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Rebalancing Tourism in a World Heritage City: The Role of Coastal and Maritime Heritage in Porto, Portugal

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Abstract

This study examines the potential of coastal and maritime heritage to diversify tourism experiences and contribute to discussions on more balanced spatial patterns of tourism in the historic centre of Porto, Portugal. Tourism in UNESCO World Heritage cities is often concentrated in historic centres. Research on overtourism in these sites has mostly taken the perspective of residents, planners and carrying capacity. Little is known about what would lead tourists themselves to engage with alternative areas. In this context, this study investigates the determinants of tourists' intentions to visit coastal areas and their effects on satisfaction and loyalty, considering the mediating role of visit intentions and moderating effects of age and income. A quantitative survey was conducted with tourists in Porto, Portugal, and 432 responses were collected. The data were analysed using partial least squares structural equation modelling (PLS-SEM). The findings show that coastal and maritime tourism motivation and interest most strongly influenced visit intentions and loyalty, while accessibility and information availability had the strongest effect on satisfaction, highlighting the importance of adequate access and information to engage with alternative experiences. Visit intentions also positively affected satisfaction and loyalty, with significant indirect effects supporting its mediating role, whereas age and income did not significantly moderate the relationships. The findings suggest that the development of attractive coastal and maritime experiences, potentially supported by improved accessibility and information provision, could offer opportunities to broaden Porto's tourism offer and encourage greater spatial diversification beyond the historic centre. Such developments may also have the potential to enhance tourist satisfaction and foster destination loyalty. Theoretically, the study provides demand-side evidence that the pull of alternative experiences matters more than the push of crowding. Motivation and opportunity act at different stages of the visitor experience, and the historic centre and coastal heritage work as complementary rather than competing attractions.

Keywords: coastal and maritime tourism; coastal and maritime heritage; heritage city; Porto; destination development; destination management

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1. Introduction

Tourism is a main driver of economic, social, and cultural development in historic cities, where heritage is central to destination identity and attractiveness. It can generate economic benefits, support urban regeneration, and contribute to the conservation and valorisation of cultural heritage. However, increasing visitor numbers and their concentration in historic

areas can also place considerable pressure on heritage resources, historical landscapes, local communities, and urban infrastructure [1]. In highly visited destinations, these concerns are increasingly associated with perceptions that tourism activity may be approaching or exceeding the capacity of urban areas to accommodate visitors without compromising local life and the visitor experience [2]. Such pressure calls for strategic tourism management that balances tourism's role in territorial development with the preservation of local social and economic vitality and the historical and cultural significance of heritage.

The city of Porto, Portugal, illustrates the close relationship between heritage, tourism development and urban economic activity. The Historic Centre of Oporto, Luiz I Bridge and Monastery of Serra do Pilar were inscribed on the UNESCO World Heritage List in 1996, recognising its Outstanding Universal Value and its significance as a historic urban landscape shaped by centuries of cultural, commercial and maritime connections. Since then, Porto has strengthened its position as an international tourism destination, supported by its historic and cultural heritage, distinctive urban landscape and diverse tourism offer. This growing international visibility is also reflected in its recognition through the World Travel Awards, including Europe's Leading City Break Destination in 2023 and Europe's Leading Seaside Metropolitan Destination in 2024, as well as World's Leading Seaside Metropolitan Destination in 2024 [3].

Although tourism generates significant economic benefits for destinations, increasing visitor numbers may also create challenges for residents, particularly in areas experiencing high levels of tourist activity. Under certain conditions, these pressures may contribute to concerns associated with overtourism. The authors define overtourism not merely as high visitor numbers but as the resulting congestion, price escalation, and transformation of local commerce into tourist-focused enterprises, which diminish cultural authenticity [4].

The situation in Porto exhibits similarities to historical patterns observed in European cities, which experience excessive pressure in their central areas and require strategies that balance exploration needs with their negative consequences [5]. Residents of Porto already report their concerns about peak-season traffic problems, infrastructure limitations and short-term rental activities that drive up housing costs [5,6]. This is particularly relevant given the strong spatial concentration of tourism activity in Porto's historic core, with a municipal study estimating that the Historic Centre and Baixa account for approximately 71% of tourism supply and 79% of tourism demand [7].

In Porto, the challenge is not simply the absolute volume of visitors, but the concentration of tourism activity within a relatively limited historic urban area, where visitor pressure intersects with residential functions, heritage conservation and local economic activity [8]. In fact, the overdependence on historic districts risks their potential for future destruction, indicating the need to find other forms of tourism development. Recent research on urban tourism suggests that alternative local experiences can function as soft interventions for dispersing visitors away from central places [9].

Nowadays, Porto municipality attempts to address these issues through a strategic vision that focuses on achieving balanced solutions for municipal requirements. The "Visão de Futuro para a Sustentabilidade do Destino Porto" seeks a balanced development model that integrates tourism with resident quality of life, establishing the city as an authentic and sophisticated international destination [7].

The concentration of 79% of foreign ATM transactions in the Historic Centre and Baixa indicates a geographical concentration of tourism-related financial activity and motivates the examination of perceived pressure in the historic centre as a potential push factor. Maritime and coastal tourism motivation and interest are examined as potential pull factors that may encourage interest in alternative tourism experiences. Perceived accessibility and information availability are also considered, as they may influence tourists' interest in

visiting coastal areas. Finally, appreciation of the historic centre is examined to understand whether attachment to the historic core may complement or compete with interest in coastal and maritime heritage.

In this context, the coastal and maritime heritage of the destination represents a particularly relevant territorial dimension, offering opportunities to diversify tourism experiences while integrating cultural, natural, and leisure resources.

Coastal and maritime tourism has gained growing popularity, providing experiences that integrate cultural, natural, and leisure activities [10]. The International Coastal and Marine Tourism Society describes this type of tourism as encompassing a variety of leisure activities associated with the marine world, such as cruises, boating, and water sports [11]. Coastal destinations are therefore not defined only by their beaches or marine activities. They can also encompass maritime landscapes, historic ports and settlements, fortifications, fishing traditions, gastronomy and other forms of tangible and intangible cultural heritage. In this broader perspective, coastal tourism can bring together natural, cultural and recreational resources within integrated visitor experiences [12].

This approach is especially relevant to Porto, where previous research has identified the need to extend tourism activity beyond the city centre and develop tourism products in less-visited areas [5]. Such areas also encompass established residential communities whose presence, everyday practices, and local identities contribute to the cultural character and authenticity of these neighbourhoods. Therefore, tourism diversification should not simply seek to redistribute visitors spatially but should be carefully managed to support local communities and preserve the social and cultural fabric of residential areas while enabling the sustainable valorisation of their heritage and tourism resources [6].

Yet, Porto's maritime resources are still not maximally developed from the perspective of promotion and infrastructure, even though they are of great historical and cultural value. The territory extending from the Atlantic Ocean to the Douro estuary encompasses a rich cultural landscape reflecting Portugal's long-standing maritime traditions, including exploration, fishing, navigation and trade. Mobilising these heritage resources for tourism can diversify visitor flows and experiences, extend tourism to less concentrated areas, and strengthen the territorial integration of cultural and maritime identity [12].

Previous research has examined overtourism in historic cities and carrying capacity in heritage destinations [4,13–16], including its effects in Porto [5,8], and has proposed visitor redistribution and flow management as responses to spatial concentration [9,17]. Other studies have reframed carrying capacity in heritage and urban destinations [2,14,18], and have shown the cultural and tourism value of coastal and maritime heritage [12]. However, most studies of overtourism in heritage cities have adopted the perspectives of residents, planners or carrying-capacity assessment [6,8,15]. Less is known about what would lead tourists themselves to engage with alternative areas. Evidence on whether alternative experiences can effectively disperse visitors remains limited [9]. Less attention has been paid to how tourists' perceptions of coastal and maritime heritage, accessibility and information, and pressure in the historic centre influence their intentions to visit coastal and maritime areas. It is also unclear how these intentions subsequently may affect satisfaction and loyalty in the context of a UNESCO World Heritage city.

Drawing on this gap, this study aims to analyse how tourists' perceptions of coastal and maritime tourism and of the historic centre influence their intentions to purchase and visit coastal experiences in Porto, and how these intentions shape satisfaction and loyalty, considering the moderating role of age and income.

2. Literature Review and Hypotheses

Tourism has become a major driver of economic, social, and cultural development in historic cities, particularly in UNESCO World Heritage cities, where heritage is central to destination identity and attractiveness. It can generate economic benefits, support urban regeneration, and contribute to the conservation and valorisation of cultural heritage. However, increasing visitor numbers and their concentration in historic areas can also place considerable pressure on heritage resources, historical landscapes, local communities, and urban infrastructure [1,13].

