Integrating big data and marketing concepts into tourism, hospitality operations and strategy development

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Abstract

Big data (BD) research articles are on new issues, this study sought to fill the knowledge gap of linkage the relationships between big data and marketing strategy with comprehensive viewpoints across different research fields in tourism and hospitality literatures. Content analysis was conducted to gather materials from the particular studies. For each study, the content analysis included the title, abstract, journal, type of sample, exploration design, statistical and analytical techniques, data collection process and keywords was also conducted to confirm the main results of the criteria. The research shows that big data adds value to marketing strategies by using social media to collect information from consumers, which is complemented with appropriate evidence relevant to predicting their needs and behaviors.

Keywords Big data · Marketing strategy · Technology analytic · Online review

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1 Introduction

The epistemology of the literature on big data in hospitality and tourism operations provides enormous opportunities and has dynamically revolutionized this discipline, attracting attention from academics Alaei et al. 2019; Aydin 2020; Leung et al., 2014; Xiang et al. 2015). Because of new concepts related to big data, hospitality and tourism scholars have used bibliometric analysis (Ali et al. 2019; Nusair et al. 2019) or literature reviews (Lin et al. 2020; Moro and Rita 2018) to advance insights to enrich the content of the literature. In view of emergency events, such as the current COVID-19 pandemic, tourism and hospitality scholars across different disciplines have highlighted the role of big data trends in improving the quality of marketing strategies (Leung et al. 2015). For example, Iorio et al. (2020) asserted that big data can be a useful source of information that can not only interpret unstructured data through the knowledge discovery process but also predict tourists' behaviour when facing requirements that are changeable. Gallego and Font (2020) asserted that managers might use big data to detect the reactivation of visitors to develop targeted marketing strategies and diminish the effects of the COVID-19 pandemic. Therefore, big data analysis provides a better understanding of the social change in present and future issues and value creation by comparing cross-sectional data in diverse areas (Davidson et al. 2019; Giacalone et al. 2021). Given the increasing complexity of tourism and hospitality environments, big data analysis may not only be helpful in predicting and alerting emergency event systems but also be useful in detecting individual preferences and maintaining competitive advantages through personalized customer service (Jiang and Wen 2020). Therefore, studies (Li et al. 2017; Marine-Roig and Clavé 2015; Samara et al. 2020) have provided potential avenues associated with big data for future research and empirical evidence when discussing the general situation of the hospitality and tourism industry when facing dynamic environments and unpredictable requirements for customers. In addition, following the increasing reliance on social media and the emergence of new technology in predicting consumer behaviour, there is a fundamental and critical need to assess the existing research on the influences of big data and social media networks. Social media provides participatory, interactive, and user-centric functions that not only allow users to share experience, information, ideas, knowledge, and other content (Altinay and Taheri 2019) but also influence customer attitudes, brand image, and behavioural intentions to spread information via electronic word of mouth (Leung et al. 2015). This study conducted bibliometric and social network analyses to offer comprehensive viewpoints on predicting the evaluation of big data concepts in the identified specified disciplines. In view of the increasing attention on the role of big data concepts in marketing communications and interaction, a large number of tourism and hospitality journal articles have been published and examined these issues. In particular, the integrated framework or comparison models are critical to verifying the marketing strategy, providing the contribution of academics, organizations, and institutions within a given time and comprehending the contents and extensions of this discipline (Leung et al. 2015).

Following the increase in big data, researchers across different disciplines have examined the newly discovered phenomena and categories in journals (Li et al. 2018). For example, Samara et al. (2020) highlighted the benefits of the efficiency, productivity and profitability of big data and business values in the tourism and hospitality sector. Previous studies have provided potential avenues for future research on big data in the general hospitality and tourism field (Li et al. 2017; Marine-Roig and Clavé 2015). While the use of big data

technology will continue to grow, there is an essential requirement to explore the current research literature on big data and its connections to marketing strategy formulation in hospitality and tourism.

Unlike other literature review articles published on big data, the current study seeks to take a more holistic approach by discovering the influences of academic findings as empirical evidence. Therefore, this study is (1) to illustrate the epistemological foundations of the content analysis of marketing strategy and big data concepts and (2) to draw, from proposed foundations, integrate the new trends of marketing strategy rules concerning the choice of content-analytic tactics in the tourism and hospitality field. The scaffolding of rationality and systems in content analysis should provide us with another way of thinking about new trends in industrial evaluation (Aaldering and Vliegenthart 2016; Hogenraad et al. 2003) and further enhance our understanding and improve the capabilities of evaluating content-analytic findings with respect to the generation of new social knowledge (Zapata-Sepúlveda et al. 2012). Additionally, this paper aimed to highlight the usefulness of big data analytics to support tourism and hospitality operations by studying thirteen well-known, international big data journals and analyzing the results of more than 43,000 relevant articles from the last ten years. Figure 1 shows the 62 most appropriate articles, which were chosen by carefully selecting emerging topics from thirteen well-known journals. The previous analysis of big data has been incomplete as it has focused on only a few of the well-recognized journals over short time spans and without a structural framework for a comprehensive literature review (Ali et al. 2019). As far as we know, the current sample synthesizes the largest collection of content analyses of big data and hospitality and tourism marketing articles published in international journals that have not been analyzed in previous studies. In addition, discovering the prevalent studies on big data and marketing strategy acts as another contribution of this study to the tourism and hospitality literatures. Overall, this paper extends the existing literature and sheds light on the present trends in big data issues, antecedents and consequences, thereby showing where the field is heading. A comprehensive review of the big data studies in hospitality and tourism gives us the foundational thinking and creates an avenue to guide academics in their future research. Specifically, following the additional literature review and to address any questions, the purposes of this study are provided as follows:

