedonic Motivation play a

central role in shaping user interaction with the platform. However, ease of use and functional utility were less significant in this value-oriented context.

Together, the three studies suggest that smart, crowdsourced platforms can do more than provide sustainability information. These types of platforms actively shape perception, decision-making and behavioural consistency. The research highlights that responsible traveller behaviour is not only a matter of individual values or external constraints, but also of how sustainability is surfaced, framed and supported at the point of digital interaction. The findings argue for a more deliberate integration of participatory design, behavioural insights and digital infrastructure into tourism sustainability efforts.

By grounding the enquiry in a real-world platform and connecting conceptual models to empirical evidence, the thesis contributes to tourism studies, consumer behaviour and technology research. The approach also helps position smart, crowdsourced platforms as emerging tools that can foster more visible and socially reinforced sustainability engagement. As travel-related contexts continues to digitise and as global challenges demand more active traveller participation (Tan et al., 2025), such platforms have the potential to bridge long-standing gaps between sustainability preferences and practice.

5.2. Contributions and implications

5.2.1. Theoretical contributions and implications

This section outlines the theoretical implications derived from Studies 1, 2 and 3. Informed by existing literature, these implications aim to enhance our understanding of how smart, crowdsourced platforms can empower responsible travellers through the lens of functionality, recognition, and technology adoption and usage. Altogether, the three conducted studies contribute to broader debates in sustainable tourism, responsible travel and digital behaviour by offering new theoretical entry points relevant to the evolving role of technology in shaping traveller engagement.

Study 1: The research contributes to theoretical discourse by introducing the Theory of Change (ToC) as a structured, participatory framework to conceptualise the functionality and assumed behavioural pathways of smart, crowdsourced platforms in empowering responsible travellers. Although ToC has been widely applied across public health, development and

environmental policy (Montano et al., 2023; Taplin et al., 2013; Stein & Valters, 2012), its application within tourism, particularly in the context of smart technology interventions, remains limited (Michelini et al., 2020). By employing ToC as both a conceptual tool and a co-creative research process, this study broadens its methodological use beyond expert-led evaluations (Montano et al., 2023). The research integrates end-user perspectives through stakeholder interviews and a participatory workshop; an approach aligning with Phi et al.'s (2016) calls for the broader inclusion of stakeholder insights in tourism interventions. The findings suggest that traveller-facing technologies can be explored not just as outcomes, but as evolving socio-technical systems shaped by embedded assumptions and user motivations (Roodbari & Olya, 2024; Michelini et al., 2020).

A key theoretical contribution of study 1 lies in mapping the assumptions and interventions of a smart, crowdsourced platform, rather than directly evaluating behavioural outcomes. By focusing on platform structure, user interaction flows and the underlying systems of rating mechanisms, the study shifts attention from observable behaviours to the enabling conditions that support those behaviours. This reframing supports a more intricate understanding of how smart tourism tools can conceptualise impact. This aspect responds to Inmor et al.'s (2025) emphasis on context-sensitive evaluation in smart tourism and contributes a structured lens for interrogating the operational logic of such platforms.

The study also invites further reflection on how user-facing digital platforms can contribute to reducing the persistent intention–action gap in responsible travel (Viglia & Acuti, 2023; Font & McCabe, 2017; Gössling, 2017). While previous research has predominantly focused on structural, informational or psychological barriers to responsible traveller behaviour, this case draws attention to how platform structure and functionality itself may act as enablers of more responsible behaviour of travellers. TripDoodler's design logic, including structured sustainability parameters, guided response formats and peer validation, assumes that travellers will be more likely to act on sustainable values when provided with transparent, credible and value-aligned cues. These remain assumptions, not proven mechanisms, but the study contributes a theoretical entry point to understand digital interventions as part of the enabling environment, rather than external to behaviour.

Study 2: This study contributes to theoretical developments in sustainable tourism by offering an empirical lens into what travellers recognise as sustainability in practice. Previous research has predominantly focused on intentions, motivations or attitudinal alignment (Li et

al., 2024; Wang et al., 2024), often drawing on self-reported or hypothetical data. In contrast, this study foregrounds recognition as an in-situ behavioural response, including what travellers notice and acknowledge about sustainability practices while engaging with tourism services. By drawing on structured traveller ratings from a smart, crowdsourced platform (TripDoodler), the study provides a grounded perspective on how sustainability practices are recognised across various business types. This approach complements intention-based models and responds to recent calls for research that focuses more directly on observed, context-specific behaviours (Viglia et al., 2024).

The findings of this study extend current conceptualisations of recognition. While earlier literature has essentially treated recognition as an outcome of awareness or value alignment (Font & McCabe, 2017; Miller et al., 2010), this study reconceptualises it as a context-dependent interpretive act shaped by visibility, integration and design (Mansoor et al., 2025). Parameters such as “They offer vegan or vegetarian food options”, “They serve local and seasonal food”, “Guests are encouraged to reuse towels” and “Guests can control temperature in the room” received comparatively higher recognition. These practices are typically either embedded in guests’ daily routines or surfaced through visible environmental cues, which may have improved their visibility. These findings align with prior research on the role of tangibility in sustainability communication (Salinero et al., 2022; Moscardo, 2019), suggesting visibility may contribute to how travellers acknowledge certain sustainability practices.