The continued increase in visitor numbers over recent decades in historical cities has transformed the social, economic, and spatial dynamics of many cities, giving rise to contrasting perspectives on tourism development [14–16]. In highly visited destinations, these concerns are increasingly associated with perceptions that tourism activity may be approaching or exceeding the capacity of urban areas to accommodate visitors without compromising local life and the visitor experience [2]. This pressure highlights the need to manage tourism strategically, recognising its importance for territorial development while ensuring that tourism growth supports local social and economic vitality and safeguards the historical and cultural significance of heritage. Consequently, the sustainable management of UNESCO World Heritage cities requires an integrated approach that reconciles heritage conservation with tourism development and addresses the spatial and temporal concentration of visitors through more effective visitor-flow management and the distribution of tourism activity across different areas [17].

This requires moving beyond a narrow focus on heritage and city pressures towards an integrated approach in which tourism development, visitor experience, local communities, and heritage protection are considered simultaneously. When tourism becomes spatially and temporally concentrated, management strategies need to address where, when, and how visitors use heritage areas, rather than focusing exclusively on the total number of tourists [18]. This includes monitoring tourism flows, identifying areas of excessive pressure, managing visitor density, and encouraging the distribution of tourism activity towards less concentrated areas. In this sense, thoughtful and adaptive planning is essential for managing tourism growth in ways that support the long-term sustainability and resilience of destinations [19]. Rather than being a linear process, tourism development requires continuous monitoring, evaluation, and adjustment as destinations respond to changing visitor demand, environmental pressures, infrastructure constraints, and the interests of different stakeholders [20]. At the same time, tourism planners and decision-makers operate within complex institutional, spatial, economic, and governance contexts, which can constrain their ability to implement sustainable development strategies effectively.

Tourism pressure is not determined exclusively by the overall number of visitors, but also by their spatial and temporal concentration within destinations. Consequently, contemporary visitor management increasingly moves beyond simply increasing capacity towards strategies that influence where, when and how visitors move through urban and heritage environments. Spatial and temporal redistribution can help relieve pressure on highly visited sites by encouraging alternative itineraries, broadening the visitor offer, promoting lesser-known areas and attractions, and shifting visitation towards less sensitive locations and periods. Nevertheless, the effective redistribution of tourists requires the active involvement of local authorities in developing substantial alternative attractions and amenities, as isolated soft interventions are unlikely to significantly alter tourists' preference for traditional, centrally located experiences [9].

In World Heritage cities, however, visitor redistribution is more complex than simply shifting tourists from crowded sites to less visited ones. The relocation of visitor flows must be compatible with the vulnerability, significance and carrying capacity of different heritage

assets, while also considering the everyday life of local communities and the distribution of tourism benefits. UNESCO increasingly emphasises integrated approaches to urban heritage management that connect heritage conservation with tourism, urban development, stakeholder participation and local community interests [21].

This is particularly important because heritage value extends beyond individual monuments to encompass the wider historic urban landscape and its social, cultural and community dimensions. UNESCO's Historic Urban Landscape approach therefore promotes the integration of heritage management into broader urban planning and development processes, while recent visitor-management guidance stresses the need to consider spatial and temporal pressures, carrying-capacity ranges and impacts on local quality of life [21]. Accordingly, the objective should not be to disperse tourists indiscriminately, but to develop context-sensitive visitor-flow strategies that reduce pressure on vulnerable heritage assets while integrating visitor redistribution with conservation, interpretation, and stakeholder perspectives [22].

This requires combining spatial and temporal redistribution with visitor monitoring, interpretation, diversified itineraries, community engagement and, where necessary, access management. Such an approach shifts the focus from simply managing visitor numbers towards managing the relationship between visitor intensity, heritage vulnerability and community needs and capacity. By integrating visitor-flow management with conservation objectives, the quality of the visitor experience and the interests of local communities, destinations can develop more balanced and resilient approaches to World Heritage tourism [23]. Within this broader approach to destination management, coastal and maritime tourism may provide opportunities to diversify visitor experiences. Coastal and maritime tourism integrates natural, cultural and recreational resources, extending beyond beaches and marine activities to include historic ports, landscapes, fishing traditions, gastronomy and tangible and intangible heritage, reflecting the cultural identities and practices of coastal communities [10,12]. Coastal zones are characterised by rich historical legacies, distinctive land- and sea-scapes and diverse forms of intangible cultural heritage, all of which contribute to their unique identities and tourism appeal [24].

This multidimensional character makes coastal and maritime tourism particularly relevant for fostering meaningful connections between natural environments, maritime heritage, and local communities. Maritime heritage has intrinsic cultural and social value that extends beyond its potential contribution to tourism and economic development. From this perspective, it should not be regarded exclusively as a resource for tourism consumption, but also as an important component of cultural identity and place attachment, reflecting the historical and continuing interactions between communities and coastal environments [25].

Coastal and maritime tourism offers integrated cultural, natural and recreational experiences [10,12,24,25], and its motivational pull has been studied for coastal and marine destinations [26]. Porto's maritime resources remain under-promoted and under-equipped [12], so accessibility and information are expected to condition intentions, in line with the ability–motivation–opportunity view of marine tourism intention [27]. Drawing on the literature on coastal and marine tourism motivations, overtourism and destination information, the following hypotheses are proposed (Figure 1):

H1. *The determinants (a) maritime and coastal tourism motivation and interest, (b) perceived accessibility and information availability, (c) perceived pressure in the historic centre, and (d) historic centre appreciation positively affect the coastal experience purchase and visit intentions.*

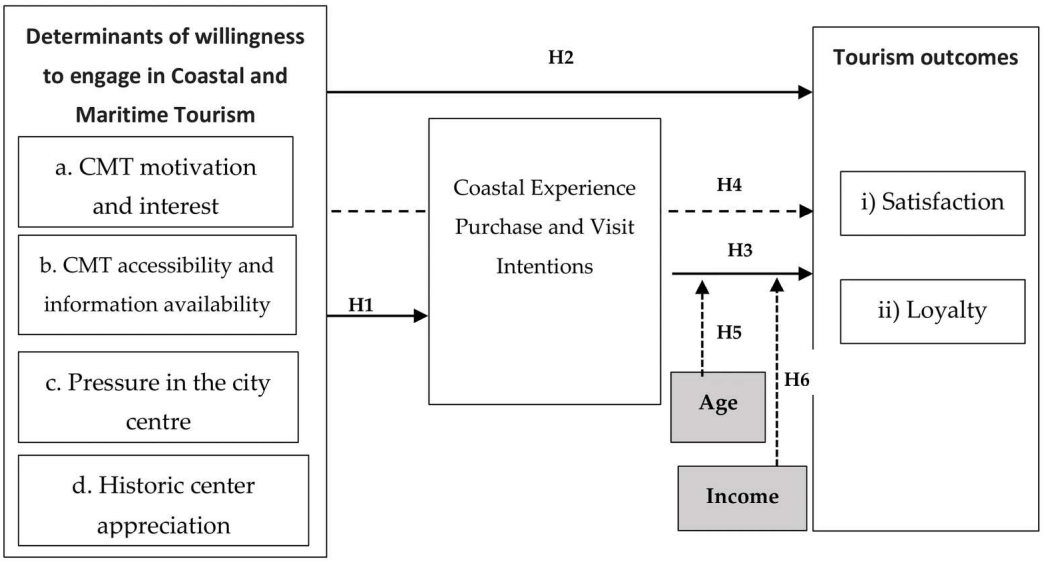

Figure 1. The research model and the formulated hypotheses.

