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# Environmental Skills Gaps in Tourism and Hospitality Organisations: Evidence from Europe

## Abstract

This research analyses the current self-reported level of proficiency of environmental skills, the required future level of proficiency, and the gaps between them. Given the increasingly urgent need for the tourism industry to take action to support environmental management practices, this research provides evidence of key environmental skill gaps. Mixed methods research is applied where the sample includes 1404 respondents to a questionnaire and 264 interviewees from senior management of organisations from five tourism sectors (accommodation establishments, food and beverage outlets, destination management organisations, tour operators and travel agents, visitor attractions) in eight European countries. Analysis of variance, t-tests, correlation and cluster analyses, and Pearson Chi-square tests were employed for data analysis. The findings revealed that the country of registration, the size and the tourism sector type influence significantly the current and future proficiency levels of environmental skills, and the gaps between them. Most respondents did not receive environmental skills training. Theoretical, managerial and policy implications are also discussed.

**Keywords:** environmental skills, green skills, skill gaps, sustainable tourism, skills training

## 1. Introduction

In 2019, the International Panel on Climate Change published a report with a comprehensive assessment of climate change and actions required across international industries and governments to achieve urgent climate resilience, adaptation and mitigation (Intergovernmental Panel on Climate Change [IPCC], 2019). To achieve such actions, environmental skills and training are required to improve management and operations that support greater adoption of environmental management systems (EMS), in every tourism and hospitality business and training provider.

Advocates of sustainable tourism have long promoted the importance of the adoption of environmental practice and values to support the visitor experience, nurture host and guest relations, reduce waste, pollution, water and energy use at the destination level (Gössling, 2015; Fennell, 2006; Weeden & Boluk, 2014; Smith & Duffy, 2003). In 2017, the World Tourism Organization (UNWTO) announced the “Year of Sustainable Tourism” to increase pressure upon the tourism industry and governments to increase implementation of Sustainable Development Goals (SDGs) and sustainable environmental practice and behaviours for employers, employees and tourists (UNWTO, 2017). This is a challenging remit which requires appropriate knowledge and skills.

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Although there are extensive academic articles outlining the importance and challenges of environmental management practices and activities, a detailed analysis of associated skills gaps within businesses is lacking. Evaluation of EMS and related managerial and operational activities and skills performed by staff, establishes how to achieve better management of natural resources and reduction of carbon emissions (Styles, Schönberger & Galvez Martos, 2013). This process helps an organisation determine whether it can achieve its environmental commitment set out in company policy via identification of successful and unsuccessful program training and related skills gaps (Margoluis & Salafsky, 1998). The Organisation for Economic Co-operation and Development (OECD, 2018, p. 95) highlights that “incorporating sustainable practices in consumption and production of tourism services implies a change in the mindset of stakeholders, increasing increasing awareness of the importance of sustainable practices in their daily activities”. This requires upskilling and reskilling, a core factor in the new European Skills Agenda and the new *Pact for Skills* policy agenda launched by the European Commission in November 2020.

The Next Tourism Generation Alliance (NTG) is a European Commission funded project that aims to establish national and EU level Blueprint Action Plans for Sectoral Skills Development in Tourism. The primary aim is to strengthen the relationship between industry and education and respond to the digital and sustainability skills needs of five different subsectors within tourism (i.e., Visitor Attractions, Food & Beverage, Accommodations, Destination Management and Travel Agents & Tour Operators). The NTG Alliance encompasses a unique partnership of tourism departments at six universities and seven tourism and hospitality trade associations from eight European countries. The project builds on previous European tourism skills mapping exercises completed by the European Commission (2014; 2016) and research by the European Centre for the Development of Vocational Training (Cedefop, 2018, 2020). Such research begins to outline some typologies of environmental skills and typology trends but not specific environmental skills gaps. The NTG research also builds on the comprehensive European Commission (2013) report on Best Environmental Management Practice in the Tourism Sector. This report briefly mentions the importance of staff training; however, there is limited recognition of specific skills gaps of employees to implement best practices. There is surprisingly limited academic literature analysing environmental skills gaps or articulated competencies required to complete environmental management activities. Instead, much of the focus is upon the explanation of the environmental activity or practice, but not the skills to execute the activities.

The Next Tourism Generation Alliance (NTG, 2019) identified sets of green (environmental) skills for a comprehensive skills gap survey targeted in five sectors of the tourism and hospitality industry. The skill sets derived from extensive secondary data analysis across eight participating countries, academic literature and EU skills policy analysis. These included a range of high-level environmental managerial skills and operational skills, categorised as follows: ability to minimise the use and maximise efficiency of energy and water consumption; ability to manage waste, sewage, recycling and composting; conservation of biodiversity; promotion of sustainable transport; promotion of environmentally friendly products and services; knowledge of climate change. These skills reflect business actions required to respond to the 2015 Paris Agreement on Climate Change mitigation and adaptation as well as the changing consumer demand for tourism companies to increase environmental protection, conservation and adoption of environmental management of buildings and natural areas (United Nations Environment Programme [UNEP], 2019).

In light of the above discussion the main aim of this paper is to assess the environmental skills gaps of tourism and hospitality employees. The specific objectives include: (a) to evaluate the current proficiency level of environmental skills of tourism and hospitality employees; (b) to evaluate the required future proficiency level; (c) to identify the gaps between the current and the required future proficiency levels; (d) to evaluate the role of the tourism sector, country of registration, and organisation size on the environmental skills gaps and proficiency levels; (e) to identify the environmental skills training of tourism and hospitality employees

and the role of country of registration of the company, the tourism sector it operates in and its size on type of training received by the employees.

Firstly, the environmental skill sets investigated in this study are explained to identify relevance, application and importance using a literature review. Subsequently, the research methodology will be outlined, and the results of the quantitative and qualitative research are presented and analysed. In the conclusion, the contribution of the paper is summarised in relation to the managerial implications as well as research limitations and future research directions.