Fig. 1 Number of Publications and trends of used the concepts of big data into tourism and hospitality studies

- A synthesized analysis of journal articles that made significant contributions to the existing literature (Nusair et al. 2019). The first purpose was to perform a retrospective systematic literature review of big data and marketing strategy studies using bibliometric and social network analyses;
- With the increasing development of the hospitality industry, academic journals have provided knowledge for authors, assessors, publishing supervisors and practitioners (Ali et al. 2019). The second purpose was to explore and track international scientific publications on key issues related to big data that applied to the marketing strategy literature in the tourism and hospitality field. Khaldi and Prado-Gascó (2021) asserted that coword network structure and content analysis are the best ways of catching the trends and presenting directions for further academic studies. The current study used a similar analysis to use and analyse the concept of big data in tourism and hospitality studies to identify the influence of publications and trends.
- Despite the growing importance of social media and big data, the existing studies were limited to either a few of the cited journals and/or investigations within a restricted time span (Nusair 2020). Using tourism and hospitality journals over a wide time span revealed a new trend of social media and big data and, as a primary research orientation of prevalent research orientations, made significant contributions to the existing literature (Kim and Therefore, 2022). Therefore, the third purpose was to analyse the evolution and trend research of tourism and hospitality academic journals to highlight the relationships between big data, social media and marketing strategy literature through the keyword, citation and content analysis of big data and marketing analysis in the tourism and hospitality fields of the selected articles.
- Transaction cost theory proposes the need to investigate strategic frameworks to identify future opportunities and implications for hospitality and tourism studies (Altinay and Taheri 2019). Through the systematic scientific mapping of tourism and hospitality literature on collaboration, cocitation, or coword analysis on knowledge structures, the current study provides a new integrated picture for investigating the benefits of using big data, and the fourth purpose is to present the structural and conceptual structural aspects of transaction cost, efficiency, customization and customer relationship management (CRM); and.
- Although the 4 P (e.g., product, price, place and promotion) model is also widely used to help businesses solve marketing strategy issues regarding segmentation, positioning and differentiation, comprehensive and detailed extension work is needed following the changeable customer requirements and dynamic industrial environment (Kwok et al. 2020). Therefore, the fifth purpose was to integrate the concepts of big data into a mixed tourism and hospitality marketing strategy of (a) **P**roduct, (b) **P**rocess, (c) **P**eople, (d) **P**romotion, (e) **P**hysical evidence, (f) **P**lace and (g) **P**rice.

2 Literature review

The concept of big data (BD) originated in computer science studies in relation to scientific visualization (Cox and Ellsworth, 1997). Although the concept of BD has been increasingly applied in various industrial applications, the first definition of big data was given by Laney

(2001) who defined three foundational attributes of BD with three characteristics: volume (e.g., depth/breadth of data and amount of data), velocity (e.g., speed, consequence, generation, interaction and updating of data), and variety (e.g., incompatibility, nonaligned data structure and inconsistent data semantics). Based on the characteristics of BD, the requirement for effective data management, which transforms the data into useful information to improve the decision-making quality, arises (Mariani 2019).

With the benefits of BD, academics are progressively willing to utilize large volumes of data to advance our understanding of complex tourism and hospitality industry and dynamic environmental phenomena, as observed by a number of articles explicitly adopting BD concepts and analytics (Mariani et al. 2018). Figure 2 shows the integrated concepts of the progressively embedded mixed methods. In the green parts of the word clouds, regarding research on how BD influences tourism and hospitality, it seems that online reviews, social media, intelligence, and analytics are the most common methods for forecasting customer demand and values. Nusair et al. (2019) asserted that although the concepts of integrated sources of data of online reviews into useful information are critical issues for decision-making. However, how social media generate information and how it influences BD are still in the early stages of development, and there are an increasing number of articles published on this emerging topic, which represent the new focus on understanding the new growth trends of this discipline. In the recent studies on BD, Li et al. (2018) used 144 journal articles that were published in leading journals including *Tourism Management*, the *International Journal of Contemporary Hospitality Management*, the *Journal of Travel Research*,