Excessive visitor pressure can undermine the visitor experience, whereas effective visitor-flow management and adequate facilities can enhance satisfaction [2,17,18]. Accessibility and information provision are also expected to influence satisfaction in coastal destinations [28], while distinctive experiences rooted in maritime heritage, cultural identity, and place attachment may strengthen visitor loyalty and encourage repeat visits and positive recommendations [24,25]. Drawing on this, the following hypotheses are proposed:

H2. *The determinants (a) maritime and coastal tourism motivation and interest, (b) perceived accessibility and information availability, (c) perceived pressure in the historic centre, and (d) historic centre appreciation positively affect (i) satisfaction and (ii) loyalty.*

Tourism diversification in historic cities depends on tourists' willingness to purchase and visit alternative experiences beyond established tourist areas [5,9]. Coastal experiences combining cultural, natural, and recreational resources may encourage engagement, satisfaction, and destination attachment [12,24,25]. Building on research that identifies behavioural intention as a key outcome in marine tourism [26], the following hypothesis is proposed:

H3. *The coastal experience purchase and visit intentions positively affect satisfaction and loyalty.*

The four determinants are expected to influence tourists' intentions to purchase and visit coastal experiences, which subsequently shape satisfaction and loyalty (H1, H3). In Porto, where tourism demand is concentrated in the Historic Centre and Baixa [7], perceived pressure may encourage interest in coastal alternatives [5,9]. Coastal motivation, accessibility, and information availability can further stimulate engagement [26,27], while historic centre appreciation may complement oastal experiences by reinforcing cultural identity and place attachment [12,21,24,25]. Accordingly, the following hypothesis is proposed:

H4. *The determinants (a) maritime and coastal tourism motivation and interest, (b) perceived accessibility and information availability, (c) perceived pressure in the historic centre, and (d) historic centre appreciation positively affect satisfaction and loyalty, when this relationship is mediated by the coastal experience purchase and visit intentions.*

Tourists' age may influence how coastal and maritime experiences translate into satisfaction and loyalty, as older visitors may place greater value on cultural heritage, maritime identity, and place attachment. Accordingly, the following hypothesis is proposed:

H5. *The relationship between the coastal experience purchase and visit intentions and (i) satisfaction and (ii) loyalty is stronger when tourists are older.*

Tourists' income may influence the extent to which purchase and visit intentions translate into satisfaction and loyalty, as higher-income tourists may face fewer financial constraints when engaging with paid coastal and maritime experiences. Accordingly, the following hypothesis is proposed:

H6. *The relationship between the coastal experience purchase and visit intentions and (i) satisfaction and (ii) loyalty is more intense when tourists have higher income.*

3. Materials and Methods

3.1. Porto and the Atlantic Quarter

Porto is located in the north-west of Portugal and is one of the country's oldest cities; it is renowned for its historical, cultural, and architectural heritage. Porto lies at the core of the Porto Metropolitan Area (PMA), a grouping of 16 municipalities. Porto is surrounded by Matosinhos, Maia, Gondomar and, across the Douro, Vila Nova de Gaia. It is the main urban centre of the region, with an estimated 273,476 residents at the end of 2025 [29]. Although it covers just 41.4 km^2, it is one of Portugal's most important municipalities in economic and social terms. It is divided into seven parishes: four single parishes (Bonfim, Campanhã, Paranhos and Ramalde) and three unions of parishes (Aldoar, Foz do Douro and Nevogilde; Cedofeita, Santo Ildefonso, Sé, Miragaia, São Nicolau and Vitória; and Lordelo do Ouro and Massarelos) [7]. Figure 2 shows the study area, highlighting the Historical Centre of Porto and the Atlantic Quarter, as well as the tourist centre and the remaining parishes.

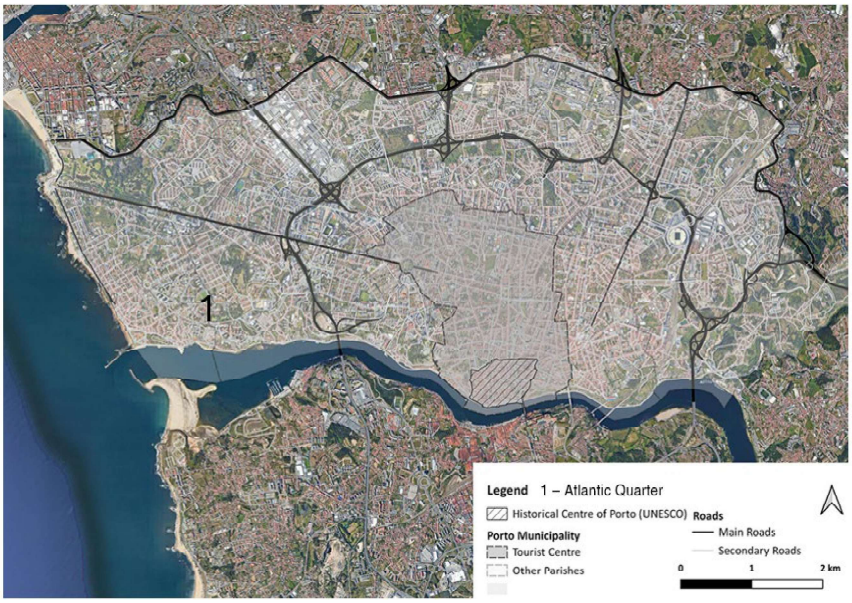

Figure 2. Municipality of Porto. Source: Authors' elaboration based on the Official Administrative Map of Portugal; Google Satellite Maps [6].

The city is classified as a UNESCO World Heritage Site and is distinguished by its combination of modernity and tradition. Despite its relatively small geographical area, Porto stands out as one of the leading tourist destinations in the PMA and a Northern Portugal. The promotion of tourism in Porto city and other Northern regions of Portugal is based on various tourism products, such as nature, heritage, culture, climate, and port wine [6]. Over the past decade, Porto has experienced substantial growth in tourist arrivals, with particularly strong pressure in the historic city centre. In this context, the Municipality of Porto developed a strategy to disperse tourism flows, which divides the city into eight tourism "quarters" [7]. Its rationale is to address emerging overtourism in the city centre. The Historic Centre and Downtown Porto concentrated 71% of tourism supply, measured by the number of tourist establishments, and 79% of tourism demand in 2022, measured by foreign ATM transactions, which the report reads as signs of excessive tourism pressure in these areas. The Atlantic Quarter corresponds to the quarter designated in that strategy as "Foz—Matosinhos Sul", which extends into the neighbouring municipality of Matosinhos and is classified as a "consolidating" quarter. It encompasses Porto's western waterfront, extending from the point where the Douro River meets the Atlantic Ocean to the southern part of the neighbouring municipality of Matosinhos. It represents the Atlantic-facing side of Porto, connecting the river and the ocean while bringing together the natural and geological characteristics of the coastline, distinctive culinary and retail activities, and a rich array of intangible cultural traditions. Its identity is strongly rooted in the area's maritime heritage, reflected in the chain of coastal fortifications extending from the Castle of São João da Foz to the Fort of São Francisco Xavier. The quarter also encompasses the transition towards Matosinhos, an area historically associated with fishing and renowned for its strong gastronomic traditions, which form an integral part of the character and identity of the Atlantic Quarter [7].

3.2. Tourism Supply and Demand in Porto and the Atlantic Quarter

Over the past decade, Porto has experienced substantial tourism growth, accompanied by an expansion of tourism infrastructure and accommodation capacity. This rapid development has been particularly evident in central areas, contributing to increasing tourism intensity and reshaping the city's spatial and economic dynamics. Table 1 presents the evolution of tourism supply in the PMA, Matosinhos and Porto between 2021 and 2025. Porto showed the strongest expansion, with the number of establishments rising from 302 to 498 and bed-places from 20,674 to 32,653, with average annual growth rates of 13.3% and 12.1%. By 2025, the city concentrated 62.6% of establishments and 61.6% of bed-places in the PMA. Matosinhos grew more moderately (5.9% for establishments and 5.0% for bed-places), and its share of PMA capacity fell from 7.6% to 6.2%. Its number of hotels remained almost unchanged [30].

Table 2 shows how tourism demand evolved in the Porto Metropolitan Area (PMA), Matosinhos and Porto between 2021 and 2025. Porto grew the most, with guests and overnight stays rising at average annual rates of 35.1% and 37.0%. By 2025, the city accounted for 60.9% of guests and 66.3% of overnight stays in the PMA, which confirms it as the region's main tourism hub. Porto also had the longest average length of stay, at 2.17 nights. Matosinhos grew more slowly (12.2% and 16.5%), and its share of guests in the PMA fell steadily, from 12.5% to 7.3%.

Table 1. Tourism supply.

Indicators/Years	2021	2022	2023	2024	2025	AAG
Number of accommodation establishments						
Porto Metropolitan Area (PMA)	521	638	713	776	795	11.1%
Matosinhos	35	35	41	42	44	5.9%
Porto	302	389	443	488	498	13.3%
% Matosinhos (share of PMA)	6.7%	5.5%	5.8%	5.4%	5.5%	
% Porto (share of PMA)	58.0%	61.0%	62.1%	62.9%	62.6%	
Number of rooms						
Porto Metropolitan Area (PMA)	16,346	19,552	21,463	22,901	24,379	10.5%
Matosinhos	1316	1415	1469	1515	1550	4.2%
Porto	9428	11,694	13,199	13,954	15,027	12.4%
% Matosinhos (share of PMA)	8.1%	7.2%	6.8%	6.6%	6.4%	
% Porto (share of PMA)	57.7%	59.8%	61.5%	60.9%	61.6%	
Accommodation capacity (bed places)						
Porto Metropolitan Area (PMA)	35,552	42,866	46,531	50,148	52,966	10.5%
Matosinhos	2718	3037	3162	3359	3306	5.0%
Porto	20,674	25,936	28,656	30,616	32,653	12.1%
% Matosinhos (share of PMA)	7.6%	7.1%	6.8%	6.7%	6.2%	
% Porto (share of PMA)	58.2%	60.5%	61.6%	61.1%	61.6%	

Source: ref. [30].

