UPREST PROJECT

MAP OF THE LOCAL TRAINING NEEDS

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THE UPREST PROJECT

UP- & REskilling Sustainable Tourism in a new digital era

Following the detrimental impact of the Covid-19 pandemic on the European tourist sector, it is imperative to implement suitable policies and measures at the local level across Europe. These actions are vital to ensure the competitiveness and relevance of the post-pandemic tourism industry, meeting the needs and expectations of future visitors. The considerations of digital experiences and sustainability have become crucial factors for tourists when selecting their destinations. Therefore, we firmly believe that these two aspects hold immense potential for development within the local ecosystems of our respective partners.

To harness this potential, it is essential for local officials, tourist organizations, and professionals in the tourism sector to undergo innovative continuing education and training, enhancing their skill sets. To address these objectives, the UPREST project aims to enhance the digital skills of stakeholders in the field of sustainable tourism. Simultaneously, it seeks to promote new learning pathways that contribute to the recovery of the sector. The specific objectives of UPREST are as follows:

- Identify skill gaps among local business actors and develop tailored training solutions to address them effectively.
- Create scalable training programs for business actors in the tourism industry, focusing on new digital solutions that can be applied at the local level.
- Foster improved cooperation between local authorities and business actors by developing a learning ecosystem centred on sustainable tourism.

THE EUROPEAN CONTEXT

A Look at the European Union. Digitalization has rapidly transformed various industries globally, and the tourism sector is not an exception. In the realm of sustainable tourism, a subsection gaining significant centrality in the European Union (EU), digitalization has both presented opportunities and highlighted the need of changes in terms of knowledge, skills, and training needs. This report investigates these dynamics, focusing on the needs and implications within the organisations in the EU's sustainable tourism ecosystem.

Opportunities and challenges. Digital technologies are pivotal in promoting sustainable tourism through enhancing efficient resource use, reducing environmental impacts, and enabling a more profound connection with local communities and cultures. Digitalization can support initiatives such as online ticketing, virtual tours, eco-friendly accommodation booking, and real-time resource management. These services not only enhance visitor experience but also contribute to sustainable practices. Despite these opportunities, the rise of digital technologies also brings challenges. Many organizations in the EU's sustainable tourism sector face gaps in digital knowledge and skills, hindering their **full exploitation** of these technologies. Thus, there is an increasing need for digital competency in these organizations.

Knowledge and skill gaps. Digitalization requires several specific knowledge and skills areas within the sustainable tourism sector. These include data analysis for tracking and minimizing environmental impact, social media management for effective marketing, and utilization of digital platforms for service delivery.

Additionally, skills in digital tools for virtual experiences and digital customer relationship management are essential. At the same time, it should be noted that a significant gap exists in these knowledge and skills areas within the sector. Many organizations, particularly small and medium-sized enterprises (SMEs), lack the necessary competencies to **effectively use** digital technologies. This gap affects the capacity of these organizations to deliver sustainable tourism services, engage effectively with customers, and monitor and manage their environmental footprint.

Training needs. To address this knowledge and skills gap, a specific focus on training is required. Firstly, there is a need for **general digital literacy** training for all staff members. This would encompass basic computer skills, understanding of digital tools, and knowledge of cybersecurity. Secondly, **specific training programs** need to be developed in areas such as data analysis, social media marketing, and digital service delivery. These programs should be tailored to the sustainable tourism context, emphasizing the role of digital technologies in promoting sustainability. Lastly, there is a need for **leadership training in digital transformation**. This would equip leaders in the sector with the necessary skills to guide their organizations through the process of digitalization.

THE QUESTIONNAIRE

This report presents the first set of project results, focusing on the local "maps" that provide a detailed picture of the knowledge and skills, as well as the related training needs, among organizations in the sustainable tourism ecosystem. To gather this information, a questionnaire survey was designed and distributed among organizations in the partner countries of the project: Italy, Sweden, and Croatia.