A further theoretical contribution lies in the differentiated patterns of recognition across business types. For instance, the parameter “They offer vegan or vegetarian food options” received the highest recognition score in eateries. In contrast, infrastructural or policy-oriented parameters such as “The electricity comes from renewable energy sources” and “The place contributes to protecting biodiversity” consistently showed the lowest levels of recognition. These findings suggest that some sustainability actions, particularly those that are infrastructural, back-of-house or temporally distant from the guest experience, remain structurally invisible unless explicitly brought into focus (Paatlan & Ranga, 2024; Moscardo, 2019). Although Chi-square tests of independence indicated statistically significant associations between recognition parameters and business categories, the results should be interpreted as providing preliminary evidence rather than demonstrating causality. Conceptually, the findings support critiques that not all sustainability efforts carry equal

perceptual weight (Paatlan and Ranga, 2024; Fischer, 2023). This empirical study reinforces the importance of experiential framing of how sustainability is embedded and surfaced within travel-related encounters.

This work also contributes to theoretical understandings of credibility indicators in sustainable tourism and responsible travel. The weak association between recognition and third-party sustainability certification challenges assumptions about the automatic signalling power of such schemes (Singh et al., 2025; Velaoras et al., 2025). The mere presence of certification did not translate into higher recognition scores. This aspect suggests that the communicative framing of certification, rather than its mere existence, may shape its effectiveness (Heras-Saizarbitoria et al., 2020). In contrast, a modest but statistically significant association was found between higher Google ratings and increased recognition of sustainability parameters. The result supports broader observations that travellers may rely on informal indicators, including online reviews and ratings, when forming impressions of credibility and service quality in tourism settings (Filiari et al., 2021; Foris et al., 2020). These results highlight how trust is evolving in travel-related contexts, particularly as digital platforms increasingly mediate how information is accessed, validated and interpreted.

Study 3: This study contributes to theory by extending the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) to a prosocial, sustainability-focused tourism context. Earlier models, such as the Technology Acceptance Model or the Theory of Planned Behaviour, offered a limited explanatory range when applied to value-driven digital environments, as they prioritised instrumental or attitudinal predictors with less emphasis on experiential and social constructs (Mogaji et al., 2024; Chang et al., 2019; Venkatesh et al., 2003). UTAUT2 offers a more comprehensive framework by integrating constructs such as Hedonic Motivation, Habit and Price Value (Venkatesh et al., 2012). These constructs are particularly relevant in consumer-oriented platforms, where decision-making reflects both utility and personal experience. Moreover, TripDoodler's sustainability-focused and participatory design provides a context that is pertinent for examining individual adoption and usage behaviours through UTAUT2 constructs in smart, crowdsourced travel settings.

A central theoretical contribution lies in reinforcing the role of Habit (HB) in shaping Use Behaviour (UB), even in platforms centred on sustainability and community goals. The strong association between HB and UB observed in this study aligns with Yin et al. (2023), who identified the importance of habitual use in tourism technology settings. However, this

finding contrasts with that of Gupta et al. (2018), who suggested that habit may exert a limited impact in the early stages of using unfamiliar or disruptive platforms. Given that TripDoodler is still in its early adoption phase, this result challenges that assumption and suggests that platforms rooted in prosocial or value-based purposes may foster habitual engagement faster. While this hypothesis requires further empirical testing, it points to a promising direction for future research into habit formation in purpose-driven digital environments.

Facilitating Conditions (FC) also impacted both Behavioural Intention (BI) and UB in this study. The presence of external enablers, such as stable internet connectivity, interoperability with other travel planning tools and location-based filtering functions, appeared to support sustained interactions. This finding is consistent with Assaker et al. (2019), who emphasised the role of enabling infrastructure in shaping technology adoption and usage within tourism. In the context of sustainability-oriented platforms, such conditions may help reduce cognitive and logistical barriers, and, therefore, encourage consistent use over time.

While prior studies often confine Hedonic Motivation (HM) to leisure and entertainment technologies (Ali et al., 2024; Tamilmani et al., 2022), the present findings suggest that user enjoyment can contribute to BI even in sustainability-oriented platforms. This broadens the theoretical scope of HM, suggesting it should not be dismissed in value-based domains, particularly when user experience design is engaging. Theoretically, the proposed idea reinforces the need to move beyond binary classifications of platforms as either utility- or pleasure-driven. Instead, researchers can consider hybrid motivations, where hedonic appeal supports goal-congruent behaviours.

The limited role of Performance Expectancy (PE) and Effort Expectancy (EE) in shaping BI suggests a specific contextual limitation of the UTAUT2 model. Although Venkatesh et al. (2012) positioned PE and EE as key predictors of technology adoption and use, the current findings suggest that this relationship may not hold when other motivations take precedence. When users are drawn to a platform because of its ethical or societal value, functional convenience may become less central to their decision-making. This finding aligns with Kundan et al. (2024), who noted that social relevance can sometimes outweigh practical considerations in the adoption and usage of technology.

The substantial impact of social cues, reflected in the significance of Social Influence (SI), aligns with earlier work on peer-driven adoption in travel technology (Shen et al., 2020).

In line with Romero-Charneco et al. (2025), age and gender do not significantly affect behavioural intention (BI) or use behaviour (UB), suggesting that sustainable tourism platforms can appeal broadly across user groups. This finding indicates that adoption may be shaped less by demographic traits and more by shared values and social motivations, with factors such as social influence, habit and enjoyment carrying greater weight.