Table 2. Tourism demand in the Porto Metropolitan area, Matosinhos and Porto, 2021–2025.

Indicators/Years	2021	2022	2023	2024	2025	Annual Average Growth
Number of guests						
Porto Metropolitan Area (PMA)	1,846,265	3,810,790	4,507,707	4,834,582	4,999,650	28.3%
Matosinhos	230,322	345,253	375,546	383,714	364,894	12.2%
Porto	913,883	2,267,125	2,757,813	2,965,862	3,046,116	35.1%
% Matosinhos (share of PMA)	12.5%	9.1%	8.3%	7.9%	7.3%	
% for Porto (share of PMA)	49.5%	59.5%	61.2%	61.3%	60.9%	
Number of overnight stays						
Porto Metropolitan Area (AMP)	3,352,303	7,470,106	8,898,492	9,514,850	9,973,516	31.3%
Matosinhos	329,188	548,747	596,363	628,805	605,382	16.5%
Porto	1,874,637	4,819,168	5,869,506	6,279,499	6,611,174	37.0%
% Matosinhos (share of AMP)	9.8%	7.3%	6.7%	6.6%	6.1%	
% Porto (share of AMP)	55.9%	64.5%	66.0%	66.0%	66.3%	
Average length of stay, nights						
Porto Metropolitan Area (AMP)	1.82	1.96	1.97	1.97	1.99	2.4%
Matosinhos	1.43	1.59	1.59	1.64	1.66	3.8%
Porto	2.05	2.13	2.13	2.12	2.17	1.4%

Source: ref. [30].

Figure 3 shows tourism intensity, measured as guests in tourist accommodation per inhabitant, in Portugal, the Porto Metropolitan Area (PMA), Porto and Matosinhos between 2021 and 2025. Porto stands out: intensity rose from 3.9 guests per inhabitant in 2021 to a peak of 11.8 in 2024, then fell slightly to 11.1 in 2025, about four times the national value (2.8). The PMA (2.7) closely followed the national trend, which suggests that tourism demand in the metropolitan area is concentrated mainly in the city of Porto. Matosinhos recorded the lowest intensity, stabilising at around 2.0 guests per inhabitant from 2022 onwards. This indicates relatively low tourism pressure and scope for further development, possibly by capturing part of the demand spilling over from Porto.

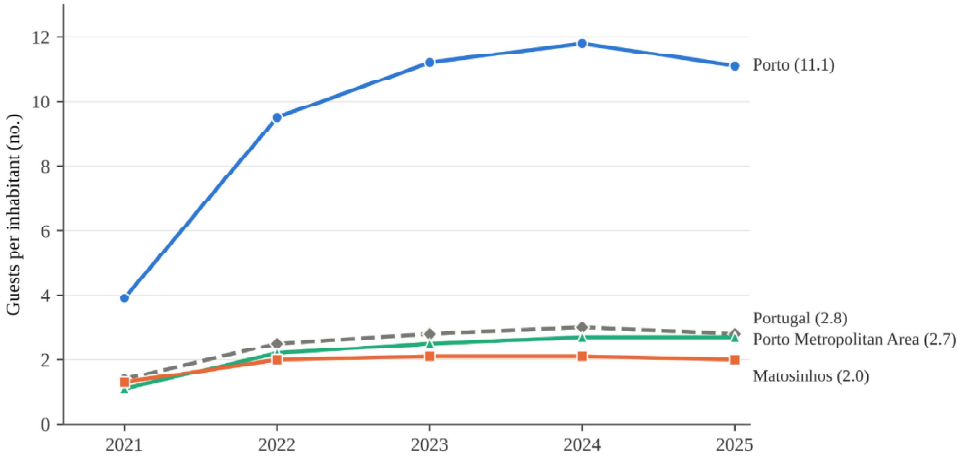

Figure 3. Tourism intensity (guests in tourist accommodation per inhabitant). Source: ref. [30].

The secondary data reveal a spatial concentration of tourism activity in Porto, with the city accounting for more than 60% of the PMA's accommodation establishments and guests and approximately two-thirds of overnight stays by 2025. The sharp increase in tourism intensity, reaching 11.1 guests per inhabitant, contrasts with the substantially lower level recorded in Matosinhos, indicating an uneven distribution of tourism pressure across the metropolitan area. This concentration may intensify pressures on Porto's urban fabric, particularly in areas already characterised by high visitor density and a strong presence of tourism-related activities. In 2025, Porto concentrated 273,476 residents in just 41.4 km^2, more than twice the population density of neighbouring Matosinhos, which had 181,930 residents in a larger area of 62.42 km^2 [29]. This concentration of residents within a small territory, combined with Porto's strong tourism growth, raises questions about the city's capacity to balance residential life and tourism flows.

The comparatively lower intensity observed in Matosinhos suggests that its tourism potential remains underexploited. A more spatially balanced approach could strengthen the integration of Porto and Matosinhos as a complementary coastal-urban destination. The municipal strategies have already identified these resources as important components of the municipality's tourism development. Consequently, extending tourism flows towards Matosinhos, particularly through the Atlantic Quarter, could help redistribute visitor pressure while creating opportunities for local economic development. Municipality-level accommodation statistics provide context but cannot establish local carrying capacity or spare capacity in coastal neighbourhoods. Lower tourism intensity should not automatically be interpreted as an opportunity for further development without considering residents, recreational use, infrastructure and heritage vulnerability.

3.3. Survey Process and Data Collection

The sample for this study was collected from tourists visiting the historical city centre of Porto between January and July 2025. Data were gathered using a structured questionnaire, which was made available to respondents in both printed and online formats. Printed questionnaires were distributed directly to tourists in the historical city centre, while a QR code was also provided, allowing respondents to access and complete the same questionnaire electronically via Google Forms. This dual approach facilitated data collection among tourists with different preferences for completing the survey.

A non-probabilistic convenience sampling approach based on voluntary participation was adopted. Participation was restricted to individuals who met the eligibility criterion specified in the questionnaire, namely, being a tourist visiting the city of Porto. Participants

were recruited through face-to-face interactions in Porto's historic centre and invited to access the online questionnaire by scanning a QR code. A total of 432 valid responses were obtained. The questionnaire was administered in English. Participation was voluntary and anonymous. Information about the research objectives and participation conditions was included directly in the questionnaire and explained orally to each participant before participation. The study received ethical approval from the Research Ethics Committee of the University Portucalense, under approval code CEI25_04_011. Prior to the main data collection, a pre-test was conducted with 10 participants to assess the clarity and comprehensibility of the questions, as well as the average time required to complete the questionnaire. Based on the feedback received, the questionnaire was reviewed and finalised for the main survey.

The questionnaire consisted of three sections. The first section gathered information on trip characteristics. Section II focused on perceptions of maritime and coastal heritage, access and information availability, perceived pressure in the historic centre and coastal experience, comprising 20 items adapted from the studies of the authors [5,8,27].

The measurement model comprised 20 observed indicators organised into seven constructs. Five constructs were measured using multiple items, comprising 18 indicators in total: Maritime and Coastal Tourism Motivation and Interest (5 items), Perceived Accessibility and Information Availability (4 items), Perceived Pressure in the Historical Centre (4 items), Historical Centre Appreciation (3 items), and Coastal Experience Purchase and Visit Intentions (2 items). Satisfaction was measured using a single item assessing respondents' overall evaluation of the variety of maritime and coastal tourism activities available in Porto. Importantly, the questionnaire did not establish whether respondents had previously participated in coastal or maritime tourism activities. Therefore, this measure should be interpreted as perceived satisfaction with the available tourism offer rather than as a strictly post-experience evaluation based on direct participation in such activities. The item referring to coastal and maritime tourism as being "underpromoted" was included in the Perceived Accessibility and Information Availability construct. Since this item was negatively worded relative to the construct's conceptual direction, it was reverse-coded before the statistical analysis (1 = 5, 2 = 4, 3 = 3, 4 = 2, and 5 = 1). This procedure ensured that higher scores consistently represented more favourable perceptions of accessibility and information availability. Responses were measured on a five-point Likert scale, ranging from 1 = "Strongly Disagree" to 5 = "Strongly Agree." Section III collected socio-demographic data about the respondents through seven questions. Age was operationalised as a continuous variable, using respondents' actual age in years. Monthly income was operationalised as an ordinal numerical variable, with values ranging from 1 to 4, representing progressively higher income categories. Respondents selecting "Prefer not to disclose" were recorded as missing values. These missing values were replaced with the mean of the observed income values using the mean replacement procedure available in SmartPLS 3, allowing all 432 respondents to be retained in the income moderation analysis. This procedure was adopted to preserve the full sample; however, the potential influence of mean replacement on the estimated income interaction effects is acknowledged as a methodological limitation. Accordingly, the income moderation findings are interpreted cautiously. The age moderation analysis also included the full sample (N = 432).

