AI, CIRCULAR ECONOMY AND THE FUTURE OF TOURISM: THE PERSPECTIVE OF BUSINESS ADMINISTRATION STUDENTS

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Abstract

He integration of artificial intelligence (AI) in tourism and the principles of the circular economy within the tourism industry is driving significant changes in transformation processes at the operational, strategic, and educational levels. This paper focuses on an analysis of Business Administration students' perceptions of the role played by AI in tourism, their knowledge of the circular economy, and their expectations regarding future developments in this sector. The study employed a quantitative approach, using a questionnaire administered to a sample of 134 students as the survey instrument. The findings generally indicate a rather positive attitude toward AI technologies, which are perceived as tools for personalization, efficiency, and the reduction of environmental impact. At the same time, students acknowledge the relevance of the circular economy but point to a gap in formal education on this topic. This paper seeks to contribute to the existing body of knowledge by combining the perspectives of emerging economic professionals with recent research on the technology–sustainability nexus in tourism.

Keywords: *artificial intelligence, circular economy, sustainable tourism, digitalization, student perceptions.*

1.Introduction

The tourism industry is undergoing a fundamental transformation driven by technological advancement and the global demand for sustainable practices, which interact in a far deeper manner than traditional environment-induced changes.

Over the past two decades, rapid developments in artificial intelligence (AI) - including machine learning, predictive analytics, natural language processing, and autonomous systems - have reshaped the structural operations of tourism organizations.

According to Buhalis and Amaranggana (2015), the application of these technologies forms the foundation of the "smart tourism destinations" concept, which is based on the integration of real-time data, smart infrastructures, and various AI - driven solutions implemented at the level of tourism cities, with the aim of enhancing the tourist experience and increasing operational efficiency. Within this framework, AI serves as a major facilitator of service personalization, tourist flow management, and resource optimization.

The academic literature also examines the effects of digitalization on tourist behavior. Gretzel, Sigala, Xiang, and Koo (2015) highlight the pivotal influence of smart technologies on reconfiguring the dynamics between consumers and tourism destinations. They demonstrate that tourists - today's travelers - are becoming "experience co-creators" interacting with digital services, virtual assistants, and AI - based systems. Simultaneously, Xiang and Fesenmaier (2017) emphasize how AI - supported big data analytics help identify tourist preferences, optimize digital marketing, and develop predictive strategies for stakeholders in the tourism industry.

On the other hand, the circular economy has emerged as an increasingly popular strategic model for analyzing sustainability in tourism. Kirchherr, Reike, and Hekkert (2017) define the circular economy as a systemic model that aims to eliminate the concept of waste, maximize material value, and establish regenerative systems. In the tourism context, García-Muiña et al. (2019) suggest that when applied in a circular manner - particularly through greening practices - it reduces pressure on natural resources while simultaneously lowering operational costs and enhancing destinations' capacity to withstand climate-related shocks.

The transition toward circular models is not merely an option, as emphasized by the World Tourism Organization (2020); rather, if destinations wish to protect their natural and cultural heritage, the shift toward circularity becomes an essential necessity in the face of climate change and increasing levels of demand.

Thus, the literature reveals a growing interdependence between AI and the circular economy. For instance, Mariani (2021) shows that AI tools can enhance circularity through energy efficiency, waste prediction, supply chain control, and environmental impact monitoring. In tourism, such technologies can support pollution reduction, prudent resource use, and the implementation of sustainable hotel standards. Becker (2020) argues that AI acts as a vehicle for sustainability by providing tools for emissions measurement, energy efficiency assessment, and environmentally responsible destination planning.

The relevance of integrating these concepts into university curricula is becoming increasingly evident. Neuhofer (2016) and Sigala (2018) emphasize the need for higher education institutions in economics and tourism to provide advanced training in technology, data science, sustainability, and innovation. Based on recent studies, students in economic faculties are viewed as a key group of future strategic actors, as they will influence how businesses adopt new technologies and behave responsibly in the future (Camilleri, 2022). Research has shown that students' perceptions are critical to the acceptance of new technologies and their diffusion within the organizations in which they may eventually work.

Therefore, investigating the perceptions of Business Administration students regarding AI and the circular economy represents both an academic and a practical necessity. On the one hand, it allows for an assessment of the professional preparedness of the new generation of managers, and on the other hand, it provides insights into how curricula should be reoriented in response to ongoing global changes in higher education. Given that tourism is both technology - dependent and environmentally burdened, it is crucial to understand how young people perceive this evolving process in order to inform educational policy and innovation strategies within the industry.