5.2.2. Practical contributions and implications

This section outlines practical implications emerging from Studies 1, 2 and 3. These contributions suggest potential avenues for platform designers, tourism businesses, certification bodies and destination managers to enhance visibility, engagement and alignment around sustainability in tourism contexts.

Study 1: A key practical contribution lies in how smart, crowdsourced platforms like TripDoodler can structure user-generated content into standardised formats. Instead of open-ended reviews, users are guided through defined parameters that align with common sustainability themes and objectives (Agapito et al., 2023). The described design enables the aggregation of user-driven data into coherent categories, which can make it easier for stakeholders like local governments and tourism authorities to identify behavioural patterns, knowledge gaps and areas of stakeholder misalignment. Such real-time, crowdsourced information can complement formal sustainability audits by capturing how sustainability is perceived and experienced by travellers on the ground (Garcia de los Salmones et al., 2025).

Destination policymakers may also use these crowdsourced insights to inform adaptive governance. Rather than relying solely on sporadic surveys or consultant-led evaluations, such platforms may support continuous monitoring of sustainability awareness and practice (Liu, 2025). While these data do not replace scientific measurements, they offer a valuable supplementary perspective grounded in the experiences of the end-users. These insights could inform where to invest in visibility improvements, how to reframe local narratives around sustainability or which aspects of responsible tourism fail to resonate with particular visitor segments (Ependi et al., 2023).

Regarding tourism enterprises, the study suggests that smart, crowdsourced platforms can serve as third-party recognition channels, enabling sustainability actions to be noticed and validated by guests. Such approaches may help reduce over-reliance on self-declared claims,

which are often met with scepticism. Feedback collected through guided review mechanisms can enable properties or service providers to showcase their commitments in a way that feels more authentic to potential customers (Nguyen et al., 2024). This approach also creates opportunities for businesses to reflect on their own strengths and weaknesses. Structured responses can enable easy internal benchmarking, as well as inform broader environmental, social and governance (ESG) performance tracking.

Study 2: This study offers several practical insights for tourism practitioners seeking to enhance the visibility and relevance of their sustainability efforts. For businesses such as eateries, accommodations, shops and experience providers, the findings indicate that the most frequently recognised sustainability parameters tended to share common traits, such as being embedded in guest routines or surfaced through tangible, visible cues. Strategic yet straightforward interventions, such as referencing sustainability actions on menus, booking confirmations, in-room signage or product packaging, can help anchor such practices within the customer journey. The emphasis should be on tangible, context-relevant communication rather than abstract claims.

For destination managers, the results highlight the importance of establishing shared infrastructures for sustainable communication across diverse business types. Tools such as local signage systems, visitor-facing directories or digital maps that surface verifiable sustainability actions can foster coherence and visibility at the destination level. Systems that enable the collection and synthesis of traveller feedback, particularly regarding what is noticed or appreciated, can support data-informed planning and help surface overlooked but meaningful practices. Accordingly, smart, crowdsourced platforms can leverage these insights to refine the presentation of sustainability content. Enhancing searchability by sustainability dimension, surfacing peer-verified practices and aggregating recognition trends into visual dashboards could empower both travellers and tourism providers. Structured feedback mechanisms may also help businesses understand which efforts are resonating and where communication gaps exist (Tiago et al., 2021).

Finally, certification bodies may also find the results instructive. The weak association between certification and guest recognition suggests a need for improved integration of certification messages within the customer experience. Offering guidance on how to position certification information in booking flows, digital interfaces or physical environments may increase salience. Developing standardised templates or communication toolkits can help

certified businesses convey credibility in a more accessible and operationally embedded way (Font & McCabe, 2017).

Study 3: The findings of this study yield several practical implications for platform designers, tourism businesses and sustainability advocates seeking to enhance the adoption and usage of smart, crowdsourced platforms, such as TripDoodler.

First, the strong association between HB and UB suggests that regular interaction should be deliberately fostered. Platform developers could incorporate mechanisms that promote repeated engagement, such as gamified progress tracking, personalised content updates or timely push notifications (Nwaimo et al., 2024). These features can help normalise platform use as part of travellers' routine planning activities. Second, the significance of SI underscores the value of peer cues in encouraging behavioural intention. User-generated content, social proof mechanisms and collaborations with sustainability-focused influencers could serve as practical approaches to enhance social visibility (Susanto et al., 2024). Community-building strategies can further support the organic dissemination and broader adoption and usage of platforms. Third, the role of HM highlights the importance of emotional resonance and enjoyment in shaping the intention to use. Platform developers should consider incorporating features that make sustainability engagement enjoyable and personally meaningful. Interactive design elements, such as storytelling interfaces, augmented reality visualisations or community-based sustainability challenges, may increase user satisfaction and deepen commitment (Theocharis & Tsekouropoulos, 2025).

Regarding usability, FCs remain critical. Features such as compatibility with existing travel tools (e.g., itinerary apps or certification databases), intuitive mobile design, reliable access to location-based functions and a streamlined user interface may reduce friction and enable sustained usage (Sia et al., 2023). Interestingly, the limited role of PE and EE in this context suggests a shift in communication priorities. Rather than focusing solely on functional efficiency or ease of use, platform messaging might benefit from emphasising ethical alignment, social connectedness and the user's contribution to a collective cause (Theocharis & Tsekouropoulos, 2025). Although age and gender did not exert moderation effects, younger users may engage more readily with peer-driven narratives (Seyfi et al., 2024), while older travellers may respond better to clarity around platform purpose and demonstrated reliability (Bi & Kim, 2020). These generational patterns warrant further investigation in future research

to better understand how demographic factors shape engagement with crowdsourced sustainability platforms.