3.4. Data Analysis

Data analysis was conducted in several stages. First, descriptive statistics were computed using SPSS (version 25) to characterise the sample and examine the study variables. Skewness and kurtosis were assessed to investigate deviations from normality.

Second, an exploratory Principal Component Analysis (PCA) was conducted in SPSS (version 25) using the correlation matrix of the 20 observed indicators. Sampling adequacy was assessed using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity. Two extraction solutions were examined. First, the Kaiser criterion (eigenvalues greater than 1) was applied to identify the empirically retained components. Second, a supplementary seven-component solution was estimated by fixing the number of components in advance, in accordance with the study's theoretically specified measurement structure, comprising five multi-item constructs and two single-item outcome measures. Varimax rotation with Kaiser normalisation was applied to facilitate interpretation, with a maximum of 25 iterations for convergence. The five-component solution is reported as the primary PCA result, while the seven-component solution is presented in Appendix A to show the allocation of indicators across the seven theoretically specified constructs. The measurement model was subsequently assessed within the PLS-SEM framework using SmartPLS 3.

Third, the measurement model was assessed in SmartPLS (version 3) using confirmatory composite analysis within the PLS-SEM framework. This stage examined the measurement model's reliability and validity before testing the structural relationships. We assessed internal consistency reliability using Cronbach's alpha and composite reliability, with values above 0.70 considered acceptable. We assessed convergent validity using average variance extracted (AVE), with values above 0.50 indicating adequate convergence. Discriminant validity was examined using the heterotrait–monotrait (HTMT) ratio. The predictive relevance of the structural model was assessed using the Stone–Geisser Q^2 statistic through the cross-validated redundancy procedure implemented in SmartPLS 3, based on blindfolding with an omission distance of 7. The Q^2 statistic was calculated as $Q^2 = 1 - (SSE/SSO)$, where SSE represents the sum of squared prediction errors and SSO represents the sum of squared observations. Positive Q^2 values indicate predictive relevance for the corresponding endogenous constructs.

Fourth, we estimated the structural model using PLS-SEM in SmartPLS (version 3). The significance of the structural relationships, including direct, indirect, and moderating effects, was assessed using bootstrapping in SmartPLS 3, with 5000 bootstrap subsamples. This procedure estimated standard errors, t-values, *p*-values, and confidence intervals for the hypothesised relationships. We evaluated the statistical significance of the estimated effects using the resulting *p*-values and confidence intervals. This approach was selected to examine interrelationships among the latent constructs and assess direct effects, indirect effects through coastal experience purchase and visit intentions, and the moderating effects of age and income. The choice of PLS-SEM was informed by the proposed models [31].

4. Results

4.1. Descriptive Analysis

The sample consists of 432 participants. Of these, 54.9% are female, and 45.1% are male. The average age of respondents is 34.19 years, ranging from 16 to 75 years. Three respondents were under 18 years of age (two aged 16 and one aged 17). In terms of education, 75.2% hold a higher education degree, while 22.9% have completed secondary or intermediate-level education. Regarding professional status, 25.1% are students, 56.6% are employees, 14.1% are self-employed, and 4.2% are retired. As for net monthly income, 15.3% earn less than €1000 per month, 20.8% earn between €1000 and €2000, 25% between €2000 and €3000, and 17.1% report earnings above €3000 per month. A total of 21.8% of respondents preferred not to disclose their income. The moderation analyses (age and income) were conducted using the full sample of 432 participants. No observations were excluded from the moderation analyses based on sample size. Table 3 shows the statistical description of the latent variables and indicators included in the model.

Table 3. Statistical description of variables.

Constructs	Mean	SD
Maritime and Coastal Tourism Motivation and Interest	3.65	1.050
1. I find the idea of coastal and maritime heritage in Porto and its coastal areas appealing	3.83	1.004
2. I want to explore Porto's maritime history (museums, historic ships, fishing villages)	3.69	1.007
3. I want to practice activities such as boat tours, kayaking, surfing, recreation and leisure activities in the coastal area	3.62	1.161
4. Interacting with local communities would improve the maritime heritage experience	3.78	0.966
5. Variety of tools and applications using AI would facilitate and enhance my maritime and coastal tourism experience	3.35	1.101
Perceived Accessibility and Information Availability	3.49	0.990
1. Information about maritime and coastal heritage and tourism activities in Porto is available	3.46	0.972
2. Maritime and coastal tourism is underpromoted in Porto	3.52	1.020
3. It is easy to access coastal and maritime sites in Porto using public transportation (bus, metro)	3.55	1.033
4. Information about how to access maritime and coastal sites in Porto is available	3.42	0.927
Perceived pressure in the historical centre	3.33	1.040
1. The city centre is overcrowded, and it is difficult to access attractions due to overcrowding	3.23	1.097
2. Traffic congestion is worse in the city centre	3.43	1.049
3. There is an increasing number of commercialised shops and stores instead of traditional ones	3.64	0.986
4. I feel a loss of cultural identity due to expanding businesses in the centre	3.00	1.035
Historical centre appreciation	3.79	1.010
1. During a visit, I learned about historical and cultural heritage in Porto	3.85	0.94
2. I enjoyed visiting the centre and did not look for other experiences around	3.59	1.096
3. The historical monuments are well preserved	3.93	0.988
Coastal Experience Purchase and Visit Intentions	3.54	1.020
5. I am willing to spend extra money on coastal or maritime experiences (guided coastal tours, visiting maritime museums, participating in water-based activities, etc.)	3.36	1.100
6. I would visit Porto's coastal areas if I had more information about the activities available there.	3.72	0.935
Loyalty/I will return to Porto to experience more of its maritime and coastal heritage and related tourism activities	3.83	1.025
Satisfaction/I am satisfied with the variety of maritime and coastal activities available in Porto	3.58	0.952

The descriptive results indicate that Historical Centre Appreciation had the highest mean among the multi-item constructs (M = 3.79, SD = 1.010), followed by Maritime and Coastal Tourism Motivation and Interest (M = 3.65, SD = 1.050). Perceived Accessibility and Information Availability had a mean of 3.49 (SD = 0.990), while Perceived Pressure in the Historical Centre had the lowest construct-level mean (M = 3.33, SD = 1.040). Among the two single-item measures, Loyalty had a mean of 3.83 (SD = 1.025), while Satisfaction had a mean of 3.58 (SD = 0.952). At the item level, the highest mean was observed for the statement that Porto's historical monuments are well preserved (M = 3.93, SD = 0.988). The lowest mean was recorded for the statement expressing a perceived loss of cultural identity due to expanding businesses in the city centre (M = 3.00, SD = 1.035). The descriptive results indicate moderate, rather than uniformly strong, agreement with statements about tourism-related pressures and coastal and maritime tourism opportunities. Given the five-point Likert scale, mean values near the midpoint should be interpreted as an intermediate response rather than as evidence that respondents were necessarily unfamiliar with Porto. Nevertheless, perceptions of changes in traditional commerce and cultural identity may depend on visitors' previous experience of the destination. Accordingly, interpret these findings as tourists' reported perceptions at the time of the survey, not as definitive assessments of long-term changes in Porto's urban and cultural environment.

