Tourism and Hospitality in terms of Analytics, Industry 4.0 and Public Value: A Mini Bibliometric Review

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Abstract

This research concisely reviewed the area of hospitality and tourism through a bibliometric study with the consideration of analytics, industry 4.0 and public value dimensions. The Scopus database was utilised for literary search and scanning. The PRISMA technique outcome was 94 relevant and impactful papers that became part of the analysis. The co-occurrence bibliometric technique through VOSviewer was applied resulting in network, overlay and density visualisation mapping. The frequency based on period, author, university affiliation, country/territory, document type and subject area has been projected through figures and tables. The results reflect the diversity of the problem at hand. The 11 reviews available on the subject of hospitality and tourism projected that there is a need for research on dimensions of analytics, industry 4.0 and public value for a holistic view and observing the bigger picture. A dearth of research on these lines has inhibited the dimension-based enrichment of the area concerned. The usage of VOSviewer for keyword-based co-occurrence visualisation analysis further added value to the present body of knowledge of hospitality and tourism area.

Keywords: Tourism Analytics, Hospitality Analytics, Industry 4.0, Public value

Introduction

The observation of hospitality and tourism with the consideration of analytics, industry 4.0 and public value dimensions reflects that the studies started emerging in 2011 with research on macro-economic perspectives (Chan & Lim, 2011) and then on work-life balance and human resources consideration (Choi & Kim, 2012). Afterwards, the trend changed and the focus shifted to social media, behaviour analytics, revenue management Twitter data, and study on trends that were the new normal in tourism. The digitalisation of the tourism and hospitality industry has shifted the trends by focusing on text analytics and EWOM, which means that the stakeholders are concerned about what has been written by the consumers or customers about their tourist and hospitality spots.

The use of digital channels of communication with tourists and operations being monitored by

artificial intelligence-empowered tools have changed the rule of the business (Bowen & Whalen, 2017; Buckley et al., 2014; Park, Ok, & Chae, 2016; Wang, Heo, Schwartz, Legohérel, & Specklin, 2015). Fast forward, recent studies have been concentrating on image analytics as a step ahead of text analytics, user experience scanning from online reviews, the concept of digital traveller and sustainable tourism, big data analytics, and business intelligence. The multilayered enrichment of experience that involves a greater sense of responsiveness, and proactiveness regarding the readiness of mechanisms and interaction are pivotal now. The Industry 4.0 perspective reflects the technological shifts in the tourism and hospitality industry. The analytics perspective is marked by the tracking, reporting, and smart decision-making that is driven by digital data from multiple channels and inputs. The public value perspective is connected to the concept that corporations and other economic stakeholders have to join hands and make partnerships for shared values. The integration of the three perspectives could bring sustainable tourism and digital user experience to life for better economic rationalisation of tourism and hospitality industry and future readiness (Ibrahim & Handayani, 2022; Nhamo, Dube, Chapungu, & Chikodzi, 2023; Yallop, Gică, Moisescu, Coroş, & Séraphin, 2023; Zachlod, Samuel, Ochsner, & Werthmüller, 2022). This turbulent shift of the research trends in the area of hospitality and tourism was studied with the consideration of analytics, industry 4.0 and public value dimensions that call for a holistic view, which could effectively be achieved from a review of the overall research canvas by following the below research questions.

Research Questions

1. What is the overall time-period frequency of publications for the tourism and hospitality area in terms of Analytics, Industry 4.0 and Public Value?
2. Which authors have contributed the most through research publications?
3. To which universities or institutes are most authors affiliated?
4. Which countries have the major contribution to the research area?
5. What is the frequency of the research publication types for the area concerned?
6. Which subject areas are the research publications related to?
7. What are the current major themes in terms of tourism and hospitality in terms of Analytics, Industry 4.0 and Public Value?