Fig. 2 Keywords analysis of big data concepts used in tourism and hospitality studies

the *International Journal of Hospitality Management*, the *Annals of Tourism Research* and *Tourism Geographies* to highlight the importance of big UGC data (generated by users) generated through social media. Leung et al. (2015) provided a retrospective analysis of social interaction, decision making, guests' demands and marketing communications from *Current Issues in Tourism*, the *Journal of Travel Research*, the *Journal of Hospitality and Tourism Technology*, the *International Journal of Hospitality Management*, the *Journal of Hospitality and Tourism Research*, the *International Journal of Contemporary Hospitality Management*, the *Annals of Tourism Research*, the *Journal of Hospitality Marketing and Management, Tourism Management, Tourism Review* and the *Journal of Travel and Tourism Marketing*. They discovered that information communication technologies (ICTs) have grown into a critical trend and the mainstream of marketing interaction, and the topic is rapidly changing the operations of the hospitality and tourism industry in the new generation of e-marketing and e-strategic management. Additionally, Ranjbari et al. (2020) analyzed 112,138 online review comments to provide empirical evidence on predicting customer demand and behavior in the general hospitality and tourism field. Cheng and Edwards (2019) followed the four steps of conducting automated content analysis (ACA) of tourism academic journal contents and highlighted different data sources, such as social media, intelligence, and analytics, that would advance the understanding of the critical methodological literature concerning sources of BD. Through content analysis, Aydin (2020) asserted that big data from social networks, online reviews and social media that collect information instantly through interactions can be used to arrive at cognitive, affective and behavioral insights that offer superior value and superior experiences to customers and provide a competitive edge in digital marketing. The overcrowding of widespread social media platforms and the appearance of marketing communications have become new trends of business operations, allow one to obtain insights into environment requirements and have
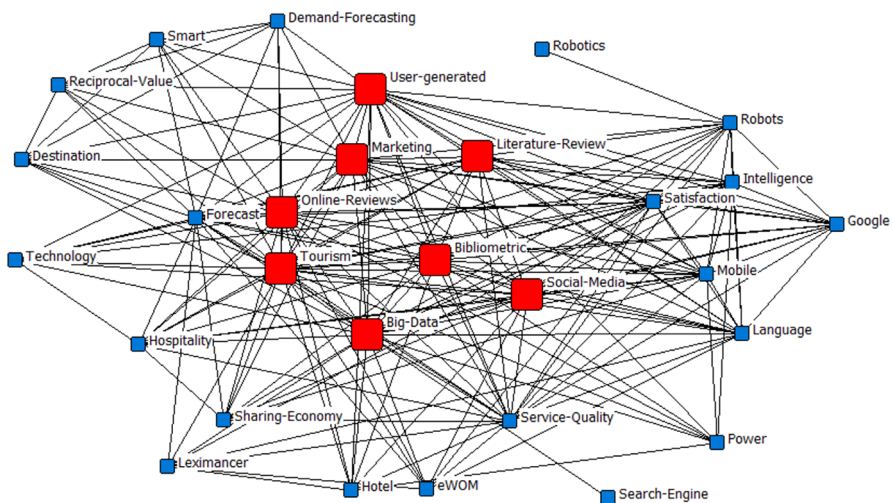

Fig. 3 Keyword analysis of big data concepts and highly correlated keywords used in tourism and hospitality studies

led to a rapid increase in the amount of content available to improve marketing decisions (Alaei et al. 2019). Consequently, BD analysis can identify the critical attributes attracting users' attention and has becoming easier as the amount of collected information increases and analysis tools are easier to use. This study integrated the above viewpoints on providing the foundational attributes of BD. In Fig. 3, the brown part shows that marketing strategies act as roots and sources in supporting eWOM, information generation, and technology development to anticipate customers' behaviors and satisfaction.

To advance the analysis of BD applications, social network analysis was also applied to select the most relevant topics, as shown in the results in Fig. 3. Centobelli and Ndou (2019) used social network analysis to advance the exploitation of big data analytics, develop systems to predict customer behavior and thus provide the best marketing strategy regarding how to deliver the appropriate service in the right place at the right time. As far as the research streams are concerned, it seems that social media, online reviews and user-generated content are the sources of BD and that marketing strategies improve service qual-

Table 1 Hospitality and tourism journals that listed in Social Sciences Citation Index