4.2. Factor Analysis

The Principal Component Analysis (PCA) was conducted on the 20 observed indicators using SPSS (version 25). The Kaiser–Meyer–Olkin (KMO) measure was 0.863, indicating good sampling adequacy. Bartlett's test of sphericity was statistically significant ($\chi^2 = 2352.401$, df = 190, $p < 0.001$), confirming that the correlation matrix was suitable for component analysis. Applying the Kaiser criterion (eigenvalues greater than 1),

five components were identified. Their eigenvalues were 6.368, 1.885, 1.536, 1.367, and 1.001, respectively. Together, these five components explained 55.259% of the total variance. The first component explained 28.944% of the variance, followed by 8.570%, 6.980%, 6.216%, and 4.549%, respectively. The measurement model subsequently examined the five multi-item constructs, comprising 18 indicators, and two single-item outcome variables (Satisfaction and Loyalty). The component loadings, extraction communalities, and standardised confirmatory loadings are reported in Appendix A. The standardised confirmatory loadings were generally satisfactory. However, one indicator within the Perceived Accessibility and Information Availability construct presented a loading of 0.526, below the conventional threshold of 0.70. This indicator was retained because of its theoretical relevance and contribution to the construct's content validity. A supplementary PCA solution was also estimated by fixing the number of components at seven, corresponding to the five multi-item constructs and the two single-item outcome measures specified in the conceptual model. This theoretically specified solution was used to examine the allocation of the observed indicators across the seven constructs and is reported separately in Appendix A. It should be distinguished from the primary PCA solution, in which five components were retained empirically according to the Kaiser criterion. Accordingly, the seven-component solution is not interpreted as evidence that seven components met the eigenvalue-greater-than-one retention criterion.

4.3. Measures of Reliability and Validity

Table 4 presents the measures used to assess the reliability, convergent validity and discriminant validity of the latent variables included in the measurement model. The reliability and validity assessment yielded mixed results. Composite reliability values were above the conventional threshold of 0.70, while Cronbach's alpha was below this threshold for Accessibility (0.649), Historical Centre Appreciation (0.653), and Coastal Visit Intentions (0.590). These lower alpha values warrant caution when interpreting the internal consistency of these constructs. Although composite reliability values were acceptable, this does not eliminate the need to acknowledge the comparatively low alpha coefficients. We assessed convergent validity using average variance extracted (AVE) and examined discriminant validity using the HTMT criterion. Accordingly, the measurement model should not be characterised as uniformly reliable. Instead, interpret the results by considering evidence from composite reliability, convergent validity, and discriminant validity, while acknowledging the comparatively low Cronbach's alpha values for the three constructs identified above. Regarding convergent validity, the AVE for Perceived Accessibility and Information Availability was 0.494, slightly below the recommended threshold of 0.50. This result is consistent with the relatively low standardised loading of one indicator (0.526). Nevertheless, the construct's composite reliability was 0.793, exceeding the conventional threshold of 0.70. These results suggest acceptable composite reliability, although convergent validity remains marginal and should be interpreted cautiously. The model exhibits good model fit according to the reference values of the authors [32]: NFI = 0.963 (reference value > 0.90) and SRMR = 0.074 (reference value < 0.08). Potential multicollinearity was assessed by calculating the variance inflation factor (VIF) for each variable. The largest VIF is for the variable Access_4 (1.481), which indicates that there is no evidence of severe multicollinearity between the variables in the model, as it falls within acceptable standards, according to the authors [32].

Table 4. Measures of convergence, reliability and validity of latent variables.

	Cα	CR	AVE	Motiv. and Interest	Access & Availability	Pressure	H. Centre Appreciation	Visit Intentions	Loyalty	Satisfaction
Coastal motivation. and interest	0.711	0.813	0.519							
Accessibility and availability	0.649	0.793	0.494	0.824						
Pressure in the center	0.701	0.816	0.564	0.427	0.447					
Historical center appreciation	0.653	0.810	0.636	0.622	0.747	0.426				
Coastal visit intentions	0.590	0.830	0.709	0.596	0.727	0.508	0.621			
Loyalty	-	-	-	0.700	0.562	0.254	0.476	0.688		
Satisfaction	-	-	-	0.473	0.602	0.332	0.469	0.559	0.413	

The explanatory power of the structural model was assessed using the coefficient of determination (R^2), which indicates the proportion of variance in each endogenous construct explained by its predictor variables. According to the author's [33] criterion, the dependent variables present a "substantial effect" (>0.26) (Table 4). The predictive relevance of the structural model was assessed using the Stone–Geisser Q^2 statistic obtained through the cross-validated redundancy procedure. The Q^2 values were positive for all endogenous constructs: Loyalty ($Q^2 = 0.266$), Satisfaction ($Q^2 = 0.288$), and Coastal Experience Purchase and Visit Intentions ($Q^2 = 0.307$). These results indicate predictive relevance for the three endogenous constructs (Table 5).

Table 5. Predictive relevance of the endogenous constructs.

Dependent Variables	R^2	Q^2
Loyalty	0.288	0.266
Satisfaction	0.311	0.288
Coastal Experience Purchase and Visit Intentions	0.449	0.307

4.4. Structural Model Testing

Table 6 shows the results of the bootstrap analysis of the research model.

The determinants of coastal tourism motivation and interest, pressure on the historic center and city center appreciation positively affect tourists' coastal experience purchase and visit intentions ($\beta = 0.526$, $\beta = 0.121$, and $\beta = 0.101$, respectively). However, accessibility and information availability about coastal tourism did not reach statistical significance in influencing tourists' coastal experience purchase and visit intentions. Therefore, hypotheses H1a, H1c, and H1d are confirmed, while H1b is rejected. Coastal tourism motivation and interest is the determinant with the strongest positive effect on tourists' willingness to engage and purchase in Coastal and Maritime Tourism.

The determinants of coastal and maritime tourism motivation and interest, perceived accessibility and information availability, perceived pressure in the historical centre, and historical centre appreciation have positive effects on tourism satisfaction ($\beta = 0.023$, $\beta = 0.317$, $\beta = 0.088$, and $\beta = 0.108$, respectively). However, the effects of motivation and interest ($\beta = 0.023$) and perceived pressure in the historical centre ($\beta = 0.088$) are not statistically significant. Thus, hypotheses H2bi and H2di are supported, whereas H2ai and H2ci are not supported. Perceived accessibility and information availability have the strongest positive effect on tourists' satisfaction ($\beta = 0.317$).

The determinants of coastal and maritime tourism motivation and interest, perceived accessibility and information availability, perceived pressure in the historical centre, and historical centre appreciation also positively affect tourism loyalty ($\beta = 0.351$, $\beta = 0.116$, $\beta = 0.027$, and $\beta = 0.110$, respectively). However, the effect of perceived pressure in the historical centre is not statistically significant ($\beta = 0.027$). Therefore, hypotheses H2aii, H2bii, and H2dii are supported, whereas H2cii is not supported. Coastal and maritime tourism motivation and interest have the strongest positive effect on tourism loyalty ($\beta = 0.351$).

Table 6. Bootstrap analysis of the research model.

	Path (β)	t Value (Bootstrap)	*p*-Value	2.5% *	97.5% *	Hypothesis Support
H1a) Maritime Coastal Tourism Motivation and interest ⟶ Coastal Experience Purchase and Visit Intentions	0.526	11.654	0.000	0.435	0.625	Yes
H1b) Perceived Accessibility and information availability ⟶ Coastal Experience Purchase and Visit Intentions	0.074	1.410	0.159	−0.031	0.178	No
H1c) Perceived Pressure in the historical centre ⟶ Coastal Experience Purchase and Visit Intentions	0.121	2.634	0.009	0.035	0.208	Yes
H1d) Historical centre appreciation ⟶ Coastal Experience Purchase and Visit Intentions	0.101	2.836	0.005	0.007	0.194	Yes
H2ai) Maritime Coastal Tourism Motivation and interest ⟶ Satisfaction	0.023	0.357	0.721	−0.095	0.153	No
H2aii) Maritime Coastal Tourism Motivation and interest ⟶ Loyalty	0.351	5.941	0.000	0.244	0.464	Yes
H2bi) Perceived Accessibility and information availability. ⟶ Satisfaction	0.317	5.674	0.000	0.218	0.428	Yes
H2bii) Perceived Accessibility and information availability. ⟶ Loyalty	0.116	2.347	0.019	0.025	0.211	Yes
H2ci) Pressure in the historical centre ⟶ Satisfaction	0.088	1.859	0.064	−0.007	0.184	No
H2cii) Pressure in the historical centre ⟶ Loyalty	0.027	0.668	0.504	−0.005	0.106	No
H2di) Historical centre appreciation ⟶ Satisfaction	0.108	2.184	0.029	0.017	0.210	Yes
H2dii) Historical centre appreciation ⟶ Loyalty	0.110	2.282	0.023	0.012	0.196	Yes
H3i) Coastal Experience Purchase and Visit Intentions ⟶ Satisfaction	0.189	2.775	0.006	0.048	0.306	Yes
H3ii) Coastal Experience Purchase and Visit Intentions ⟶ Loyalty	0.212	3.443	0.001	0.085	0.323	Yes
H4ai) Coastal Motivation and interest ⟶ Coastal Experience Purchase and Visit Intentions ⟶ Satisfaction	0.099	3.645	0.000	0.053	0.177	Yes
H4aii) Coastal Motivation and interest ⟶ Coastal Experience Purchase and Visit Intentions ⟶ Loyalty	0.112	7.101	0.000	0.094	0.142	Yes
H4bi) Perceived Accessibility and information available ⟶ Coastal Experience Purchase and Visit Intentions ⟶ Satisfaction	0.014	1.349	0.178	−0.005	0.036	No
H4bii) Perceived Accessibility and information available ⟶ Coastal Experience Purchase and Visit Intentions ⟶ Loyalty	0.016	1.415	0.158	−0.015	0.085	No
H4ci) Perceived Pressure in the historical centre ⟶ Coastal Experience Purchase and Visit Intentions ⟶ Satisfaction	0.023	2.246	0.025	0.007	0.052	Yes
H4cii) Perceived Pressure in the historical centre ⟶ Coastal Experience Purchase and Visit Intentions ⟶ Loyalty	0.026	2.789	0.005	0.024	0.106	Yes
H4di) Historical Center appreciation ⟶ Coastal Experience Purchase and Visit Intentions ⟶ Satisfaction	0.019	1.815	0.070	−0.001	0.050	No
H4dii) Historical center appreciation ⟶ Coastal Experience Purchase and Visit Intentions ⟶ Loyalty	0.021	2.090	0.037	0.004	0.100	Yes
H5a) Coastal Experience Purchase and Visit Intentions × Age ⟶ Satisfaction	0.057	1.459	0.145	−0.024	0.135	No
H5b) Coastal Experience Purchase and Visit Intentions × Age ⟶ Loyalty	0.055	1.483	0.139	−0.015	0.125	No
H6a) Coastal Experience Purchase and Visit Intentions × Income ⟶ Satisfaction	0.005	0.116	0.908	−0.078	0.088	No
H6b) Coastal Experience Purchase and Visit Intentions × Income ⟶ Loyalty	−0.054	1.256	0.210	−0.140	0.033	No