5.3. Limitations

While this thesis offers several theoretical and practical insights into the role of smart, crowdsourced platforms in empowering responsible travellers, a few limitations warrant reflection. Firstly, all three studies were anchored in the context of a single platform, TripDoodler, whose user base during the research period remained relatively limited and regionally concentrated in Northern Europe. This aspect introduces constraints on generalisability, as the findings may reflect platform-specific design choices, user cultures and adoption contexts not representative of the wider traveller population. Also, the empirical design across the studies relied primarily on cross-sectional data. Study 2 and Study 3, in particular, captured traveller interactions within a fixed period, restricting the ability to observe evolving behaviours or long-term engagement. While Study 1 offered a more process-oriented lens through Theory of Change, its reliance on a small number of stakeholder interviews and a single participatory workshop limited the range of perspectives embedded within the causal pathways. Third, while the UTAUT2 framework applied in Study 3 proved analytically useful, it did not account for contextual variables such as environmental concern, trust or gamified engagement, which may hold relevance in prosocial digital environments (Pegan et al., 2025). Similarly, the concept of sustainability recognition explored in Study 2 was operationalised using predefined parameters, which may not fully capture the diversity of sustainability practices encountered across tourism settings.

5.4. Direction for future research

This thesis provides a starting point for theorising how smart, crowdsourced platforms can enable responsible tourism, while also opening several avenues for future inquiry. First, expanding the scope beyond a single platform is essential. Comparative studies involving multiple platforms with different interface designs, rating mechanisms and user demographics would help assess whether the findings hold across diverse digital environments. Such an approach could also clarify which platform features most effectively support sustainability engagement. Second, the regional concentration of the current dataset calls for cross-cultural

replication (Wang & Cheng, 2020). Local norms, infrastructure and regulatory environments likely impact traveller recognition of sustainability and motivations for using digital platforms. Comparative research across global North and South contexts could illuminate how digital tools intersect with varying understandings of sustainability. Third, longitudinal studies could enable a deeper understanding of habit formation, behavioural consistency and seasonal or crisis-related variations in platform use. Tracking travellers' sustainability engagement over time, particularly before, during and after trips, could generate insights into sustained impact and platform stickiness. Fourth, future research could extend the theoretical frameworks used here. Integrating constructs such as environmental concern, platform trust and gamification into models like UTAUT2 could improve explanatory power. Likewise, adapting the Theory of Change framework to incorporate user typologies or differential engagement paths may offer more refined causal mapping. Also, mixed-methods research, combining behavioural data with in-depth interviews or digital ethnographies, could deepen the understanding of how travellers interpret, validate or even disregard sustainability cues. Such approaches would enrich the current findings and inform the design of more context-sensitive and actionable sustainability interventions within digital tourism ecosystems.

5.5. References

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APPENDICES

Appendix 1. List of questions - semi-structured interviews – ToC framework

1.1 Questions for TripDoodler CEO

Section -1 | TripDoodler - Getting Started

1. What motivated you to create TripDoodler? Can you provide an overview of the platform, including its purpose and key features?
2. Can you briefly explain the main objectives and vision of TripDoodler in relation to promoting responsible traveller behaviour?

Section -2 | TripDoodler - Empowering Responsible Travellers

3. Is TripDoodler addressing the attitude-behaviour paradox? If so, how does it encourage users to translate their positive attitudes into tangible, responsible behaviours? Are there any strategies or features in place to bridge this gap?
4. Can you share a personal success story or a memorable interaction with a TripDoodler user who embraced responsible tourism practices? How did that experience reinforce your belief in the power of responsible travel?
5. What challenges have you faced in promoting responsible behaviour through TripDoodler? If any, how have you overcome them? Are there any valuable lessons or insights you have gained from these challenges?
6. Is TripDoodler incentivising users to engage in responsible traveller behaviour? Are there any rewards or recognition systems in place?
7. Are there any initiatives TripDoodler takes to educate and raise awareness among its user community about responsible tourism practices?

Section -3 | TripDoodler - The Crowdsourced Platform

8. What exactly is crowdsourced sustainability, and how does TripDoodler leverage it to encourage responsible traveller behaviour?
9. What mechanisms does TripDoodler have in place to verify the authenticity and accuracy of user-generated content related to responsible traveller behaviour?

Section -4 | TripDoodler - The Smart Tourism Technology

10. Does TripDoodler leverage smart technologies, such as data analytics or interactive maps, to promote responsible traveller behaviour? If so, are any metrics or indicators used to track and evaluate user engagement in responsible behaviours?
11. Does TripDoodler provide personalised recommendations to travellers based on their preferences? If so, how does TripDoodler ensure the security and privacy of user data?
12. Are there any plans to further enhance TripDoodler's use of smart technology in the future to empower responsible travellers? If so, what areas or features are being considered for development?

Section -5 | TripDoodler - The Future Developments

13. Regarding future development, what plans does TripDoodler have to enhance further its platform's ability to empower responsible travellers?

1.2 Questions for TripDoodler end users

Section -1 | TripDoodler - Getting Started

1. How long have you been using TripDoodler?
2. Can you describe when you primarily use TripDoodler in relation to your travel journey?

