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**ACESSO À CULTURA COMO INDICADOR-CHAVE PARA AVALIAR O DESENVOLVIMENTO SUSTENTÁVEL NA REGIÃO
VINHATEIRA DO ALTO DOURO**

**CULTURAL ACCESS AS A KEY INDICATOR FOR EVALUATING SUSTAINABLE DEVELOPMENT IN THE ALTO DOURO
WINE REGION**

**ACCESO A LA CULTURA COMO INDICADOR CLAVE PARA EVALUAR EL DESARROLLO SOSTENIBLE EN LA REGIÓN
VITIVINÍCOLA DEL ALTO DOURO**

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RESUMO

Introdução: A cultura é cada vez mais reconhecida como um componente essencial do desenvolvimento sustentável, ao lado dos fatores ambientais, económicos e sociais. No entanto, os estudos sobre o seu impacto ainda são limitados.

Objetivo: Este estudo visa explorar como a cultura influencia o desenvolvimento sustentável na Região Vinhateira do Alto Douro (RVAD), utilizando os "Indicadores Temáticos para a Cultura na Agenda 2030" da UNESCO.

Métodos: A pesquisa recorreu a dados secundários qualitativos e quantitativos, focando-se no indicador "acesso à cultura" para avaliar o papel da cultura na promoção da coesão social, inclusão e bem-estar da comunidade.

Resultados: O estudo encontrou desenvolvimentos positivos no setor cultural da RVAD após a sua inclusão na Lista de Património Mundial da UNESCO. Os *stakeholders* locais fizeram progressos na promoção do acesso à cultura, com um impacto notável no desenvolvimento social, económico e ambiental. No entanto, estas melhorias ainda estão em estágios iniciais.

Conclusão: Embora o desenvolvimento cultural na RVAD mostre potencial, são necessários esforços contínuos para maximizar o seu papel no crescimento sustentável e no bem-estar da comunidade.

Palavras-chave: Região Vinhateira do Alto Douro (RVAD); indicadores culturais; acesso à cultura; desenvolvimento sustentável

ABSTRACT

Introduction: Culture is increasingly recognized as a key component of sustainable development, alongside environmental, economic, and social factors. However, studies on its impact are limited.

Objective: This study aims to explore how culture influences sustainable development in the Alto Douro Wine Region (ADWR) using UNESCO's "Thematic Indicators for Culture in the 2030 Agenda."

Methods: The research employed secondary qualitative and quantitative data, focusing on the "access to culture" indicator to assess culture's role in promoting social cohesion, inclusion, and community well-being.

Results: The study found positive developments in the cultural sector of ADWR after its inclusion in the UNESCO World Heritage List. Local stakeholders have made progress in making culture accessible, with a noticeable impact on social, economic, and environmental development. However, these improvements are still in the early stages.

Conclusion: While cultural development in ADWR shows promise, continued efforts are needed to maximize its role in sustainable growth and community well-being.

Keywords: Alto Douro Wine Region (ADWR); cultural indicators; access to culture; sustainable development

RESUMEN

Introducción: La cultura es cada vez más reconocida como un componente clave del desarrollo sostenible, junto con los factores ambientales, económicos y sociales. Sin embargo, los estudios sobre su impacto son limitados.

Objetivo: Este estudio tiene como objetivo explorar cómo la cultura influye en el desarrollo sostenible de la Región Vinícola del Alto Douro (RVAD), utilizando los "Indicadores Temáticos para la Cultura en la Agenda 2030" de la UNESCO.

Métodos: La investigación utilizó datos secundarios cualitativos y cuantitativos, centrados en el indicador "acceso a la cultura" para evaluar el papel de la cultura en la promoción de la cohesión social, la inclusión y el bienestar de la comunidad.

Resultados: El estudio encontró desarrollos positivos en el sector cultural de la RVAD tras su inclusión en la Lista de Patrimonio Mundial de la UNESCO. Los actores locales han logrado avances en la promoción del acceso a la cultura, con un impacto notable en el desarrollo social, económico y ambiental. Sin embargo, estas mejoras aún están en sus primeras etapas.