2.Research Methodology

The methodological framework of the present study was developed in order to systematically respond to the three central research objectives:

(1) examining students' views on the integration of artificial intelligence in tourism activities,

(2) assessing their level of familiarity with circular economy principles, and

(3) exploring their perspectives on the future evolution of tourism under the influence of digitalization and sustainability requirements.

To accomplish these aims, the research adopted a quantitative approach with descriptive and exploratory characteristics.

Data were collected using a structured questionnaire, followed by statistical analysis focusing primarily on descriptive and comparative indicators. The methodological orientation is consistent with a descriptive quantitative study enriched by exploratory elements, as the main intention was to outline students' perceptions and attitudes rather than to test advanced theoretical models or establish causal relationships.

The selection of a questionnaire-based quantitative method was motivated by several considerations: first, the need to identify general patterns of opinion within a relatively large group of respondents; second, the opportunity to compare perceptions across multiple thematic dimensions, such as artificial intelligence, circular economy, and future tourism development; and third, the suitability of this method for statistical processing, including the calculation of averages, percentages, and simple associations.

The target population consisted of undergraduate students enrolled in the Bachelor's program in Business Administration within a Faculty of Economic Sciences. The empirical investigation relied on a convenience sample of 134 students who voluntarily agreed to participate in the survey. The respondents represented all three years of study, were aged between 19 and 25 years, and originated predominantly from urban environments, with a smaller proportion coming from rural

areas. Although the non-probabilistic nature of the sample limits the possibility of strict statistical generalization, it remains appropriate for an exploratory analysis of attitudes and perceptions, offering valuable insights into the mindset of young economics students.

Data were collected using an online questionnaire administered through a digital platform (such as Google Forms). The instrument was organized into four distinct sections: perceptions of artificial intelligence in tourism, knowledge related to the circular economy, attitudes toward the future of tourism in a digital and sustainable context, and socio-demographic characteristics. For the thematic sections, responses were recorded on a five-point Likert scale ranging from "strongly disagree" to "strongly agree". This measurement approach enabled the quantification of attitudes and perceptions, as well as the construction of synthetic indicators, such as mean scores and aggregated indices.

With respect to the first research objective, students' perceptions of the role of artificial intelligence in tourism were operationalized through a set of seven statements addressing key dimensions such as personalization, efficiency, cost reduction, environmental impact, labor implications, flow management, and destination competitiveness. Analytical procedures included the calculation of means and standard deviations for each item, the construction of a composite perception index based on the average of all AI-related items, and the examination of internal consistency, methodologically supported by reliability indicators such as Cronbach's Alpha. These steps made it possible to determine the overall orientation of students' perceptions - whether predominantly positive or cautious - and to identify the aspects of AI perceived as most influential.

The second objective focused on evaluating students' knowledge of circular economy concepts. This variable was measured through a mixed set of items combining objective and subjective elements, including dichotomous questions (yes/no), recognition-based questions, and Likert-scale statements assessing self-perceived knowledge. In total, six items were used to capture exposure to the concept, formal academic learning, perceived understanding, applicability to tourism, perceived importance, and readiness to apply circular principles in a professional context. Data analysis involved the calculation of response frequencies for dichotomous items, mean scores for Likert-scale statements, and comparative examination between formal educational exposure and perceived competence levels. The interpretation of findings was aligned with established literature on the circular economy and sustainable tourism, particularly regarding the alignment between students' self-assessment and the competencies required in the sector.

The third research objective addressed attitudes toward the future of tourism, conceptualized as a multidimensional construct encompassing digital transformation, sustainability orientation, and perceived professional responsibility. This dimension was measured using five statements reflecting expectations regarding technological advancement, the adoption of sustainable and circular models, personal responsibility as future professionals, competitiveness driven by digitalization, and the integration of technology and sustainability in tourism strategies. The analysis relied on mean score calculations to assess the level of agreement, identification of the most strongly endorsed statements, and simple comparative analyses between subgroups, such as different years of study or prior exposure to sustainability-related courses. These attitudes were interpreted in light of contemporary academic contributions emphasizing the convergence of digitalization and sustainability in reshaping tourism.