Note: * Confidence interval.

Coastal experience purchase and visit intentions positively affect satisfaction ($\beta = 0.189$) and loyalty ($\beta = 0.212$). Thus, hypotheses H3i and H3ii are supported, with the estimated effect being slightly stronger for loyalty than for satisfaction.

The results also reveal indirect effects of the antecedents on tourism outcomes through coastal experience purchase and visit intentions. Coastal and maritime tourism motivation and interest have significant positive indirect effects on satisfaction ($\beta = 0.099$) and loyalty ($\beta = 0.112$). In contrast, perceived accessibility and information availability do not have statistically significant indirect effects on satisfaction ($\beta = 0.014$) or loyalty ($\beta = 0.016$). Perceived pressure in the historical centre has significant positive indirect effects on satisfaction ($\beta = 0.023$) and loyalty ($\beta = 0.026$). Finally, historical centre appreciation has a statistically significant indirect effect on loyalty ($\beta = 0.021$), but its indirect effect on satisfaction is not statistically significant ($\beta = 0.019$). Accordingly, hypotheses H4ai, H4aii, H4ci, H4cii, and H4dii are supported, whereas H4bi, H4bii, and H4di are not supported.

Finally, the moderation analysis did not provide statistically significant evidence that age or income moderated the relationships between coastal experience purchase and visit intentions and satisfaction or loyalty. All four interaction effects were statistically non-significant, and their corresponding 95% confidence intervals included zero. Therefore, the proposed moderation hypotheses were not supported. These findings should not, however, be interpreted as evidence that the relationships are equivalent across age or income groups. Rather, the results indicate that the present study did not identify statistically significant interaction effects. Therefore, H5a, H5b, H6a, and H6b were not supported.

5. Discussion and Results

The findings suggest that the determinants of Coastal and Maritime Tourism may influence coastal experience purchase and visit intentions, satisfaction, and loyalty to varying degrees. Coastal and maritime tourism interest and motivation emerged as the strongest predictor of the coastal experience purchase and visit intentions ($\beta = 0.526$). Perceived accessibility and information availability, however, were not significant. This suggests that, within the context of this study, practical considerations related to accessibility and information provision may not be the primary factors directly associated with tourists' intentions to engage in coastal and maritime experiences. Instead, intrinsic interest and motivation may play a more prominent role in shaping these intentions, while accessibility and information may act as facilitating conditions.

This result is consistent with the broader literature emphasizing that tourism diversification requires attractive alternative experiences rather than simply redirecting visitors to less-congested areas [5,9]. The importance of interest and motivation in coastal and maritime tourism may also reflect the multidimensional nature of coastal and maritime tourism, which combines natural, cultural and recreational resources [11,12].

Regarding satisfaction, perceived accessibility and information availability about coastal tourism showed the strongest positive association ($\beta = 0.317$), whereas coastal and maritime tourism motivation and interest and perceived pressure in the historic centre were not statistically significant. This suggests that tourists who perceive coastal and maritime tourism opportunities as more accessible and better supported by information also tend to report more favorable evaluations of the tourism offer available in Porto. However, since the survey did not establish whether respondents had previously participated in coastal or maritime activities, satisfaction should be interpreted as a perceived evaluation of the available tourism offer rather than as an assessment based on direct experience. The results therefore do not establish how accessibility and information affect satisfaction following actual participation in coastal experiences. Instead, they identify an association between these perceptions and respondents' overall evaluations of the available offer. This finding is

consistent with the ability–motivation–opportunity framework [27] and highlights the relevance of accessibility and information in tourists' perceptions of destination opportunities.

Interest and motivation in coastal and maritime tourism also showed the strongest direct effect on loyalty ($\beta = 0.351$), followed by accessibility and information availability and historic centre appreciation. This supports the importance of developing distinctive coastal and maritime experiences that integrate cultural, natural and maritime resources [24,25]. This suggests that tourists who are more interested in coastal and maritime tourism may develop stronger loyalty when these experiences reflect the destination's distinctive natural and cultural identity, fostering meaningful connections with the place.

The mediation results further indicate that coastal experience purchase and visit intentions statistically mediate some of the relationships between destination-related perceptions and the tourism outcomes examined. Significant indirect associations were identified for coastal and maritime tourism motivation and interest and perceived pressure in the historic centre in relation to both satisfaction and loyalty, as well as for historic centre appreciation in relation to loyalty. These findings suggest that tourists' perceptions of coastal and maritime tourism opportunities are associated with satisfaction and loyalty partly through their stated intentions to purchase and visit coastal experiences. Nevertheless, given the cross-sectional nature of the data, these indirect effects should not be interpreted as evidence of a temporal or causal process. Furthermore, the results reflect stated intentions and perceptions rather than actual changes in visitor flows. Whether these intentions translate into actual visitation, visitor redistribution or reduced pressure in the historic centre requires further investigation [5,9].

Finally, the absence of statistically significant interaction effects suggests that this study did not find sufficient evidence that age and income condition the associations between coastal experience purchase and visit intentions and the tourism outcomes examined. However, non-significant interaction effects do not establish demographic equivalence or demonstrate that age and income are irrelevant. The results should therefore be interpreted cautiously, particularly considering the distribution of income responses and the effective sample size available for the moderation analyses.

Overall, these findings highlight the importance of considering the different roles of tourist motivation, accessibility, and perceived urban pressure when developing coastal and maritime tourism in Porto. However, tourists' willingness to engage with coastal experiences does not necessarily translate into actual visitor redistribution. Future research should therefore examine whether these intentions lead to changes in visitor flows and whether coastal tourism development can contribute to a more balanced spatial distribution of tourism while supporting destination sustainability and local community well-being.

6. Conclusions

This study examined the potential of coastal and maritime tourism to diversify tourism in Porto, a UNESCO World Heritage city facing challenges associated with the spatial concentration of tourism in its historic centre.

6.1. Theoretical Contributions

The findings indicate that tourists' motivation and interest in coastal and maritime tourism are positively associated with their intentions to purchase and visit coastal and maritime experiences, whereas perceived accessibility and information availability show the strongest positive association with satisfaction. Visit intentions are also positively associated with satisfaction and loyalty, and the mediation analysis identifies significant indirect relationships between some destination-related perceptions and these tourism outcomes. These findings provide evidence of associations between tourists' perceptions,

stated intentions and evaluations of the available tourism offer. However, given the cross-sectional design, they do not establish causal relationships or demonstrate that intentions translate into actual participation in coastal and maritime activities or subsequent changes in satisfaction and loyalty.