Method

The researchers mapped the available literature on tourism and hospitality with the canvas of Analytics, Industry 4.0 and Public Value by utilising the research publication database of Scopus and bibliometric co-occurrence and frequency analysis techniques. The research questions reflect the landscape of observations that are effectively possible only through bibliometric analysis. The objective of using bibliometrics for the area of concern has six layers. The current study maps the overall frequency of publications by year and then indicates the authors, universities and countries that are noted in terms of most contribution through research. Afterwards, the subject areas covered and the major themes through the co-occurrence analysis have been executed (Linnenluecke, Marrone, & Singh, 2019).

Data Collection and Finalisation

The Scopus database was searched while concentrating on the hospitality and tourism area with a focus in terms of analytics, industry 4.0 and public value (Cooper, 2016). The search string is stated below:
"(TITLE-ABS-KEY (tourism) AND TITLE-ABS-KEY (hospitality) AND TITLE-ABS-KEY (analytics) OR TITLE-ABS-KEY (industry 4.0) OR TITLE-ABS-KEY ("public value")) AND

(LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "cp") OR LIMIT-TO (DOCTYPE, "re")) AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (SRCTYPE, "j") OR LIMIT-TO (SRCTYPE, "p"))"
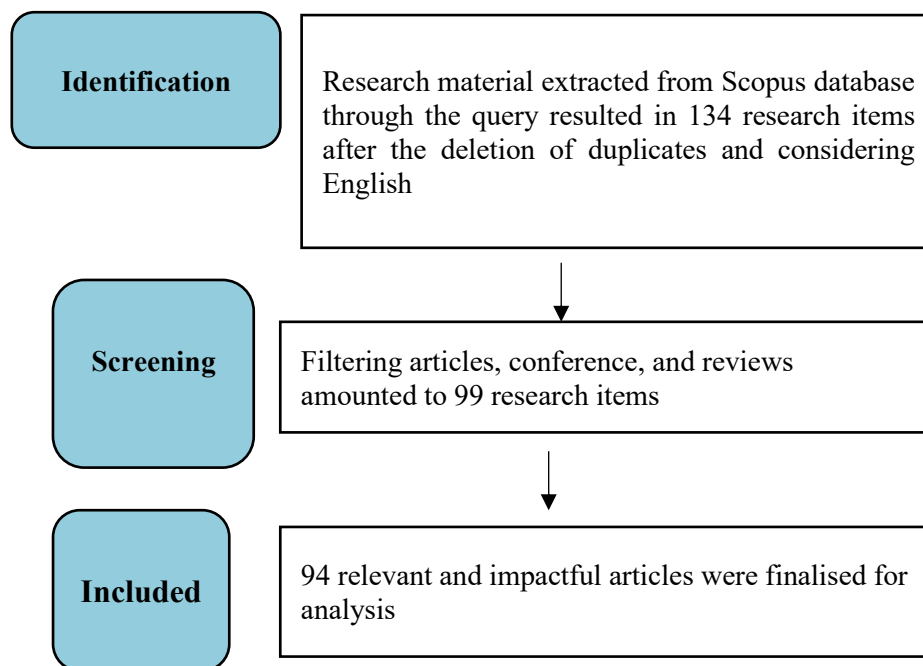

Figure 1: PRISMA flow diagram

The PRISMA flow diagram is one of the most used and accepted criteria for the finalisation of articles to map the theoretical landscape (Page et al., 2021). There are three stages of PIRSMA. The first stage is marked by the identification of the literature. The second stage is focused on screening the research items and the third is aimed at the finalisation of the articles that are impactful and concrete to be included in the analysis

Bibliometric Analysis

Bibliometric analysis through a co-occurrence algorithm run through the VOSviewer software is marked by the diagrammatical visualisation of the key constructs that network together with colour coding to form themes of the literature being analysed. The size, links, colour coding and position of the constructs define their literary mapping which is inferred by the researchers. This type of analysis is becoming common in medical science but its introduction in management and other sciences is recent, which has opened doors for new avenues of research observations (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021; Linnenluecke et al., 2019).