The questionnaire was distributed online through official faculty communication channels. Participation was voluntary and anonymous, and respondents were informed about the academic purpose of the research and the confidential handling of data. The data collection process spanned approximately two weeks, resulting in 134 valid and complete responses, with incomplete questionnaires excluded from the analysis. The dataset was subsequently exported into statistical software (e.g., Excel or SPSS) for processing.

The analytical techniques employed included descriptive statistics (frequencies, percentages, and mean values), comparative analysis of average scores across relevant subgroups, and methodological checks of internal consistency for item scales. The outcomes of this approach facilitated the development of a coherent overview of students' perceptions of artificial

intelligence, an evaluation of both actual and perceived knowledge of circular economy principles, and the identification of prevailing attitudes regarding the future of tourism in relation to digital and sustainable transformations.

3.The research results

The presentation of results follows the structure of the three research objectives and is supported by statistical tables, percentage distributions, mean values, and interpretative conceptual representations. This approach ensures a systematic and transparent analysis of the collected data, facilitating a consistent interpretation of students' perceptions and attitudes.

Within the scope of this research, students' attitudes toward tourism development were examined across three interrelated dimensions. First, tourism is widely perceived as an increasingly digitalized industry. A significant proportion of respondents expect future tourism systems to rely heavily on automation, intelligent digital interfaces, autonomous technologies, and integrated information solutions. This outlook is consistent with prior research emphasizing the role of digital transformation in reshaping tourism structures and experiences, as highlighted in studies on smart tourism systems.

Second, respondents strongly emphasize the importance of transitioning toward sustainability. The majority of students associate the long-term viability of tourism with the enforcement of environmentally responsible practices, stricter ecological regulations, and the application of circular economy principles. These views reflect concerns related to environmental pressure and resource depletion in major tourist destinations, reinforcing arguments in the literature that position sustainability as a fundamental condition for the future of tourism development.

Third, the findings underline the perceived responsibility of younger generations in redefining tourism practices. Students express a heightened sense of personal and collective accountability for environmental protection and show a clear preference for digital solutions that contribute to waste reduction, pollution control, and more efficient resource use. This generational perspective supports existing research indicating that younger cohorts are more inclined to engage with digital tools and sustainable practices within the tourism sector.

Taken together, these results reveal a multidimensional and integrated vision of tourism development. Digitalization and sustainability are not viewed as independent or competing trajectories, but rather as mutually reinforcing processes that should be pursued simultaneously. This integrated perspective is in line with prevailing international trends discussed in recent academic contributions on the convergence of technological innovation and sustainable tourism management.

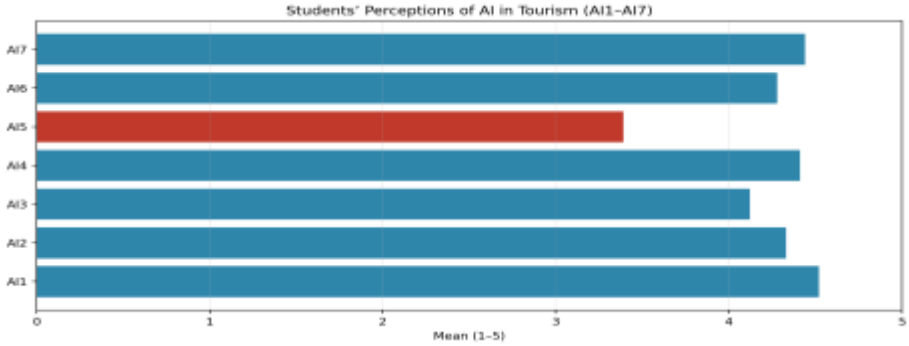
Regarding students' perceptions of artificial intelligence in tourism, analysis was conducted using seven Likert-scale items (AI1–AI7), rated on a five-point scale. The aggregated results indicate an overall favorable attitude toward the adoption of AI technologies in tourism-related activities. Mean scores for the individual items range from 3.39 to 4.52, suggesting a generally positive evaluation, albeit with some variation across specific aspects of AI implementation. These differences point to a nuanced perception, where certain benefits—such as efficiency, personalization, and smarter destination management—are more strongly endorsed than others, such as potential impacts on employment.