Impact Factor Hospitality and tourism journals	2019	2018	2017	2016	2015	2014
Tourism Management	7.432	6.012	5.921	4.707	3.140	2.554
Journal of Travel Research	7.027	5.338	5.169	4.564	2.905	2.442
Annals of Tourism Research	5.908	5.493	5.086	3.194	2.275	2.685
Journal of Destination Marketing & Management	4.279	3.800	3.667	1.556	1.034	1.000
Current Issues in Tourism	4.147	3.395	3.462	2.451	1.733	0.918
International Journal of Hospitality Management	6.701	4.465	3.445	2.787	2.061	1.939
Journal of Sustainable Tourism	3.986	3.400	3.329	2.978	2.480	1.959
International Journal of Contemporary Hospitality Management	5.667	3.957	2.874	3.196	2.176	1.407
Journal of Hospitality & Tourism Research	3.816	2.849	2.685	2.646	1.540	1.188
Journal of Hospitality Marketing & Management	4.489	3.011	2.683	---	---	---
International Journal of Tourism Research	2.585	2.278	2.449	1.857	1.095	1.314
Leisure Studies	1.566	1.375	2.247	1.476	1.057	0.690
Journal of Vacation Marketing	1.940	1.865	2.170	1.148	---	---
Tourism Geographies	3.159	2.747	2.068	1.663	1.235	1.695
Cornell Hospitality Quarterly	2.800	2.492	2.060	2.657	2.408	1.746
Journal of Travel & Tourism Marketing	4.097	2.988	1.975	1.453	1.741	0.736
Tourism Management Perspectives	3.648	2.485	1.779	---	---	---
Leisure Sciences	1.952	1.969	1.585	1.132	0.967	1.177
Tourist Studies	1.250	1.391	1.537	1.147	0.667	0.667
Asia Pacific Journal of Tourism Research	2.017	1.444	1.352	1.051	1.290	1.023
Journal of Hospitality Leisure Sport & Tourism Education	1.439	1.519	1.265	0.206	0.375	0.455
Scandinavian Journal of Hospitality and Tourism	3.037	2.508	1.235	1.091	0.518	0.432
Journal of Leisure Research	0.625	1.120	1.172	0.851	0.688	0.907
Journal of Tourism and Cultural Change	1.327	1.455	1.105	0.732	0.474	0.361
Tourism Economics	1.819	1.098	0.942	0.826	0.392	0.515
Journal of Hospitality and Tourism Management	3.415	2.496	---	---	---	---
Tourism Review	2.908	1.060	---	---	---	---
Journal of Hospitality and Tourism Technology	2.796	---	---	---	---	---

e.g. Selected journals are shown in black bold

ity through technology, intelligence and smart learning functions; can change consumers' evaluations and satisfaction (Buhalis and Sinarta 2019; Rahimi et al. 2017); and have the power to increasingly focus on reciprocal value for firms and customers (Line et al. 2020).

3 Methodology

3.1 Data collection

Several steps were used to collect the data for analysis. First, after reviewing articles from hospitality and tourism journals and assessing the trends of hospitality and tourism studies, this study follows previous studies and uses hospitality and tourism journals from the Social Sciences Citation *Index* (*SSCI*) but excludes sports and psychological journals as areas of focus. The research was conducted to better understand the evolution of research trends and offers more current literature (Ali et al. 2019; Altinay and Taheri 2019; Cheng and Edwards 2019; Lai et al. 2018). Table 1 shows the *SSCI* hospitality and tourism journals and impact factors over six years (e.g., 2014–2019) for each journal. The journals represent the new research trends for tourism and hospitality literatures. We observed that journals with higher impact factors have also increasingly focused on BD, and a number of studies have focused on the relationship between BD and marketing strategy.

Second, this study also ranks the impacts and identifies the five tourism and hospitality journals with the five highest scores: *Tourism Management*, the *Journal of Travel Research*, the *Annals of Tourism Research*, the *International Journal of Hospitality Management*, and the *International Journal of Contemporary Hospitality Management*. Third, considering the topics of big data and social media and marketing strategy, through content analysis, thirteen journals were included in this study, including the *International Journal of Contemporary Hospitality Management, Tourism Review, Tourism Management*, the *Journal of Travel Research*, the *Journal of Travel & Tourism Marketing*, the *Journal of Destination Marketing & Management*, the *Journal of Hospitality and Tourism Technology*, the *Journal of Hospitality Marketing & Management, Cornell Hospitality Quarterly, Current Issues in Tourism*, the *International Journal of Hospitality Management*, and *Annals of Tourism Research*.