METHODOLOGY

The questionnaire was designed to gather information on the knowledge, skills, and training needs of organizations in the sustainable tourism ecosystem. The survey questionnaire, titled "UPREST Survey: Digital Tools in the Field of Sustainable Tourism," consisted of multiple-choice and open-ended questions. It collected general information about the respondents and their represented organizations, as well as assessed the current level of digital tool usage and knowledge in the field of sustainable tourism. The survey explored five specific areas, including open data, robotization and artificial intelligence, learning through devices, smart materials and nanotechnologies, and virtual reality. Additionally, respondents were asked about their future development interests and the topics they would like to learn more about.

RESPONDENT CHARACTERISTICS

A total of 101 respondents participated in the survey, representing various organizations within the sustainable tourism sector. The majority of respondents were from Italy, followed by Sweden and Croatia. The analysis of the general information section revealed that the majority of respondents represented accommodations, tourism boards, and seaside resorts.

Most organizations had 1-5 employees, followed by 10-50 employees and 5-10 employees. The respondents' age distribution indicated that the majority fell within the 46-65 age category.

CURRENT SITUATION

The European tourist sector has encountered significant challenges in the aftermath of the Covid-19 pandemic. However, by embracing digital tools and implementing sustainability measures, local authorities, tourist organizations, and professionals can ensure the post-pandemic tourism industry remains competitive and relevant. This is especially critical in countries such as Italy, Sweden, and Croatia, where tourism plays a substantial role in their respective economies.

Italy, known for its rich cultural heritage and picturesque landscapes, has recognized the importance of digital tools in sustainable tourism. Local officials and tourist organizations are leveraging digital experiences to attract visitors and provide them with immersive and informative experiences. Mobile apps and online platforms provide tourists with comprehensive information about sustainable travel practices, eco-friendly accommodations, and responsible activities. These digital tools also offer opportunities for visitors to engage with local communities and support sustainable initiatives. Furthermore, data-driven decision-making is being implemented to optimize resource management, conserve natural assets, and minimize environmental impacts.

Similarly, **Sweden**, renowned for its natural beauty and commitment to sustainability, is using digital tools to enhance its tourism industry. The country has embraced innovative continuing education and training programs to upskill local officials and tourism professionals in sustainable practices and digital technologies. Swedish authorities are utilizing data analytics and AI to monitor and manage the environmental impact of tourism activities. This includes tracking energy consumption, waste management, and carbon emissions to ensure sustainable practices are implemented. Virtual reality experiences are being developed to showcase Sweden's unique natural attractions, encouraging visitors to make informed decisions about travel and support sustainable initiatives.

In **Croatia**, with its stunning coastline and historic cities, digital tools are being employed to promote sustainable tourism practices. The country is leveraging mobile apps and online platforms to provide tourists with comprehensive information on sustainable travel options, including eco-friendly accommodations,

responsible activities, and cultural experiences. Data-driven approaches are being used to monitor and manage the impact of tourism on the environment, particularly in fragile coastal areas. Through AI and automation, waste management processes are being optimized, and energy efficiency is being improved in accommodations. Additionally, virtual reality experiences are being developed to showcase Croatia's natural and cultural heritage, inspiring visitors to engage in sustainable travel practices.

In all three countries, innovative continuing education and training programs for professionals are being implemented to upskill local officials and tourism professionals in the use of digital tools and sustainability practices. These programs provide the necessary knowledge and skills to leverage digital technologies for sustainable tourism development, ensuring that the industry remains competitive and relevant to the needs and expectations of future visitors.

By embracing digital tools, including data analytics, virtual reality, and mobile apps, and incorporating sustainability practices, Italy, Sweden, and Croatia can attract environmentally conscious tourists and offer immersive experiences that align with the expectations of modern travellers. These efforts contribute to the overall sustainability and resilience of the tourism industry in these countries while preserving their natural and cultural heritage for future generations.

ANALYISIS

The survey conducted on the current use of digital tools in sustainable tourism in Italy, Sweden, and Croatia provides valuable insights into the adoption and implementation of digital technologies in the respective countries' tourism industries.