Table 1. Mean Responses Regarding Perception of AI in Tourism

Item Code	Statement	Mean	Standard Deviation
AI1	AI improves tourists' experiences through personalization	4.52	0.71
AI2	AI reduces operational costs	4.33	0.78
AI3	AI contributes to environmental protection	4.12	0.83
AI4	AI optimizes hotel processes	4.41	0.74
AI5	AI may replace traditional jobs	3.39	1.02
AI6	AI improves the management of tourist flows	4.28	0.80
AI7	AI increases the competitiveness of tourist destinations	4.44	0.69

Interpretation:

- The highest values (AI1, AI4, AI7) show that students primarily perceive AI as a tool for personalization, efficiency, and competitiveness.
- Item AI5 ("AI may replace traditional jobs") has the lowest mean (3.39), indicating a moderate perception of automation-related risk, similar to Ivanov's (2020) conclusions.
- The coherence of the responses suggests a mature understanding of AI functions in tourism.



The bar chart illustrates the differences between the mean values of the items. The bars clearly indicate the value of each item between 3.3 and 4.6, highlighting the predominance of favorable perceptions.

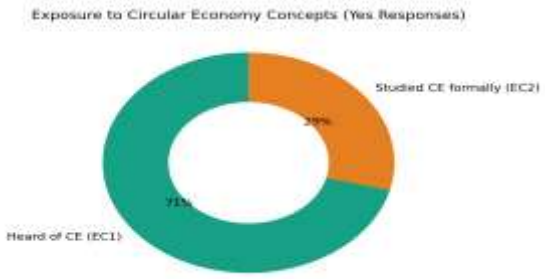
This section on the level of knowledge of circular economy concepts included six items (EC1–EC6) that assessed exposure to the concept, the self-perceived level of knowledge, and the intention to engage in circular practices.

The results show that although a high proportion of students (71%) say they have heard of the concept of circular economy, only 29% of them have studied this concept formally in university courses. This result indicates a clear gap between general exposure and structured academic training. The values come from the analysis of responses to items EC1 and EC2 of the questionnaire, which assessed the degree of exposure and formal training in the field of circular economy

Table 2. *Exposure to the Concept*

Item	Question	"Yes" Response (%)
EC1	Have you heard of the concept of "circular economy"?	71%
EC2	Have you formally studied the circular economy?	29%

Interpretation: Although most students have heard of the concept, only a minority report having formally studied it - an aspect also highlighted in the European literature regarding the educational gap (European Commission, 2020).



Regarding the answers to items EC3 – EC6 are presented in the following table:

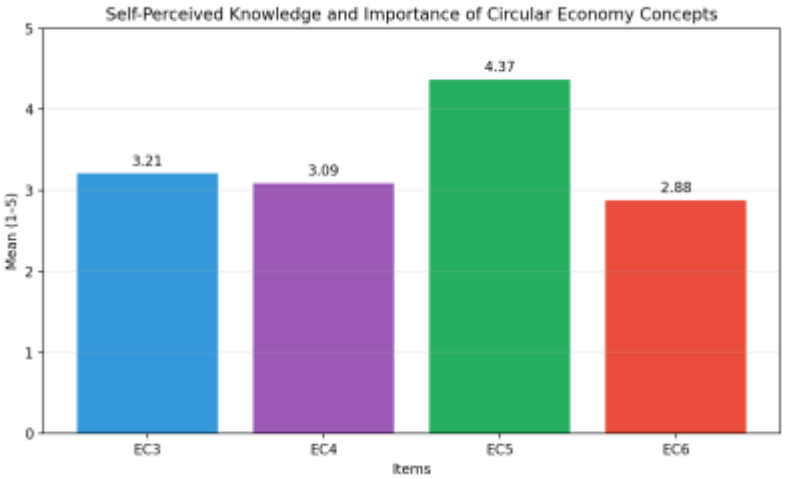
Table 3. *Self Perceived Knowledge Assessment*
Mean Scores Regarding Knowledge of the Circular Economy

Code Item	Statement	Mean	Standard Deviation
EC3	I can broadly explain the concept of the circular economy	3,21	0,91
EC4	I understand how the circular economy can be applied in tourism	3,09	0,95
EC5	The circular economy is essential for the future of tourism	4,37	0,72

EC6	I feel prepared to contribute to the implementation of circularity	2,88	0,97

Interpretation:

- Students recognize the importance of circularity (EC5 = 4.37), consistent with the World Tourism Organization (2020).
- Their level of knowledge is, however, only moderate (EC3 = 3.21; EC4 = 3.09).
- EC6 has the lowest mean score, indicating a deficit in applied training, similar to the observations made by Camilleri (2022).