To emphasize the research topic of big data and how it correlates with marketing strategy, keywords or headings that were considered relevant in the selection process were retained and those that did not mention or emphasize a marketing strategy were removed. Only those articles most correlated with the topic or keywords, such as big data, social media, marketing, behaviour, among others, are shown in Fig. 4 of the search scope in tourism and hospitality journals, which were involved in the present study's analysis. Furthermore, this study also excluded research notes, book chapters, meetings, book comments and editorial suggestions and removed them when conducting searches on Google Scholar. In the initial search, 43,000 relevant articles from the last ten years appeared in the results. In summarizing the 62 selected articles, the most appropriate articles followed the requirements of focusing on big data and social media and marketing strategy, were listed in the SSCI articles on tourism and hospitality in well-known international journals and matched the headings or keywords on such topics. We noticed that although the *Journal of Hospitality and Tourism Technology* was a new journal listed in the SSCI, the journal may have been focused on technology application; therefore, the journal received high scores in this study.
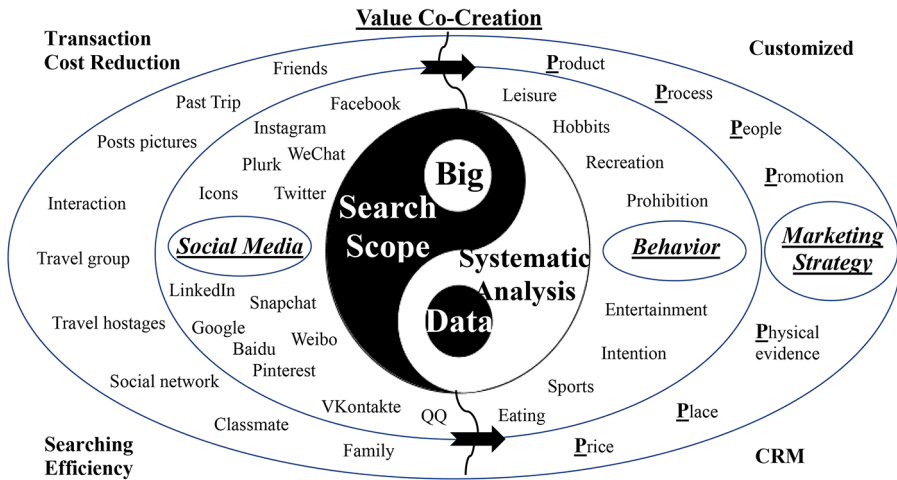
Fig. 4 The integrated concepts of big data to tourism and hospitality operation

Li and Liu (2018) asserted that studies on tourism and hospitality in well-known international journals listed in the SSCI that identify research trends and new industrial phenomena provide important implications for academia and practical managers. The previous tourism and hospitality literature also used similar terms and requirements for discussing specific topics and provided meaningful findings for tourism and hospitality studies (Ali et al. 2019; Altinay and Taheri 2019; Cheng and Edwards 2019; Lai et al. 2018). The selected journals and number of journals are as shown in Fig. 1.

Content analysis refers to the analysis and explanation of the meanings that the text contains, which is one of the more popular qualitative analyses of social phenomena (Oh et al. 2004; Oleinik et al. 2014) and has been widely used in previous studies of longitudinal observations to highlight the critical issues of both the present and upcoming trends (Opperhuizen and Schouten 2021; Piwowar-Sulej et al. 2021) asserted that content analysis represents the bibliometric characteristics of articles related to specific issues that not only allow researchers to identify the main trends in scientific production but also present directions for further academic studies through science mapping (Khaldi and Prado-Gascó 2021). For the marketing strategy and big data study, the content analysis included the title, abstract, journal, sample type, exploration design, statistical and analytical techniques, data collection process and keywords to catch the weight and ranking of customers' sentiment (emotion) of the text (Zapata-Sepúlveda et al. 2012). The current study analysed the selected articles and used word clouds and Ucinet 6.0 software to analyse the title, abstract, contents and keywords to demonstrate what elements are meaningful according to the information sources, which could be seen as an advance analysis by extending the traditional methods of content analysis (Rani and Shokeen 2021). The study calculates subjectivity and polarity measurements of title, abstract, contents and keywords; a greater value for the polarity score indicates a more important demonstration of the critical issues (Hogenraad et al. 2003; Zhao et al. 2019). The purpose of grouping selected studies and calculations was to preserve the reliability after the comprehensive integration of the above information on the topics of big data and marketing strategy followed by an evaluation of previous tourism and hospital-

ity studies (Dinçer and Alrawadieh 2017). Additionally, multiple keywords or subjects that were selected and appeared in a study would offer information to potential customers and shape tourists' perceptions, which can provide a deep understanding of the tourism and hospitality service entity regarding what improvements can be made to improve decision quality (Yu 2020). With regards to data classification, data collection methods, analytical perspectives and statistical techniques, when different methods or techniques were used in the same study, all of them were included. Therefore, the current measurement is consistent and extended with those of previous studies (e.g., Oh et al. 2004; Oleinik et al. 2014; Opperhuizen and Schouten 2021) that used content analysis to measure selected articles.

3.2 Data analysis

The following steps were adopted to analyze the collected data. First, foundational attributes and descriptive indicators for each selected journal and studies were formed to show the basic statistics of the BD studies published in these thirteen well-known hospitality and tourism journals. Second, since BD research articles are on new issues, the existing literature widely uses the literature review and content analysis to address these critical issues (Mariani and Baggio, 2021; Mariani et al. 2018). Therefore, constraining the new issues and without widespread literature, this study limited the time span for our selected articles to 2014–2020. Oleinik (2021) asserted that selected long-term observations were used to better understand the evolution of current and future trends, which provides more meaningful information to the existing literature. The observation times were categorically based on the BD issues that were observed in each year and depended on researchers' subjective evaluation. BD issues were employed to discover the substantial influences of mixed marketing strategy studies across the observed stages. Third, following the first steps of selected journals and second steps of key issues of big data that selected articles across widespread literature. The third applied content analysis concepts to judge and evaluate research objects and categorical characteristics simultaneously based on selected and nominal data (Lai et al. 2018). In this study, we integrated the different concepts of big data, social media and marketing, which generate perceptual guidelines in which a set of items and features of big data are vividly presented in a combined appearance grounded on the linked substances and critical characteristics. Overall, the above steps display close proximity when the research objects of big data, social media and marketing strategy have a high association.

