

The Use of Social Big Data in Small Hospitality Businesses

Social media has transformed the way hospitality businesses interact with their customers, increasing tourist engagement and co-creation in travel. By analysing large amounts of data from social media, tourism enterprises can improve their operations and customer experiences through the use of Big Data and artificial intelligence. This study examines whether and how small businesses in the Italian hospitality sector with high online visibility adopt Social Big Data practices. Through a review of existing literature and qualitative interviews with small businesses, various models of Social Big Data usage have been identified, particularly for enhancing operational and marketing strategies. The findings indicate that small hospitality businesses extensively use social media, but the use of Social Big Data is limited due to their small size.

Keywords: Big Data, AI, social media, web 3.0, tourism, small accommodation

Uporaba družbenih velikih podatkov v majhnih gostinskih podjetjih

Družbena omrežja so spremenila način, kako gostinske dejavnosti komunicirajo s strankami, kar povečuje turistično vključenost in soustvarjanje potovanj. S pomočjo analize velikih količin podatkov z družbenih omrežij lahko turistična podjetja z uporabo velikih podatkov in umetne inteligence izboljšajo svoje poslovanje ter izkušnje strank. Pričujoča raziskava preučuje, ali in kako majhna podjetja v italijanskem gostinskem sektorju z visoko spletno prepoznavnostjo uvajajo prakse družbenih velikih podatkov. Preko pregleda obstoječe literature in kvalitativnih intervjujev z majhnimi podjetji so bili identificirani različni modeli uporabe družbenih velikih podatkov, zlasti za izboljšanje operativnih in marketinških strategij. Ugotovitve kažejo, da majhna gostinska podjetja precej uporabljajo družbena omrežja, vendar je uporaba družbenih velikih podatkov omejena zaradi njihove majhnosti.

Ključne besede: veliki podatki, umetna inteligenca, družbeni mediji, splet 3.0, turizem, majhne nastanitve



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Introduction

The rise and rapid spread of social media have transformed the manner in which businesses connect with customers, significantly impacting the tourism sector. Social media drives the commercialisation of tourism products and generates valuable data for identifying market trends and user sentiments.

The literature highlights the importance of social media for customer engagement and value creation in hospitality. While large businesses use social media data for demand forecasting and customer satisfaction, small hospitality businesses,

especially in Italy, might benefit more from Social Big Data due to their flexibility and personalised service.

This study examines the extent to which small, highly visible accommodation facilities adopt Social Big Data practices. The research proposes a framework for integrating this data into business strategies, with the aim of assisting small businesses in overcoming barriers and leveraging social media data.

Based on manager interviews and a literature review, the findings indicate that these facilities utilise social media extensively and are aware of

the potential of Big Data. However, implementation is limited, which highlights an underexplored area in mega-data analysis and AI.

Literature Analysis

The theme of Social Big Data encompasses various characteristics that have been explored and detailed through selected contributions and empirical research. The literature on this subject is evolving, due to the ongoing impact of emerging technologies. This can be attributed to two main streams of thought that trace the use of social media in the tourism industry:

- The evolution of Web 2.0, analysing how the advent of social media has contributed to market approach development (Buhalis and O'Connor 2005; Cozzi 2010; Lim et al. 2011; Meini and Spinelli 2012; Scott and Orlikowski 2012; Leung et al. 2013; Moretta Tartaglione, Berné Manero, and Vicuta Ciobanu 2018; Tuten and Solomon 2012; Bizirgianni and Dionysopoulou 2013; Panahande 2021);
- The use of Big Data originating from media (Mayer-Schönberger and Cukier 2013; Jingjing et al. 2018; Del Vecchio et al. 2018; Sigala, Rahimi, and Thelwall 2019; Belias et al. 2021; Blanco-Moreno et al. 2023; Das, Talukder, and Pego 2024).

Since the mid-1990s, with the advent of online distribution processes, the Internet has transformed the tourism sector. By the early 2000s, with the emergence of Web 2.0, tourism businesses began to focus on the development of relationships with consumers, the enhancement of interactivity, and the reengineering of the development, management, and marketing of tourism products (Kotler and Keller 2007; Buhalis and O'Connor 2005). The term 'Web 2.0' was coined by Tim O'Reilly to describe the shift from static, one-way communication websites to dynamic, interactive platforms. This new paradigm places a premium on interaction between industry operators and users, thereby fundamentally transforming the manner in which tourism services are promoted and offered (O'Reilly 2007). According to O'Reilly (2007), the new paradigm is based on principles of interaction among industry operators, including:

- The network as a platform;
- Collective intelligence, which relies on user contributions to create and improve content and services;

- Data as the new 'Intel Inside', highlighting the importance of user-collected data and their role in creating value for web applications;
- User experiences, which enhance the interactivity and usability of web applications.