The bar chart illustrates the contrast between:

- the recognition of importance (high value),
- the actual level of knowledge (medium values),
- the perceived preparedness for implementation (low value).

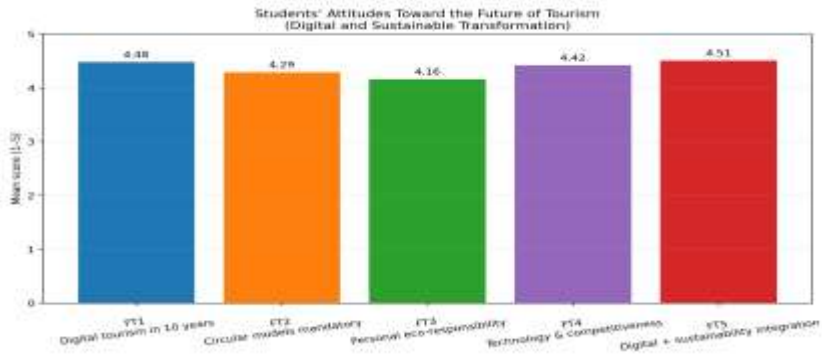
The results regarding attitudes toward the future of tourism in the context of digital and ecological transformations focused on analyzing how students anticipate the evolution of tourism within an environment dominated by digitalization and ecological pressures.

Table 4. Mean Scores on Attitudes Toward the Future of Tourism

Item Code	*Statement*	*Mean*	*Standard Deviation*
FT1	Tourism will become predominantly digital in the next 10 years	4.48	0.67
FT2	Destinations will be required to adopt circular models	4.29	0.74
FT3	I have a responsibility to promote eco-friendly tourism	4.16	0.81
FT4	Organizations that do not adopt technology will lose competitiveness	4.42	0.70
FT5	Digitalization and sustainability must be integrated together	4.51	0.60

Interpretation:

- Students perceive the future of tourism as "digital + sustainable" two converging directions confirmed by Buhalis (2019) and Lew (2020).
- The highest mean score (FT5 = 4.51) indicates that respondents view digital transformation and sustainability as complementary rather than parallel.
- The results also show a strong sense of responsibility among young people regarding the future of the industry (FT3 = 4.16).



For an overall interpretation, three composite indices were calculated:

Table 5. Comparing the indices AI Index, Circular Economy Index, Future Tourism Index

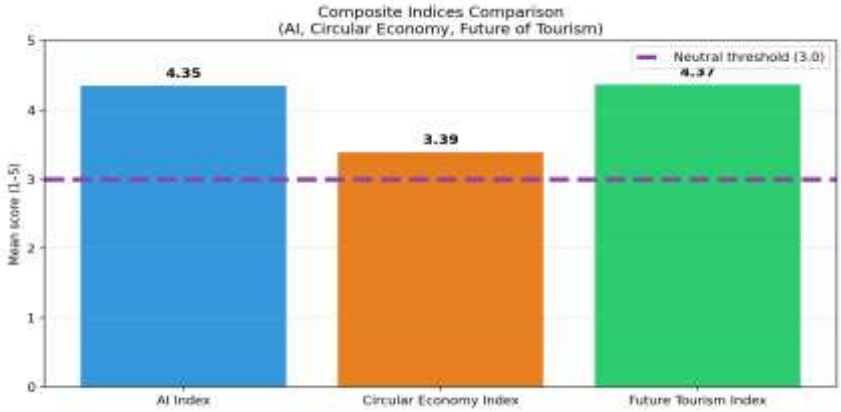
Index	Content	Average Score
AI Index	Mean of items AI1–AI7	**4,35**
Circular Economy Index	Mean of items EC3–EC6	**3,39**
Future Tourism Index	Mean of items FT1–FT5	**4,37**

In accordance with the findings, we can state that:

1. Perceptions of AI are highly favorable, suggesting a generation prepared to adopt new technologies.

2. The level of knowledge regarding the circular economy is moderate, with a clear gap between perceived importance and actual preparedness.

3. Attitudes toward the future of tourism are strongly oriented toward digitalization and sustainability, confirming current trends in the international literature.