## 2. Literature review

### 2.1. Environmental management and operations

An Environment Management System (EMS) reflects the organisational structure, responsibilities, practices and resources for determining and implementing environmental policy within an organisation (Kasim 2015). The implementation of EMS is most commonly associated with voluntary certification initiatives and environmental standards stipulated for example by ISO14001 and ISO14000, EU Ecolabel for Tourist Accommodation, Travelife, Green Globe 21, Green Key, Green Business Scheme, Scandic. Hsiao et al. (2014) emphasise the importance of the ISO14000 environmental standards which can support an EMS and help increase employee awareness of environmental criteria of product packaging, energy and water resource use, production line processes, product sales, consumer safety, CO<sub>2</sub> emissions, post-consumption waste disposal. In order to achieve these required changes within tourism and hospitality businesses Kasim (2015) recommends an organisational learning response to achieve environmental objectives and bring new behaviours into organisational routines (Jones & Macpherson, 2006). Sinkula et al. (1997) conceptualise organisational learning as a firm's values that reflect a commitment to learning, open mindedness and shared vision that influence the propensity to create and use knowledge. This can help organisations to identify environmental skills gaps and process new environmental knowledge and information which is widely available to businesses and respond to climate change.

Herremans et al. (2005) emphasise how learning generates information to support self-regulatory and self-correcting activities, which are vital to increased adoption of environmental practice and behaviours to support environmental objectives. Learning can also be an ongoing process supported by implementation of environmental indicators such as the Global Sustainable Tourism Criteria (GSTC) and the European Tourism Indicator System (ETIS) for monitoring, performing environmental audits, and reporting which can also facilitate training processes. Herremans et al. (2005) also advocate benefits derived from integration of commitment, capability and learning into a companies' EMS.

There is a distinct importance of training and education to improve EMS and employee environmental behaviour in the tourism and hospitality workplace (El Demerdash & Mohamed, 2013; Wells et al., 2015; Cedefop 2018). This correlates with the need to counteract high levels of energy consumption, greenhouse gas emissions, and excessive freshwater use for watering golf courses and heating water for showers, laundry services, swimming pools and spas (Gössling, 2015). Tourism also contributes to unsustainable land use and large-scale imports for food consumption which contribute to CO<sub>2</sub> emissions (Mullis, 2017). Addressing these issues effectively requires continuous innovation in skills and knowledge development to meet these environmental challenges and associated stakeholder (visitor, employees and employers) behaviours (UNEP, 2008, p. 36). Continuous improvement is the cornerstone of EMS which needs clear identification of where skills gaps lie. However, a lack of recognition that sustainable principles and environmental management processes need articulation into relevant skills is causing a lack of emphasis on environmental training applied to an employee's day to day work. The following sections outline key environmental management and operational activities required.

### *2.1.1. Ability to minimise the use and maximise efficiency of energy and water consumption*

Tourism has the highest energy consuming buildings in the tertiary sector after shopping malls and hospitals (Pieri et al., 2015; Sheng et al., 2018). Implementation of energy efficiency measures largely depend on operational management, associated operative actions and promotion of environmentally friendly behaviours of staff and customers. Carbon emissions can also be reduced through the knowledge and use of renewable energy and technologies but relies on employers actively seeking carbon reduction solutions.

A key problem identified by Smitt et al. (2021) is the increased expectations and needs of the comfort-based hotel environment, where heating or cooling systems increase carbon emissions. With recent extreme temperature rises this will become increasingly challenging for many tourism destinations. Cingoski and Petrevska (2018) show that hotels can achieve energy savings of 20% or more as energy use is one of the more controllable costs. However, this relies on knowledge of appropriate managerial actions to support zero carbon investment and operations in alternative energy systems which may be limited by space for on-site renewable resources, but may be overcome by a city or district wide approach to energy consumption and supply (Crespi et al., 2021).

### *2.1.2. Ability to manage waste, sewage, recycling and composting*

In tourism destinations the collection, transportation, processing and disposal of municipal solid waste (MSW) in an environmentally sound and cost-efficient way is essential to protect residents, tourists and natural environments. Murava and Korobeinykova (2016) and Ezeah et al. (2015) propose management and operational measures which rely on knowledge and skills to reuse, recycle and compost within accommodation, food establishments, administrations and offices. Pirani and Arafat (2014) analysed the reduction of operational costs via food waste management and the causes of the different types of waste encountered in hotels and restaurants and which strategies may be used to reduce waste. Skills to execute such tasks are essential to all employees not exclusively facilities or maintenance staff, but also procurement and housekeeping to help reduce plastic waste and chemical contamination of water. Food and beverage operations can minimise waste through portion control, composting and waste reduction procedures to eliminate waste disposal, increasing cost savings and maximise yield. Faced with increasingly tight profit margins, restaurants need training in methods to trim their costs and improve productivity (Dhir et al., 2020).

### *2.1.3. Knowledge of climate change*

Without increased and urgent mitigation and adaptation measures matched with employee actions to support a sharp decline in greenhouse gas emissions by 2030, global warming will surpass 1.5°C in decades to come and irretrievable damage will occur through extreme changes in weather patterns in tourism destinations (IPCC, 2019; UNWTO & International Tennis Federation [ITF], 2019). Global warming contributes to sea level rise, which threatens tourism destinations via breaching coastal and flood defences. This requires adaptation measures by tourism businesses that must rely on employers' and employees' ability to reduce risks and support flood proofing of vulnerable buildings (Simpson et al., 2008; UNEP, 2010; Njoroge, 2014; DeConto & Pollard, 2016; Vousdukas et al., 2018).

Temperature increases resulting in heatwaves, droughts, wet winters and sea level rises may lead to greater change in numbers of tourists at alternative tourism hotspots which could increase employment opportunities and revenue (Weston et al., 2019). Therefore, knowledge and action that relies on skills are therefore twofold: to have a fundamental understanding of the contribution of the tourism sector to climate change and how to mitigate and adapt the tourism sector through changing employee roles and responsibilities to protect the environment; and how to protect the industry against current impacts of climate change upon tourism.

Damm et al. (2018) analysed the impact and extent of required change due to a two-degree rise in temperature upon the viability of European winter tourism destinations, whilst Aristeidis et al. (2018) analyse the

impact of a two-degree rise on European summer tourism threatening the health and safety of tourists and residents. This holds significant implications for the urgent need for tourism businesses and employees to support active implementation of carbon reduction programmes for increased levels of business resilience, adaptation and mitigation strategies (UNEP, 2008; UNWTO & ITF, 2019; World Business Council for Sustainable Development [WBCSD], 2020). This will support the implementation of the United Nations sustainable development goal 7 (SDG 7) to induce climate change action. Zhao et al. (2020) provide a comprehensive review of carbon labelling and calculation schemes to support a greater customer awareness of carbon footprint of products and services. Carbon calculation requires relevant skills to be able to monitor and evaluate energy use from equipment and technology and assess and implement strategies to reduce carbon emissions.