Conclusión: Aunque el desarrollo cultural en la RVAD muestra un gran potencial, se necesitan esfuerzos continuos para maximizar su papel en el crecimiento sostenible y el bienestar de la comunidad.

Palabras clave: Región Vinícola del Alto Douro (RVAD); indicadores culturales; acceso a la cultura; desarrollo sostenible

INTRODUCTION

Culture has been recognized as a fundamental element in discussions on sustainable development, being viewed not only as a set of meanings and symbols but also as an essential factor in achieving sustainable economic and social development. Sustainability is, therefore, a cultural issue that should be assessed based on indicators that integrate the economic, social, and environmental dimensions, while preserving local cultural identity. These indicators are important tools for monitoring the impact of human actions and promoting social inclusion and cultural participation, both of which are crucial for sustainability.

This study proposes the implementation of UNESCO's Thematic Indicators for Culture in the 2030 Agenda, focusing on the Alto Douro Wine Region (ADWR), recognized by UNESCO as a World Heritage site. The research aims to assess how culture contributes to the sustainable development of this region, highlighting the importance of preserving cultural heritage and its impact on the quality of life for the local population. The ADWR, rich in cultural heritage and viticulture, faces challenges such as an ageing population and demographic decline, but offers significant potential for sustainable development through cultural tourism and the promotion of its traditions.

The main objective of the study is to determine the impact of culture on the sustainable development of the ADWR between 2001 and 2023, exploring the relationship between access to culture, social inclusion, and community cohesion. The study examines the role of culture in promoting social cohesion and improving the well-being of the local population, based on cultural indicators related to inclusion and participation. The central research question is: "What contribution has access to culture made to the sustainable development of the ADWR between 2001 and 2023?"

This study also aims to investigate whether the ADWR adheres to the sustainability principles defined by UNESCO and the 2030 Agenda, with a focus on developing cultural indicators that can assess the effectiveness of culture in sustainable development and improving the social conditions of the region.

1. LITERATURE REVIEW

1.1. Culture and Sustainable Development

Culture has taken a central position in international discussions on sustainable development, being recognized as one of the essential pillars alongside the environmental, economic, and social dimensions (UNESCO, 2002). Culture is understood as the spiritual, material, intellectual, and emotional traits that characterize a society or social group, encompassing art, literature, ways of life, values, traditions, and beliefs. Its relevance in the context of sustainable development has gained prominence by promoting social cohesion, economic and territorial unity, intellectual growth, and interculturality (CEPAL, 2023).

Capoano and Noversa (2023) argue that culture has become a key asset for economic and human progress, reinforcing freedom of expression and territorial competitiveness. Recent studies suggest that culture can be considered the fourth pillar of sustainable development, alongside the economic, social, and environmental pillars, highlighting the positive externalities of cultural heritage in enhancing human and social capital (Sabatini, 2019; Cicerchia, 2023).

The contemporary vision of sustainable development has evolved to incorporate a more holistic approach, recognizing the social, cultural, and environmental influences. According to Guimarães (2020), development is not limited to economic expansion but encompasses balanced and harmonious growth, with emphasis on racial and cultural dimensions. In terms of cultural heritage, Shaheen (2023) identified six approaches to sustainable management: the value-based approach, urban historical landscape, integrated approach, participatory approach, preventive conservation, and ecosystemic approach (Santangelo et al., 2022).

Cultural heritage also exerts a significant impact on local economic development, especially when associated with sustainable cultural tourism (Abouelmagd, 2023). This type of tourism can generate substantial economic benefits while preserving the cultural identity of communities and promoting sustainability goals (Cicerchia, 2022). In the European context, Škrabić Perić et al. (2023) analysed the impact of UNESCO World Heritage Sites, concluding that these sites generate significant revenue and increase employment in the tourism sector. It is also important to highlight that government investment in culture has a positive impact on economic and social indicators (Cho et al., 2023).

