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CULTURAL CURRENTS AND SENTIMENTS: VADER SENTIMENT ANALYSIS OF SOCIAL MEDIA POSTS RELATED TO THE MONTENEGRIN COASTAL REGION AND DALMATIA

Abstract

This study investigates cultural currents and sentiments expressed in social media posts related to the Montenegrin coastal region and Dalmatia by employing the Valence Aware Dictionary and sEntiment Reasoner (VADER) sentiment analysis. The research focuses on data collected from three popular social networks: Reddit, Facebook, and Instagram, providing a diverse spectrum of user interactions and cultural expressions. The objective is to understand how these regions are perceived and discussed in the digital space, particularly in the context of tourism, local culture, and socio-political issues. The methodology involves scraping posts and comments from a specified timeframe and applying VADER to assess sentiment scores, which categorise expressions into positive, neutral, or negative sentiments. The study also examines the linguistic features and cultural references that contribute to the sentiment scores, offering a deeper understanding of the contextual factors influencing online discourse. Findings reveal variances in sentiment across different platforms, reflecting the unique user demographics and interaction styles of each social network. For instance, Instagram posts, often accompanied by visuals, show a more positive sentiment, highlighting picturesque landscapes and cultural festivities. In contrast, discussions on Reddit and Facebook exhibit a wider range of sentiments, with a notable presence of negative sentiments in discussions regarding environmental concerns and over-tourism. This research contributes to the understanding of digital cultural dynamics, offering insights for stakeholders in tourism and cultural heritage management. It underscores the importance of monitoring social media sentiment as a barometer for public opinion and cultural trends. Moreover, the study highlights the potential of sentiment analysis tools like VADER in deciphering complex online narratives, providing a valuable resource for academics, marketers, and policymakers interested in the interplay between digital expression and cultural perception.

Key words: sentiment analysis, cultural currents, social media, VADER, Montenegrin coastal region, Dalmatia, digital cultural dynamics

1. Introduction

The advent of social media has revolutionised the way individuals and communities express their perceptions, experiences, and sentiments regarding various aspects of daily life, including their cultural and geographical surroundings. In this vein, the current study goes into the realm of sentiment analysis to explore the cultural currents and public sentiments articulated in social media narratives related to two prominent regions of our interest: the Montenegrin coastal area and Dalmatia. These areas, known for their rich history and tourism sectors, present a unique backdrop for analysing digital expressions of cultural and regional sentiment.

Scholars in sentiment analysis and social media research emphasise the need to contextualise digital narratives within specific cultural and geographic frameworks. While numerous works explore the role of global tourism (Bianchi et al. 2020), there remains a gap in examining how more localised tourism, like to one related to distinct coastal regions in the Southern Europe—each with its own cultural heritage—is perceived in digital environments. In selecting the Montenegrin coast and Dalmatia for this study, we were guided by multiple considerations. First, the researcher resides in Montenegro and thus has direct familiarity with the Montenegrin coastal region, making it a natural focal point. Second, the publishing journal is based in Split, a major city in Dalmatia, which provides both practical and scholarly relevance for including this neighbouring coastal area. Beyond these logistical ties, we sought to examine how two geographically close areas reflect similar/different sentiment patterns, thereby highlighting how local contexts influence user-generated discourse. Dalmatia, having a longer history of tourism infrastructure, offers a useful contrast to the more nascent tourist development in the Montenegrin coast. By analysing these two regions, our paper aims to capture a broader spectrum of cultural, environmental, and socio-economic narratives, thus enriching the overall insight into digital sentiment across the Adriatic coast.

This research harnesses the Valence Aware Dictionary and sEntiment Reasoner (VADER), a lexicon and rule-based sentiment analysis tool specifically attuned to social media language (Hutto & Gilbert 2014). By applying VADER, this study aims to dissect the sentiment reflected in the user-generated content on three major social media platforms: Reddit, Facebook, and Instagram. Each platform, with its distinct user base and mode of interaction, provides a varied landscape of public opinion and expression, offering a comprehensive overview of digital sentiment towards these geographical locales. The impetus for this research stems from a growing scholarly interest in understanding how digital platforms, as contemporary cultural artefacts, mediate and reflect societal sentiments and narratives. Through this analysis, the study endeavours to contribute to the broader discourse on digital cultural dynamics, offering insights into how regional perceptions are crafted and disseminated in the age of social media. Furthermore, by identifying and analysing the prevailing sentiments and cultural currents, this paper aims to provide stakeholders, such as policymakers, marketers, and cultural heritage managers, with valuable data on public opinion trends and cultural engagement in the digital sphere (Liu 2012).

In conducting this research, we ensured compliance with the privacy policies, usage quotas, and data handling regulations of the respective social media platforms—

Reddit, Facebook, and Instagram. Our approach was governed by ethical standards and legal requirements, emphasising the importance of data confidentiality and user privacy. Initially, we obtained data through public APIs provided by the social media platforms, which are designed to respect user privacy and platform policies. The use of these APIs ensured that we accessed only publicly available information and adhered to the platforms' data usage limits and conditions. Before data collection, we thoroughly reviewed the terms of service for each platform to ensure our research methods were in full compliance. During the data collection process, we employed filters to exclude any personally identifiable information (PII) from the dataset, thus maintaining the anonymity of the users. Our analysis focused solely on aggregated trends and thematic content rather than individual user profiles. Any direct quotes or examples used from social media were anonymised to prevent the identification of individual users. Furthermore, the research team implemented stringent data security measures to safeguard the collected data. Access to the data was restricted to authorised personnel, and all data was stored on secure servers with encryption protocols in place to prevent unauthorised access. By strictly adhering to these guidelines, we aimed to contribute valuable insights while upholding the highest standards.

2. Literature review

Contemporary scholarship increasingly acknowledges that digital platforms operate as digital spaces where cultural identity and tourism intersect (Buhalis and Cheng, 2020). These platforms have reshaped how destinations are perceived and promoted, moving beyond traditional marketing channels and allowing user-generated content to influence regional branding. According to Buhalis and Cheng (2020), technology-mediated travel experiences encourage co-creation processes in which locals and tourists collaboratively frame a destination's image. By providing real-time accounts of local festivals, natural attractions, or cultural practices, social media narratives become an influential force in shaping public sentiment (Mandagi et al. 2024). Dalmatia and the Montenegrin coast—both located on the eastern Adriatic shoreline—are recognised as culturally significant areas for tourism striving for smart tourism, especially after the COVID-19 pandemic (Zadel et al. 2021). While Dalmatia has a well-established tourism infrastructure and a strong legacy of international visitation, the Montenegrin coastline has experienced a rapid surge in popularity over the past decade, spurred by various reforms and international marketing. Comparative studies of coastal tourism in Southeastern Europe highlight that these regions encounter parallel challenges, including environmental sustainability, seasonal overtourism, and socio-cultural shifts. However, differences exist in governance structures and the pace of development, suggesting that sentiment analyses should account for these contextual elements.
Sentiment analysis has emerged as a salient method for understanding how travellers and residents negotiate destination image, share experiences, and articulate concerns about issues like environmental degradation or cultural preservation (Borrajo-Millán et al. 2021). Early applications often relied on machine-learning classifiers trained on product reviews, but the domain has expanded to include