For comparing the indices, we created a bar chart with three columns (AI Index, Circular Economy Index, Future Tourism Index). It shows: high values for AI and the future of tourism (above 4.30) and a medium value for the circular economy (3.39), suggesting the need for educational interventions.

4.Discussions, limitations, and critical analysis of the results

This section provides a critical and integrative examination of the research findings, placing them in relation to the specialized literature and the three objectives of the study. The purpose is to clarify the relevance of the results, to highlight points of convergence and divergence with existing knowledge in the fields of tourism, artificial intelligence, and the circular economy, and to outline implications for the improvement of academic education and professional practice in the sector.

4.1. Discussion of students' perceptions regarding the role of artificial intelligence in tourism

The findings indicate that students generally hold a favorable view of the role of artificial intelligence in tourism, a result that is in line with recent academic contributions.

The high mean values recorded for statements referring to experience personalization, the optimization of operational processes in accommodation units, and the strengthening of destination competitiveness support the arguments advanced by Buhalis and Amaranggana (2015) concerning the development of smart tourism destinations grounded in AI-based technologies.

Students also emphasize the potential of artificial intelligence to support sustainability objectives, particularly through improved resource efficiency and more effective management of tourist flows. This perception is consistent with Becker's (2020) discussion on the capacity of AI to reduce energy consumption and to facilitate environmental impact monitoring. At the same time, responses related to the replacement of jobs by AI display a moderately neutral orientation (mean value of 3.39), reflecting the duality identified by Ivanov (2020) between the advantages of automation and concerns regarding employment in tourism. This aspect suggests that AI is not predominantly viewed as a threat, but rather as a factor contributing to the redefinition of professional roles.

Overall, students' perceptions are consistent with global developments in the tourism sector and reflect the profile of a generation that is open to technological innovation while remaining aware of the ethical and labor-related challenges associated with artificial intelligence.

4.2. Discussion of the level of knowledge related to circular economy concepts

In relation to the circular economy, the results point to a gap between students' familiarity with the concept and their actual level of knowledge. While a significant proportion of respondents (71%) report having heard of the circular economy, only 29% indicate having studied it within a formal educational context.

Furthermore, the mean values associated with the ability to apply circular economy principles in tourism (3.09) and with perceived preparedness (2.88) suggest a limited depth of understanding. This situation corresponds with the observations of Kirchherr et al. (2017), who note that the circular economy is frequently approached in a fragmented way, often perceived more as an environmental slogan than as a comprehensive economic framework. In the tourism context, Garcia-Muiña et al. (2019) emphasize that the implementation of circular models requires interdisciplinary competencies spanning business administration, resource management, and public policy - areas that remain insufficiently developed within traditional higher education curricula.

Despite these limitations, students clearly acknowledge the importance of the circular economy for the future of tourism, as reflected by a high mean score (4.37). This finding supports the position of the World Tourism Organization (2020), which characterizes circularity as a strategic necessity for tourism destinations. The contrast between perceived importance and limited preparedness highlights the need for curricular approaches that extend beyond general theoretical discussions and incorporate practical components, such as industry-based case studies, applied projects targeting waste reduction, skills for environmental impact assessment, and the integration of digital tools, including AI-based monitoring systems. In this respect, the results are consistent with Camilleri's (2022) argument that sustainability education must be reoriented toward the concrete demands of the tourism industry.

4.3. Discussion of students' attitudes toward the future of tourism in the context of digital and ecological transformations

Students' expressed attitudes reveal a coherent perspective that aligns closely with international trends, emphasizing a future tourism sector that is both highly digitalized and environmentally sustainable. This outlook is consistent with Buhalis's (2019) analysis, which identifies digital transformation as an irreversible and essential process for the effective functioning of tourism destinations. Respondents anticipate a strong impact of digitalization on organizational competitiveness (mean value of 4.42), reinforcing Pencarelli's (2020) conclusion that the adoption of digital technologies has become a decisive factor for the long-term viability of tourism organizations. At the same time, students' responses reflect a strong awareness of

sustainability concerns and the necessity of preserving natural resources. The high mean score associated with personal responsibility in promoting environmentally friendly tourism practices (4.16) is in line with Lew's (2020) research on the increasing involvement of younger generations in global sustainability initiatives. Particularly noteworthy is the very high value recorded for item FT5 (4.51), indicating that respondents perceive digitalization and sustainability as complementary and interconnected strategies rather than as separate development paths. This perspective is consistent with Mariani's (2021) concept of techno-ecological convergence, which emphasizes the role of digital technologies - especially artificial intelligence - in monitoring, optimizing, and reducing the environmental impacts of tourism activities.