Results

The results of the study reflect a multilayered picture of the overall bibliometric analysis done on the tourism and hospitality area with the respective focus on analytics, industry 4.0 and public value. The real hype was observed during and after the covid when the tourism and hospitality sector experienced the most serious setbacks. This projects that the analytics, industry 4.0 and public value can be points of concern where further could be promising.

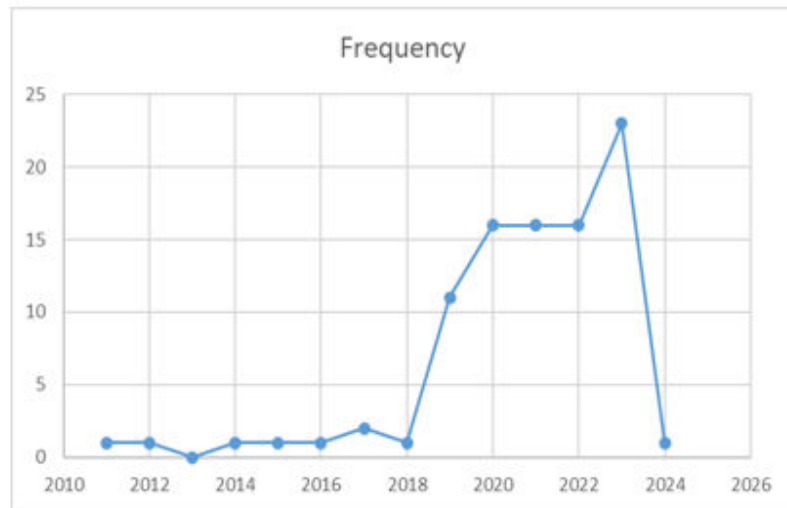| Year	Frequency
2024	1
2023	23
2022	16
2021	16
2020	16
2019	11
2018	1
2017	2
2016	1
2015	1
2014	1
2013	0
2012	1
2011	1

Figure 2: Frequency of research papers (2011-2024)
Source: Scopus

Figure 2 projected the frequency of the publication over the period from 2011 to 2024. It can be observed that the area concerned has experienced the largest hype in 2023 followed by consecutive notable publications in 2022, 2021 and 2020. The elevation in the research started in 2019. This means COVID-19 had a profound impact on the area concerned in the market globally.

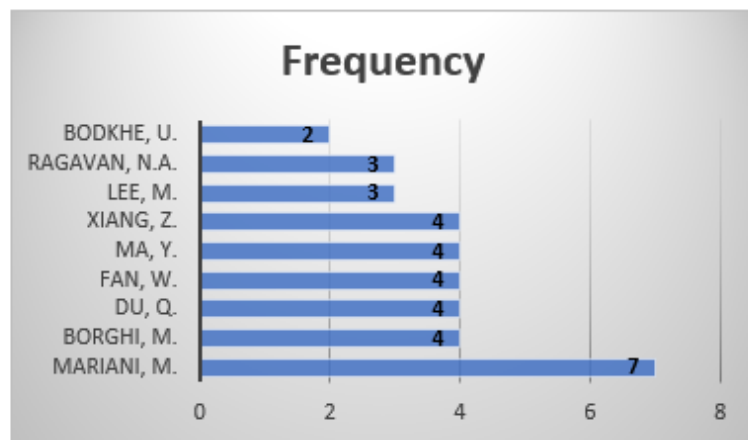| Authors	Frequency
Mariani, M.	7
Borghi, M.	4
Du, Q.	4
Fan, W.	4
Ma, Y.	4
Xiang, Z.	4
Lee, M.	3
Ragavan, N.A.	3
Bodkhe, U.	2

Figure 3: Significant Authors' Contribution regarding papers frequency
Source: Scopus

Figure 3 shows that one of the most prominent authors securing seven publications has been Mariani, M. followed by five authors having four publications. There have been nine authors that dominated the scene through their work.