Section -2 | TripDoodler – Your Personal Experience

3. From your personal experience, how would you describe the user-friendliness of TripDoodler?
4. What motivates you to use TripDoodler for your travel planning and responsible tourism needs?
5. Can you share a personal experience or instance where TripDoodler empowered you as a responsible traveller? How did the platform contribute to your sense of empowerment and impact your travel experience?

6. How smart is TripDoodler? Do any specific functionalities significantly influence your responsible choices or actions while using the platform?
7. From your perspective as a user, how do you perceive the role of user-generated ratings within TripDoodler in promoting responsible tourism?
8. Have you personally observed any changes in your travel behaviour or decision-making process due to using TripDoodler? Have you personally observed any changes in your travel behaviour or decision-making process due to using TripDoodler?

Section -3 | TripDoodler - The Follow-up

9. Based on your personal experiences using TripDoodler, do you have any recommendations or suggestions for the platform to improve its effectiveness in empowering responsible travellers?
10. Do you feel that TripDoodler has the potential to create a broader positive impact on the travel industry regarding responsible tourism? If so, in what ways?
11. How likely are you personally to recommend TripDoodler to a friend or fellow traveller?
12. How did you come across TripDoodler? Was there a specific source or recommendation that led you to discover the platform?

Appendix 2. List of sustainability parameters by TripDoodler

#	Name of the Parameter	Description of the Parameter	Type of Place related to the Parameter
1	I have the opportunity to carbon offset as a part of the payment process	The company has implemented the option to off set your calculated carbon emission as a natural flow in the purchase process.	"Accommodations", "Eateries", "Shops"
2	They actively promote activities and places in the local community (posters, business cards, etc.)	When establishments promote their local businesses, they both help them financially and support them morally.	"Accommodations", "Eateries", "Shops", "Other Businesses"
3	They are a social impact enterprise (primary purpose is addressing social challenges)	A social impact business clearly prioritizes doing work that consciously, systemically and sustainably serves or attempts to solve a local or global community need.	"Eateries", "Shops", "Other Businesses"
4	They have automated light sensors in all public areas and/or rooms	The lights in public areas and rooms turn on and off automatically by using e.g. a motion sensor in order to conserve energy.	"Accommodations", "Eateries"
5	They have water efficient toilets (e.g. dual flush)	A dual-flush toilet uses two buttons or a handle mechanism to flush either a smaller or larger amount of water, according to your needs.	"Accommodations", "Eateries", "Other Businesses"
6	Actively providing guests with information regarding local heritage and culture	Guests are educated about cultural background and history of the accommodation's region and information opportunities are provided.	"Other Businesses"
7	They have a clear signage of sustainability certifications (e.g. Green Key, Ecolabel, GreenSign, etc.)	Accredited sustainability certifications are a clear sign that the company has started their sustainable journey.	"Accommodations", "Eateries", "Shops", "Other Businesses"
8	They provide reusable/ recycled table cloth, napkins etc.	Clearly marked reusable materials could be cotton, bamboo etc.	"Eateries", "Other Businesses"
9	Ethical tourism initiatives are actively promoted	This way, establishments can help ensure that tourism affects the local way of life and ecosystem as little as possible.	"Accommodations"
10	They offer "Made to order" products	To lower overproduction the shop offers made to order products.	"Shops"
11	Recycle bins are available or I know that the hotel is sorting my room waste.	Hotels can reduce the waste sent to landfills by 1.5kg per guest daily, if they place recycling bins in rooms.	"Accommodations", "Other Businesses"
12	I can opt out of room cleaning	The room service must be actively ordered and does not clean automatically every day.	"Accommodations"
13	No beef dishes are the default on the menu (I have to actively ask for beef)	There are meat options, but the staff is actively recommending to eat no meat options.	"Accommodations"
14	The paper reads are replaced with digital solutions (QR codes)	Could be QR codes instead of paper menus, digital tickets with barcodes, app solutions instead of magazines etc.	"Accommodations", "Eateries"
15	Their food is 100% vegetarian	Food and drinks are 100% vegetarian.	"Accommodations", "Eateries"
16	They offer a place to fill my reusable water bottle	Actively providing you with the option to refill your own bottles with clean water.	"Eateries", "Other Businesses"