4 Results

With the above analysis on BD research, we observed that marketing strategies were concentrated on the influence of BD on tourism and hospitality operations. Figure 4 integrates various sources and BD concepts. Following the original concepts of Laney (2001), the current study divided BD concepts into two aspects. First, "big" refers to encompassing new social media sources, such as Facebook, WeChat, Twitter, and QQ, to track the target customers' past trips, interactions, etc. to generate original data. In the analysis of the sources of BD and social media, it was found that Facebook, Google+, LinkedIn, Twitter, and Weibo are widely used to generate big social network data because users use social networking sites to share life activities with friends (Leung et al. 2018; Zhao et al. 2018) asserted that

the user-generated content (UGC) platforms of Twitter, Facebook, Instagram and WeChat provide users conscious choices and constructive processes to influence their friends and others. Therefore, following the technology evaluation, 'social sensing' concepts provide large quantities of information that can overcome data shortages and advance tourist behavioral predictions through big data analysis that provides more actual behavior predictions than traditional tourism research (Zhang 2018). Second, "data" refers to using those data to systematically analyze customers' leisure activities, hobbies, etc. to generate useful information through an effective data management process and develop a marketing strategy. As Line et al. (2020) asserted, BD provides tourism and hospitality organizations with powerful tools to form marketing strategies to ensure that the right marketing message is sent to the right persons (and on the right channel or device) at the right time, which is a value cocreation catalyst in four ways: it improves search efficiency, it allows for customer relationship management (CRM), it reduces transaction costs, and it allows for service customization.

As shown in Fig. 5, when considering tourism and hospitality organizations and customer-level data benefits, a systematic typological structure emerges that can be categorized into seven new concepts of marketing strategy with reciprocal big data value creation. First, this study concluded that applying BD can promote transaction cost reductions, searching efficiency, customization and Customer Relationship Management (CRM). In the previous literature, transaction cost theory proposed that in the tourism and hospitality fields, the costs should consider the costs of *how* to provide the appropriate tourism products/services through the market rather than *what* products/services can be provided by a tourism and hospitality firm (Altinay and Taheri 2019). BD analysis not only can reduce the search, transaction and coordination costs, but it also can improve the quality of marketing decision making to provide the appropriate tourism products/services to target customers (Calveras and Orfila-Sintes 2019). Further, big data is a critical component of tourism marketing strategy since it can contribute to collecting valuable data more efficiently, enhance the data search efficiency, improve the decision-making quality and offer tourists unforgettable travel experiences (Nusair et al. 2019). Additionally, big data provides tourism and hospitality managers with a better understanding of customer tourism requests, new tourism evaluation trends, and other tourism issues, thus helping them to design customized projects in order to attract tourists (Fuchs et al. 2014). Furthermore, although BD was used to address customer relationship management (CRM) systems, it is still in its early stages, and increasing studies have asserted that BD plays a central role in providing better quality services (Sigala 2018), keeping good relationships with customers(Rahimi et al. 2017), and formulating marketing strategies and approaches(Talón-Ballestero et al. 2018). Second, BD concepts have been integrated into tourism and hospitality mixed marketing strategies. Traditionally, a marketing strategy based on the 4 Ps (product, price, place and promotion) might have some limitations in an actual competitive scenario and may not suitable for new industrial evaluation analysis (Labanauskaitė et al. 2020). Therefore, in recent decades, three supplementary attributes of Ps, people, physical evidence and processes, which seek to include interactive tourism and hospitality marketing strategy dimensions, have been added and transferred into a new mixed marketing model, which is called the 7 Ps (Loo and Leung 2018; Pantano et al. 2019) asserted that BD is a part of mixed marketing strategies; thus, a firm's active use of social media for communication and interaction with customers should be considered as a new industrial phenomena and new trend, which may transform the traditional mixed marketing model into efficient market sizing and sensing. Furthermore,

Product
Service Quality; Destination Image; Features; Flexible;
Branding Management; Guarantees; Customer Service
Process
Customer Communication; Business Values; Technology Acceptance;
Technology Generated; Research and Development; Revolution
People
Activities Support; Customer Contacts; Customer Interaction; Training;
Skills; Remuneration; Recruitment; Learning; Culture; Shared values
Promotion
Marketing Communication; Personal Promotion; Promotion Design;
Brand Restructure; On-Line Promotion; Direct/Indirect Promotion
Physical evidence
Dining Experience; Staff Attitudes; On-Line Feedback; Product Packing;
Physical Contacts; Travel Experience; User-Generated; Consumer-Reviews
Place
Interactive Channel; Sales Support; Website; Interconnectivity Channel;
Interoperability Channel; Co-Creation
Price
Brand Position; List; Discount; Credit; Membership; Free;
Value-added; Payment Method; Charge; Reduction

Fig. 5 The integrated concepts of big data into tourism and hospitality marketing mix strategy

using this systematic typological structure, the nature of integrating the concepts of big data and marketing strategy is described as products, processes, people, promotion, physical evidence, places and prices. Under such an evaluation, as the most desirable systematic typological structure of reciprocal value creation, BD technology might translate into developments of effective marketing strategies to support marketing strategy in improving service quality, decision making and business innovation.