Table 1: University Affiliation dynamics regarding publication frequency

University Affiliation	Frequency
University of Reading	8
Henley Business School	7
Virginia Polytechnic Institute and State University	6
Virginia Tech, Pamplin College of Business	5

University of Houston	4
Alma Mater Studiorum Università di Bologna	4
Taylor's University Malaysia	4
The Hong Kong Polytechnic University	3

Source: Scopus

The university affiliation frequency in Table 1 projected that "University of Reading" took the lead by having eight publications affiliated with their institution followed by "Henley Business School", "Virginia Polytechnic Institute and State University" and "Virginia Tech, Pamplin College of Business". This frequency indicates that South East Asian, Middle Eastern and South Asian countries' representation is low and not noticeable, which means that there is room for multiple studies, particularly in terms of case studies that could be affiliated with the universities of these regions.

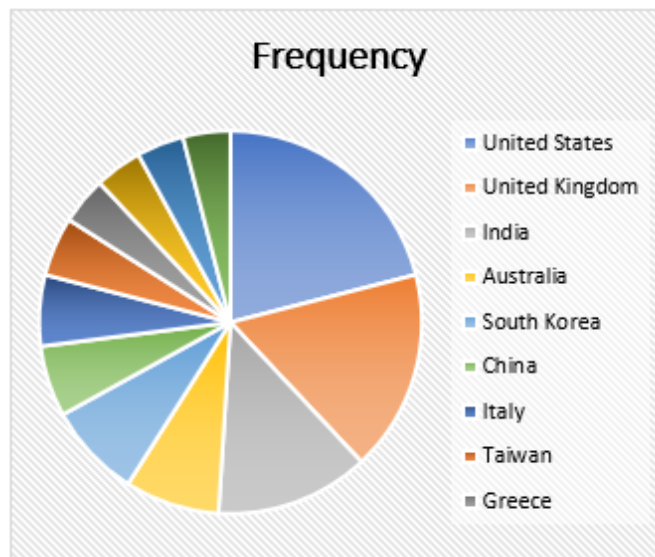| Country/Territory	Frequency
United States	21
United Kingdom	17
India	13
Australia	8
South Korea	8
China	6
Italy	6
Taiwan	5
Greece	4
Indonesia	4
Kazakhstan	4
Malaysia	4

Figure 4: Country-based publication frequency
Source: Scopus

In Figure 4, it can be seen that the USA takes the lead with the UK and India being in the second and third position. The comparison of the table 3 and 4 presents the research dynamics that publications are being produced by the regions of South Asia and South East Asia but are not affiliated with the universities of this region which raises questions for this scenario.

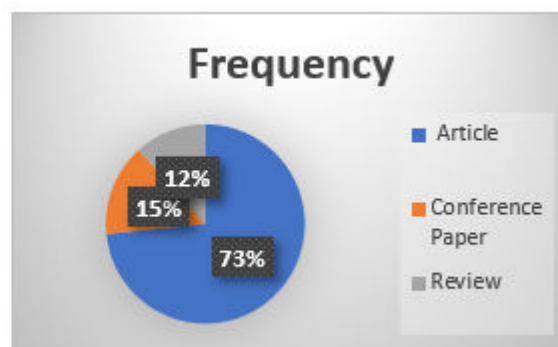| Document Type	Frequency
Article	69
Conference Paper	14
Review	11

Figure 5: Documents type-based publication frequency

Source: Scopus

Figure 5 states that 73% of the research available is in the form of research papers which reflects the interest of researchers in this area. The conference papers account for 15% and review papers stand at 12 % respectively, which projects that the problem area demands new approaches and theoretical mapping as well as a fresh look into the overlapping of subject areas.