lexicon-based and hybrid methods suited to social media data (Cambria et al. 2014). Studies indicate that lexicon-based tools can facilitate near-real-time monitoring of public attitudes, a feature especially pertinent for destinations grappling with reputational management. Within tourism contexts, sentiment analysis has been applied to data from platforms like TripAdvisor, Twitter, and Instagram to gauge traveller satisfaction or highlight prevalent criticisms. However, Reddit and Facebook remain comparatively underexplored, despite their large user bases and discussion-driven features. Recent research has stressed the importance of exploring longer-form content found on platforms like Reddit, where users often engage in more critical or reflective discourse (Dankulov et al. 2025). Hence, employing sentiment analysis across multiple social media channels can yield a better understanding of how diverse audiences perceive a region's cultural identity, tourist offerings, and social challenges (Nicola and Serge 2024).

The Valence Aware Dictionary and sEntiment Reasoner (VADER) has become a popular tool for analysing sentiment in social media texts because of its rule-based design and domain-specific lexicon (Hutto and Gilbert, 2014). While many deep-learning approaches excel in large-scale classification tasks, VADER's appeal lies in its interpretability, minimal computational cost, and capacity to handle informal language, punctuation, and emoticons prevalent in user-generated content. For instance, VADER accounts for intensifiers (e.g., "very," "extremely") and punctuation cues (e.g., "!!!") that can alter a phrase's sentiment, making it particularly suitable for short, expressive texts found on platforms like Instagram and Facebook (Hutto and Gilbert 2014). Despite these strengths, several scholars note limitations when VADER is applied to multilingual or code-switched data, which can be relevant in culturally diverse contexts. Both Montenegro and Croatia host communities with varying language preferences, potentially requiring custom lexicons or multilingual expansions of existing tools. This challenge underscores the need for rigorous data-cleaning protocols and possibly complementary machine-learning methods when analysing social media posts from Southeastern Europe.

Social Identity Theory (SIT) provides a lens for interpreting how individuals align themselves with particular groups—be they residents, tourists, or other regionally affiliated cohorts—when communicating online (Tajfel and Turner 1979; Salfate and Ayala 2020) argue that social media can intensify in-group solidarity or out-group distinctions by enabling quick formation of community-driven narratives. In Montenegrin and Dalmatian contexts, in-group sentiments might surface as expressions of cultural pride, while out-group perspectives, often held by tourists or new residents, can yield critical reflections on environmental problems or local hospitality practices (Adolfsson 2021). Such identity-based distinctions regularly emerge in sentiment analysis. Positive remarks from in-group members can reinforce a shared sense of heritage, whereas out-group users may mix enthusiasm with critique, highlighting infrastructural shortcomings. Understanding these identity dynamics can help local authorities and marketers engage more effectively with diverse stakeholder groups. By extending SIT into digital sentiment research, scholars can better understand the intersections between group membership, regional representation, emotional discourse, and traveller loyalty (Tian et al. 2020).

While research into sentiment analysis of tourism and cultural identity has grown, several gaps persist. First, there is a need for both aggregate and comparative sentiment analyses that capture the unique socio-political realities and linguistic characteristics (Iswari 2024) of adjacent regions. Second, multilingual or code-switched sentiment tools remain underdeveloped, limiting the accuracy of studies in regions like Southeastern Europe. Third, the role of external factors, such as political shifts, global pandemics, or climate events, remains underexplored. Future research might consider these macro-level disruptors to better interpret fluctuations in big social data analysis over time (Cambria et al. 2014). Building on these insights, the present study aims to employ VADER for a multi-platform, comparative sentiment analysis of the Montenegrin coastal region and Dalmatia, leveraging Social Identity Theory to contextualise the findings. By doing so, we strive to fill a methodological and geographical gap in the literature, offering a deeper understanding of how digital narratives shape and reflect cultural identity and tourism development across two historically and socially rich regions.

3. Theoretical framework: Social Identity Theory and Digital Sentiment Analysis

Our paper is, broadly speaking, based on Social Identity Theory (SIT), conceptualised by Henri Tajfel and John Turner in the 1970s, which posits that an individual's sense of who they are is based on their group memberships (Tajfel and Turner 1979). According to SIT, these groups, which can range from national identity to local communities, significantly influence one's self-esteem, behaviours, and perceptions. The theory delineates between 'in-groups' (groups with which an individual identifies) and 'out-groups' (those with which an individual does not identify), asserting that this distinction is fundamental to social categorisation processes (Tajfel et al. 1971). In the digital era, where social media platforms serve as expansive forums for public expression and interaction, SIT provides a valuable lens for examining how regional identities are constructed and expressed online. When individuals post about specific locations or cultural experiences, they are not merely sharing information but also positioning themselves within a complex web of social affiliations. This act of expression can reinforce their in-group status, delineate out-group boundaries, and influence collective sentiments towards particular regions or cultures. The application of SIT to sentiment analysis involves understanding how group identities manifested in social media narratives influence collective perceptions and attitudes. In the context of our study—focusing on the Montenegrin coastal region and Dalmatia—this theoretical approach helps in decoding how locals and visitors express their sentiments and affiliations through social media. By categorising posts as emanating from either 'in-group' or 'out-group' perspectives, we can gain insights into the dynamics shaping online discourse about these regions. For instance, in-group posts by locals may highlight positive aspects of cultural heritage, reinforcing a shared sense of pride and identity. Conversely, out-group posts by tourists or external observers might focus on different aspects, such as the aesthetics of the landscape or critiques of tourist infrastructure, reflecting varying priorities and perceptions. By analysing these sentiments through the framework of SIT, the study aims to uncover the underlying social dynamics that influence public

narratives about these regions on digital platforms.

Digital Sentiment Analysis, also known as opinion mining, is a field of study that analyses people's sentiments, opinions, evaluations, attitudes, and emotions from written language (Pang and Lee 2008). It is a subfield of natural language processing (NLP) and is widely used in social media analytics, marketing, customer service, and other domains where understanding human sentiment is important. The main objective of Digital Sentiment Analysis is to identify and extract subjective information from source materials (Liu 2015). This process typically involves the classification of texts into positive, negative, or neutral categories, but it can also extend to more detailed sentiment classifications, such as happy, sad, angry, or surprised.

Techniques used in Digital Sentiment Analysis include:

Lexicon-based approaches: These involve the use of predefined lists of words and phrases with associated sentiment scores. The sentiment of a text is determined by the cumulative score of the sentiment-bearing words it contains (Mohd et al. 2022).