Assessing the cultural impacts on sustainable development requires the use of appropriate indicators (Cabral & Gehre Galvão, 2022; Nocca, 2017). Sung (2023) argues that a cultural indicator should be measurable, simple, and easy to monitor, facilitating the exchange of information between the scientific community and policymakers. Shaheen et al. (2024) propose a multidimensional evaluation framework that includes tourism, heritage conservation, environment, well-being, economy, and society.

In recent years, the concept of access to culture has gained increasing prominence on the international political agenda, attracting the attention of policymakers and local cultural organizations. Access and the promotion of access to culture are vital indicators in this field of study (Pasikowska-Schnass, 2017), reflecting the intersection with other cultural indicators (Badham, 2009).

1.2. Cultural Heritage, Tourism, and Sustainability: Challenges and Opportunities

The integration of culture into sustainable development policies has been emphatically highlighted by UNESCO (2019), which developed the Thematic Indicators for Culture in the 2030 Agenda. These indicators allow for the monitoring of culture's contribution to the Sustainable Development Goals (SDGs) at national and local levels.

Recent studies underline the importance of integrated approaches that connect cultural heritage, cultural identity, and consumer behavior in the context of tourism (Zhang et al., 2022). The proposed model analyses how heritage experiences influence visitors' perception of authenticity and impact their behavioral intentions and the sustainability of heritage tourism.

Jakes (2024) advocates for the integration of traditional knowledge and local cultural practices in sustainable development strategies, emphasizing community-based management of natural and cultural resources. This approach strengthens cultural resilience and contributes to the preservation of local identity (Mason, 2025).

However, cultural sustainability faces substantial challenges (Abouelmagd & Elrawy, 2022). To address these issues, Topler (2022) proposes a resilient approach that includes community participation and continuous adaptation strategies to socio-economic changes, particularly in rural areas.

Additional studies highlight the need for integrated approaches linking cultural heritage, identity, and consumer behavior in the context of cultural tourism (Zhang et al., 2022). These models examine how heritage experiences shape visitors' perception of authenticity, affecting their behavioral intentions and, consequently, the sustainability of heritage tourism.

Thus, the literature review emphasizes the importance of culture and cultural tourism for sustainable development, reflecting both the challenges and opportunities in the integrated management of cultural heritage.

2. METHODS

2.1 Sample

This study focused on the Alto Douro Wine Region (ADWR), a UNESCO World Heritage site, analyzing data from 2001 and 2023. The first year was close to ADWR's inclusion in the World Heritage List, while 2023 provided more recent data. The geographical scope encompasses the 13 municipalities officially comprising the ADWR as demarcated in the UNESCO nomination dossier.

2.2 Data Collection Instruments

This study utilised high-reliability secondary sources, including National Statistics Institute data, PORDATA socioeconomic statistics, heritage inventories from IPPAR/DGPC (2001/2023), and municipal cultural reports. "Access to culture" was selected from UNESCO's 2030 Agenda indicators for its relevance to SDG 11.4, data availability across both study periods, and capacity to capture both heritage preservation and cultural infrastructure development. Data was systematically identified, normalized, and structured according to UNESCO's cultural indicator dimensions.

2.3 Statistical Analysis

Descriptive statistics was utilised to characterise the distribution of cultural assets across municipalities and paired t-tests were applied to assess the significance of changes between 2001 and 2023 ($p<0.05$). Per capita distribution was calculated by dividing the total number of cultural assets by the resident population in each municipality, multiplied by 1,000 (assets/1,000 inhabitants). To evaluate territorial disparities, we employed the Gini coefficient adapted to the distribution of cultural assets, where values approaching 0 indicate equitable distribution and those closer to 1 suggest greater concentration.

The analyses were conducted separately for immovable cultural assets and cultural facilities, enabling the identification of specific development patterns in each category.