A number of authors have identified the advantages of Web 2.0 and ICTs for the hospitality sector. Lim et al. (2011), for instance, have highlighted the potential for innovations in customer self-service and community building. The advent of Web 2.0 has had a profound impact on the choices made by travellers, with social platforms, review portals and online booking sites all playing a significant role (Cozzi 2010). User reviews are of significant importance in shaping the image of hotels and influencing potential guests' perceptions (Moretta Tartaglione, Berné Manero, and Vicuta Ciobanu 2018). Social media has been identified as the most impactful form of Web 2.0, and it is therefore essential for the promotion of tourist destinations, the management of online reputations, and the creation of engaging travel experiences (Leung et al. 2013). Young tourists actively influence the structure of tourist offerings based on online opinions (Bizirgianni and Dionysopoulou 2013). The influence of platforms such as TripAdvisor on the tourism sector is considerable, with implications for the success and challenges faced by businesses (Scott and Orlikowski 2012). In their 2012 study, Kastner and Stangl investigated the impact of user-generated content (UGC) and specific tourism web applications on consumer behaviour and travel experiences. They posited that such platforms enable extensive information sharing and the aggregation of personal experiences, which in turn shape consumer behaviour and travel experiences.

The proliferation of data and large-scale processing has given rise to the phenomenon of Big Data, defined by Mayer-Schönberger and Cukier (2013, 66) as 'data that can be processed at a large scale but not at a smaller scale, with the aim of extracting new insights or creating new forms of value'. Hotel managers can identify customer trends and preferences (Wu 2016) and, with the aid of AI and machine learning, improve decision-making, personalise marketing strategies, enhance transparency and trust, and develop new business models (Del Vecchio et al. 2018). The advent of Big Data has led to a revolution in the field of tourism research, offering insights into tourist behaviours and market dynamics that

were previously unavailable (Jingjing et al. 2018). In addition to influencing marketing strategies, the availability of digital data affects the creation and adoption of new solutions in the sector. These solutions are designed to optimise operations, personalise experiences, and create new offers based on consumer needs (Sigala, Rahimi, and Thelwall 2019). The utilisation of Big Data in the tourism sector is on the rise (Belias et al. 2021), with the objective of developing effective strategies (Blanco-Moreno et al. 2023). A recent study demonstrated how AI enables the hospitality industry to adapt efficiently to customer needs by analysing large data sets to identify trends and personalise experiences (Das, Talukder, and Pego 2024).

The advent of online activities has significantly reduced the visibility gap between small hospitality businesses and large hotel chains, which have greater resources for Web 2.0 and Social Big Data. Pencarelli, Cioppi, and Forlani (2015) identified a correlation between entrepreneurs' online efforts and commercial success. A 2018 study demonstrated that the utilisation of social media platforms, including Facebook, Instagram, Twitter, LinkedIn, and TikTok, by small businesses is positively correlated with their marketing success, although this correlation is limited to the commercial aspect (Panahande 2021). Nevertheless, small businesses encounter obstacles, including the necessity for comprehensive training and the expenses associated with technological innovations (Dredge et al. 2018). While the analytics market expanded by 26 % in 2018, small businesses remained static, cognizant of the advantages of Big Data but constrained by their size (Di Deo 2019). Overcoming these limitations is crucial for the development of successful digital marketing strategies, which are supported by local government policies (Gritta and Calabrese 2023). Technological innovations such as Big Data, AI, and blockchain are transforming the intersection between ICT and policy, facilitating dynamic resource integration among actors (Troisi et al. 2019).

In conclusion, the analysis of the literature indicates that the combined use of Big Data and AI can greatly benefit tourism businesses through the analysis of large amounts of data from social media. This can be used to improve their operations and customer experience. Regarding small hospitality businesses, significant use of social media is noted, especially in the phase of co-creating the journey with customers. However,

an underutilisation of Social Big Data analysis emerges.

Methodology

The objective of the literature review was to conduct a comprehensive analysis of existing and emerging literature, utilising published articles from national and international scientific journals as the unit of analysis. In order to retrieve relevant articles, primary titles and keywords such as 'Web 2.0', 'small hotels', 'small accommodation', 'Big Data', 'AI', 'social media', and 'data analysis' were considered.

A series of research cycles were conducted using a list of keywords to iteratively adopt the relevant terms. Databases such as Google Scholar, EBSCO, and Scopus were employed in this process. Given the paucity of literature on the utilisation of Social Big Data by small enterprises, the research strategy was revised to encompass a broader scope, incorporating additional questions such as the capacity of small hotels to utilise social media and the challenges they face in technological advancement. This was conducted through an analytical lens, examining the problem from multiple perspectives.

The selection process for the studies started from the titles and abstracts, ensuring that their content contained elements relevant to our question.