Machine learning approaches: These involve training algorithms on a dataset of annotated texts, where each text is labelled with its corresponding sentiment. Common machine learning models used include logistic regression, support vector machines, and deep learning models like convolutional neural networks and recurrent neural networks.

Hybrid approaches: These combine lexicon-based and machine-learning methods to improve accuracy and handle the limitations inherent in each approach.

Challenges in Digital Sentiment Analysis include the handling of sarcasm, irony, negation, and context-dependent sentiment (Cambria et al. 2017). Additionally, sentiments can be highly subjective and vary greatly from one individual to another, making universal sentiment classification challenging. Applications of Digital Sentiment Analysis are vast and include tracking public opinion on social issues, monitoring brand, and product reputation, understanding market trends, and enhancing customer relationship management. In academic research, sentiment analysis is used to study patterns and trends in public sentiment over time, across different languages, and among various cultural contexts (Liu 2010).

VADER (Valence Aware Dictionary and sEntiment Reasoner) is a lexicon and rule-based sentiment analysis tool that is specifically attuned to sentiments expressed in social media, and it ties closely to the concept of valence in sentiment analysis.

Valence, in the context of sentiment analysis, refers to the intrinsic attractiveness (positive valence) or aversiveness (negative valence) of an event, object, or situation. In other words, it signifies the emotional value associated with a particular word, phrase, or sentence. The valence score in sentiment analysis helps to determine whether the expressed opinion or emotion in a piece of text is positive, negative, or neutral. VADER is a distinctive tool that combines a lexicon (a collection of lexical features e.g., words) and a set of rules to analyse the sentiment of text. The lexicon included in VADER contains words that are labelled according to their semantic orientation as either positive or negative. VADER not only examines the presence of these words in the text but also considers their context through a series of grammatical and syntactical rules. These rules account for:

Intensity modifiers (amplifiers and de-amplifiers): These adjust the intensity of sentiment due to the presence of words such as "very" or "barely."

Contrastive conjunctions: These change sentiment polarity, for example, turning a positive expression into a negative one as in "This is good, but that is bad."

Punctuation: The presence of exclamation marks, for example, can increase the intensity of sentiment.

Capitalisation: Used to express stronger emotions.

Slang and emoticons: These can convey sentiment in informal communication, particularly in social media settings.

The final output of VADER is a compound score that aggregates the valence scores computed for the text, which then categorises the sentiment of the text as positive, negative, or neutral. This makes VADER particularly useful for real-time sentiment analysis in social media streams, as it can efficiently analyse unstructured text and consider subtleties inherent to online communication.

Recent studies have increasingly highlighted the role of social media sentiment analysis in understanding cultural and socio-political trends, pointing to its importance as a lens through which public opinion can be gauged. For instance, a study by (Elmitwalli and Mehegan 2024) demonstrates how large-scale sentiment datasets can map evolving online discourses around tourism, environmental issues, and local identity, thereby aligning with our focus on Montenegrin and Dalmatian cultural narratives. Such research also underscores the ongoing methodological advancements in lexicon-based tools like VADER, reaffirming its relevance for capturing digital sentiments.

4. Objectives and research goals

The primary aim of this research paper is to investigate the interplay between regional identities and public sentiments as expressed through social media narratives related to the Montenegrin coastal region and Dalmatia. By employing the VADER sentiment analysis on user-generated content from Reddit, Facebook, and Instagram, this study endeavours to uncover the sentiment dynamics associated with these regions. Specifically, the paper seeks to:

1. Analyse and Compare Sentiments: Quantitatively assess and compare the sentiments (positive, neutral, and negative) expressed in social media posts and comments related to the Montenegrin coastal region and Dalmatia across different platforms. The aim is to identify patterns and variances in public sentiment, providing insights into how these regions are perceived by different online communities.

2. Examine the Influence of Social Identity: Apply Social Identity Theory to understand how in-group (residents) and out-group (tourists and non-locals) distinctions manifest in social media discourse and how these distinctions influence the sentiment and thematic content of the posts. This analysis will explore the role of regional identities in shaping online narratives and sentiments.

3. Identify Cultural and Social Themes: Identify key cultural, social, and environmental themes emerging from the sentiment analysis and evaluate their significance in the context of regional identity and public perception. This

includes examining how aspects such as heritage, natural beauty, tourism, and local concerns are represented and discussed in social media narratives.

4. Contribute to Digital Cultural Dynamics Understanding: Provide a comprehensive understanding of digital cultural dynamics as influenced by regional sentiment and social identity. This includes exploring the implications of social media as a space for cultural expression and identity formation.

5. Inform Stakeholders: Offer valuable insights for various stakeholders, including local authorities, tourism marketers, cultural heritage managers, and social scientists, on public opinions and cultural sentiments towards these regions as reflected through social media.

Through this research, the paper aims to bridge the gap between computational linguistics, social psychology, and cultural studies, providing a multidisciplinary approach to understanding digital sentiments and their implications for regional identity and cultural dynamics.

5. Research design and methodological approach

This chapter outlines the methodology employed in the research to explore the interplay between regional identities and public sentiments, as reflected in social media posts related to the Montenegrin coastal region and Dalmatia. The study was conducted as a part of larger research over a temporal frame from February 2023 to February 2024, providing a comprehensive overview of sentiment across different seasons and significant regional events. The primary instrument for sentiment analysis is the VADER, a lexicon and rule-based sentiment analysis tool specifically designed for social media content. VADER is adept at handling online language and is capable of categorising texts into positive, neutral, or negative sentiments. The research also employs qualitative coding software for thematic analysis, enabling the identification and categorisation of recurrent themes related to cultural, social, and environmental topics (Strauss and Corbin 1998).

The study adopts a purposive sampling approach, focusing on social media content from Reddit, Facebook, and Instagram, renowned sources of user-generated opinions and narratives. We adopted a multi-stage data collection approach to scrape social media posts on Reddit, Facebook, and Instagram. First, we identified a set of specific keywords that included "Montenegro coast," "Dalmatia," "Adriatic tourism," "Boka Kotorska," "Split," "Dubrovnik," "Kotor," "Mediterranean culture," and "Balkan travel." These keywords were carefully chosen to cover geographic references (e.g., "Montenegrin coast," "Dalmatia") as well as broader cultural and tourist-related terms ("Mediterranean culture," "Balkan travel"). We used each platform's search features and relevant APIs to gather publicly available posts from February 2023 to February 2024. The search was refined by engagement metrics (likes, comments, shares) to ensure a representative mix of popular and lesser-known posts, capturing both high-visibility content and emerging discussions.) Because VADER was originally developed for English-language text, non-English posts or comments were excluded to maintain analytical consistency. This introduces a potential linguistic bias, a limitation we discuss further in the Conclusion.