3. ANALYSIS AND RESULTS

In Portugal, immovable cultural assets of cultural interest can be classified into three categories: Monument, Group, or Site, and may be designated as of National Interest, Public Interest, or Municipal Interest. The analysis of Table 1 clearly indicates that monuments represent the most culturally significant assets across all municipalities in the Alto Douro Wine Region (ADWR).

Table 1 – Immovable cultural assets

Municipality	Monuments		Complex		Sites	
	2011	2023	2011	2023	2011	2023
Year						
Alijó	7	8	1	2	2	5
Armamar	8	9	1	1	0	2
Carrazeda de Ansiães	10	12	0	0	2	3
Lamego	25	29	3	3	0	1
Mesão Frio	8	8	1	1	1	2
Peso da Régua	21	23	3	3	2	3
Sabrosa	21	22	1	1	2	3
Santa Marta de Penaguião	14	13	0	0	0	1
São João da Pesqueira	3	3	2	3	0	1
Tabuaço	15	15	4	4	1	2
Torre de Moncorvo	12	14	2	2	2	3
Vila Nova de Foz Côa	17	18	0	0	3	4
Vila Real	40	39	1	2	1	2
Total	201	213	19	22	16	32

Source: INE (2024)

Analyzing the overall evolution, there is a noticeable increase in the total number of cultural heritage assets over this period. In 2011, there were a total of 201 Monuments, 19 Ensembles, and 22 Sites. By 2023, these numbers had increased to 213 Monuments, 19 Ensembles, and 32 Sites. This represents a significant growth, particularly in the Sites category.

Focusing on the situation in 2023, some municipalities stand out for their specific characteristics. Vila Real leads in the number of Monuments, with 39, followed by Lamego with 29. These two municipalities also stand out in the Ensembles category, each with 3. Regarding Sites, Vila Nova de Foz Côa excels with 4, the highest number among all municipalities.

Lamego deserves special attention for presenting high numbers in all categories: 29 Monuments, 3 Ensembles, and 1 Site, making it one of the municipalities richest in terms of cultural heritage assets. Other municipalities that stand out include Peso da Régua and Tabuaço, both with a balanced distribution across the categories.

Figure 1 provides the number of cultural facilities, specifically cinemas, museums, galleries, and cultural venues, across three time points: 2001, 2011, and 2023. The total number of facilities across these categories has increased significantly over the years, as outlined below:

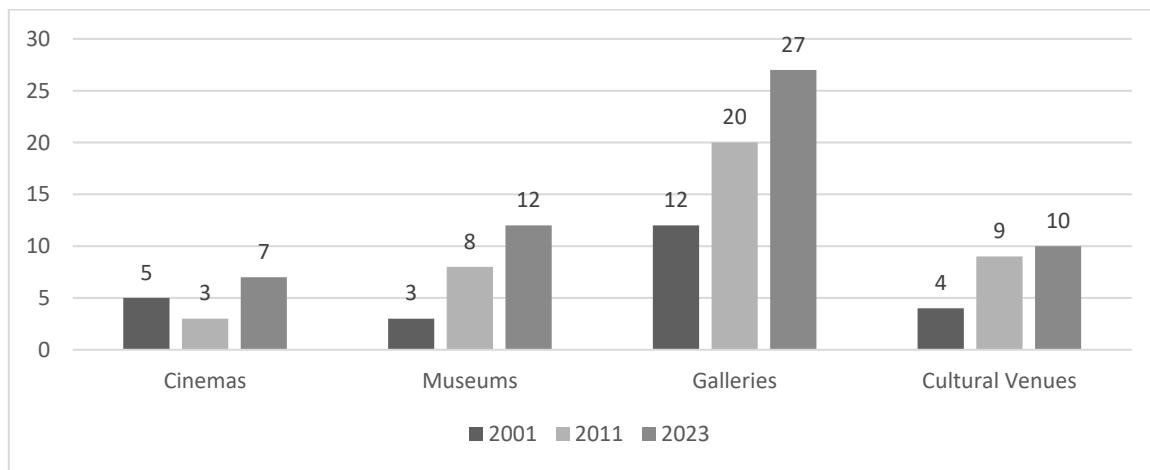


Figure 1 - Number of cultural facilities – cinemas, museums, cultural venues, and galleries (ADWR)