The procedure for identifying articles to include in the review was based on a process of reading previously selected contributions and screening out articles that, despite the title and/or abstract, were not relevant to the subject of investigation. In this phase, a synthesis of the contributions was made, highlighting how different authors address the theme of Web 2.0 evolution in relation to market approach and the use of Big Data generated by the media.

Thirdly, the literature was subjected to a critical analysis and commentary in order to ascertain the extent of advancement in studies and research activity pertaining to the relationship between small businesses and the utilisation of social media and user-generated data.

To enhance the discourse, interviews were conducted with managers of small hotels in Rome, focusing exclusively on small enterprises due to their pivotal role in advanced economies (Mattiacci and Ceccotti 2005). In Europe, 99 % of businesses are Small and Medium Enterprises (Corsi and Migliori 2016). In Italy, micro-enterprises with fewer than 10 employees represent

Table 1: Number of structures per post frequency category

Description	Number of structures
Low Frequency	7
Medium Frequency	11
High Frequency	14
Total	32

Table 2: Characteristics of the selected structures

Description	Type of structure	Rooms	Employees
Structure 1	2-star hotel	15	9
Structure 2	2-star hotel	15	6
Structure 3	2-star hotel	14	6
Structure 4	1-star hotel	10	4
Structure 5	1-star hotel	7	4
Structure 6	Guesthouse	6	4
Structure 7	Guesthouse	5	2
Structure 8	Guesthouse	5	1
Structure 9	Guesthouse	4	0
Structure 10	Guesthouse	3	0

the most significant proportion of the country's business landscape, comprising 95.13 % of the 4.4 million active businesses. In contrast, large enterprises account for a mere 0.09% of the total.

The selection of hotels was made through a methodology based on four criteria:

- Geographic localisation: hotels located in various areas of Rome's historic centre were selected to obtain a tourist representation of the city;
- Hotel size: focus was on smaller hotels, with fewer than 15 rooms;
- Online reviews: online reviews from various platforms (such as TripAdvisor, Booking.com, and Google Maps) were used to identify hotels with a significant presence on social media and of interest to travellers;
- Social media interaction: the activity and engagement of hotels on social media like Facebook, Twitter, and Instagram were analysed to select those with an active and engaging presence, and/or with a significant follower base.

The selected locations include the most famous historical sites in the city of Rome.

Using the aforementioned criteria, the research was then conducted on the entire reference universe of 32 hospitality structures located in the tourist squares of the city of Rome, small in size and boasting significant activity on the Internet.

In the week from December 1st to December 8th, 2023, this ranking was compiled after detecting the number of posts and responses published in brokerage portals and on social media.

We categorised the frequency of posts into three categories:

- Low frequency: structures that publish content 1-3 times a week, to share significant updates, special events, or promotions;
- Medium frequency: structures that publish about once a day, using posts to maintain engagement and presence in consumers' minds;
- High frequency: very active structures on social media that post several times a day, using different platforms to reach different audiences, like Instagram for captivating images of the property and Facebook for updates and promotions.

A total of 14 structures were identified as belonging to the high-frequency class (Table 1). The top 10 structures were selected based on the number of posts published during the week from 1 December to 8 December 2023. It was confirmed that the selected businesses belonged to the microenterprise category. This was determined by examining the official documents provided by the entrepreneurs, which indicated that they had fewer than 10 employees and a turnover of less than 2 million euros. Table 2 presents the characteristics of the sample structures.

The case studies were prepared through qualitative interviews conducted by a group of three researchers in December 2023. The interviews were directed specifically to the entrepreneur owner, who from a managerial perspective declares themselves responsible for strategic decisions, and lasted about an hour.

The following questions were asked of the entrepreneurs:

- Q1: Which social media platforms do you actively use to promote your hotel?
- Q2: What tools or services do you use to monitor and analyse social media activity?
- Q3: How do you use social media data to inform your marketing strategies and business operations?
- Q4: What have been the results or benefits observed from the use of social big data in your facility?
- Q5: What are your future plans for using Social Big Data in your facility?

Table 3: Main response provided by the selected facilities

Description	Q1	Q2	Q3	Q4	Q5
Structure 1	Instagram	Instagram Insights	Personalisation of the offer	Optimisation of advertising campaigns	AI
Structure 2	Instagram	Instagram Insights	Personalisation of the offer	Optimisation of advertising campaigns	AI
Structure 3	Instagram	Instagram Insights	Personalisation of the offer	Optimisation of advertising campaigns	AI
Structure 4	Facebook	Facebook Insights	Personalisation of the offer	Optimisation of advertising campaigns	AI
Structure 5	Facebook	Facebook Insights	Personalisation of the offer	Improvement of guest experience	AI
Structure 6	Facebook	Facebook Insights	Personalisation of the offer	Improvement of guest experience	AI
Structure 7	Facebook	--	Personalisation of the offer	Improvement of guest experience	Advanced booking systems
Structure 8	Facebook	--	Personalisation of the offer	Increase in bookings	Advanced booking systems
Structure 9	Booking	--	Personalisation of the offer	Increase in bookings	Advanced booking systems
Structure 10	Booking	--	Personalisation of the offer	Increase in bookings	Advanced booking systems

Presentation of the Results Obtained

In this paper, we discuss small hotel businesses, including both hotel and non-hotel accommodation facilities. According to the European Commission Recommendation no. 361 of 2003, these organisations are defined as having fewer than 10 employees and an annual turnover or total assets of less than 2 million euros.