#### *2.1.4. Promotion of environmentally friendly products and services*

The skills required within a business or destination management organisation (DMO) to support pro-environmental behaviour of customers relates to how environmental practices are translated and presented to the customer (the tourist) by employees and employers so that appropriate behaviour can occur. Traditionally the business has pursued environmental standards and criteria via sustainable hospitality and tourism accreditation schemes such as the Green Business Scheme (GBS), Keep Wales Tidy or Global Sustainable Tourism Criteria (GSTC). Tourists may also have relatively low levels of responsibility when required to actively support pro-environmental behaviours despite morally supporting a sustainable tourism ethos (Juvan & Dolnicar, 2014).

The onus is placed upon the business to pursue accreditation rather than placing responsibility on the tourist which arguably reduces awareness of environmental issues and behaviours which tourists can support. Tkaczynski, Rundle-Thiele and Truong (2020) investigated effective measures to utilise social media marketing techniques and benchmarks to increase awareness of environmental efforts of a company or DMO to encourage supportive environmental behaviours. The point at which customers act in environmentally friendly ways is connected to personal attitudes (Juvan & Dolnicar, 2014) towards the environment but also can be influenced by a company's promotion of its environmental credentials and values of environmental practices. Promotion could advocate a range of environmental practices including supporting conservation, choice of alternative transport methods, supporting purchasing of locally sourced products and traditional crafts or reducing plastic waste. Values of environmental accreditation and certification schemes have been extensively debated over the last twenty years from the use of certification and "eco-labelling" (Duglio et al., 2017; Font & Buckley, 2001) to evaluation of carbon labelling (Gossling & Buckley, 2016). Translating environmental standards into everyday behaviours by tourists and employees is becoming increasingly important to increase further benefits from certification and thus requires appropriate skills sets to honestly promote environmentally behaviours and use of environmentally friendly products and services.

The skills and techniques of how to market and promote environmentally friendly products is controversial due to the need to avoid "greenwashing" and falsely marketing and promoting environmental criteria that is not valid or real (Urbanski & Haque, 2020). Arguably tourists need to have a more comprehensive understanding of how their holiday contributes to carbon emissions and actions which can be taken to reduce their carbon footprint. The skills of employees to calculate carbon emissions of a business and disseminate that information honestly to their customers should become standard practice in the supply chain to help influence consumer choices based on environmental performance (Loyarte-López et al., 2020).

#### *2.1.5. Conservation of biodiversity*

The prosperity of the tourism industry depends on healthy ecosystems in lake, mountain, coastal, river, forest, woodland environments that attract visitors who appreciate biodiverse natural landscapes (Petrosillo et al., 2006). And yet tourism can negatively impact biodiversity through pollution, visitor impacts, destruction



of natural habitats (Milder et al., 2016). Most outdoor tourism activities are directly based on the natural resources provided by these ecosystems. These recreational values offered by ecosystems, that visitors can experience whilst doing an outdoor activity such as fresh air, and seeing abundant plants, trees and flowers and wildlife have been acknowledged as one of the main cultural services that nature provides to people, along with educational, aesthetic, and spiritual values (Daniel et al., 2012). Biodiversity, therefore, is a large part of what makes tourist destinations attractive. At the same time, biodiversity serves as an opportunity to increase awareness among tourists of its intrinsic value and provides inhabitants with incomes and stimuli to preserve their natural environment (Whitelaw et al., 2014) although this is also dependent on access and right to secure livelihoods and access to land. The UN Convention on Biological Diversity (2010) laid out clear targets to safeguard biodiversity and enhance its benefits for all.

Although qualified professionals in tourism exist in relation to biodiversity conservation skills, in general there is a lack of tourism staff with sufficient competencies and skills to support biodiversity in and around tourism businesses. Tourism managers and employees across different business functions should have a thorough understanding of their company's impact and dependence on ecosystems and ecosystem services such as water, clean air and natural environments (Braat et al., 2012). Therefore, it is important to develop management and operational skills and relevant conservation of biodiversity training, to increase knowledge and understanding by businesses (Milder et al., 2016).

### *2.1.6. Promotion of environmentally friendly transport*

Sustainable transportation strategies consist of green and eco-friendly forms of travel which minimise or eradicate use of fossil fuels to minimise damage to the environment (Steg, 2005). There is a growing concern of the need to offer alternatives to fossil fuel transport (UNWTO & ITF, 2019; Pan et al., 2018). Given the environmental effects of tourism transportation (mainly of air travel, but also of cruises and car travel), tourism managers and staff need to be educated well for sustainable mobility and tourism. Attention should be paid to topics such as encouraging tourists to use sustainable modes on their trips, improving the quality of information available to tourists, how to reduce transport-related emissions, encouraging sustainable transport behaviour, reducing the amount of polluting vehicles on the road and encouraging a modal shift towards public transport (Hall et al., 2017).

Despite the importance of these topics, dedicated study programs in this field are quite scarce. The EU Erasmus project 'Sustainable Transport Education for Environment and Tourism' (STREET, 2018) which ran from 2015-2018, is an example of this kind of specific education. It defined a new professional profile, the 'Expert in Sustainable Mobility and Tourism', focusing on two main fields: alternative mobility and sustainable tourism, providing opportunities for economic growth, local development and employment. In general, these competences should be incorporated further in tourism study programs.

## **2.2. Training and education in environmental skills**

The United Nations 2030 Agenda for Sustainable Development includes seventeen Sustainable Development Goals (SDGs) and 169 associated targets that rely on a people centred, transformative approach to learning (UNWTO, 2017). The implementation of SDGs rests on new knowledge and skills within the tourism industry to contribute, directly or indirectly to all of the goals. The value of education and training for new skills is reflected in Goal 4 which promotes lifelong learning opportunities so that the tourism industry can develop a well-trained and skilful workforce. This is essential, if SDGs particularly relevant to environmental management, are achieved by tourism employees. Goal 7, to ensure access to affordable, reliable, sustainable and modern energy, can support the shift towards renewable energy adoption. Goal 12, to ensure sustainable consumption and production patterns, combined with environmental accreditation standards and practices via jobs and skills, supports the protection of the natural environment and helps reduce waste. Goal 13, to

adopt urgent action to combat climate change, is essential to reduce the CO<sub>2</sub> emissions and lowering energy consumption that the tourism industry contributes to.