The absence of statistically significant moderating effects of age indicates that this study did not find evidence that age conditions the relationships examined. The study therefore suggests that developing new attractions and experiences in historic cities should be understood as part of an integrated visitor-management strategy rather than simply as a means of increasing tourism supply. The objective should be to create a diversified network of meaningful experiences across the destination that can potentially broaden visitor flows, reduce pressure on highly concentrated areas, and generate benefits for local communities while maintaining the heritage values of the World Heritage property. This approach is consistent with UNESCO's emphasis on spreading visitors spatially and temporally, diversifying tourism products and experiences, strengthening community benefits, and ensuring that tourism management contributes to the protection and presentation of Outstanding Universal Value [23]. The absence of statistically significant income interaction effects should also be interpreted in light of the income data. Since 21.8% of respondents preferred not to disclose their income, missing values were replaced by the mean to retain the full sample. Although this procedure allowed the moderation analysis to include all respondents, mean replacement may have reduced the variability of the income variable and potentially affected the estimation of interaction effects. Therefore, the absence of statistically significant moderation should not be interpreted as definitive evidence that income does not condition the relationships examined.

The findings suggest that tourists' intentions to explore less-concentrated areas are associated with both the attractiveness of alternative experiences and perceptions of accessibility and information availability. From a UNESCO perspective, such diversification forms part of responsible visitor management that can help reduce pressure on sensitive heritage areas; in the Porto context, it highlights the potential of coastal and maritime tourism to function not simply as a new attraction, but as an integrated component of destination management that broadens visitor experiences beyond the historic centre while supporting satisfaction and the protection of World Heritage values. Nevertheless, the present study examines tourists' intentions and perceptions and does not establish whether the development of alternative experiences leads to actual changes in visitor distribution or reduced pressure on the historic centre.

6.2. Practical Implications

For Porto decision-makers, these findings highlight the importance of developing distinctive coastal and maritime experiences while strengthening their accessibility, information, and visibility as complementary tourism offers. This approach could support a more balanced spatial distribution of visitors beyond the historic centre and reinforce the conclusions of the Porto tourism study [7], which identifies spatial concentration as a key challenge and emphasizes the need to diversify tourism experiences and distribute visitor flows across the city.

These findings support the development of coastal and maritime experiences as potentially inclusive alternatives rather than strategies targeted exclusively at specific age or income segments.

For Porto, future destination planning could therefore focus on strengthening the Atlantic Quarter as a complementary tourism area through the integrated development of maritime heritage, coastal landscapes, fortifications, gastronomy, fishing heritage and recreational activities. These resources should be connected through thematic itineraries,

improved interpretation, digital information, public transport and pedestrain/cycling connections, rather than developed as isolated attractions. Local communities and businesses should be involved in the design and management of these experiences so that tourism diversification also contributes to local economic and social value. UNESCO similarly recommends locally driven tourism management and economic diversification around World Heritage properties. This perspective is particularly relevant to Porto, where coastal and maritime tourism can be positioned not simply as a beach-oriented alternative, but as a diversified portfolio of heritage, cultural, natural and maritime experiences. As suggested by the Salinas study, strengthening the visibility and distinctiveness of these different attributes may help broaden the destination image beyond a single dominant tourism product [26]. In Porto, this diversification may be particularly relevant for extending the visitor experience beyond the historic centre and supporting a more spatially balanced tourism offer.

Overall, the findings highlight the potential of coastal and maritime tourism to broaden Porto's tourism offer and support a more integrated territorial approach to destination planning. The historic centre remains fundamental to the city's identity, while coastal and maritime heritage may provide complementary experiences that expand the geographical and cultural scope of the destination. However, tourists' intentions to visit coastal areas do not necessarily translate into actual visitor redistribution or reduced congestion in the historic centre. Similarly, the comparatively lower tourism intensity of other municipalities should not be interpreted as evidence of available capacity to accommodate additional visitors. The development of Porto's Atlantic Quarter as a complementary tourism area should therefore be supported by careful assessment and continuous monitoring of visitor movements, infrastructure and environmental capacity, residents' perceptions and heritage vulnerability. Further research is needed to determine whether such development can contribute to more geographically balanced tourism patterns and generate benefits for local communities while safeguarding the destination's cultural and natural heritage.

Local communities, businesses, and heritage institutions should be actively involved so that tourism generates local economic benefits and contributes to the visibility, conservation, and sustainable management of local heritage assets.

6.3. Limitations

Several limitations should be considered when interpreting the findings of this study. First, the use of convenience sampling, although appropriate for the study's exploratory objectives, may limit the extent to which the results can be generalised to the wider population of tourists visiting Porto. Second, the cross-sectional design provides a snapshot of tourists' perceptions and intentions at a particular point in time. The reliance on self-reported intentions also means that these findings may not fully reflect actual purchasing and visitation behaviour. Furthermore, as data were collected in the historic centre, the sample may reflect the characteristics and perceptions of tourists visiting this specific area. Finally, although the study explores the potential of coastal and maritime tourism to support tourism diversification, the Atlantic Quarter was not directly examined as a destination in terms of actual visitor behaviour. Future research could address these aspects by adopting more diverse sampling approaches, longitudinal designs, and behavioural data collected across different urban and coastal areas. Such approaches would help further clarify the potential contribution of coastal and maritime tourism to visitor distribution and destination development in Porto.

6.4. Suggestions for Future Research

Nevertheless, future research should examine more closely the relationship between tourists' demographic and motivational profiles and the specific coastal and maritime

attractions they value, allowing the identification of potential visitor segments and the development of experiences more closely aligned with different patterns of demand [34].

Future research should extend the present analysis in three directions. First, longitudinal studies could examine whether the development of coastal experiences and the implementation of tourism-development policies in the Atlantic Quarter actually change visitor flows between Porto's historic centre and the coastal area over time. Such research could establish baseline conditions before or during policy implementation and subsequently monitor changes in visitor volumes, spatial distribution, length of stay, activity patterns, and residents' perceptions. This would allow assessment of whether the Municipality's strategy of tourism diversification and spatial decentralisation is effectively redistributing tourism activity, rather than simply generating additional demand in the Atlantic Quarter. Second, spatial and temporal visitor data could be combined with residents' perceptions and heritage-vulnerability indicators to identify areas where redistribution would be appropriate and areas where additional tourism pressure should be avoided. This is particularly important when tourism diversification extends into predominantly residential areas, where the capacity of local communities and infrastructure to accommodate additional tourism activity should be assessed before promoting increased visitor flows. Such an approach would help identify areas where redistribution may be appropriate, while avoiding the transfer of tourism pressure from established hotspots to residential neighbourhoods with limited capacity to accommodate additional tourism. Third, future research could evaluate specific coastal and maritime tourism products and test whether improved accessibility, interpretation, and digital promotion translate into actual visitation, longer stays, and greater local economic benefits. Such research should also examine how local communities and heritage sites and monuments in the Atlantic Quarter could participate in and benefit from tourism development, including opportunities for local businesses, employment, entrepreneurship, and the valorisation of local cultural and maritime resources. It should further assess whether increased visitor flows can contribute to the visibility, interpretation, conservation, and sustainable management of local monuments, ensuring that tourism development generates benefits for both communities and heritage.

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Appendix A

Component loadings from the supplementary seven-component PCA, communalities and confirmatory loadings.

Construct	Indicator	CFA Loading	Communality	Component
Motivation and Interest	Item 1	0.739	0.786	1 (0.794)
	Item 2	0.704	0.782	1 (0.708)
	Item 3	0.729	0.793	1 (0.749)
	Item 4	0.713	0.845	1 (0.755)
	Item 5	0.715	0.714	1 (0.743)
Accessibility and Information Availability	Item 1	0.768	0.779	2 (0.741)
	Item 2	0.526	0.821	2 (0.886)
	Item 3	0.700	0.752	2 (0.700)
	Item 4	0.788	0.723	2 (0.731)
Pressure in the Historical Centre	Item 1	0.773	0.743	3 (0.724)
	Item 2	0.718	0.745	3 (0.713)
	Item 3	0.723	0.837	3 (0.826)
	Item 4	0.787	0.770	3 (0.817)
Historical Centre Appreciation	Item 1	0.812	0.802	4 (0.752)
	Item 2	0.795	0.878	4 (0.886)
	Item 3	0.786	0.861	4 (0.863)
Coastal Experience Purchase and Visit Intentions	Item 1	0.838	0.786	5 (0.637)
	Item 2	0.846	0.748	5 (0.753)
Loyalty	Single item	1.000	0.730	6 (0.783)
Satisfaction	Single item	1.000	0.857	7 (0.887)

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