The number of cinemas initially declined from 5 in 2001 to 3 in 2011, but rebounded to 7 by 2023, suggesting improved cinema availability driven by changing entertainment trends or increased investment. Museums saw significant growth from 3 to 12 over the same period, reflecting a fourfold expansion in museum infrastructure, aligned with efforts to preserve culture and heritage. Galleries consistently increased from 12 in 2001 to 27 in 2023, highlighting a growing emphasis on visual arts and cultural activities. Cultural venues also rose from 4 to 10, though the growth rate slowed after 2011, possibly indicating nearing saturation.

In 2023, the analysis of cultural facilities across the 13 ADWR municipalities reveals a diverse and uneven distribution (Table 2), with a total of 56 facilities comprising cinemas, museums, galleries, and cultural venues.

Table 2 - Distribution of cultural facilities/municipality

Municipality	Cinemas		Museums		Galleries		Cultural Venues	
Year	2011	2023	2011	2023	2011	2023	2011	2023
Alijó	0	0	1	1	2	1	3	3
Armamar	0	0	0	0	0	0	1	1
Carrazeda de Ansiães	0	1	0	0	0	1	1	1
Lamego	0	1	1	1	1	2	3	3
Mesão Frio	0	0	0	0	1	1	1	1
Peso da Régua	0	1	1	1	0	0	3	1
Sabrosa	0	0	0	1	1	1	1	3
Santa Marta de Penaguião	0	0	0	0	0	0	1	0
São João da Pesqueira	0	0	0	1	1	1	1	2
Tabuaço	0	0	1	0	0	0	1	1
Torre de Moncorvo	0	1	0	1	1	2	1	3
Vila Nova de Foz Côa	1	1	1	2	1	0	1	2
Vila Real	2	2	3	4	1	1	2	6

Source: PORDATA, 2024.

Vila Real stands out as the main cultural hub in the region, with 13 facilities including cinemas, museums, galleries, and cultural venues, reflecting its role as a regional center. In contrast, Santa Marta de Penaguião lacks any cultural facilities, highlighting disparities in cultural access.

Lamego and Torre de Moncorvo present a more balanced distribution with 7 facilities each, while cultural venues are the most common, present in 11 out of 13 municipalities. Cinemas are limited to just 6 municipalities, indicating potential for future investment.

Some smaller municipalities, like Sabrosa, have a relatively high number of cultural facilities despite their size, suggesting strong local cultural development or tourism demands.

Overall, cultural facilities have grown between 2011 and 2023, with Vila Real solidifying its role as the cultural center. Despite ongoing investment, challenges remain in achieving an equitable distribution of cultural resources across the region.

The data presented in Figure 2 shows the number of cultural assets per capita in the 13 municipalities of the ADWR.