Green human resource management practices are gaining increased attention by companies who are committed to environmental leadership (Luu, 2019; Pham et al., 2019; Yong & Mohd-Yusoff, 2016) to support environmental training and staff development and sustainable human resource management (Kramar, 2014; Baum, 2018). Managerial and operational actions that support environmental practice include accreditation and environmental standard schemes (Font, 2002; Klintman, 2012; Peiró-Signes et al., 2014). McLoughlin et al. (2019) evaluated the application of a sustainable European Tourism Indicators (ETIS) system that helps measure the extent of environmental management.

Soyoung and Park (2013) analysed a study of 278 event planners and managers which strongly indicated the value and influence of environmental knowledge and education upon the intention of environmental planning and operational logistics of arranging green meeting events. Kim et al. (2014) analysed the correlation between environmental skills, knowledge, capabilities and environmental practice in hotels in the Northwest American lodging industry. The authors highlighted five key environmental management skills: staff training, knowledge and skills around environmental actions; informing guests of the hotel's environmental policies; capital investment in environmental management; and staff support. More recently in the case of a luxury hotel Sourvinou and Filimonau (2018) analysed the factors that help contribute to effective implementation of an environmental management programme which supports prioritisation of environmental skills and knowledge development. Garay et al. (2017) also emphasise the importance of knowledge through information acquisition, proactivity, performance and the ability to retain knowledge gained from various different sources of environmental knowledge according to different learning styles of target audiences. This training can be implemented inside companies, but also sustainability curricula by including the concepts, values and practices of sustainability in courses offered in Vocational Education Training (VET) and Universities (Murga-Menoyo, 2014; Renwick et al., 2015).

Pace (2016) characterises the skills for energy efficiency in hotels following the dynamic capabilities approach which encourages businesses to train in sensing, seizing and solving capabilities in environmental management, at the different hierarchical levels. The environmental practices must therefore relate to relevant green skills for large and small companies, otherwise implementation remains vague.

### 3. Methodology

This research is part of a large project on tourism and hospitality employees' skills gaps, implemented within the framework of the Next Tourism Generation (NTG) Alliance funded by the KA 2 Erasmus+ Programme (<https://nexttourismgeneration.eu/>). Sector Skills Alliances 2018 for implementing a new strategic approach (Blueprint) to sectoral cooperation on skills; EAC/A05/2017, LOT 3). The research population included companies and organisations from five tourism subsectors (accommodation establishments, food and beverage outlets, tour operators and travel agents, visitor attractions, and destination management organisations) registered in eight European countries (Italy, Germany, UK, Spain, Bulgaria, Hungary, Ireland, and the Netherlands). The scope of the countries is based on the geographic scope of NTG Alliance partners, while the scope of the tourism subsectors reflects the parameters of the project. Ethical Approval was received from Cardiff Metropolitan University Ethics Committee.

#### 3.1. Quantitative research

The authors implemented mixed methods research. Quantitative data was collected between 14th January and 28th February 2019 through an anonymous online Qualtrics questionnaire sent to managers of companies and organisations. Additionally, the link was posted to relevant tourism trade networks and relevant social

media groups. The researchers across the NTG consortia utilised their industry contacts and looked for the support of key tourism and hospitality trade associations to increase the number of respondents. The final sample included 1404 respondents and its characteristics are presented in Table 1a.

**Table 1a**  
*Questionnaire sample characteristics*

Characteristic	Number of respondents	Share (%)
<i>Country</i>		
Italy	370	26.4
Germany	246	17.5
UK	233	16.6
Spain	139	9.9
Bulgaria	135	9.6
Hungary	123	8.8
Ireland	74	5.3
Netherlands	40	2.8
Other	44	3.1
<i>Sector</i>		
Accommodation	525	37.4
Destination management	295	21.0
Visitor attractions	212	15.1
Food & beverage	201	14.3
Travel agents and tour operators	171	12.2
<i>Size</i>		
Individual or part-time activity	135	9.6
Micro (Less than 10 employees)	501	35.7
Small (10-99 employees)	512	36.5
Medium (100-249 employees)	128	9.1
Large (250 or more employees)	128	9.1
<b>Total</b>	<b>1404</b>	<b>100.0</b>

The questionnaire was developed in the English language. It was translated into the official languages of the alliance countries by the partners' employees, who were native speakers. The questionnaire consisted of several blocks of questions. The first block collected data about the characteristics of the organisations the respondents worked for, country of registration, type, size, sector, and job position. The second and third blocks collected data about the current and the required future proficiency levels for three groups of skills: digital, environmental, and social skills. The fourth block asked about the training provided by the organisation for the same groups of skills.

This paper focuses on the *environmental skills* of respondents, while the digital (see Carlisle et al., 2021) and social skills go beyond the scope of this paper. The list of skills was formulated by the alliance members based on the review of academic and trade press publications, their own industry experience, and research expertise. The proficiency level was measured on a 5-point scale – from 1 (no skills) to 5 (expert). The managers self-evaluated the level of proficiency of each skill in their company/organisation in line with previous studies (e.g. Castro & Ferreira, 2019) for two reasons: (a) due to time and budget constraints, it was impossible to evaluate the actual proficiency level of all members of staff and their environmental skills in each of the 1404 companies and organisations in the sample; (b) the managers were considered as the most knowledgeable respondents who could provide a realistic perspective of the proficiency levels of the various skills within their companies/organisations.



The empirical distribution of responses was treated as close to normal because the skewness and kurtosis values were all within the range [-1; +1] and the sample size was sufficiently large (>500) (George & Mallery, 2019; Kim, 2013); thus, parametric tests (paired samples t-test and ANOVA) were used for data analysis. Cluster analysis was employed to reveal the existence of groups of respondents based on their environmental skills gaps. The number of respondents in the cluster analysis (1404) exceeded 234 times the number of variables in the segmentation base (6), hence it was much higher than the minimum ratio of 70 recommended by Dolnicar et al. (2014).

### 3.2. Qualitative research

Qualitative data was collected through semi-structured interviews. The researchers applied purposive sampling. The interviewees were selected from the five different tourism sub-sectors, the function they had within their companies/organisations, and the level of seniority. In total, 264 interviews were conducted by researchers from the partner institutions in the NTG project: 249 with company owners and executives, general managers, human resource managers, and heads of department in the five tourism subsectors, and 15 interviews with training and consultancy companies in tourism to provide further insights in skills development for the industry. The sample's characteristics are presented in Table 2b. Interviews lasted for about 45 minutes, they were recorded where permitted and transcribed. Thematic analysis identified key themes surrounding the current and future levels of environmental skills, skills gaps and related topics in the interview responses and a textual abstract was made for each interview by filtering the relevant raw data. After that data were coded and respective themes and subthemes were identified.