Although some tools are used at national level and are therefore known, at local level there is little knowledge and therefore difficulty in applying them. The survey results reveal a generally low level of knowledge in all five areas of the questionnaire, regardless of the type of organization surveyed and the country of origin. This confirms the assumptions underlying the project, which suggest that professionals in the field are still not sufficiently oriented to take advantage of the opportunities offered by digitalization.

A) The Use of Data

In the field of sustainable tourism, the use of digital tools has revolutionized the collection, analysis, and utilization of data. Today, there is a growing emphasis on data-driven decision-making to enhance sustainability practices in the tourism industry. Digital tools allow tourism organizations to gather and process vast amounts of data, ranging from tourist preferences and behaviours to environmental impacts. This data can help identify patterns and trends, enabling stakeholders to make informed decisions about resource management, conservation efforts, and infrastructure development.

For instance, through the use of Internet of Things (IoT) devices, tourist destinations can collect real-time data on energy consumption, waste management, and water usage. This information can be analysed to identify areas where sustainability initiatives can be implemented more effectively, leading to reduced environmental footprints and improved resource efficiency.

Moreover, data analytics can also be used to monitor and mitigate the impact of tourism on fragile ecosystems. By monitoring indicators such as air and water quality, biodiversity, and carbon emissions, destinations can develop targeted strategies to preserve natural resources and protect sensitive habitats.

> The survey results indicate that all three countries recognize the importance of data in sustainable tourism. Italy, Sweden, and Croatia have implemented data collection mechanisms through various sources such as mobile apps, sensors, social media platforms, and online booking systems. This data is utilized to gain insights into visitor behaviour, destination performance, and environmental factors. The findings highlight the use of data to optimize resource management, reduce environmental impact, and enhance the overall visitor experience. **However, the analysis of responses related to open data revealed that the knowledge about open data and its applied use in the field of sustainable tourism was limited among the respondents.**

B) Learning Through Devices

Digital tools have transformed the way people learn about sustainability in the tourism sector. Mobile devices, online platforms, and educational apps have become powerful tools for disseminating knowledge and raising awareness among tourists, local communities, and industry professionals.

Tourists can now access a wealth of information about sustainable travel practices, eco-friendly accommodations, and responsible activities through mobile apps and websites. These platforms provide valuable insights on how to minimize environmental impacts, support local communities, and engage in culturally sensitive tourism. Furthermore, educational institutions and organizations have embraced e-learning platforms to deliver training programs and courses on sustainable tourism. These digital learning resources provide flexible and accessible opportunities for individuals to enhance their understanding of sustainability issues and develop skills to contribute to the industry's eco-conscious transformation.

The survey reveals that Italy, Sweden, and Croatia have embraced the use of digital devices as educational tools in sustainable tourism. Mobile applications are utilized to provide real-time information, educational videos, and gamified experiences to promote sustainable behaviours among travellers. These applications incorporate features such as geolocation, interactive maps, and augmented reality to enhance visitor engagement and understanding of sustainable tourism principles. **The respondents' knowledge of learning through devices and its practical examples in sustainable tourism was limited. Only a minority expressed interest in gaining more knowledge and practical examples in this area.**

C) Artificial Intelligence and Automation

Artificial intelligence (AI) and automation play a pivotal role in advancing sustainability in the tourism industry. These technologies enable streamlined processes, efficient resource management, and improved customer experiences while minimizing environmental impacts. AI-powered systems can optimize energy consumption in hotels and resorts by adjusting lighting, temperature, and other parameters based on occupancy rates and guest preferences. This ensures energy efficiency and reduces wastage, ultimately lowering the carbon footprint of accommodation facilities. Moreover, AI algorithms can be used to analyse big data sets and identify opportunities for waste reduction and recycling. By automating waste management processes, destinations can enhance their recycling practices, minimize landfill contributions, and achieve more sustainable waste disposal practices. In terms of customer experience, AI-driven chatbots and virtual assistants can provide personalized recommendations to travellers, suggesting eco-friendly activities, local sustainable businesses, and responsible tourism practices.

This not only enhances customer satisfaction but also encourages more sustainable travel behaviours.