5 Conclusions and discussion

In conclusion, there is a growing scholarly awareness of the increasing complexity of the tourism and hospitality industry that requires well-known BD concepts to establish effective marketing strategies. The research shows that BD adds value to marketing strategies by using social media to collect information from consumers, which is complemented with appropriate evidence relevant to predicting their needs and behaviors. Consumers' extraordinarily generated feedback information and the continuous altering of their requirements for customized service have serious influences on the traditional operating methods. Furthermore, consumers send feedback and experience via social media engagement with the entire tourism and hospitality service through numerous platforms, and mass media may also provide useful information to help organizations adjust their marketing strategies based on intelligence and contextual data.

5.1 Implications

This paper also offers practical contributions by providing integrated concepts to the extensive tourism and hospitality industry operational environment and destination evaluations to conduct integrated and effective procedures for value cocreation and marketing strategy formation. First, by extending this research to other service fields, the results can provide another perspective on the deployment of BD technology and show how BD can be applied in operations, provide critical mechanisms for tourism and hospitality organizations to develop sensitive digital environment engagement to conform with consumer requirements and suggest integrated and context-based attributes through the systematic analysis of well-recognized journals. This implies that BD analysis can be utilized by all firms, especially in small and medium-sized enterprises (SMEs) of tourism and hospitality industries. For example, Fuchs et al. (2014) asserted that BD includes a huge amount of data on customer requirements and attitudes, which may provide valuable knowledge on behaviour intention prediction and destination promotion. For instance, the results of this study also suggested that managers may develop specific 7 Ps marketing and promotion strategies through social media, thereby allowing them to differentiate customers' needs by emphasizing one or two aspects of the marketing mix elements (Kwok et al. 2020). Through a systematic analysis of the literature, we also found that social media may build a bridge between hospitality firms and customers (Aydin 2020). Thus, investments in digital marketing plans may lead to higher levels of communication and interaction with customers and relatively low expenditures compared with traditional marketing channels; thus, they deserve more attention from policymakers (Mariani 2019).

Second, BD analysis is mostly beneficial in helping tourism and hospitality industries develop the optimal mixed marketing strategy to achieve cost reductions, market differentiation, and CRM (Labanauskaitė et al. 2020). This study used empirical evidence on BD from tourism and hospitality industrial environment analyses, which may provide managers with a strategy marketing mindset, and benefits from a comprehensive exploration of new insights. For example, given changeable customer requirements, tourism and hospitality managers may make greater efforts to collect customer feedback from UGC (Zeng and Gerritsen 2014), which provides foundational guidelines to help them to design attractive websites and implement an appropriate marketing strategy. These guidelines can include easy-to-use functions or immediate feedback and helping customers to assess a tourism and hospitality service or product free and quickly, and they can be accomplished through a thoughtful website design and a step–by-step revision process to the set the standards outlined on a business's website. Our analytical procedure, such as analyzing the sources and contents of BD and correlating the findings with the 7 Ps mixed marketing segments, and our findings also provide useful insights. These findings allow practitioners to consider Porter's (1981) competitive strategy of cost reduction and differentiation and focus on specific customers though analyzing the tourism and hospitality industry, the economy, technical opportunities, and threats to discover the organization's strengths and weakness to develop marketing strategies that improve their industrial positioning (Okumus et al. 2017). Furthermore, tourism and hospitality managers are greatly encouraged to assess the consequences reported in Figs. 4 and 5 carefully. With better knowledge of how customers evaluate their products or services using the data offered by UGC (Zeng and Gerritsen 2014), customers' feedback and comments can mirror what the tourism and hospitality organization provides

pertaining to the 7 P attributes, and businesses can adjust their offerings according to customers' opinions. The feedback from UGC becomes critical for tourism and hospitality managers to discover the best ways to communicate more with potential customers and improve their satisfaction, such as providing a brief service or product introduction to attract visitors.