**Table 1b**  
*Interview sample characteristics*

Sector	UK	Germany	Italy	Ireland	Hungary	Netherlands	Spain	Bulgaria	Total
Accommodations	11	7	16	6	6	7	14	5	72
F&B companies	9	6	7	6	8	5	5	2	48
Destination management organisations	13	6	5	6	6	5	6	0	47
Tour operators & travel agencies	8	5	3	7	6	7	3	3	42
Attractions	9	7	3	7	6	6	2	0	40
Training providers	0	9	0	0	0	0	0	6	15
<b>Total</b>	<b>50</b>	<b>40</b>	<b>34</b>	<b>32</b>	<b>32</b>	<b>30</b>	<b>30</b>	<b>16</b>	<b>264</b>

Note:  $\chi^2=90.761$ ,  $df=35$ ,  $p<0.001$ .

## 4. Results

### 4.1. Quantitative results

#### 4.1.1. Overall analysis

Table 2 presents the self-reported current level of proficiency of environmental skills, the required future level of proficiency, and the absolute and percentage gaps between them. Respondents considered that their companies and organisations had best developed skills related to *Promotion of environmentally friendly activities and products* ( $m=3.34$ ) and *Knowledge of climate change* ( $m=3.34$ ), followed by *Ability to manage waste, sewage, recycling and composting* ( $m=3.24$ ) and *Ability to minimise the use and maximise efficiency of energy and water consumption* ( $m=3.10$ ). *Conservation of biodiversity* ( $m=2.84$ ) and *Promotion of sustainable forms of transport* ( $m=2.98$ ) were least developed. The paired samples t-test values between the current level of proficiency of the top two environmental skills and the other four skills were all significant at

$p < 0.001$ . For the future, the respondents considered that they would need higher proficiency in all six skills and the respective paired samples t-test values between the future and current levels of proficiency were significant at  $p < 0.001$  (Table 2). The order of skills based on their future required proficiency level remained the same as in the current level of proficiency: *Promotion of environmentally friendly activities and products* ( $m=3.95$ ) and *Knowledge of climate change* ( $m=3.84$ ) were the top environmental skills, while *Conservation of biodiversity* ( $m=3.51$ ) and *Promotion of sustainable forms of transport* ( $m=3.67$ ) were perceived as requiring lower level of proficiency compared to the other skills. The lowest gaps between the future and current levels of proficiency were identified in *Knowledge of climate change* (absolute gap=0.5078, percentage gap=15.20%) and *Ability to manage waste, sewage, recycling and composting* (absolute gap=0.5085, percentage gap=15.69%), while the highest gaps were reported for *Promotion of sustainable forms of transport* (absolute gap=0.6930, percentage gap=23.26%) and *Conservation of biodiversity* (absolute gap=0.6695, percentage gap=23.57%).

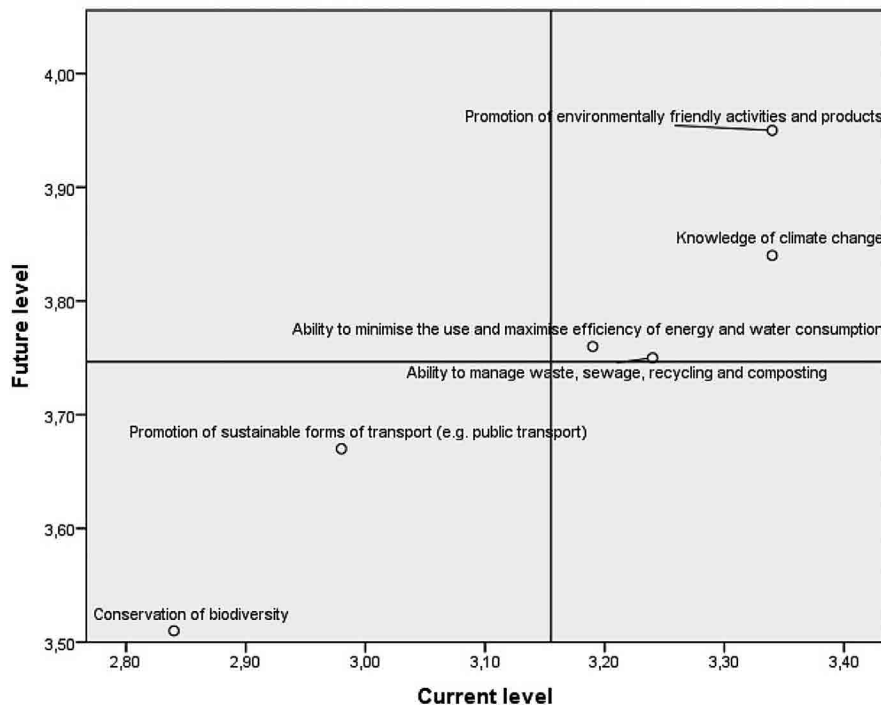
Table 2 shows that the current and required future levels of proficiency of environmental skills are strongly and positively correlated (min  $\rho=0.574$ , max  $\rho=0.664$ , all  $p < 0.001$ ). This finding is further supported by Figure 1 which reveals that the current level of proficiency is related to the required future level – all environmental skills with a current level of proficiency above or below the average level are the same as the skills with a required future level of proficiency above or below the average. This result is suggestive of the existence of a potential anchoring bias (Tversky & Kahneman, 1974) – tourism and hospitality employees’ perceptions about the future environmental skills requirements are based on their evaluations of the current levels of proficiency. Similar conclusion was derived for respondents’ evaluation of digital skills levels (Carlisle et al., 2021).

**Table 2**  
**Current level of proficiency and future required proficiency level of environmental skills**

Environmental skills	Current level		Future level		Absolute gap (future level – current level)		Percentage gap (absolute gap/current level)	Correlation between Current and future levels	Paired samples t-test (Current vs future level)
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation			
Ability to minimise the use and maximise efficiency of energy and water consumption	3.19	1.052	3.76	1.085	0.5698	0.9507	17.86%	0.604***	-22.457***
Ability to manage waste, sewage, recycling and composting	3.24	1.127	3.75	1.110	0.5085	1.0000	15.69%	0.601***	-19.056***
Conservation of biodiversity	2.84	1.256	3.51	1.171	0.6695	1.0259	23.57%	0.645***	-24.453***
Promotion of sustainable forms of transport (e.g. public transport)	2.98	1.177	3.67	1.168	0.6930	1.0349	23.26%	0.611***	-25.091***
Promotion of environmentally friendly activities and products	3.34	1.120	3.95	1.050	0.6123	1.0036	18.33%	0.574***	-22.869***
Knowledge of climate change	3.34	1.119	3.84	1.058	0.5078	0.8938	15.20%	0.664***	-21.289***

Notes: N=1404; Level of significance: \*\*\* $p < 0.001$ ; Coding – 1-no skills present, 5-expert.