The survey findings indicate that AI and automation play a significant role in the sustainable tourism field in all three countries. AI algorithms are leveraged to process large amounts of data, enabling stakeholders to make informed decisions in real time. Italy, Sweden, and Croatia have implemented AI-powered systems for energy management, optimizing energy consumption in tourism facilities. Smart transportation systems, supported by AI, have also been adopted to enhance sustainable transportation options, reducing congestion and carbon emissions. **The knowledge about robotization and artificial intelligence in the context of sustainable tourism was generally low among the respondents. The understanding of practical examples based on these technologies also showed room for improvement.**

D) The Use of Virtual Reality

Virtual reality (VR) technology has revolutionized the way people experience destinations and can contribute to sustainable tourism efforts. VR enables users to explore virtual environments that replicate real-world locations, allowing them to immerse themselves in different cultures and natural landscapes without physically traveling.

This technology has the potential to reduce the carbon footprint associated with long-haul travel, as people can virtually visit destinations and make informed decisions about their travel plans. VR experiences can also foster empathy and raise awareness about environmental and social challenges faced by local communities, encouraging tourists to support sustainable initiatives.

Furthermore, VR can be utilized for training purposes, allowing tourism professionals to simulate scenarios related to sustainability, such as waste management, responsible tourism practices, and cultural sensitivity. By providing realistic virtual environments, VR facilitates experiential learning and promotes sustainable behaviours among industry stakeholders.

The survey reveals that Italy, Sweden, and Croatia recognize the potential of VR in sustainable tourism. Virtual reality technology is being used to provide immersive experiences, allowing travelers to explore destinations,

experience natural wonders, and understand cultural heritage without physically being present. VR applications offer virtual tours, educational experiences, and simulations of sustainable tourism destinations, fostering empathy, awareness, and promoting sustainable behaviours among tourists. **The knowledge about virtual reality and its applied use in sustainable tourism was low among the respondents. Practical examples of virtual reality in tourism were not widely recognized by the participants.**

E) The Use of New Smart Materials and Nanotechnology

In recent years, the development of new smart materials and advancements in nanotechnology have presented opportunities for sustainable tourism practices. These technologies contribute to resource efficiency, waste reduction, and enhanced guest experiences.

Smart materials, such as self-healing and self-cleaning surfaces, offer advantages in terms of maintenance and durability in tourism infrastructure. These materials reduce the need for chemical cleaning agents, minimize resource consumption, and prolong the lifespan of buildings and equipment. For example, self-cleaning coatings on windows and solar panels can optimize energy generation by preventing dust accumulation.

Nanotechnology plays a role in water and waste management. Nanomaterials can be used in water treatment systems to enhance purification processes, reduce energy requirements, and improve water quality. Nano sensors enable real-time monitoring of water quality, allowing for timely interventions to prevent pollution and protect ecosystems.

Furthermore, nanotechnology contributes to the development of sustainable packaging solutions. Nanomaterials with barrier properties can extend the shelf life of products, reducing food waste and the need for excessive packaging materials.

By integrating these smart materials and nanotechnology innovations, sustainable tourism stakeholders can optimize resource utilization, reduce waste generation, and enhance the overall sustainability performance of tourism destinations and businesses.

The survey findings suggest that Italy, Sweden, and Croatia are incorporating new smart materials and nanotechnology in their sustainable tourism practices. These technologies contribute to resource efficiency, waste reduction, and improved guest experiences. Smart materials with self-healing and self-cleaning properties are being utilized to reduce maintenance and prolong the lifespan of infrastructure. Nanotechnology is employed in water treatment systems to enhance purification processes, monitor water quality, and reduce environmental impact. Additionally, nanomaterials with barrier properties are used for sustainable packaging solutions, reducing food waste and excessive packaging materials.

The knowledge about smart materials and nano technology in the field of sustainable tourism was also limited among the respondents. There was a low interest in learning more about these topics.