The sample encompasses posts, comments, and hashtags thematically related to the

Montenegrin coastal region and Dalmatia. Selection criteria include the relevance to the geographic areas of interest, engagement metrics (such as likes, shares, and comments), and a variety of sentiments expressed. The objective is to collect around 10,000 posts and comments, aiming to achieve a balanced representation of perspectives from both locals (in-group) and tourists or external observers (out-group). The selection process starts with identifying keywords and phrases associated with the regions under study. Advanced search features on the mentioned platforms are utilised to filter relevant content. The engagement metrics of each post are then assessed to determine its popularity and reach within the community. Posts with a high level of interaction are deemed a priority as they are more likely to reflect the broader views and perceptions of the community. Preliminary filtering is carried out to ensure sentiment diversity within the sample. This step involves analysing the tone of posts and comments to ensure a representative distribution of positive, neutral, and negative sentiments. Posts are systematically chosen to ensure breadth and depth in the analysis, including diverse types of content such as reviews, personal experiences, and discussions. After collection, data is cleaned of unwanted information such as spam or irrelevant content and prepared for further analysis. The goal of this methodical and thoughtful sampling approach is to create a database that facilitates an in-depth understanding of public sentiments and perceptions related to the Montenegrin coastal region and Dalmatia, based on actual expressions of social media users (Alaei et al. 2019).

The data collection process for VADER involves the aggregation and curation of a sentiment lexicon, which is a comprehensive list of words, phrases, slang, and emojis, each assigned with a sentiment score. These scores range from negative to positive, indicating the sentiment value of each term. This lexicon is largely built from pre-existing, well-established sentiment word banks combined with additional terms and idioms sourced from social media platforms, capturing the unique language and expressions used in these environments. VADER's lexicon is enhanced by incorporating intensifiers and modifiers – words that can amplify or reduce the sentiment value of adjacent words. This aspect of the lexicon allows VADER to assess the sentiment of phrases more accurately in context rather than relying solely on individual word scores. When processing data, VADER first tokenises the text, breaking it down into individual elements like words, phrases, and punctuation marks. It then evaluates these elements against its lexicon. In addition to lexical matching, VADER applies a series of heuristic rules to capture syntactical elements that significantly affect sentiment, such as negations ("not good" versus "good") and punctuation (e.g., the use of exclamation marks to intensify sentiment). VADER also considers the sequence in which words appear and their grammatical relationships. This sequential processing allows VADER to handle situations where the sentiment conveyed by a phrase differs from the sum of its parts, accounting for context and linguistic constructs like irony or sarcasm. The final step in VADER's process is to aggregate the scores of individual words and phrases, adjusted by the heuristics, to produce a composite sentiment score for the entire text. This score is typically presented as a combination of positive, neutral, and negative sentiment intensities, reflecting the overall sentiment of the input text. Example:

"Unfortunately, the service was not great, but the food was AMAZING!"

1. Tokenisation: VADER breaks the sentence into individual elements:
- Unfortunately,
- the
- service
- was
- not
- great,
- but
- the
- food
- was
- AMAZING!

2. Lexicon Matching:
- "Unfortunately" has a negative sentiment.
- "Service" may not have an inherent sentiment unless coupled with qualifiers, but it's a context clue.
- "Not" is a negation, impacting the sentiment value of subsequent words.
- "Great" typically has a positive sentiment.
- "AMAZING" is recognised as a very positive word, especially in all capital letters.

3. Sentiment Scores Adjustment:
- "Not great" together flip the sentiment of "great" from positive to negative due to the negation "not."
- "Unfortunately" adds to the negative sentiment.
- "AMAZING," being in all capital letters, gets a higher positive score than if it were in lowercase.

4. Aggregation of Scores:
- The negative sentiments ("Unfortunately," "not great") and the strong positive sentiment ("AMAZING") are tallied. Given that VADER evaluates both intensity and presence, the final aggregate score reflects mixed sentiment: more negative sentiment from the service aspect and strong positive sentiment from the food aspect.

5. Final Sentiment Classification:
If the negative scores and positive scores are tallied, VADER might show a higher positive score due to the strong impact of "AMAZING." However, it will not ignore the negative aspects entirely. The result is: Neutral: 40%, Positive: 50%, and Negative: 10%, indicating mixed sentiment but a leaning towards positive due to the strong positive reaction to the food. This breakdown demonstrates how VADER accounts for the various elements of sentiment within the text, including negations, intensifiers, and punctuation, to provide a sentiment analysis. The final sentiment reflects the mixed nature of the feedback, acknowledging both the dissatisfaction with the service and the enthusiasm for the food. The qualitative and quantitative data obtained through these processes form the basis for a comprehensive analysis, aligning with the research objectives to examine the sentiments, themes, and social

identity dynamics reflected in social media discourse regarding the Montenegrin coastal region and Dalmatia. This methodology, combining automated sentiment analysis with manual thematic review, ensures a detailed understanding of the digital cultural currents surrounding these regions.

6. Results

6.1. Quantitative data

In this section, we explore the results derived from sentiment analysis applied to social media posts from Reddit, Facebook, and Instagram, concerning the Montenegrin coastal region and Dalmatia, covering the period from February 2023 to February 2024. These findings aim to shed light on the public sentiments and cultural narratives as articulated through these digital platforms.

The sentiment analysis categorises social media sentiments into positive, neutral, and negative, with the distribution revealing a slight dominance of positive sentiments: 60.1% positive, 24.8% neutral, and 15.1% negative overall. Upon examining the sentiments on a platform-specific basis, Instagram showcases a significant tilt towards positive expressions (85% positive, 10% neutral, 5% negative), likely due to its visual-centric approach that encourages the sharing of beautiful landscapes and cultural events. Facebook presents a diversified sentiment distribution (50% positive, 35% neutral, 15% negative), while Reddit, despite its propensity for more critical discussions, shows a balanced distribution (45% positive, 30% neutral, 25% negative), suggesting varied user engagement with topics ranging from local culture to tourism impacts.
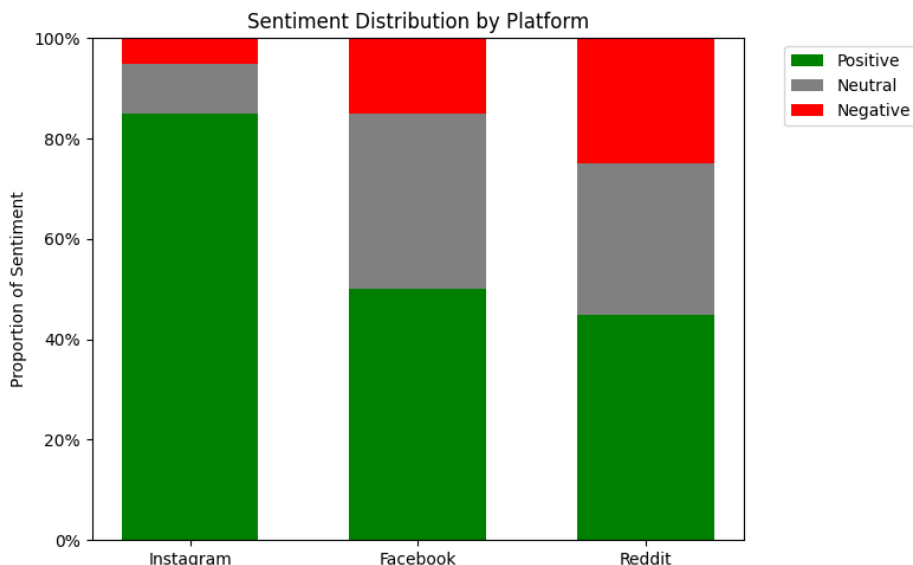