Taken together, the findings point to the emergence of a hybrid development paradigm often described as "smart and circular tourism," which is already being adopted by numerous destinations at the global level.

The integrated examination of the three research objectives allows for the formulation of several key conclusions. First, artificial intelligence is perceived as a fundamental driver of tourism evolution, with students demonstrating an understanding of both its advantages and its implications for employment. Second, the circular economy is widely recognized as a strategic priority; however, current university education does not yet ensure an adequate level of competence, as indicated by the relatively low averages related to perceived preparedness. Third, students endorse an integrated vision of tourism development in which technological innovation and sustainability converge, supporting the arguments advanced in recent academic literature.

Overall, these findings underline the necessity of targeted educational and institutional measures aimed at preparing future professionals for a tourism sector undergoing rapid transformation.

Additionally, recent research (Dura C. C., 2024) identifies key drivers of sustainable business development—including societal influence, regulatory pressure, sustainable finance, organizational culture, cost efficiency, digitalization, and bricolage—that facilitate the transition toward circular economy models and enhance organizations' capacity to adopt regenerative business practices.

5.Conclusions

This research focused on examining the views of Business Administration students concerning the role of artificial intelligence in tourism, their understanding of circular economy principles, and their expectations regarding the evolution of the tourism sector amid digital and environmental changes. The findings reveal both favorable prospects and existing limitations, offering valuable insight into how future professionals perceive their role within a rapidly evolving industry.

In terms of artificial intelligence, the results indicate a high degree of receptiveness among students toward the integration of AI technologies in tourism-related activities. Artificial intelligence is perceived as a key instrument for improving several core dimensions of the sector, including the customization of tourism experiences, the enhancement of operational efficiency within hotels and travel agencies, the optimization of tourist flow management, the strengthening of destination competitiveness, and the support of sustainable practices. These perceptions emphasize AI's transformative capacity within tourism and its potential to reshape occupational roles. Based on these outcomes, the study suggests that students would benefit from academic exposure to specialized courses addressing AI applications in tourism and business, with an emphasis on practical implementation, data-driven projects, and collaboration with industry stakeholders.

With regard to the circular economy, the results show that while awareness of the concept is relatively widespread among students, in-depth and application-oriented knowledge remains limited. A clear contrast emerges between the strong recognition of circular economy importance for tourism development (mean score of 4.37) and the low level of perceived readiness to apply these principles in practice (mean score of 2.88). This imbalance highlights a gap in education that

restricts students' ability to operationalize circular strategies within tourism organizations. In response to these findings, the study points toward the potential value of introducing mandatory coursework on circular economy in tourism and business, encouraging interdisciplinary projects that combine business, environmental, and technological perspectives, and fostering partnerships with environmentally certified tourism enterprises to facilitate exposure to real-world practices.

Regarding expectations for the future of tourism in the context of technological and environmental transformation, students demonstrate a structured and multifaceted outlook. Tourism is largely perceived as increasingly digitalized (4.48), strongly reliant on sustainability and circular economy adoption (4.29), influenced by individual responsibility toward environmental protection (4.16), and shaped by the integrated application of technology and sustainability (4.51). This combined digital–ecological perspective outlines the profile of the emerging tourism professional: technologically skilled, environmentally conscious, and capable of adapting to ongoing change. In light of these findings, educational directions may include strengthening advanced digital competencies, incorporating leadership-oriented sustainability modules, enhancing risk anticipation skills related to ecological and technological challenges, promoting applied innovation initiatives, and facilitating student participation in European programs supporting green and digital transitions.

The expansion of artificial intelligence has also contributed to broadening the concept of sustainable development. AI is increasingly recognized as a factor that supports the advancement of green energy, although effective implementation requires technological systems capable of interacting with environmental processes and enhancing energy quality (Iorgovan, 2025). Across all three research objectives, a consistent conclusion emerges: students support both digital and ecological transformation in tourism, yet require academic programs that better correspond to evolving labor market demands.

