



Contagious diseases and tourism: a systematic review based on bibliometric and content analysis methods

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Abstract

The present study examines the existing knowledge and intellectual structure on contagious diseases and tourism to map the development of the concept through collaborative networks. Utilising the Scopus and Web of Science bibliometric databases, 328 research records were extracted through keyword searching and forward referencing approaches. Based on these records, the study conducted bibliometric and content analysis to diagnose core themes in the field. The present study's findings are helpful for academia and industry to aid their existing knowledge about contagious diseases, particularly its timeline, geographical spread, and development of coherent themes. A rigorous literature review revealed that the scholarly work in the domain of contagious diseases and tourism revolves around four important themes, namely COVID-19, SARS, Crisis management, and Sustainability. The first theme revolves around *COVID-19*, highlighting about the impact of COVID-19 on different sectors of the TTH industry, countries, stakeholders, and contexts. Also, researchers foresee COVID-19 as a catalyst to reshape the tourism industry. The next group of studies explained the handling of *SARS*, particularly by Asian countries. The third cluster elaborated on different stages of crisis and strategies adopted by organizations and countries to manage the crisis. Lastly, a handful of studies in the corpus stated that sustainability in tourism needs to be understood beyond saving the environment and aspiring prosperous travel and tourism industry. The study also suggested the scope of future work.

Keywords Tourism · Contagious diseases · Content analysis · Covid-19 · Crisis management · SARS

1 Introduction

COVID-19 pandemic hit the travel, tourism, and hospitality (TTH) industry a hard way. According to the projections made by UNWTO, in 2020 globally, there would be a decline of 1.5 billion international tourists arrivals (Brouder 2020). Besides this, the job market particularly for those employed in the TTH industry impacted unprecedentedly.

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TTH industry faced many other pandemics in the twentieth century, such as Spanish flu (1918–1920), Asian flu (1957–1958), Hong Kong flu (1968–1969), and twenty-first century like Severe Acute Respiratory Syndrome(SARS) (2002–2003), Middle East Respiratory System (MERS) (2012), Ebola (2014–present), Zika (2015–present) among others (Hall et al. 2020). The severity and extent of COVID-19 makes it different and scarier than other above mentioned pandemics (Brouder 2020).

One such difference between COVID-19 and other pandemics and contagious diseases can be marked in academic attention. COVID-19 has been the central theme for journal of various domains such as tourism, logistics, fashion, food, finance, among others. Hence, scholars have explored COVID-19 in multiple aspects of human life, and this trend continues. We can still see many upcoming special issues of the reputed journals dedicated to the COVID-19 theme in the year 2021 too. For instance, “COVID-19: a pandemic outbreak in the age of the digital economy” a special issue by Managerial Auditing Journal or “Sustainability transitions in the global south—learnings from COVID-19 and future directions”—a special issue call for papers from *Revista de Gestao*.

Further, a simple Google Scholar search with *COVID 19 AND Travel* keywords produced more than 30,000 results in November 2020. Clearly, a lot of academic writing is happening in the domain that needs to be examined to understand the global risks, challenges, and changes due to this disease, specifically in travel, tourism, and hospitality (TTH) industries (Chen et al. 2020a, b). To develop greater levels of resistance and resilience, we need to learn lessons from earlier pandemics that hit not only our part of the globe but also others (Nepal 2020). In the absence of any synthesis of studies conducted on contagious diseases or pandemics, we may miss some important insights provided by the scholars of the field. Hence, there is a need to undertake a literature review study on contagious diseases and tourism. For that purpose, a systematic literature review (SLR) study is a well-adopted methodology to provide the state the art review of the domain (Goyal and Kumar 2020). SLR studies have the capabilities to advance knowledge and identify the inconsistencies in the existing literature (Paul et al. 2021).

Nonetheless, few scholars (Abbas et al. 2021; Kumudumali 2020) have conducted review studies to map the impact of COVID-19 on the TTH industry. Abbas et al. (2021) mentioned that COVID-19 had impacted all the stakeholders of the TTH industry, including intermediaries, planners, accommodation providers, and educators, in the proportion of their attributes such as size, shape, type, management, and governance, among others. In another study, Chen et al. (2020a, b) reviewed 115 studies on tourism-related diseases and presented the relationship between diseases and tourism from eight different perspectives. Further, Hall et al. (2020) presented extensive literature on all major pandemics that happened to date and suggested nations focus on recovering or even expanding the tourism industry business.

Despite the valuable contribution made by the above-mentioned studies, the authors identified two major gaps in the literature that need to be filled. *First*, except for Hall et al. (2020) no other study has collated the literature related to major global diseases pertaining to the tourism domain. *Second*, following the future work directions suggested by Chen et al. (2020a, b), this study examined the state of the artwork related to major global pandemics and contagious diseases scattered around, including travel, tourism, hotels, and the hospitality industry. Hence, this study using bibliometric analysis identifies publication patterns and intellectual structure in the area of contagious diseases and tourism. To the best of our knowledge, this study is the first attempt that presents combined insights generated through bibliometric analysis and systematic literature review in this area. In particular, this study addresses the following research questions (RQs): RQ1: What is the current

publication trend regarding contagious diseases? RQ2: Which studies contributed significantly in the literature? RQ3: What are the major orientations in this field, and which areas need additional studies?