Table 3 indicates the main response provided by each entrepreneur interviewed during the discussion.

The results of the interviews show that small hospitality businesses make significant use of intermediary portals and social media. Eight out of ten entrepreneurs primarily use Facebook and Instagram for promotion, actively engaging in group management where users post their experiences. The remaining two rely mainly on portals like Booking.com. These businesses typically lack employees, with OTAs compensating for their organisational structure.

When asked about tools or services used to monitor and analyse social media activity, six entrepreneurs use performance analysis tools like Facebook Insights and Instagram Insights, while the other four read guest reviews and learn from them but do not use data measurement tools. These four are likely limited by small business constraints, such as a lack of human resources and familiarity with technology.

All respondents unanimously agreed that they use social media data to identify guest preferen-

ces and opinions, helping to personalise offers and adapt marketing strategies. This highlights the importance of digital tools and the uniqueness of small businesses in personalising tourist services compared to large hotel chains.

Regarding the perceived benefits of social big data, four entrepreneurs stated that data analysis optimises advertising campaigns, three used it to improve the overall guest experience, and three saw an increase in direct bookings due to direct engagement on social media.

As shown in Table 3, six entrepreneurs are exploring the use of AI to predict future trends, while the remaining four, managing very small guesthouses, are working on better integrating social media data with their booking management systems.

Overall, the survey reveals that small hospitality businesses are eager to embark on a path towards the use of emerging technologies, which, however, is hampered by factors characteristic of their small size.

Conclusion

This research has explored the use of social big data in small hospitality businesses, with a specific focus on the context of Rome. Through a detailed analysis of the strategies adopted, the benefits obtained, and the limitations encountered, several significant considerations have emerged to guide future actions of businesses in the sector.

Among the benefits, we highlight some of the key ways in which AI and Big Data can impact the management of small facilities:

- Service personalisation: by analysing data from online interactions, social media and mobile devices, businesses can create tailored offers for individual users, improving customer satisfaction.
- Online reputation management: advanced algorithms can analyse reviews, social media posts and customer feedback to identify areas of strength and improvement, allowing businesses to respond proactively.
- Targeted marketing: Big Data analytics can identify the most profitable market segments and personalise marketing campaigns to speak directly to these groups.
- Demand forecasting: Big Data and AI can predict future tourism trends by analysing historical and current data, allowing businesses to adjust their strategies in advance.

Small hospitality businesses can adopt solutions to overcome limitations arising from their small size. These include collaboration with specialised companies and staff training.

- Collaboration with specialised companies: small businesses can collaborate with external suppliers or agencies specialising in social media data analysis. These companies can offer tailor-made solutions adapted to the needs and budgets of smaller enterprises, allowing them to access skills and resources not available internally.
- Staff training: investing in staff training can help small hospitality businesses develop internal skills for collecting, analysing, and using social media data.
- The utilisation of simplified tools: small businesses may opt for the use of user-friendly and accessible social media analysis tools, which have been designed specifically for the needs of small businesses. These simplified tools can assist businesses in collecting and analysing data in a more efficient manner, without the necessity for advanced technical skills.
- An automation-based approach: the implementation of automation can assist small businesses in managing the collection and analysis of social media data in a more efficient manner. The utilisation of automation

tools for the scheduling of posts, the monitoring of online conversations, and the generation of automated reports can result in the liberation of resources and the allocation of valuable time to other pivotal business activities.

It should be noted that this research is subject to certain limitations. Firstly, the sample of businesses involved may not be representative of all realities in Rome. The participating businesses may differ significantly from those that did not, which could introduce potential bias. Secondly, limited access to internal data may have influenced the completeness of the information collected and the analysis conducted, limiting the depth and accuracy of the conclusions and recommendations. Finally, the specific context of the research may affect the generalisability of the results. It is possible that the dynamics of the hotel market in Rome may differ from those observed in other cities or regions. Consequently, the findings may not be readily transferable to other geographical contexts.

In summary, despite the limitations encountered, this research provides important guidelines for small hospitality businesses interested in leveraging social big data to improve their operations and meet customer needs more effectively.

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