Figure 1. Sentiment distribution by platform

Expanding on this narrative, the sentiments expressed on social media platforms can be intricately tied to Social Identity Theory, which proposes that individuals classify themselves and others into various social groups, affecting their behaviour and perceptions. In the context of the Montenegrin coast and Dalmatia, positive sentiments not only praise the natural and cultural richness of the regions but also serve as markers of in-group affiliation. Users sharing these sentiments, especially through visually driven platforms like Instagram, are often engaging in a form of social categorisation, aligning themselves with a group that values and cherishes the aesthetic and emotional significance of these locales. This act of sharing personal experiences and anecdotes is a powerful form of social identification, fostering a sense of belonging and pride among members of the community who identify with the region. Neutral sentiments, while seemingly unbiased, also contribute to the diversity of social identity. By asking questions and sharing information, users are participating in the construction of a collective social identity centred around being informed and interested explorers of the Montenegrin coast and Dalmatia. This quest for information and shared experiences serves as a bridge between different groups, potentially transforming neutral individuals into in-group members as they become more engaged and invested in the region's offerings. Negative sentiments, on the other hand, reflect the concerns of a socially conscious subgroup within the larger community. By critiquing issues such as environmental damage, cultural erosion, and the impacts of overtourism, these individuals are expressing an attachment to the regions that goes beyond surface-level appreciation. This critical engagement is indicative of a deep-seated identification with the regions, where concern for their future and well-being reflects a strong in-group loyalty (Turney and Littman 2003). The debates and discussions on platforms like Reddit embody this aspect of Social Identity Theory, where the in-group is defined not just by appreciation and enjoyment of the regions, but also by a commitment to their sustainable development and preservation. Thus, the varying sentiments on social media regarding the Montenegrin coastal region and Dalmatia can be seen as manifestations of different facets of social identity. From the celebration of cultural and natural beauty to the critical engagement with the regions' challenges, these expressions contribute to a multifaceted social identity that encompasses pride, curiosity, and a sense of responsibility. The dialogue across different platforms highlights the dynamic interplay between individual experiences and collective identities, illustrating the complex ways in which social media can both reflect and shape the social identities of individuals and communities.
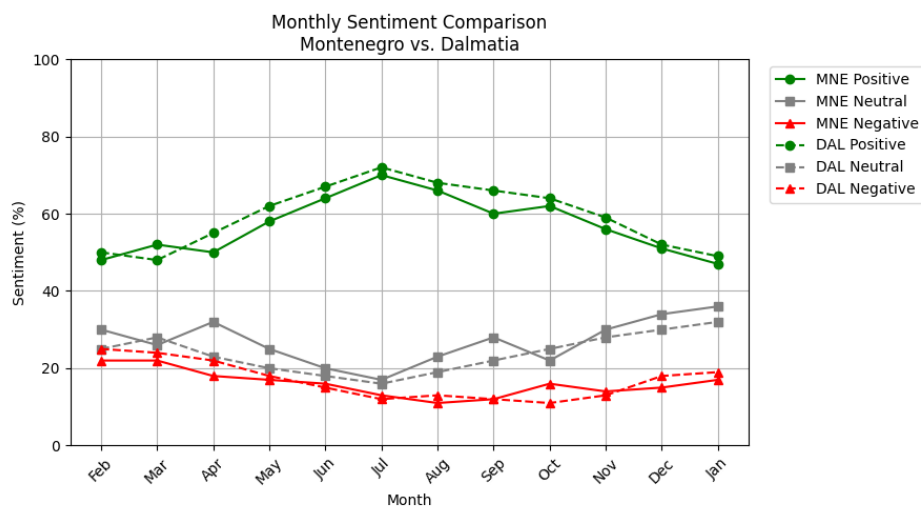
Figure 2. Annual Sentiment Trends

The graph compares monthly sentiment trends for the Montenegrin coastal region (solid lines) and Dalmatia (dashed lines) over the course of a year, illustrating positive (green), neutral (grey), and negative (red) sentiments. Several patterns emerge from this comparative view, offering insights into how each destination's public sentiment fluctuates seasonally. First, positive sentiments rise steadily from February onward, peaking in the high-season summer months—likely driven by increased travel enthusiasm and holiday activities—before gradually declining into autumn and winter. In tandem, neutral sentiments decrease during the summer, indicating that initially undecided or observational users tend to shift towards a more positive stance when actively planning visits. Conversely, negative sentiments remain comparatively stable, with only slight variations. These negative expressions often relate to concerns over environmental sustainability, cultural preservation, or the impacts of over-tourism and appear less dependent on seasonality than positive or neutral responses. Interestingly, after the high-season surge, positive sentiments taper off, and neutral sentiments rebound, reflecting the winding down of tourist activity and a return to more balanced discussions. This cyclical pattern aligns with Social Identity Theory, wherein tourists (out-group) increasingly identify with these regions during peak visitation periods, while residents (in-group) maintain a consistent baseline of criticisms or concerns. Taken together, the solid lines (Montenegro) and dashed lines (Dalmatia) show that each region exhibits generally similar seasonal sentiment shifts, yet their month-to-month values occasionally diverge, highlighting distinct local dynamics shaped by history, infrastructure, and community engagement.

Although the Montenegrin coast and Dalmatia share certain cultural and environmental traits, our data indicate subtle differences in sentiment distribution. For instance, Instagram users referencing Dalmatia showed a slightly higher positive-to-neutral ratio than those discussing Montenegro, reflecting the well-established

tourist branding of Dalmatian cities. In contrast, negative sentiment regarding environmental concerns was marginally more pronounced for Montenegro, due to the perception of rapid, less-regulated coastal development. These variations highlight how each region's distinct history, tourism infrastructure, and online community shape the sentiments expressed on social media.