#	Name of the Parameter	Description of the Parameter	Type of Place related to the Parameter
17	They have green spaces (e.g. garden, green rooftop, etc.)	There are green areas on the property of the accommodation e.g. gardens, parks, rooftops etc.	"Accommodations"
18	They run the place on 100% renewable energy	The company has a clear signage of running its business on 100% renewable energy.	"Accommodations", "Eateries", "Shops", "Other Businesses"
19	They clearly communicate their sustainability goals	The company is clearly communicating how they work towards the Sustainable Development Goals (SDGs).	"Accommodation", "Eateries", "Shops", "Other Businesses"
20	Their food is 100% vegan	Food and drinks are 100% vegan.	"Accommodation", "Eateries", "Shops"
21	They are selling locally produced products	Local products are used, highlighted and promoted.	"Accommodations", "Eateries", "Other Businesses"
22	The place is easily accessible by public transport	The place is close to a bus, metro, tram etc. stop.	"Accommodations", "Eateries", "Shops"
23	The usage of local produce is actively promoted	The establishment is actively promoting the usage of local products in their food. Eg. Seasonal menus.	"Accommodations", "Eateries"
24	Dishes representing the local food culture are on the menu	The menu includes local specialties or options based on local products.	"Accommodations", "Other Businesses"
25	Nature Reserve	Does the area have status as National Park?	"Other Businesses"
26	Actively teaching guests about local natural ecosystems and biodiversity	Guests are actively educated on how to preserve biodiversity in the region and what local nature ecosystems exist.	"Other Businesses"
27	I can turn off heating and cooling in my room	Heating, cooling, ventilation, and AC are responsible for around 50% of the total energy used by hotels.	"Accommodations"
28	I am encouraged to reuse towels	Hotels can save up to 9 L of water and up to 0.9 kWh of energy per guest daily if they encourage towel reuse.	"Accommodations"
29	They clearly signage ethically sourced/ produced (e.g. cruelty free) products	The shop guarantees socially responsible harvesting, sourcing and production of their products' raw material(s).	"Shops"
30	They have implemented food waste initiatives (doggy bags, "save a meal" etc.)	Restaurants can reduce/prevent 42% of leftover food waste if they offer you the choice to take home your food in doggy bags.	"Accommodations", "Eateries"
31	They offer vegan or vegetarian food options	There are some vegetarian and/ or vegan food options on the menu.	"Accommodations", "Eateries", "Other Businesses"
32	They eliminated single-use plastic	No sign of single-use plastic for packaging/ displaying of products.	"Accommodations", "Eateries", "Shops", "Other Businesses"
33	Chargers for electrical vehicles are easily accessible	Providing, or actively referring to, chargers for electrical cars or bikes.	"Accommodations", "Eateries"
34	They are compensating carbon emissions on my behalf	All emissions produced because of the company are actively compensated.	"Accommodations", "Eateries", "Shops"
35	Organic ingredients are clearly indicated on the menu	There is a clear signage of the use of organic ingredients.	"Accommodations"

#	Name of the Parameter	Description of the Parameter	Type of Place related to the Parameter
36	The shop encourages me to reuse shopping bags	You have a smaller climate change impact if you use a sturdier bag 2-9 times instead of lighter, single-use ones.	"Shops"
37	They are involved in social programs (e.g. NGOs or local community initiatives)	The company is actively communicating about their engagement in social outreach programs with clear mentioning of the program(s) and their engagement	"Accommodations", "Eateries", "Shops"
38	They use/ offer fairtrade products	Fairtrade arrangements help producers in developing countries achieve sustainable and equitable trade relationships.	"Accommodations", "Eateries", "Shops"
39	Initiatives to reduce food waste	The establishment has collaborations with 3rd parties like ToGoodToGo, payment scheme for food waste at buffet or similar.	"Accommodations", "Eateries", "Other Businesses"
40	No single-use plastic	Avoiding single-use plastic can be replaced with reusable or biodegradable materials e.g. bamboo (bottles, cups, straws, packaging etc.)	"Accommodations", "Other Businesses", "Eateries"
41	Clear signage of how they work to minimize their carbon footprint	The company has visible communications on their goals, current emission and lists the activities taken to lower their carbon emissions.	"Other Businesses"
42	They give me tips and ideas for choosing more sustainably	The shop provides inspiration on how to integrate sustainability into your day-to-day life.	"Shops"
43	This is a second-hand shop	To make a new cotton t-shirt, factories use 3.9 MJ of energy, and it has an eco-footprint of 5.4 m2.	"Shops"
44	They offer vegan items	The shop ensures that no animal has been harmed for the production of their items.	"Shops"
45	Electrical transportation	The vehicle is running 100% on electricity.	"Other Businesses"
46	They clearly signage the use of recycled/ sustainable materials	The product sold are produced of recycled/reused/sustainable materials. Min. 50% of all products in the shop.	"Shops"
47	They offer to collect and recycle my used items	The shop offers a collection service at the end-of-life of the purchased good, ensuring it is reused /recycled prior to proper disposal.	"Shops"
48	They support environmental projects	Comes in many shapes. One random example: The shop plants a tree in a forest for every item sold.	"Shops"
49	Recycle bins are available for me		"Eateries", "Shops", "Other Businesses"
50	No beef dishes are the default on the menu (I have to actively ask for beef)	If you choose a vegan patty instead of a beef one, you can help reduce GHG emissions by 89% and water use by 99.9%	"Eateries"
51	They are selling locally produced products	Buying local products is a way for you to support local businesses and culture. And a learning opportunity.	"Shops", "Other Businesses"
52	Dishes representing the local food culture are on the menu	Food is one of the largest translator of culture. Restaurants and cafés can promote and help preserve local culture by including local dishes in their menu.	"Eateries"