Table 2: Subject area-based publication frequency

Subject Area	Frequency
Business, Management and Accounting	66
Social Sciences	36
Computer Science	31
Environmental Science	15
Decision Sciences	12
Engineering	10
Energy	6
Economics, Econometrics and Finance	3
Mathematics	3
Medicine	3
Materials Science	2
Multidisciplinary	2
Arts and Humanities	1
Physics and Astronomy	1

Source: Scopus

Table 2 argues about an interesting picture at hand as the area of hospitality and tourism was studied with the consideration of analytics, industry 4.0 and public value dimensions is so heterogenous that it covers fourteen different subject areas. Most of the research has been in the subject areas of Business and Social Sciences as well as Computer Sciences. This means that the overlap of these subject areas has a promising set of opportunities. No wonder, the articles on analytics and industry 4.0 dimension can be traced to have the flavour of Business Social and Computer Sciences. Afterwards, the areas of environmental science, decision sciences, engineering and energy were noted. Other subject areas were having a few papers that ranged from three to one.
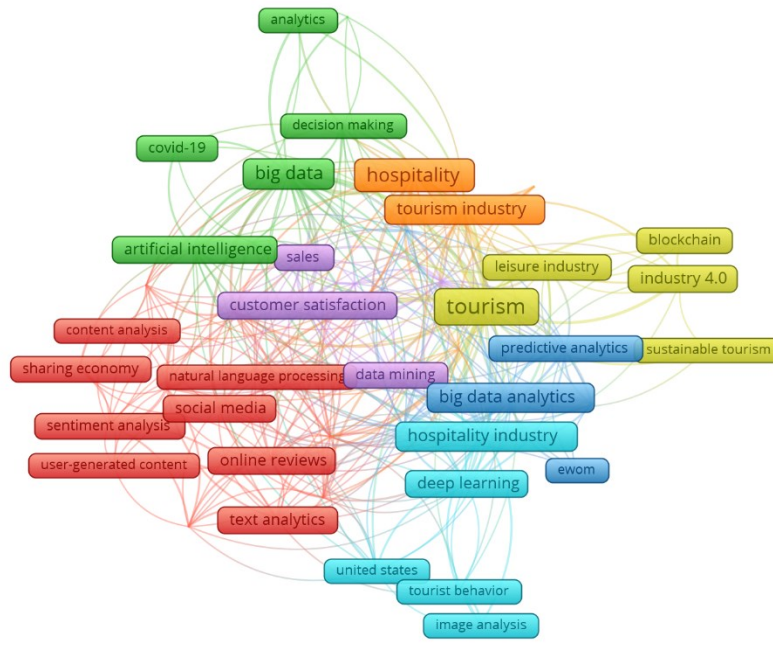
Figure 6: keyword co-occurrence network visualisation analysis (VOSviewer)

Figure one projected the "keyword co-occurrence network visualisation analysis" with 7 themes constructs attached to each theme as Theme 1 included "analytics, COVID-19, decision making, big data, artificial intelligence"; Theme 2 consisted of "Hospitality, tourism industry"; Theme 3 consisted of "Blockchain, Industry 4.0, Tourism, Sustainable Tourism"; Theme 4 as "Sales, Customer Satisfaction, Data mining"; Theme 5 included "content analysis, sharing economy, natural language processing, social media, sentiment analysis, user-generated content, online reviews, text analytics"; Theme 6 as "Predictive analytics, big data analytics, EWOM"; and Theme 7 was composed of "Hospitality Industry, deep learning, tourism behaviour, united states, image analysis".
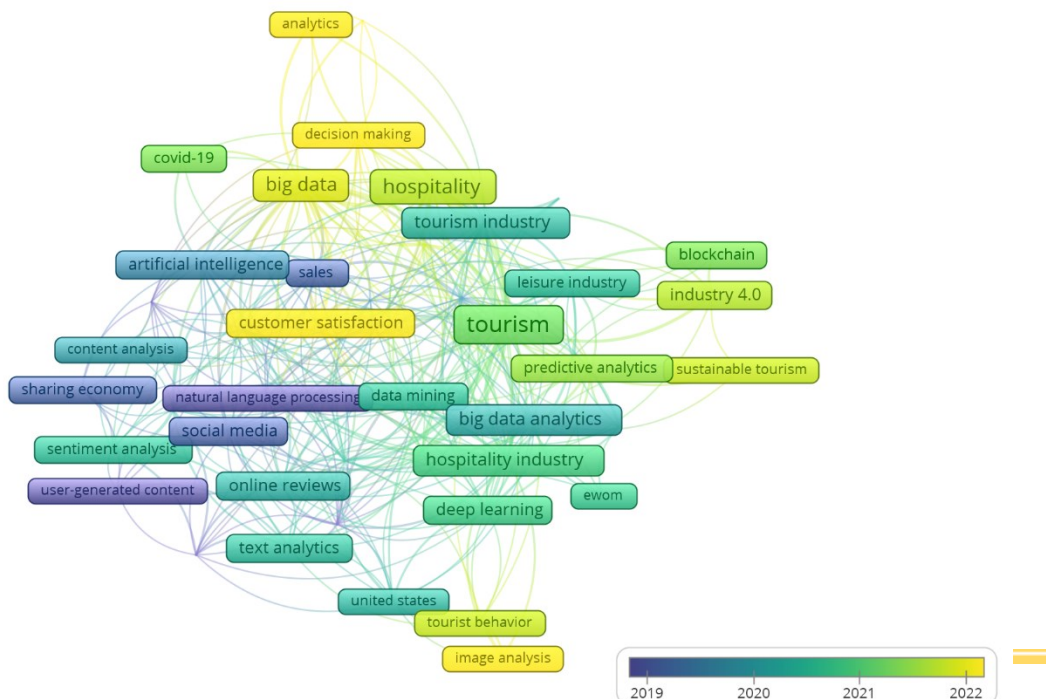
Figure 7: keyword co-occurrence overlay visualisation analysis (VOSviewer)