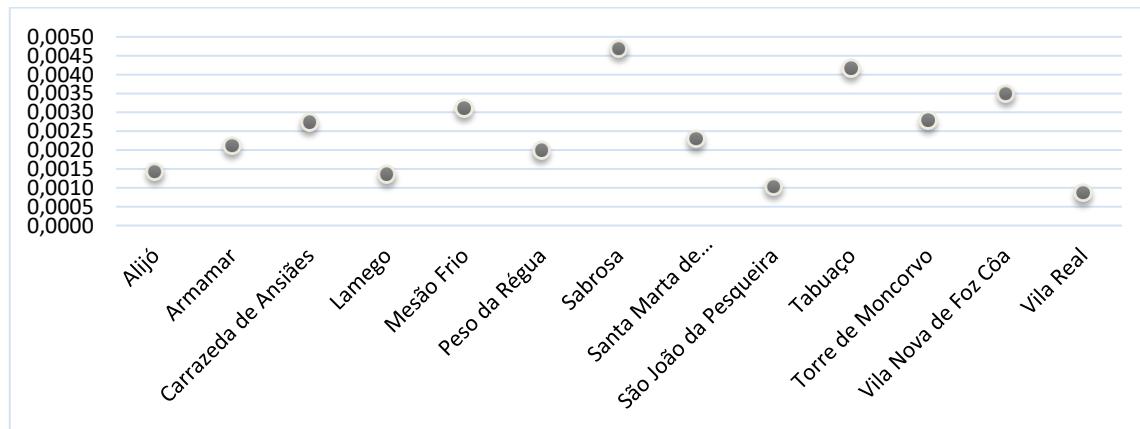


Figure 2 - Cultural assets per capita

The ADWR region hosts 267 cultural assets serving a population of 150,211, with an average of 20.5 assets per municipality. However, this distribution is notably uneven. Vila Real, the largest municipality (49,571 inhabitants), contains the highest absolute number of cultural assets (51), while São João da Pesqueira (6,775 inhabitants) has the fewest (6). Interestingly, smaller municipalities like Sabrosa and Tabuaço demonstrate higher per capita cultural asset ratios (0.00469 and 0.00417, respectively), suggesting more substantial cultural investment relative to their population size.

Cultural facilities (museums, galleries, cinemas) show significant disparities across the region. While Vila Real has the most facilities (13), its ratio of 0.26 facilities per 1,000 inhabitants is relatively low due to its large population. In contrast, smaller municipalities such as Sabrosa (5 facilities, 5,548 people) and Torre de Moncorvo (7 facilities, 6,826 people) offer better access proportionally. Santa Marta de Penaguião represents a concerning case with no cultural facilities for its 6,100 residents.

Despite a 7.7% population decline in the region during this period (from 162,827 to 150,211 inhabitants), cultural infrastructure has expanded significantly:

- Immovable cultural assets per 10,000 inhabitants increased from 14.49 to 17.77 (22.6% growth)
- Cultural facilities per 10,000 inhabitants rose from 2.46 to 3.73 (51.6% growth)

This substantial investment in cultural infrastructure, particularly in facility development, occurred despite demographic challenges, suggesting a conscious regional strategy to enhance cultural access and preserve heritage assets following the region's UNESCO World Heritage designation. The data reveal a positive correlation ($r=0.78$, $p<0.01$) between the number of cultural assets and the population of municipalities, indicating that more populated areas tend to concentrate a greater number of cultural resources. This distribution, although expected from a demographic perspective, raises important questions about equity in access to culture throughout the ADWR region, especially in less populated rural areas. Simultaneously, it is observed that the percentage growth of cultural facilities (42.3%) exceeded that of immovable cultural assets (28.7%) during the analysed period, suggesting a conscious effort to balance heritage preservation with the development of contemporary cultural infrastructure.

These results, when interpreted in light of the Sustainable Development Goals and UNESCO's cultural indicators, offer valuable insights into the dynamics of cultural development in the ADWR following its designation as a World Heritage site. Below, we discuss the implications of these findings for understanding the role of culture in the sustainable development of the region, analysing how access to culture relates to the social, economic, and environmental dimensions of development.

4. DISCUSSION

4.1 Correlation between Immovable Cultural Assets and Cultural Facilities

The analysis of immovable cultural assets and cultural facilities in the municipalities of the Alto Douro Wine Region reveals some significant correlations and other distribution patterns that warrant further exploration to understand cultural dynamics and accessibility in the region.