**Figure 1**  
*Self-reported mean current and required future level of proficiency of environmental skills*



Note: Coding – 1-no skills present, 5-expert.

#### 4.1.2. The role of country of registration, tourist sector and organisation size

Table 3 presents the ANOVA results. They show that the country of registration, sector and size significantly shape respondents' answers. On the one hand, Hungarian and German respondents were least confident of their current proficiency levels – for 4 and 2 out of 6 environmental skills, respectively, they reported the lowest mean value. On the other hand, Italian respondents and those outside the eight countries of the NTG Alliance members were more confident in their environmental skills. Hungarian and Bulgarian respondents evaluated as lowest their required future environmental skills proficiency levels, while again Italian respondents and those outside the NTG Alliance countries were most confident. Finally, the gap between current and required future skills proficiency levels was smallest for respondents from Bulgaria and Italy, while highest – for Irish respondents. Most of the F-test values and the respective Tukey's HSD-test values between the minimum and maximum means were significant at  $p < 0.001$  (Table 3).

Looking at the sector type, we see that accommodation establishments had highest current proficiency levels on 4 out of 6 skills. DMOs needed highest future proficiency on three skills. They also reported the highest skills gaps on four skills. Visitor attractions reported the smallest gaps. Half of the differences were statistically significant (Table 3).

In terms of size, individual entrepreneurs had highest confidence in their current level of proficiency of all six skills, had highest future proficiency requirements for three skills, but had the lowest gap in four skills. Large organisations had highest future proficiency requirements for *Ability to minimise the use and maximise efficiency of energy and water consumption*, *Ability to manage waste, sewage, recycling and composting*, and *Promotion of sustainable forms of transport*, but the differences to the other organisations were not statistically significant. Size mattered most in the skills gaps where medium and large organisations reported the greatest needs to upgrade the environmental skills of their employees.

**Table 3**  
Differences among respondents on the basis of country of registration, tourist sector and size (ANOVA results)

Environmental skills	ANOVA (F-statistic)								
	Current level			Future level			Absolute gap		
	Country	Sector	Size	Country	Sector	Size	Country	Sector	Size
Ability to minimise the use and maximise efficiency of energy and water consumption	9.367***	13.314***	3.135*	6.141***	9.925***	1.491	4.350***	3.420**	4.093**
Ability to manage waste, sewage, recycling and composting	11.206***	9.450***	2.457*	6.094***	8.823***	1.842	5.913***	1.266	4.781***
Conservation of biodiversity	5.277***	1.814	8.302***	3.212***	2.120	1.535	4.212***	2.452*	7.747***
Promotion of sustainable forms of transport (e.g. public transport)	2.802**	9.994***	1.238	3.418***	8.642***	1.420	2.531**	1.324	3.879**
Promotion of environmentally friendly activities and products	4.619***	0.528	3.225*	2.469*	2.156	0.521	5.246***	2.553*	4.263**
Knowledge of climate change	5.443***	1.852	9.025***	2.054*	0.956	0.969	5.607***	1.707	10.696***

Notes: N=1404; Level of significance: \*\*\*p<0.001; \* p<0.01; \*p<0.05.

#### 4.1.3. Cluster analysis

The cluster analysis elicited two groups of respondents based on the absolute environmental skills gaps; their characteristics are presented in Table 4 while the differences in the skills gaps between the clusters are presented in Table 5. Cluster 1 included 615 respondents that considered their companies and organisations had huge gaps between the current and required future proficiency levels of environmental skills, ranging from 1.0683 (*Knowledge of climate change*) and 1.4374 (*Promotion of sustainable forms of transport*). The second cluster consisted of 789 respondents who were more confident in their environmental skills proficiency level – the gaps between the current and required future levels were small (between -0.0063 and 0.1128). The differences between the two clusters were all statistically significant at p<0.001 (Table 5). A closer look at clusters' characteristics in Table 4 shows that most of the respondents from Italy, Bulgaria and UK were classified in Cluster 2, German, Spanish and Dutch respondents were nearly equally split between the clusters, while most of Hungarian and Irish respondents were classified in Cluster 1 ( $\chi^2=31.148$ , p<0.001). Respondents from DMOs were split equally between the clusters, while the respondents from the other tourism subsectors were classified mostly in Cluster 2 ( $\chi^2=13.122$ , p<0.05). In terms of size, nearly two thirds of respondents from micro enterprises and of individual entrepreneurs were in Cluster 2, while small, medium and large organisations were equally distributed between the two clusters ( $\chi^2=27.465$ , p<0.01).

**Table 4**  
Cluster characteristics

Characteristic	Cluster 1	Cluster 2	Chi-square
Country			$\chi^2=31.148$ *** (df=8)
Italy	134	236	
Germany	123	123	
UK	101	132	
Spain	68	71	
Bulgaria	44	91	
Hungary	65	58	
Ireland	43	31	
Netherlands	18	22	
Other	19	25	

**Table 4 (continued)**

<i>Sector</i>			
Accommodation	227	298	$\chi^2=13.122^*$ (df=4)
Destination management	149	146	
Visitor attractions	73	139	
Food & beverage	90	111	
Travel agents and tour operators	76	95	
<i>Size</i>			
Individual or part-time activity	41	94	$\chi^2=27.465^{***}$ (df=4)
Micro (Less than 10 employees)	192	309	
Small (10-99 employees)	251	261	
Medium (100-249 employees)	64	64	
Large (250 or more employees)	67	61	
<b>Total</b>	<b>615</b>	<b>789</b>	

Notes: N=1404; Level of significance: \*\*\*p<0.001; \* p<0.01; \*p<0.05.