#	Name of the Parameter	Description of the Parameter	Type of Place related to the Parameter
53	Organic ingredients are clearly indicated on the menu	Organic farming can lead up to 30% higher / more species diversity than conventional methods, as it benefits biodiversity.	"Eateries"
54	They offer organic items		"Shops"
55	Recycle bins are available.	As an example, hotels can reduce the waste sent to landfills by 1.5kg per guest daily, if they place recycling bins in rooms.	"Shops","Other Businesses"
56	I can opt out of room cleaning	Every time you opt out of room cleaning, you help save 35 L of water, 100 ml of chemicals and 1.5 kWh of energy.	"Accommodations"
57	They eliminated single-use plastic	Reusable food packaging and cups produce up to 75% less GHG emissions than single-use packaging if used enough times.	"Other Businesses","Eateries"
58	They have automated light sensors in all public areas and/or rooms	If there are automated light controls and sensors, the business might use up to 38% less electricity for lighting.	"Accommodations"
59	They have water efficient toilets (e.g. dual flush)	A water-efficient toilet can help save up to 85 L of water daily compared to older, less efficient models.	"Accommodations", "Eateries","Other Businesses"
60	They offer a place to fill my reusable water bottle	If you use a glass bottle multiple times instead of single-use plastic bottles, you can reduce GHG emissions by 70%.	"Eateries","Other Businesses"
61	The shop offers vegan or cruelty free products	Vegan or cruelty-free items are not common, but as consumers we can make a difference by demanding more from global and local brands.	"Shops"
62	They clearly signage the use of recycled/ sustainable materials	A pair of jeans produced with organic and recycled cotton can mean 74% less CO2 and 93% less water than a standard one.	"Shops"
63	They offer to collect and recycle my used items	Deposit return schemes can lead to return rates of up to 98% for drinks containers and 72% for appliances.	"Shops"
64	They offer organic items	Organic farming can lead up to 30% higher / more species diversity than conventional methods, as it benefits biodiversity.	"Shops","Other"
65	They offer vegan/vegetarian/plant-based food options	If you choose a plant-based patty instead of a beef one, you can help reduce GHG emissions by 89% and water use by 99.9%	"Eateries","Other Businesses", "Accommodations"
66	They actively provide guests with information regarding local heritage and culture	Supporting local heritage and culture helps encourage identity, creativeness, local society and economic potential.	"Accommodations", "Other Businesses"
67	They clearly communicate their sustainability goals	The companies that work towards the Sustainable Development Goals (SDGs) are more resilient and able to capitalize on a range of positive impacts.	"Shops"

Source: TripDoodler (2024).

Appendix 3. TripDoodler user questionnaire (adapted from Venkatesh et al., 2012)

Purpose Statement

This questionnaire is part of a PhD research study in Tourism, aimed at understanding how travellers interact with the smart, crowd-sourced platform TripDoodler. The survey gathers detailed feedback on users' experiences in finding, rating, and sharing information about the sustainability practices of tourism businesses. Your insights are valuable and contribute to academic knowledge on user engagement with travel platforms that focus on sustainability.

This questionnaire is addressed to users of TripDoodler (app.tripdoodler.com). Completing it takes approximately 10 minutes.

Privacy Statement

All responses are anonymous. Data are collected solely for research purposes and treated in accordance with the Data Protection Policy accessible at www.ualg.pt. For queries regarding this questionnaire, contact: a73924@ualg.pt.

—

Consent Section

1. I confirm that I have become aware of and accept the general conditions of the terms described above.
☐ Yes
2. I confirm that I accept the terms and conditions of the Google Forms Privacy Policy available at <https://policies.google.com/privacy>
☐ Yes
3. I confirm that I accept the terms and conditions accessible at www.ualg.pt
☐ Yes

—

Section 1: Understanding Smart, Crowdsourced Travel Platforms

What are smart, crowdsourced travel platforms, and why are they important for understanding the sustainability efforts of tourism businesses? (Provided as background information, not a question to be answered)

Smart, crowdsourced platforms are websites or apps where users leave reviews and ratings based on their experiences at various locations, such as hotels or restaurants. These platforms are important because:

- **Transparency:** They show what businesses are doing to be sustainable through real customer feedback.
- **Influence:** Positive reviews can motivate other travellers and push more businesses to adopt green practices.
- **Improvement:** Businesses can learn from user reviews and improve their sustainability actions.

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Section 2: UTAUT2 Constructs

For each of the following statements, please select one option:

Strongly Disagree / Disagree / Neither Agree nor Disagree / Agree / Strongly Agree

A. Performance Expectancy

- I find TripDoodler useful in finding sustainable travel options.
- Using TripDoodler increases my chances of finding more sustainable tourism businesses.
- Using TripDoodler helps me share my sustainable experiences with others.
- Using TripDoodler helps me become a more responsible traveller.

B. Effort Expectancy

- Learning how to use TripDoodler is easy for me.
- My interaction with TripDoodler is clear and understandable.
- I find TripDoodler easy to use.
- Becoming skilled at using TripDoodler is effortless for me.

C. Social Influence

- People who are important to me think I should use TripDoodler.
- People who influence my behaviour think I should use TripDoodler.
- People whose opinions I value prefer that I use TripDoodler.

D. Facilitating Conditions

- I have the resources necessary (e.g., internet access) to use TripDoodler.
- I have the knowledge necessary to understand the sustainability ratings on TripDoodler.
- TripDoodler is compatible with other apps I use for travel planning.
- I can easily get help from the TripDoodler community or support if I encounter difficulties.

E. Hedonic Motivation

- Using TripDoodler is fun.
- Using TripDoodler is enjoyable.
- Using TripDoodler is entertaining.

F. Habit

- Using TripDoodler to find and rate sustainable travel options has become a habit for me.
- I am addicted to using TripDoodler for my travels.
- I must use TripDoodler when I travel.
- It feels natural to consult TripDoodler for my travel needs.

G. Behavioural Intention

- I intend to continue using TripDoodler for my future travel planning.
- I will always try to use TripDoodler to find sustainable businesses in my daily life.
- I plan to continue to use TripDoodler frequently.