- The positive correlation between immovable cultural assets and cultural facilities in larger municipalities supports several SDGs, promoting heritage preservation (SDG 11), boosting cultural tourism (SDG 8), and improving learning opportunities (SDG). Through investment in cultural infrastructure (SDG 9), it is possible to promote intercultural dialogue and social inclusion (SDG 16).
- The disparities between immovable cultural assets and limited cultural infrastructure underscore significant obstacles to achieving several Sustainable Development Goals, most notably the challenge of ensuring equitable access to culture (SDG 10) and implementing integrated urban planning (SDG 11). These imbalances considerably constrain the development of innovation and infrastructure (SDG 9) whilst revealing substantial unrealised economic potential in cultural tourism (SDG 8). Moreover, the insufficiency of adequate cultural spaces impedes efforts to foster peaceful and inclusive societies (SDG 16). Such challenges highlight the pressing need for strategic allocation of cultural resources that extends beyond mere heritage preservation to ensure accessibility, sustainability, and balanced development, thereby promoting enduring economic, social, and cultural prosperity throughout the region. A more nuanced approach to cultural planning would address both the preservation of existing assets and the creation of contemporary cultural spaces that serve diverse community needs.
- The negative correlation between cultural assets and cultural infrastructure in smaller municipalities has a negative impact on the achievement of the SDGs, mainly due to the lack of equitable access to culture (SDG 10), weak integration of heritage with cultural spaces (SDG 11), and limited cultural tourism (SDG 8). Additionally, insufficient investment in cultural infrastructure hampers the development of innovation and industry (SDG 9) and reduces the potential for fostering peaceful and inclusive societies (SDG 16). The need to balance cultural preservation with infrastructure development is critical to promote inclusion, economic growth, and long-term sustainability, ensuring that all communities benefit from access to culture, heritage, and education.
- The variation in the distribution of cultural assets per inhabitant and the need for adaptive cultural policies indicate inequality in access to culture (SDG 10), the need for more balanced and integrated planning (SDG 11), and limited tourism and economic potential (SDG 8). Additionally, it highlights the lack of educational opportunities (SDG 4) and the need for investment in cultural infrastructure (SDG 9). Furthermore, the need for equitable access to culture emphasizes the role of culture in fostering peaceful and inclusive societies (SDG 16). These SDGs underline the importance of integrating heritage preservation with the creation of accessible cultural spaces to ensure sustainable development and inclusive growth across all communities.

4.2 Analysis of Inequalities in Access to Culture

The analysis of the unequal distribution of immovable cultural assets and cultural facilities across the region's municipalities reveals significant disparities in access to culture, which may be explained by factors such as inequality in funding, development priorities, and demographic structure.

- Inequality in access to cultural infrastructure reflects the need to ensure equitable access to culture (SDG 10), the importance of more inclusive urban planning (SDG 11), and increasing tourism and economic potential (SDG 8). It also highlights the importance of fostering peaceful and inclusive societies (SDG 16). These SDGs emphasize the need for public policies that promote and ensure accessible cultural infrastructure for all communities, creating equal opportunities for cultural engagement, education, and economic development.
- Preserving heritage and developing cultural infrastructure can generate jobs and boost tourism (SDG 8), improve quality of life and promote local identity (SDG 11), strengthen cultural and creative industries (SDG 9), and ensure access to culture for all (SDG 10). Additionally, it plays a key role in fostering peaceful and inclusive societies (SDG 16).

4.3 Challenges for Public Managers and Cultural Policymakers

The analysis of correlations between immovable cultural assets and cultural facilities offers valuable insights for strategic planning in the ADWR region. Key considerations include:

- Promoting Equal Access to Culture: Ensuring equitable cultural access contributes to reducing inequalities (SDG 10), fostering sustainable communities (SDG 11), enriching educational opportunities (SDG 4), and stimulating local economic development through the cultural sector (SDG 8). Moreover, it promotes peaceful and inclusive societies (SDG 16) by facilitating cultural exchange and mutual understanding among diverse populations.
- Investing in Rural Cultural Infrastructure: Targeted investment in cultural facilities within less urbanized areas helps mitigate regional disparities (SDG 10) while simultaneously preserving and promoting distinct cultural identities (SDG 11).