**Table 5**  
**Cluster analysis: Differences among clusters in environmental skills gaps**

Environmental skills gaps	Cluster 1 N=615		Cluster 2 N=789		t-statistic
	Mean	Standard deviation	Mean	Standard deviation	
Ability to minimise the use and maximise efficiency of energy and water consumption	1.2130	0.8321	0.0684	0.7038	27.333***
Ability to manage waste, sewage, recycling and composting	1.1691	0.8846	-0.0063	0.7515	26.363***
Conservation of biodiversity	1.4358	0.8798	0.0722	0.6749	31.825***
Promotion of sustainable forms of transport (e.g. public transport)	1.4374	0.8946	0.1128	0.7169	29.977***
Promotion of environmentally friendly activities and products	1.3447	0.8683	0.0418	0.6793	30.618***
Knowledge of climate change	1.0683	0.8418	0.0710	0.6588	24.171***

Notes: N=1404; df=2; Level of significance: \*\*\*p< 0.001; Coding – 1-no skills present, 5-expert.

#### 4.1.4. Environmental skills training

Environmental skills training provided to tourism and hospitality employees is presented on Table 6. The overwhelming majority of respondents (802 or 57.12%) reported they had received no training in environmental skills. The most popular was on the job training, provided to 440 or 73.09% of respondents who received any training, followed by online courses (n=140) and one-day on-site training by external provider (n=139). Payment for higher education programmes related to environmental skills was least popular (n=29). Results reveal significant differences in the types of training provided by country ( $\chi^2=221.46$ , p<0.001), sector ( $\chi^2=107.42$ , p<0.001), and company size ( $\chi^2=52.49$ , p<0.001). On the job training was most popular in Italy (n=160), while in Germany respondents received a one-day off-site training by an external provider (n=56) and an online course (n=50). Vocational training was not reported by respondents from Hungary and Ireland. On the job training was the most important training type for respondents from all tourism subsectors. One- and several day offsite training by external providers were more popular among DMOs. Most of respondents in individual, micro and small enterprises reported no training, while half of medium and large tourism and hospitality companies provided some environmental skills training for their employees. On the job training was the most popular types of training for all respondent groups. Micro and small companies and organisations relied more on off-site training compared to medium and large companies who strongly



preferred onsite to offsite trainings, probably because of the organisational difficulties and financial costs involved in training many employees outside of the premises of the company.

**Table 6**  
*Environmental skills training provided by tourism and hospitality companies*

Characteristic	No training provided	Training provided										Chi-square
		Total	On the job training	Online course	One day on-site training by external provider	Several days on-site training by external provider	One day off-site training by external provider	Several days off-site training by external provider	Apprenticeship	Vocational training	Higher education	
<i>Country</i>												
Italy	183	187	160	17	37	16	12	7	8	21	8	$\chi^2=221.46$ df=64 p<0.001
Germany	128	118	47	50	36	6	56	26	13	7	5	
UK	158	75	60	27	17	4	5	3	6	8	3	
Spain	74	65	52	16	14	5	5	5	4	5	3	
Bulgaria	83	52	40	9	12	6	4	5	3	4	2	
Hungary	90	33	24	7	10	2	2	1	4	0	1	
Ireland	35	39	33	4	6	4	1	5	2	0	5	
Netherlands	25	15	11	4	3	1	3	0	5	1	1	
Other	26	18	13	6	4	0	3	0	0	2	1	
<i>Sector</i>												
Accommodation	284	241	202	34	53	14	25	11	12	15	8	$\chi^2=107.42$ df=32 p<0.001
Destination management	167	128	64	49	38	14	40	26	12	11	8	
Visitor attractions	122	90	66	17	21	7	5	5	7	7	4	
Food & beverage	111	90	80	19	16	5	9	3	10	7	5	
Travel agents and tour operators	118	53	28	21	11	4	12	7	4	8	4	
<i>Size</i>												
Individual or part-time activity	83	52	38	7	6	1	8	1	2	2	2	$\chi^2=52.49$ df=32 p<0.001
Micro (Less than 10 employees)	297	204	152	44	34	13	38	14	12	20	7	
Small (10-99 employees)	296	216	156	43	63	16	36	31	21	19	13	
Medium (100-249 employees)	61	67	47	23	18	6	7	4	4	3	4	
Large (250 or more employees)	65	63	47	23	18	8	2	2	6	4	3	
<b>Total</b>	<b>802</b>	<b>602</b>	<b>440</b>	<b>140</b>	<b>139</b>	<b>44</b>	<b>91</b>	<b>52</b>	<b>45</b>	<b>48</b>	<b>29</b>	

Note: N=1404.

## 4.2. Qualitative results

### 4.2.1. Tour operators and travel agents

Environment-friendly tourism in this subsector is still perceived as a niche market and price is still the first consideration for most clients. However, most interviewees consider environmental management skills will increasingly gain relevance as customer expectations of environmental standards change and different values

becoming more significant in the travel market. Generally, it was quite difficult for interviewees to think of future environmental skills. Some basic environmental skills were highlighted including: reduction and management of waste, electricity, water use and paper, and supporting recycling initiatives. However, several interviewees noted that these are not actually 'skills', instead behaving in a sustainable way is more about attitude, awareness and values.

#### *4.2.2. Destination management organisations*

In this subsector, there is an increased focus on green initiatives, products, and experiences since customers are increasingly expecting sustainable products and services. Also, DMOs see it as their task to create a good quality of life for their residents while maintaining a balance between the interests of visitors, the industry, local communities, and the environment and avoiding conflicts between these parties. The majority of interviewees foresee skills needed for preserving a destination environment in balance for future generations and for encouraging visitors to look beyond the most visited areas. Other skills cited in the interviews were recycling and reusing materials in events, reducing the use of plastic and paper, reducing the carbon footprint, promoting the use of renewable energy resources by services providers and in offices as well as skills to promote and develop environmentally friendly tourism experiences and products.

#### *4.2.3. Accommodation providers*

Generally, it was quite difficult for accommodation providers to predict future environmental management skills. Whereas environmental management in this sector is in some countries partly regulated by laws, green policies are generally conceived at the management level, so employees need to be aware of and follow company policies and procedures rather than possess specific green skills. When green skills were specified, they related to water, waste and energy management; reduction of the use of paper and plastic; recycling and composting; use of rain and underground waters; promotion of public transport or e-transport modes for both customers and staff; use of more local produce and sustainable materials for building and interior design.

#### *4.2.4. Visitor attractions*

Whilst no environmental skills were specified, senior executives in this subsector stated how future generations will demand a more sustainable visitor environment to reduce the guilt of contributing to environmental damage whilst on holiday. Managing impacts of large numbers of visitors using sustainable criteria at cultural and heritage attractions was also highlighted as a significant challenge. Attractions will have to plan for this shift in customer attitudes and increase training and better waste management, minimising the use of plastic and paper, energy and water saving, recycling, conservation and nature education, sourcing local products and reducing carbon emissions. Such skills should become part of the DNA of all employees.