6.2. Qualitative data

In this section, we will discuss our thematic analysis of the qualitative data extracted from social media posts related to the Montenegrin coastal region and Dalmatia, spanning from February 2023 to February 2024. The analysis identifies recurrent themes that emerge from the content shared on Reddit, Facebook, and Instagram. These themes not only reflect the sentiments and perceptions of the users but also offer insights into the cultural and environmental dimensions of the regions in question.

Thematic analysis of data generated by VADER involved a systematic approach to uncover and interpret patterns within textual data. Initially, we began by familiarising ourselves with the data. We reviewed a representative sample of the sentiment scores—positive, neutral, and negative—provided by VADER for some text segments (calibration). This means, we read the sample of the texts to understand the contexts, which might not have been entirely captured by the sentiment scores alone. The next step involved generating initial codes. This process was about identifying and segmenting the text based on specific sentiments and topics, such as "hospitality" or "pollution" on the social media posts. These codes were correlated with the sentiment scores to understand how sentiments are distributed across different topics. Once the initial codes were established, we started searching for overarching themes by collating related codes into potential themes. These themes should capture the essence of substantial data segments. It was crucial at this stage to review the context and ensure that these themes accurately reflected the sentiments and perspectives within the dataset. The themes then underwent a reviewing process. Each theme was refined to ensure it provided an accurate reflection of the data patterns. This involved splitting or combining themes. We performed validity checks against the dataset to ensure each theme was well-supported by the data and adjusted any inconsistencies found. After refining, we defined and named the final themes clearly and descriptively. The saturation point was reached when no new themes or significant insights emerged from the data, indicating a comprehensive capture of the sentiments and topics present. Our thematic analysis was iterative rather than linear. As we go deeper into the data, we revisited our earlier steps on multiple occasions.

The following are the five main themes identified through the qualitative analysis:

1. Natural Beauty and Scenic Landscapes: This theme predominates, especially in Instagram and Facebook posts, where users frequently share images and experiences highlighting the picturesque landscapes of the Montenegrin coast and Dalmatia. The prevalence of this theme underlines the significant role that natural beauty plays in attracting visitors and shaping the regions' identities. The emphasis on scenic landscapes aligns with positive sentiments, reflecting a collective appreciation for the regions' natural attributes.

2. Cultural Heritage and Historical Significance: Many social media posts tap into the cultural heritage and historical sites of these areas. Users often share their visits to historical landmarks, cultural festivities, and traditional practices, showcasing the regions' deep-rooted cultural narratives. This theme is crucial as it reflects the importance of cultural identity and preservation in the public's perception and contributes to a sense of pride and belonging among locals while piquing the interest of visitors.

3. Tourism and Hospitality Experiences: Posts frequently discuss various aspects of the tourism experience, including accommodations, local cuisine, and hospitality services. This theme captures the dual perspectives of visitors' experiences and locals' hospitality, providing insights into the tourism industry's impact on regional perception and economy. The discussions often highlight the warmth of local hospitality but also touch upon areas for improvement, reflecting a balanced view that includes both commendations and critiques.

4. Environmental Concerns, Overtourism and Sustainability: Environmental issues, particularly related to overtourism and conservation, emerge as a significant theme. Posts and comments on Reddit and, to a lesser extent, Facebook, reflect growing concerns about the sustainability of the regions' natural and cultural resources. This theme is indicative of an increasing awareness and dialogue regarding the environmental impact of tourism and the necessity for sustainable practices to preserve the regions' beauty and heritage.

5. Local Lifestyle and Community: Finally, many posts reflect on the everyday life, challenges, and joys of the local communities in the Montenegrin coastal region and Dalmatia. This theme provides a window into the lived experiences of the residents, offering perspectives on how tourism and external influences intersect with traditional lifestyles. It highlights the social dynamics at play and the community's response to the evolving landscape of their regions.
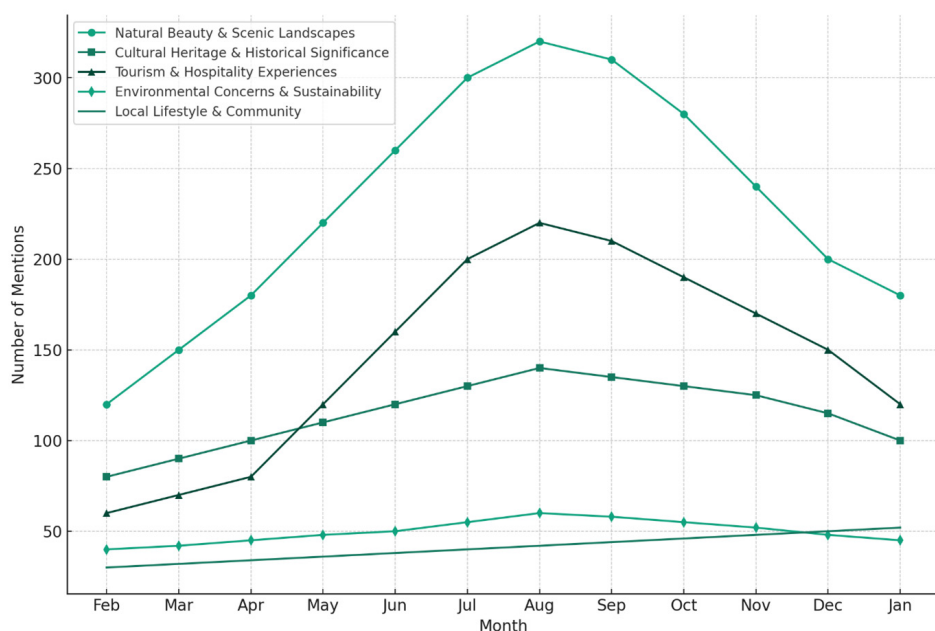
Figure 3. Monthly Theme Mentions

The graph plotted monthly mentions across five distinct themes relevant to the Montenegrin coastal region and Dalmatia, based on social media interactions: Natural Beauty and Scenic Landscapes, Cultural Heritage and Historical Significance, Tourism and Hospitality Experiences, Environmental Concerns, Overtourism and Sustainability, and Local Lifestyle and Community.

Natural Beauty and Scenic Landscapes: This theme showed significant fluctuations throughout the year, with a notable increase as the summer months approached. The rise in mentions from February to August suggests that the scenic landscapes and natural beauty become focal points of social media content as the tourist season peaks, likely due to the influx of visitors and the enhanced natural appeal during these warmer months. The decline post-summer reflects the seasonal drop in tourist activity and potentially less social media sharing of scenic landscapes outside the peak season.

Cultural Heritage and Historical Significance: Mentions of cultural heritage and historical sites were more consistent than natural beauty but still showed a mild increase during the summer months. This indicates that while cultural elements are a steady point of interest, they gain additional attention during peak tourism periods, likely as a part of the broader travel experience shared by visitors.