The establishment of museums and other cultural spaces in these regions strengthens the foundation for more inclusive and cohesive communities (SDG 16). Additionally, such investment stimulates tourism and creates employment opportunities, catalyzing economic growth in smaller communities (SDG 8).

- Ensuring Sustainability in Cultural Development: Long-term sustainable investments in culture should prioritize the quality and sustainability of cultural infrastructure while promoting community-centered approaches that address local needs and preserve cultural heritage (SDG 11). This approach fosters innovation and resilient infrastructure development (SDG 9), generates sustainable employment in the cultural sector (SDG 8), and reinforces peace, justice, and institutional capacity (SDG 16). Such strategic investments ensure enduring cultural and economic development that remains responsive to community needs and aspirations.

CONCLUSION

This study emphasizes the importance of cultural indicators in assessing sustainable development in the ADWR region and calls for stronger cultural policies. By implementing UNESCO's tools, the study has highlighted significant disparities in cultural access, offering valuable insights for improving future cultural policies. Cultural indicators reveal that some municipalities have a high density of cultural assets, suggesting privileged access, while others show a lack of resources, pointing to cultural deprivation. Understanding cultural assets per capita is vital for evaluating cultural access and ensuring balanced resource allocation across municipalities.

The findings suggest that areas with a high concentration of cultural assets relative to their population may require more careful consideration of their usage and sustainability. Conversely, municipalities with fewer assets need increased investment in cultural infrastructure. These insights are crucial for shaping future cultural, economic, and infrastructure strategies, ensuring equitable access to cultural spaces. The data also highlights the need for further exploration of correlations between cultural assets and other socioeconomic factors to guide targeted interventions.

This study presents several methodological limitations. Reliance solely on secondary data restricts our ability to capture qualitative cultural nuances and stakeholder perspectives. Data comparability challenges between 2001-2023 stem from evolving classification methodologies and administrative restructuring within cultural institutions. Furthermore, our emphasis on quantitative aspects of cultural access provides limited insight into programming quality, content relevance, or actual community impact.

Future research should incorporate primary data through stakeholder interviews, resident surveys, and participant observation at cultural events. Longitudinal studies tracking cultural development over extended periods would provide valuable insights into the long-term impacts of UNESCO designation. Research should also explore additional UNESCO cultural indicators beyond 'access to culture', and develop comparative analyses with other wine-producing World Heritage regions such as Bordeaux, Piedmont, and the Rhine Valley to identify transferable best practices.

For cultural managers, our findings suggest developing coordinated strategies across the 13 municipalities to balance cultural facility distribution, prioritising investment in currently underserved areas. Implementing targeted cultural mediation programmes (including free rural transport schemes, reduced rates for low-income populations, and locally relevant programming) would enhance participation in peripheral communities. Finally, creating integrated management models linking cultural heritage, tourism, and the wine sector through collaborative networks, unified digital platforms, and joint marketing initiatives would maximise economic and social benefits whilst ensuring sustainable cultural development throughout the region.

While the study's limitations include a focus on a single indicator and a lack of context for different types of cultural assets, the overall results indicate that the region has seen a modest increase in immovable cultural assets, although this growth is unevenly distributed. This uneven distribution hampers social participation, particularly in larger cities like Vila Real and Lamego. Achieving a fairer distribution of cultural resources could foster greater cultural participation, boost local industries, and contribute to social cohesion in line with Agenda 2030. Ultimately, culture plays a crucial role in sustainable development in the Alto Douro Wine Region, particularly after its UNESCO classification in 2001, which has helped preserve cultural heritage while promoting regional growth.

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AUTHORS' CONTRIBUTION

Conceptualization, A.S.; data curation, I.V. and D.F.; formal analysis, A.S. and D.F.; funding acquisition, I.V.; investigation, A.S., I.V. and D.F.; methodology, A.S. and I.V.; supervision, E.A.; writing-original draft, A.S.; writing-review and editing, E.A. and D.F.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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