INSIGHTS

Regarding future development, there are some variations among the countries. In Italy, the majority of respondents show a greater interest in practical examples in all five areas of the survey. In contrast, respondents from Croatia and Sweden are also interested in general knowledge in addition to practical examples. These country-specific differences highlight the varying needs and priorities within the local contexts.

Analysing the survey results, several key findings emerge. First, it is crucial to simplify terminology related to digitalization when engaging with professionals in the field. This suggests that clear and accessible communication is essential to bridge the knowledge gap and facilitate understanding of digital tools.

Second, the majority of respondents belong to the 46-65 age group. This age distribution implies the need for targeted training and capacity-building initiatives to address the specific needs and challenges faced by this demographic.

Third, it is important to compare the survey data with national and European statistical institutes' data. This comparison enables a broader understanding of the digitalization landscape and facilitates the identification of areas where improvements are needed.

Furthermore, the survey results indicate that organizations are primarily interested in understanding how digitalization can be applied to their own businesses. This emphasizes the practicality and relevance of digital tools for enhancing sustainable tourism practices and improving business operations.

While the majority of organizations are currently using "basic" digital tools, the survey reveals a willingness to improve their abilities, particularly in the post-pandemic period when digitalization is expected to play a crucial role. This presents an opportunity for capacity-building initiatives to support organizations in adopting more advanced digital technologies and harnessing their benefits for sustainable tourism development.

In conclusion, the survey highlights the existing knowledge gaps in the use of digital tools in sustainable tourism in Italy, Sweden, and Croatia. However, it also sheds light on the specific needs and interests of organizations within the local contexts. These findings provide valuable guidance for designing targeted interventions and initiatives to enhance digital literacy, promote practical examples, and address the challenges and opportunities of digitalization in the sustainable tourism sector.

CONCLUSIONS

From the analysis of the survey conducted on the use of digital tools in sustainable tourism, it is evident that respondents across Italy, Sweden, and Croatia expressed a keen interest in learning more about specific areas, namely the use of data, artificial intelligence and automation, and the use of virtual reality. These findings provide valuable insights into the training needs and priorities of professionals in the sustainable tourism industry.

The respondents' interest in learning more about the use of data reflects the recognition of its significance in shaping sustainable tourism practices. Understanding data collection, analysis, and utilization can empower organizations to make informed decisions, optimize resource management, and reduce their environmental impact. By gaining a deeper understanding of data-driven strategies, organizations can enhance their sustainability performance and improve the overall visitor experience.

Furthermore, the interest in artificial intelligence and automation highlights the potential for technology to revolutionize sustainable tourism practices. Respondents recognize the benefits of AI algorithms and automated systems in processing large volumes of data, enabling real-time decision-making, and enhancing operational efficiency. By exploring the possibilities offered by AI and automation, organizations can streamline processes, reduce costs, and enhance their sustainability efforts.

The use of virtual reality also captured the attention of respondents, indicating a strong interest in immersive experiences and virtual simulations in sustainable tourism. Virtual reality technology offers the opportunity to engage travellers, raise awareness about sustainability issues, and provide virtual tours of destinations and attractions. By leveraging virtual reality, organizations can promote sustainable behaviours, foster empathy, and showcase the unique cultural and natural heritage of their destinations.

Based on the survey results, it is clear that the training package developed as part of the project's Result 2 - Training Package fostering digital skills in sustainable tourism - should focus on addressing these specific areas of interest. The training program can provide comprehensive modules that delve into the use of data, artificial intelligence and automation, and the use of virtual reality in the context of sustainable tourism. These modules can cover topics such as data collection and analysis, AI algorithms and applications, virtual reality content creation, and immersive storytelling techniques.

By addressing the training needs highlighted by the survey, the project's training package will equip professionals in the sustainable tourism industry with the necessary digital skills and knowledge. This will enable them to leverage digital tools effectively, enhance their sustainability practices, and embrace innovation in their respective organizations. Ultimately, this will contribute to the development of a more resilient and sustainable tourism sector across Italy, Sweden, and Croatia.