Figure 7 "keyword co-occurrence overlay visualisation analysis" projected that the constructs of analytics, decision-making, customer satisfaction, image analysis, tourist behaviour and sustainable tourism are the recent focus of the researchers. The analytics-driven decision-making that is backed by the digital power of analytics has been an area of recent high interest by the researchers as indicated by the colour coding. Customer satisfaction has emerged as the central point of concern value for the sales force and tourism stakeholders, where the dimensions of data mining, online reviews, text analytics, and EWOM encircle as the value additional building blocks. Sustainable tourism and Industry 4.0 have been observed to go hand in hand, which reflects that the recent developments in the tourism and hospitality industry are marked by the considerable usage of artificial intelligence and all the application tools of Industry 4.0 to gain a competitive edge in the new normal, where the rules of the game have been changed.
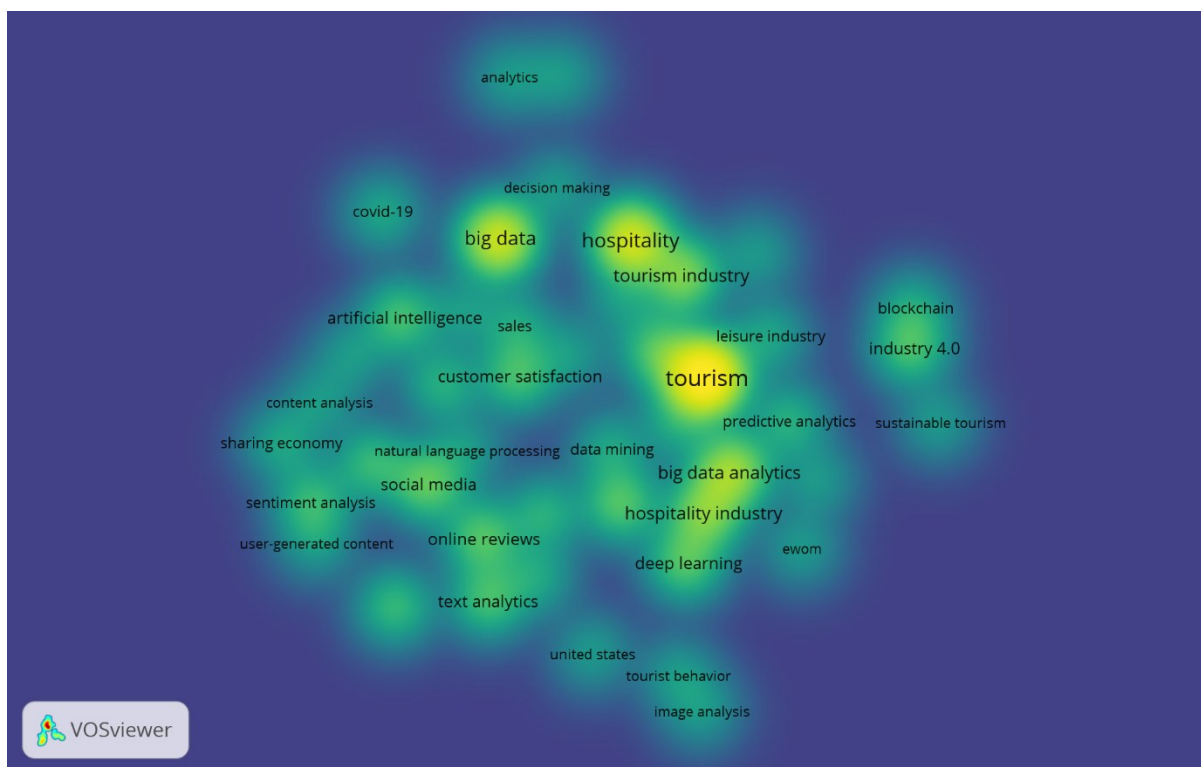