In summary, perceptions of artificial intelligence are highly favorable, indicating students' readiness to engage with new technologies, provided that strategic usage skills are developed. Knowledge of circular economy principles remains insufficient, underscoring the necessity for structured curricular integration. Attitudes toward the future of tourism are constructive and responsibility-driven, suggesting significant potential for the emergence of transformative leadership within the sector.

Looking ahead, higher education institutions are encouraged to prioritize the integration of artificial intelligence and circular economy concepts into curricula, expand innovative and practice-based learning opportunities, strengthen cooperation with industry partners, and cultivate academic environments capable of preparing graduates for a tourism sector increasingly shaped by technology and sustainability.

The purpose of this paper was to investigate students' perceptions of artificial intelligence in tourism, their awareness of circular economy principles, and their expectations regarding sectoral transformation over the coming decade. The findings underscore the influential role of young professionals in shaping smart and sustainable tourism and highlight the importance of their contribution to understanding future development trajectories. Within this context, economic universities play a decisive role in equipping future professionals with the competencies required to manage the transition toward smart and circular tourism. As a key segment of the future workforce, Business Administration students influence both academic program design and technological adoption within tourism organizations.

The study pursued three main objectives. The first objective aimed to explore students' views on the impact of artificial intelligence on tourism. Existing literature highlights AI's ability to redirect the industry through automation, personalization, and efficiency enhancement. Buhalis and Amaranggana (2015) identify artificial intelligence as a core component of smart tourism destinations, supporting digital infrastructure and real-time data utilization. Gretzel et al. (2015) emphasize that AI enables highly personalized tourism experiences and strengthens interactions between visitors and service providers, while Xiang and Fesenmaier (2017) demonstrate the role

of big data analytics and predictive tools in improving visitor satisfaction and destination competitiveness.

Within this research, students' perceptions of AI were organized across three thematic dimensions. Artificial intelligence was viewed as a mechanism for enhancing tourism experiences by enabling personalized offers and interactions, supporting Neuhofer's (2016) perspective on technology-driven experience co-creation. AI was also regarded as a driver of operational efficiency, with students highlighting its potential to reduce costs and automate routine activities, consistent with Mariani's (2021) analysis of AI's influence on tourism value chains. Additionally, artificial intelligence was associated with sustainability support, reinforcing Becker's (2020) argument that AI can assist in tracking energy use, emissions, and other environmental indicators.

The second objective focused on assessing the level of understanding of circular economy concepts. The circular economy represents an economic framework centered on resource efficiency, reuse, and waste minimization—principles that are particularly relevant for tourism due to its dependence on natural and infrastructural resources. Kirchherr et al. (2017) distinguish circular economy models from linear systems through their emphasis on regeneration and systemic innovation. In tourism, circular implementation involves complex processes, including food waste reduction, water reuse, and renewable energy adoption, as outlined by the World Tourism Organization (2020). García-Muiña et al. (2019) further demonstrate that circular practices enhance both economic and environmental resilience at the destination level.

Among students, awareness of circular economy terminology is high, reflecting the broader dissemination of European circular economy policies (European Commission, 2020). However, formal academic exposure remains limited, supporting Camilleri's (2022) observation of misalignment between educational provision and industry needs. Despite this, students recognize the relevance of circularity in safeguarding vulnerable destinations, in line with Gössling's (2017) analysis of tourism's environmental impact. Overall, while student interest is evident, knowledge depth remains insufficient, reinforcing the need to integrate circular economy themes more systematically into business and tourism education.

The third objective sought to capture students' attitudes toward the future of tourism in an era characterized by digital and ecological change. Scholarly research identifies two dominant transformation pathways. Digitalization is expected to enhance efficiency and remove information barriers across the tourism value chain (Buhalis, 2019), while automation and robotics are reshaping workforce structures (Ivanov, 2020). At the same time, sustainability has become central to tourism's future, with UNWTO (2020) emphasizing environmental responsibility as a non-negotiable condition for sectoral development. Lew (2020) further associates sustainable transition with circular and regenerative economic models. The interaction between technological innovation and sustainability is addressed by Mariani (2021), who highlights AI's role in optimizing resource use, while Ritch and Brownlie (2016) emphasize younger generations' propensity toward responsible tourism behaviors.

Consequently, contemporary students are positioned not merely as observers of tourism transformation, but as active contributors to the development of a tourism system that is intelligent, sustainable, and competitive.

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