ANNEX

The annex of this report is a valuable addition that includes a collection of best practices in sustainable tourism. These practices have been collected and curated by the project partners, providing a wealth of knowledge and inspiration for professionals in the field.

The purpose of this collection of best practices is to showcase successful initiatives and innovative approaches that have been implemented by organizations and destinations across different sectors of the sustainable tourism industry. The practices encompass a wide range of topics.

The annex serves as a valuable resource for stakeholders in the sustainable tourism industry. It offers concrete examples of how organizations and destinations have successfully integrated sustainability principles into their operations, and how these practices have resulted in positive environmental, social, and economic impacts.

Furthermore, the best practices featured in the annex are not only relevant to the project partner countries, but also applicable to a wider global audience. They showcase the potential of sustainable tourism as a transformative force in various geographical regions and highlight the importance of collaboration and innovation in driving positive change.

Learning Through Devices:

- Historic Scotland, Scotland: The agency has developed a mobile app that provides information about historical sites across Scotland, including maps, visitor information, and historical facts. This reduces the need for physical brochures and signs, contributing to a more sustainable tourism approach. Historic Scotland App

Augmented Reality

- The DETECt Aarhus web – app is a locative screen experience including three themed walking tours to discover Aarhus. By unlocking trailers, interviews with authors and 'behind the scenes footage,' the app takes visitors behind the scenes of popular films and TV series. The DETECt app is mediated through the mobile phone on location. Visitors can download the app on WIFI or use it via mobile data. This feature has been implemented to cater also for guests from outside the EU, who cannot enjoy free data roaming. https://www.visitaarhus.com/detect-aarhus
- Smart App for info to the Historical Unesco Park- Pafos: The Archaeological Park of Kato Pafos is one of the most important archaeological sites in Cyprus and has been included in the UNESCO's World Heritage List since 1980. To ensure that residents and visitors alike have a complete and digital experience while visiting a smart app has been created. The app allows users to gain access to useful content and information about the various monuments around the park, an audio guide in several languages, multiple videos, and tours to explore as well as a rich photo gallery to take with you. https://play.google.com/store/apps/details?id=com.unesco.pafos&hl=en&gl=US

- "Tourist Lublin" App and AR; Lublin: The city of Lublin has launched a brand-new mobile application enriched with AR module called "Tourist Lublin". Thanks to augmented reality and historical sources, the city of Lublin managed to revive nonexistent places like the parish church of the St. Michael the Archangel and water tower. By using AR (augmented reality), a technology that generates a three-dimensional virtual image, the app can show a virtual map that guides users to the places where mentioned buildings used to be located. In those particular locations, there are boards with a special tracker (geometric symbol) which users have to scan to see the virtual image. Thus, a virtually recreated building appears on the empty squares. Both objects can be observed at scale or real size and rotated around their axis. Both locals and visitors can make use of this app and see the city through a different lens. https://lublin.eu/en/what-to-see-do/tourist-culture-information/mobile-application-visitlublin/

Open Data:
- Fietsland, Netherlands: This bike tourism initiative uses open data to create a network of cycling routes. They collect data about bike-friendly roads, places of interest, and services, then share this data openly. This not only encourages sustainable tourism but also allows for continuous improvement and expansion of the network based on user contributions. Fietsland
- Zagreb Smart City Hub; Zagreb: The City of Zagreb has always kept in step with the times and with technology, using it to provide simple, clear and transparent access to information about its activities. The platform "Zagreb Smart City Hub" was created to help citizens find relevant information on "smart" projects and communicate on key decisions, and to involve them in strategic decision- making. The ultimate objective is to offer citizens, companies and institutions greater transparency and efficiency. The platform can be publicly accessed on the City of Zagreb's official website. https://www.zagreb.hr/pametniji-i-transparentniji-zagreb-predstavljena-n/176924

Smart Materials and Nanotechnologies:
- Stockholm Royal Seaport, Sweden: This urban development project is using smart materials in its construction, including nano-solar cells for energy production and smart concrete for durability and sustainability. While not strictly a tourism project, it will be a sustainable destination for tourists when completed. Stockholm Royal Seaport.

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