Figure 8: keyword co-occurrence density visualisation analysis (VOSviewer)

In contrast to the projection in Figure 6, figure 7 based on the density advocated that the constructs of big data, tourism, big data analytics, social media, online reviews, text analytics and Industry 4.0 have been the dominant research directions in the literature available.

Conclusion

The area of hospitality and tourism, studied with the consideration of analytics, industry 4.0 and public value dimensions, advocates that the problem concerned is heterogeneous with many overlapping of different subject areas but the triangulation of business, social and computer science is dominant. This paves the way forward for future research to be based on this triangulation with stress on the areas of analytics and spearhead focus on industry 4.0 as being the area of opportunity. The area of hospitality and tourism is now becoming an interdisciplinary area of research in the fourth industrial revolution period.

Limitations

This study is a mini bibliometric review where various other dimensions of tourism and hospitality in terms of Analytics, Industry 4.0 and Public Value were not covered as the research was confined to the major themes and other objectives reflected by the research questions. Apart from Scopus, WoS and secondary data for more depth of the concerned area through mixed methods is another limitation. The various methods, contexts, concepts and theories are another uncovered area. The co-citation and other analyses by VOSviewer were not mapped. The RStudio or Cite Space was not used for further bibliometric analysis. The ethical side of the problem was not covered and calls for further research regarding ethical tourism and hospitality in the age of Industry 4.0 for better analytics and public value development.

Future Research

There is a need for quantitive research by developing scales for various areas of industry 4.0, analytics and public value by having the tourism and hospitality conceptual foundations. The theoretical framework, and conceptual modelling of tourism and hospitality separately for the three perspectives are to be studied. Further research through secondary data streams for forecasting future predictions is a high call. Tourism and hospitality sectors have been the bread and butter of many people in Pakistan and around the world. So, the divide, common issues and paradoxes need to be observed.

Managerial Implications

This paper provides a conceptual map to the managers of the tourism and hospitality industry for the future-oriented issues of Industry 4.0, analytics and public value. National and industry-wise policy considerations and improvement in the standard operating procedures can be made by noticing what has been studied on tourism and hospitality so far.

Social Implications

The social implications of this research are that the societal shifts due to global changes in the post-covid era need to be considered as much of the research in the area of concern has emerged during and after the pandemic.

Research Implications

The major themes that emerged in this research endeavour call for further research through quantitative methods by testing the models according to the themes for positivistic sense development in the area. Case studies on these themes could provide a storyline for the companies to utilise as use cases to avoid the mistakes of other companies in their sector.

No Conflict Statement

The authors hereby reflect no conflict in terms of the research study or any thereof

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