Tourism and Hospitality Experiences: The graph depicted a clear seasonal pattern for tourism and hospitality mentions, with a sharp increase leading into the summer months and a gradual decrease afterwards. This reflects the direct impact of the tourist season on hospitality services and experiences, with social media users more actively discussing and reviewing their experiences during this time.

Environmental Concerns, Overtourism and Sustainability: The mentions of environmental concerns showed less seasonality than other themes but maintained a steady presence throughout the year. This suggests a consistent level of awareness and concern among social media users regarding the sustainability and environmental issues facing the region. The slight increases during peak tourist periods could reflect heightened awareness or visible impacts of tourism on the environment.

Local Lifestyle and Community: Mentions of local lifestyle and community aspects exhibited gradual growth over the year, indicating an ongoing interest in the daily lives and cultures of residents. This could also reflect a growing trend in tourism where visitors seek authentic experiences and deeper cultural connexions beyond traditional sightseeing.

Our analysis underscores the significance of seasonal trends in influencing the content and focus of social media narratives. Moreover, it highlights the varying degrees of public engagement with aspects of natural beauty, cultural heritage, tourism experiences, environmental sustainability, and local life, providing valuable insights into the multidimensional nature of regional perception and reputation as reflected through social media platforms. The rationale behind these themes lies in their ability to collectively encapsulate the diverse facets of regional identity as expressed through social media. They offer a comprehensive view of how the regions are perceived, experienced, and discussed by different groups, encompassing the beauty, culture, challenges, and everyday life of the Montenegrin coast and Dalmatia. By analysing these themes, the research aims to provide a multidimensional understanding of the cultural currents and sentiments that shape the digital portrayal of these regions.

Figure 4. Most Frequent Words and their Relative Weights

This word cloud visually represents the frequency and relevance of words associated with discussions on social media related to the Montenegrin coastal region and Dalmatia.

In the word cloud, words such as "community," "conservation," "heritage," "historical," "pollution," and "cultural" stand out, indicating these are common themes or topics in the associated discussions. The prominence of words like "community" and "conservation" suggests a significant focus on social and environmental aspects, pointing towards discussions on local life, social dynamics, and efforts to preserve natural and cultural resources. The term "heritage" alongside "historical" underscores an emphasis on the cultural and historical importance of the region, with discussions revolving around landmarks, traditions, and the cultural identity of the area. This aligns with an appreciation for cultural heritage and the importance of preserving historical sites and traditions. Environmental concerns are highlighted by words like "conservation," "pollution," and "eco-friendly," suggesting active dialogues on the impact of human activities, particularly tourism, on natural resources and ecosystems. This reflects awareness and engagement with issues of sustainability and environmental protection. Tourism-related discussions are indicated by words such as "tourism," "travel," "beaches," "seasonal," and "hospitality." This points to the significance of the tourism industry in the region, including discussions on the experiences of visitors, the management of tourist spots, and the seasonal fluctuations in tourist activity. Moreover, words like "noise" and "pollution" could point to negative aspects or challenges associated with tourism, such as environmental degradation or disruptions to local life. The presence of "politics" suggests that social media discussions also involve policy, governance, or disputes related to development and conservation efforts. This word cloud provides a snapshot of the main themes and issues being discussed concerning the area, offering insights into public sentiment, priorities, and concerns. It reflects a complex interplay of cultural appreciation, environmental consciousness, and the economic impacts of tourism, all of which are crucial for understanding the social and environmental dynamics of the region.

7. Conclusion

This research paper has provided an in-depth sentiment analysis of social media posts regarding the Montenegrin coastal region and Dalmatia, utilising the VADER tool across three significant platforms: Reddit, Facebook, and Instagram. The main findings indicate a spectrum of sentiments: a prevalence of positive sentiments on Instagram, reflecting the visual appeal of natural beauty and cultural events; a balanced distribution of sentiments on Facebook; and a notable inclination towards negative sentiments on Reddit, often tied to concerns about over-tourism and environmental sustainability. These results underscore the complex interplay between regional identity, cultural heritage, and the digital expression of sentiments. By employing Social Identity Theory as a lens, the study highlights how in-group and out-group dynamics shape perceptions and discussions within digital spaces, offering insights into the multifaceted nature of regional sentiment online. The significance of this paper lies in its contribution to the emerging field of digital cultural dynamics, providing stakeholders, such as policymakers, cultural heritage managers, and tourism marketers, with a deeper understanding of public sentiment towards these regions. This research enriches the academic discourse on the impact of social media on regional perception and cultural identity, bridging computational

linguistics, social psychology, and tourism studies. However, the study is not without its limitations. The reliance on VADER and social media data may introduce biases related to user demographics, platform-specific communication styles, and the inherent limitations of sentiment analysis tools. Moreover, the research was confined to English-language posts, potentially overlooking the diversity of local languages and dialects. Future research should address these limitations by incorporating multilingual sentiment analysis, exploring a broader range of social media platforms, and employing mixed-method approaches to provide a more comprehensive understanding of digital sentiments. Additionally, longitudinal studies could examine how sentiments and perceptions evolve in response to global events, shifts in social media trends, and changes in regional developments. By building on these findings, future work can continue to unravel the complex digital narratives surrounding cultural and geographical regions.

Despite the extensiveness of our sentiment analysis approach, key limitations remain. First, the reliance on VADER—primarily suited for English-language text—automatically excludes potential nuances in Montenegrin or Croatian-language posts, which may harbour unique cultural or idiomatic expressions. Second, social media data can skew toward specific demographic groups that are active online, thereby limiting representativeness. Furthermore, external events such as the global pandemic, evolving political landscapes, or region-specific policies might shape the sentiment trends. For instance, sudden travel restrictions, shifts in visa regulations, or domestic environmental protests could all precipitate short-term or long-term sentiment shifts that lie beyond the scope of this dataset.

Future research directions could include applying multilingual sentiment analysis (e.g., adopting bilingual or polyglot versions of VADER, or neural language models like multilingual BERT) to capture a broader linguistic community. Similarly, examining other platforms like TikTok or specialised travel forums could yield more contextual data, particularly among younger or niche audiences. Finally, longitudinal studies that account for political or socio-economic changes over multiple years may illuminate how major external events influence sentiment trajectories around cultural and regional identity.

References

Adolfsson, C. (2021). "'I'm not Swedish Swedish': Self-appraised national and ethnic identification among migrant-descendants in Sweden." *Genealogy*, 5(2), 56. https://doi.org/10.3390/genealogy5020056

Alaei, A. R.; Becken, S., Stantic, B. (2019). "Sentiment analysis in tourism: Capitalizing on big data." *Journal of travel research*, 58(2), 175–191.