Third, the previous study asserted that the Marketing Mix debate is on theoretical rather than empirical evidence, which requires more data about the exact effects of Ps and its applications (Constantinides 2006). The results were based on a comprehensive theoretical and empirical review and provided information for tourism and hospitality managers facing dynamic environments or struggling to improve the quality of their marketing strategies to moderate threats from the industrial environment or unpredictable issues (e.g., COVID-19, SARS, and MERS) so that they can adjust the 7 Ps marketing mix of their current services or products. By comparing what tourism and hospitality services offer and what unpredictable changes can occur in how they conduct the future services introduced using the 7 Ps mixed marketing framework, managers are highly encouraged to use BD analysis well for attainment of clearer pictures of existing services or products so that they can satisfy customer needs or determine what they did poorly and need to adjust. Through the analysis, managers are likely to be able to determine precise marketing and managerial strategies to cater to the market demand, leading them to adjust their current operational ways.

Fourth and finally, social media facilities and improves organic post effectiveness for hospitality organization operations (Aydin 2020). This study advises that policymakers pay attention to social media technology development because it may provide new paths and identify new market opportunities that may extend hospitality services to future markets (e.g., Aydin 2020; Centobelli and Ndou 2019; Labanauskaitė et al. 2020). Social media messages and BD analysis have provided valuable perspectives and gained many operational suggestions to help policymakers determine market trends and customer requirements, thus creating competitive advantages over their competitors because they normally follow traditional operating methods. Furthermore, previous studies discovered that using BD analysis could gain substantially more benefits than those obtained by traditional tourism and hospitality organizations (e.g., Leung et al. 2018; Xiang et al. 2015). Our findings also suggest that social media could act as another powerful marketing tool for discovering new market opportunities and identifying threats compared to traditional operating methods used by tourism and hospitality organizations.

5.1.1 Limitations and Future Research

Despite the contributions of this study, some limitations also should be addressed and should be followed up by future studies. First, although this study's system comprehensively reviews renown international tourism and hospitality journals on the new issues of BD and marketing strategies, we also recognized that BD has already been an area of attention in the field of business management and marketing (Buhalis and Volchek 2021; Lin et al. 2020) asserted that the analysis of BD use for marketing provides meaningful information for tourism and hospitality industry development. However, these issues have only recently been studied for tourism and hospitality, and because of sample limitations, the current discoveries may not be suitable and generalizable to other industrial fields. Moreover, this integrated analysis only focused on conceptual and empirical studies in English and on

specific topics. Future studies should translate current comprehensive reviews into different languages and perform comparisons, such as analysing the application of BD in China's tourism and hospitality industry, (Zhang et al. 2017). Extending the literature review beyond the Social Sciences Citation *Index* (*SSCI*) list or eliminating the requirement for English language journals would provide more meaningful literature contributions (Kwok et al. 2020).

Second, though machine learning approaches may speed up the analysis, a problem appears that no automatic analysis is free of errors and human work is needed to improve the quality of results (Kwok et al. 2020). Furthermore, previous studies state that statistics only provide analytical tools and no single method is perfect, depending on the situation and industrial environment. Even though this study conducted multiple analyses, this study also recognized that some errors may also appear in the current analysis and explanations. As this study adjusted the formulation of the essential 7 Ps explicitly for the literatures published and integrated from the BD analysis to avoid a focus on one or two marketing perspectives in our analysis, extra caution regarding critical attributes should be given when interpreting the outcomes that are not error-free. Hence, new or integrated methods or examinations under altered theoretical backgrounds are highly encouraged in forthcoming tourism and hospitality research because studies that integrate various theoretical frameworks through different viewpoints are likely to provide new perceptions to advance our understanding of a complex industrial phenomenon (Rahimi et al. 2017).

Third, the current valuation focuses on integrated BD concepts and their application to formulating the marketing mix. Future studies can join the different discussion and comparison methods. For example, future studies can combine interviews and questionnaires to analyze consumer behavior when reading the comments on sharing websites. Fourth, this study investigated the results during the COVID-19 pandemic period. In this period, we also observed that people pay more attention to BD and show increasing interest in the coronavirus transmission routes or how BD may influence the hygiene standards of a facility's space. Therefore, consumers' emphasis on the 7 P attributes could be altered. Future studies are highly encouraged to examine how consumers' awareness of the 7 Ps strategy has changed in the post − COVID-19 era. Fifth and finally, tourism and hospitality organizations can consider how to use social media well or even build individual websites to communicate and interact with consumers to collect useful feedback from online reviews and social media. Future investigations can use the best operations benchmark regarding the marketing strategy and conceptualize how this will revolutionize commercial and network competitiveness under the digital industrial environment.

6 Conclusions

This study used empirical evidence on big data from tourism and hospitality industrial environment analyses. Hanssens et al. (2014) asserted that firms' marketing action may potentially influence customers' attitudes and then the firm's performance. Managers can use BD to conduct a detailed analysis of customers' feedback to manage customer relationships (Grönroos 2006), which may include the message, execution, communication channel, timing, etc. In contrast, increases in tourism and hospitality service advertising generate positive feedback that converts into revisits. Hence, BD provides an "effective marketing lever"

for marketing strategies to change customers' attitudes and eventually provide for long-term relationship maintenance.

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