#### *4.2.5. Food and beverage operations*

Interview results demonstrated that environmental skills are currently not a requirement when hiring staff. Instead, sustainable practices are to a large extent customer and employee driven who may have an interest in healthy eating and want to know where their restaurant food is originating from. The use of environmentally friendly materials (for construction, furnishing), the sustainable use of resources (energy, water, waste) and the use of regional and/or organic products are mentioned as important but whether these are skills or belong more to a management vision is open for discussion. Interviewees from Spain noted that the habits of ordering and home delivery of food is generating a lot of extra waste and CO<sub>2</sub> emissions due to the large amount of packaging and transport needed. The EU single-use plastic ban will pose challenges for companies operating in this field.

## 5. Conclusion

### 5.1. Contribution

This paper theoretically and empirically contributes to the existing literature on environmental skills and green human resource management on the tourism sector. The paper evaluated the environmental skills gaps of tourism and hospitality employees in companies and organisation in five tourism sectors in eight European countries. The paper identified the role of tourism sector, country of registration and size of the company / organisation on the current and future required levels of environmental skills of employees and on the gap between them. The findings revealed that all three factors play a role. Furthermore, the paper evaluated the environmental skills training received by tourism and hospitality employees and the influence of type of sector, country of registration and size of the company / organisation on training delivery.

### 5.2. Theoretical implications

From a theoretical perspective, the findings reveal that the country of registration of a tourism/hospitality organisation, its tourism sector type and size, determine its self-reported current environmental skills level, the expected required future skills level, the gap between the current and future levels, and the training received by the employees. These are key factors to consider when integrating skills development into the EMS of an organisation where skills are largely omitted from EMS analysis. More emphasis on which skills are required to support environmental standards are required. Tourism and hospitality organisations are not homogenous in terms of the current and required future environmental skills and the gaps between them. In that sense, the paper confirms the results of previous studies that the characteristics of an organisation shape the skills the organisation has access to (Ashton & Felstead, 1998).

Furthermore, the paper revealed that there is a positive, high and statistically significant correlation between the respondents' self-reported current and required future environmental skills level, which is suggestive of a potential anchoring bias (Tversky & Kahneman, 1974). This means that respondents' perceptions about the future are like an extrapolation of what they currently do, i.e. 'more of the same'. Such a way of thinking may severely restrict urgent environmental action required and mask the differences in the actual importance of the environmental skills that tourism and hospitality companies would need in the future. Therefore, further research is needed to understand how knowledge and attitudes towards climate change correlates with direct experience of depletion or pollution of natural resources that tourism depends on, which could affect current attitudes to environmental skills. The urgency to manage resilience against impacts of future climatic disasters therefore can depend on the organisation location including access to water and type of tourism. For example, accommodation in a destination experiencing flooding or heat extremes may place more importance on climate change resilience strategies, or a rural accommodation or visitor attraction may have more options to support conservation of biodiversity compared to an urban self-catering apartment. Moreover, the required future skills may change due to technological progress (e.g. automated garbage collection, autonomous electric vehicles, mass introduction of solar panels and other types of renewable power), government regulations, consumer or competitor actions, or tourism industry self-regulations. Within the institutional theory of DiMaggio and Powell (1983), these form the mimetic pressure (e.g. copying competitors), coercive pressure (improvement of environmental skills due to customer expectations or because powerful partners such as online travel agencies require them), and the normative pressure (environmental legislation).

### 5.3. Managerial and policy implications

As conservation of biodiversity and promotion of sustainable forms of transport are the least developed skill sets, there needs to be a clearer evaluation of how an organisation can support knowledge, awareness and competencies to improve greater focus on these areas. The lower proficiency of these skills may be due to a lack of alternative sustainable transport available in a particular location, or a lack of easy access to sustainable

transport information. Therefore, adoption of an EMS can help clarify environmental objectives and identify best practice with appropriate actions to support knowledge and continually improve those skills that have greater proficiency. This can help motivate staff to become environmental leaders. For each environmental skill set responsibilities can be clearly defined according to the roles of employees within an organisation. This would encourage staff feedback and suggestions for environmental management and greater transparency for environmental performance measures.

Developing green skills is a high priority for many employers; however, as we learn from this study, there are still variations across the industry. Arguably the results from the study also demonstrated a lack of awareness of how environmental skills could be applied within an organisation. The challenge the tourism sector faces is how to change attitudes towards environmental training and associated behaviours. For training professionals both within industry and education institutions it is essential to deliver the correct skills at appropriate levels from basic understanding and awareness, through to operational and supervisory and senior management level. Categorising environmental skills also helps to prioritise key areas of environmental management that require priority within a business.

Since the largest part of the European tourism industry consists of SMEs, public sector training models may support and encourage small and medium-sized tourism firms to reduce their environmental impact through the development of green skills and implementation of green practices. In-company training is becoming increasingly important to help support the environmental objectives so needed within companies to support Sustainable Development Goals (SDGs) and national policies to reduce CO<sub>2</sub> emissions. The promotion of training curricula that includes how to implement sustainability principles including an EMS is essential on all college and degree programmes and Vocational Education Training (VET) to ensure future employees have the appropriate employability skills to support climate resilience and protection of the natural environment. Environmental skills should no longer be just about fulfilling government regulations but also embedded into organisational learning culture as discussed above. Moreover, degree programmes need to provide specialised training not just a general overview of environmental skills, which would improve the employability of the graduates (Varra et al., 2021).

#### 5.4. Limitations and future research directions

Some limitations of this study should be noted. The first limitation of this research is that, although the respondents came from 8 countries, they were all located in Europe. Therefore, findings may only be applicable to the context of the European tourism sector, but may not be generalisable to a global scale. However, this research may encourage other countries to undertake similar studies to verify levels of environmental skills gaps. Future research needs to focus on the environmental skills gaps in tourism and hospitality in other geographic and cultural contexts. In particular, the skills gaps can be mapped against specific local environments and relevant local or national environmental threats and emergencies. Secondly, although the skill sets investigated in the survey of this study were carefully selected and based on their occurrence in literature, they do not cover all conceivable environmental skills sets, and are thus not complete or applicable to every situation or country. Thirdly, future research may dive deeper into the factors that drive environmental skills gaps and the ways to close these gaps. Finally, additional research may focus on the impact of the environmental skills gaps on the environmental performance indicators of leisure, tourism and hospitality organisations.

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