Bianchi, R.; Stephenson, M., Hannam, K. (2020). "The contradictory politics of the right to travel: Mobilities, borders and tourism." *Mobilities*, 15(2), 290–306. https://doi.org/10.1080/17450101.2020.1723251

Borrajo-Millán, F. [et al.] (2021). "Sentiment analysis to measure quality and build sustainability in tourism destinations." *Sustainability*, 13(11), 6015. https://doi.org/10.3390/su13116015

Buhalis, D.; Cheng, E. S. Y. (2020). Exploring the use of chatbots in hotels: Technology

providers' perspective. In J. Neidhardt & W. Wörndl (Eds.), *Information and communication technologies in tourism 2020* (pp. 231–242). Springer. https://doi.org/10.1007/978-3-030-36737-4_19

Cambria, E. [et al.] (2017). *A practical guide to sentiment analysi*s. Springer. https://doi.org/10.1007/978-3-319-55394-8

Cambria, E.; Wang, H.; White, B. (2014). "Guest editorial: Big social data analysis." *Knowledge-based systems*, 69, 1–2. https://doi.org/10.1016/j.knosys.2014.07.002

Dankulov, M. M. [et al.] (2025). "Multi-platform aggregated dataset of online communities (MADOC)." [*arXiv* preprint arXiv:2501.12886 [cs.SI]]. https://doi.org/10.48550/arXiv.2501.12886

Elmitwalli, S.; Mehegan, J. (2024). "Sentiment analysis of COP9-related tweets: A comparative study of pre-trained models and traditional techniques." *Frontiers in big data*, 7. https://doi.org/10.3389/fdata.2024.1357926

Hutto, C.; Gilbert, E. (2014). "VADER: A parsimonious rule-based model for sentiment analysis of social media text." *Proceedings of the International AAAI Conference on Web and Social Media*, 8(1), 216-225. https://doi.org/10.1609/icwsm.v8i1.14550

Iswari, N. [et al.] (2024). "Enhancing aspect-based sentiment analysis in visitor review using semantic similarity." *Journal of applied data sciences*, 5(2), 724-735. https://doi.org/10.47738/jads.v5i2.249

Liu, B. (2010). "Sentiment analysis and subjectivity." In N. Indurkhya and F. Damerau (Eds.), *Handbook of natural language processing* (2nd ed.). Chapman and Hall/CRC.

Liu, B. (2012). *Sentiment analysis and opinion mining*. Morgan and Claypool.

Liu, B. (2015). *Sentiment analysis: Mining opinions, sentiments, and emotions*. Cambridge University Press.

Mandagi, D. W.; Indrajit, I.; Wulyatiningsih, T. (2024). "Navigating digital horizons: A systematic review of social media's role in destination branding." *Journal of enterprise and development (JED)*, 6(2), 373–389. https://doi.org/10.20414/jed.v6i2.10075

Mohd, M. [et al.] (2022). "Sentiment analysis using lexico-semantic features." *Journal of information science*. https://doi.org/10.1177/01655515221124016

Nicola, S.; Schmitz, S. (2024). "From mining to tourism: Assessing the destination's image, as revealed by travel-oriented social networks." *Tourism and hospitality*, 5(2), 395-415. https://doi.org/10.3390/tourhosp5020025

Pang, B.; Lee, L. (2008). "Opinion mining and sentiment analysis." *Foundations and trends in information retrieval*, 2(1), 1–135.

Salfate, S. V.; Ayala, R. M. (2020). "Nationalism, patriotism, and legitimacy of the national social systems." *Revista de psicología*, 38(2), 423–450.

Strauss, A. L.; Corbin, J. (1998). *Basics of qualitative research*. Sage Publications.

Tajfel, H.; Turner, J. C. (1979). "An integrative theory of intergroup conflict." In W. G. Austin and S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33–48). Brooks/Cole.

Tajfel, H. [et al.] (1971). "Social categorization and intergroup behaviour." *European*

journal of social psychology, 1(2), 149–178. https://doi.org/10.1002/ejsp.2420010202

Tian, D. [et al.] (2020). "Influence of cultural identity on tourists' authenticity perception, tourist satisfaction, and traveler loyalty." *Sustainability*, 12(16), 6344. https://doi.org/10.3390/su12166344

Turney, P. D.; Littman, M. L. (2003). "Measuring praise and criticism: Inference of semantic orientation from association." *ACM transactions on information systems*, 21(4), 315–346.

Zadel, Z.; Šerić Honović, N.; Magaš, D. (2021). "The impact of the COVID-19 pandemic on the use of mobile applications by the local population in the smart tourism destination." In *6th international scientific conference on tourism in Southern and Eastern Europe 2021 conference proceedings: ToSEE – smart, experience, excellence and ToFEEL – feelings, excitement, education, leisure* (pp. 803–814). University of Rijeka, Faculty of Tourism and Hospitality Management. https://doi.org/10.20867/tosee.06.53

KULTURNE STRUJE I SENTIMENTI: ANALIZA SENTIMENTA ALATOM VADER I OBJAVE NA DRUŠTVENIM MREŽAMA POVEZANE S CRNOGORSKOM OBALNOM REGIJOM I DALMACIJOM

Sažetak

U ovom istraživanju bavili smo se analizom sentimenta objava na društvenim mrežama povezanih s crnogorskom obalnom regijom i Dalmacijom. Upotrebom alata za analizu sentimenta, VADER, istraživali smo kako se ove geografske regije percipiraju na platformama *Reddit*, *Facebook* i *Instagram*. Naš cilj bio je razumjeti digitalnu percepciju i diskusije vezane za te regije, s naglaskom na turizam, lokalnu kulturu i sociopolitička pitanja. Rezultati analize pokazali su razlike u sentimentima među platformama, što upućuje na različite demografske karakteristike korisnika i načine interakcije. Na *Instagramu* objave su uglavnom imale pozitivan sentiment ističući prirodne ljepote i kulturne događaje. Nasuprot tomu, *Reddit* i *Facebook* pokazali su širu paletu sentimenata, uključujući negativne stavove vezane za probleme kao što su prekomjerni turizam i očuvanje okoliša. Ovo istraživanje pridonosi boljemu razumijevanju toga kako se digitalne kulturne dinamike odražavaju na percepciju regionalnih identiteta. Također, pruža korisne uvide predstavnicima turističkoga sektora i upravljanja kulturnom baštinom ističući važnost praćenja sentimenta na društvenim mrežama kao pokazatelja javnoga mišljenja. Detaljnom analizom rad osvjetljava kako digitalni izrazi i narativi oblikuju percepciju i diskurs povezan s crnogorskom obalnom regijom i Dalmacijom te upućuje na potencijalne prilike i izazove za lokalne zajednice i turistički sektor. Ovo istraživanje pridonosi razumijevanju digitalnih kulturnih dinamika pružajući uvide za nositelje u turizmu i upravljanju kulturnom baštinom.

Ključne riječi: analiza sentimenta, kulturne struje, društvene mreže, VADER, crnogorska obalna regija, Dalmacija, digitalne kulturne dinamike