Section 3: Recommendation Patterns

How likely are you to recommend TripDoodler to others?

Scale: 1 (Not recommended at all) to 10 (Highly recommended)

Section 4: Platform Alternatives

Apart from TripDoodler, which other platform do you primarily use to find or rate/review the sustainability efforts of tourism businesses? (Please select one)

☐ Google Reviews ☐ Yelp ☐ TripAdvisor ☐ FourSquare ☐ HappyCow ☐ EcoBnB ☐ I do not use another platform ☐ Other: _____

Section 5: Demographic Information

Gender

☐ Male ☐ Female ☐ Other ☐ Prefer not to say

Age (in years): _____

Nationality: _____

Education Level

☐ Basic Level ☐ High School ☐ Bachelor ☐ Master ☐ PhD ☐ Other: _____

Occupation

☐ Self-Employed ☐ Employee ☐ Unemployed ☐ Student ☐ Retired ☐ Other: _____

Appendix 4. Harman Test – assessment of common method bias

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.316	33.266	33.266	8.316	33.266	33.266
2	3.106	12.424	45.689			
3	1.843	7.371	53.061			
4	1.564	6.255	59.316			
5	1.346	5.385	64.701			
6	1.188	4.753	69.454			
7	1.114	4.457	73.910			
8	0.852	3.409	77.320			
9	0.719	2.877	80.196			
10	0.593	2.374	82.570			
11	0.537	2.148	84.718			
12	0.487	1.947	86.665			
13	0.454	1.815	88.480			
14	0.412	1.648	90.128			
15	0.357	1.427	91.555			
16	0.342	1.369	92.924			
17	0.306	1.223	94.147			
18	0.265	1.058	95.205			
19	0.257	1.030	96.235			
20	0.239	0.956	97.192			
21	0.212	0.847	98.039			
22	0.165	0.658	98.697			
23	0.148	0.592	99.289			
24	0.131	0.524	99.813			
25	0.047	0.187	100			

Source: Own elaboration.

Extraction Method: Principal Component Analysis.

Appendix 5. Cross-loading analysis of the measurement model

	BI	EE	FC	HM	HB	PE	SI	UB
BI1	0.888	0.313	0.406	0.527	0.469	0.232	0.424	0.500
BI2	0.859	0.273	0.434	0.466	0.447	0.243	0.339	0.507
BI3	0.910	0.240	0.413	0.461	0.467	0.238	0.403	0.535
EE1	0.205	0.784	0.204	0.225	0.148	0.327	0.154	0.120
EE2	0.251	0.833	0.259	0.284	0.100	0.332	0.118	0.219
EE3	0.216	0.847	0.257	0.279	0.099	0.408	0.164	0.207
EE4	0.315	0.807	0.388	0.387	0.382	0.325	0.232	0.376
FC1	0.316	0.299	0.638	0.349	0.204	0.162	0.126	0.300
FC2	0.338	0.366	0.782	0.386	0.276	0.303	0.168	0.379
FC3	0.354	0.259	0.763	0.362	0.399	0.213	0.229	0.429
FC4	0.377	0.139	0.756	0.296	0.343	0.222	0.265	0.417
HM1	0.463	0.384	0.355	0.876	0.409	0.261	0.368	0.467
HM2	0.537	0.349	0.430	0.946	0.547	0.261	0.422	0.560
HM3	0.470	0.268	0.482	0.873	0.611	0.200	0.354	0.519
HB1	0.496	0.201	0.464	0.577	0.906	0.140	0.484	0.647
HB2	0.467	0.224	0.382	0.522	0.922	0.101	0.430	0.575
HB3	0.439	0.289	0.277	0.450	0.771	0.184	0.358	0.506
HB4	0.425	0.155	0.347	0.489	0.913	0.080	0.388	0.596
PE1	0.185	0.309	0.259	0.218	0.119	0.757	0.120	0.179
PE2	0.248	0.301	0.207	0.152	0.110	0.861	0.195	0.223
PE3	0.220	0.389	0.267	0.236	0.094	0.791	0.188	0.194
PE4	0.175	0.332	0.241	0.257	0.132	0.713	0.095	0.114
SI1	0.411	0.238	0.239	0.427	0.403	0.246	0.922	0.438
SI3	0.401	0.179	0.283	0.407	0.480	0.140	0.954	0.480
UB1	0.529	0.243	0.437	0.530	0.612	0.186	0.480	0.852
UB2	0.525	0.273	0.469	0.528	0.534	0.227	0.452	0.879
UB3	0.480	0.300	0.479	0.476	0.620	0.184	0.389	0.867
UB4	0.492	0.234	0.438	0.472	0.546	0.214	0.401	0.896

Source: Own elaboration.

Appendix 6. Parecer da Comissão de Ética da Universidade do Algarve (Ethical Committee Opinion)



Nº DO PROCESSO	CEUALg Pnº 97 /2024
DATA DO PEDIDO	22 de Setembro de 2024
TÍTULO/TEMA	The Role of Smart and Crowd-Sourced Platforms in Empowering Responsible Tourists: The Case of TripDoodler
RESPONSÁVEL/REQUERENTE	Amit Bhatia
FUNDAMENTO DO PEDIDO DE PARECER	Na qualidade de responsável pelo estudo, solicita à CEUALg parecer favorável para a sua realização.
PARECER FINAL DA COMISSÃO DE ÉTICA DA UALG	Positivo sem recomendações.