Hence, the present review study contributes in several unique ways. First, to the best of the authors' knowledge, to date, no existing review study in the area of diseases and tourism has ever used bibliometric analysis to evaluate the progress of the field and answer the above-raised RQs. Second, except Hall et al. (2020), earlier studies focused mainly on COVID-19 while our review study synthesizes the literature of all major contagious diseases. Lastly, we identified the gaps in major clusters of the field and offered direction to future work. Table 1 briefly depicts the unique contributions of this work in literature. We synchronized the scattered literature on contagious diseases and tourism after reviewing 328 studies from a distinctive perspective compared to prior studies. In particular, the present study reports key findings defines clusters, and illustrates future research opportunities.

2 Research methods

The present study has relied on a two-tier analysis consisting of bibliometric and content analysis to identify the major themes in the field of contagious diseases and tourism. To perform bibliometric analysis and content analysis, identification and selection of relevant literature is a prerequisite. This study has employed a systematic literature review (SLR) methodology to ensure the transparent and comprehensive coverage of the literature (Denyer and Tranfield 2009). The motivation behind using the SLR methodology is its wider acceptability in bibliometric reviews (Cheng et al. 2018; Prashar et al. 2020; Singh and Walia 2020). The detailed methodological process is elaborated in the following subsections:

2.1 Review objectives

Following Goyal and Kumar (2020) recommendations, the present review begins with setting the research objectives. The foremost objective of this review is to map global scientific research on contagious diseases and tourism. To ensure the proper operationalisation of the principal research objective, the present study follows Zahoor and Al-Tabbaa (2020) suggestions and breaks down the fundamental objective into the following sub-objectives.

RO1: Mapping the theme bibliometric profile

- Most productive journals
- Chronological trend analysis
- Most prolific authors
- Top contributing countries and organisations

RO2: Identifying influential research studies

- Citation analysis
- PageRank analysis

RO3: Determining the nascent and emergent themes in the field

Table 1 Comparison of previous studies on diseases and tourism with our study

| Basis of comparison | Chen et al. (2020) | Kumudumali (2020) | Hall et al. (2020) | Abbas et al. (2021) | Our study |
|---------------------|----------------------------------|-------------------------------|---------------------|-------------------------------|---|
| Time period | From 2004 to January 2020 | Not mentioned | No time limit | Not mentioned | No time limit |
| Keywords | Specified | Not specified | Not specified | Not specified | Specified |
| Focus | All published studies after SARS | Impact of COVID-19 on Tourism | All major pandemics | Impact of COVID-19 on Tourism | All major pandemics |
| Methodology | Content analysis | Content analysis | Commentary | Narrative analysis | Structured review study, bibliometric study, and content analysis |

- Network co-word mapping
- Content analysis
- Key insights and future research directions

2.2 Search strategy

Designing a search strategy for literature search is a pivot step in SLR methodology as a rigorously designed search strategy ensures comprehensive coverage of the literature. The present study has employed both keywords searching through electronic databases and forward referencing approaches to identify the relevant literature (Eduardsen and Marinova 2020). Further, the study has used Scopus and Web of Science bibliometric databases to search the academic literature on contagious diseases and tourism. The rationale behind using these two bibliometric databases is two-fold: (1) widely acceptability of these databases in management studies (2) their comprehensive coverage of the literature (de Oliveira et al. 2018; Visentin et al. 2020; Yin and Fernandez 2020). The present study focuses on contagious diseases outbreaks after the year 2000. To cover all the relevant studies, the present study followed the suggestions of Bartolini et al. (2019) and segregated the keywords into two major categories. Group 1 includes the keywords related to contagious diseases such as “SARS”, “MERS”, “Covid-19”, “H1N1”, “Swine flu”, “Coronavirus”, “Zika”, “Ebola”, “Bird flu”. Group 2 includes keywords associated with hospitality such as “hotel”, “tourism”, “travel”, “tourists”, “hospitality”. With the help of Boolean and proximity operators, authors have tried all the possible combinations of keywords.

2.3 Identification, screening, and selection

After designing the search strategy, the study has performed an initial search (28 November 2020) on both bibliometric databases and retrieves 7183 research records from Scopus and 1785 records from Web of Science. Further, the authors set the following inclusion and exclusion criteria to finalise the bibliometric dataset.

- To ensure the quality of the review, the present study will consider only peer-reviewed journals (Gallardo-Gallardo et al. 2015; Saggese et al. 2016). Alternatively stated, the study will exclude book chapters, conference papers, and other forms of grey literature. The study has included only those studies that are published in the English language only.
- The present study will focus only on those research studies that are in the domain of business, accounting, and management.
- Non-contextual and duplicate records (research records in both Scopus and Web of Science) will be excluded.

After applying the above-mentioned criteria which yielded 449 research records, authors thoroughly performed the initial screening process where the title and abstract of each paper were studied. Excluding the academic studies that did not fit in the domain of contagious diseases and tourism, we left with 339 research records. In the next step, we thoroughly examined the full text of the remaining research studies and excluded another 22 research studies that did not fit in the context. Following the

recommendations of Tandon et al. (2021), the authors also used a forward referencing approach and identified another eleven relevant academic studies. Eventually, we have a bibliometric portfolio of 328 research papers.

2.4 Data analysis

The present manuscript has relied on evaluative bibliometric techniques such as journal quality analysis, affiliation analysis, citation, and chronological trend analysis to get a general overview of the field. Numerous open-source tools such as BibExcel, Citespace, Pajek, and HistCite are available for bibliometric performance analysis. Nevertheless, the study preferred the Bibliometrix R package (3.0.3) over other tools. The rationale behind using this particular library is its capability to handle bibliometric data from multiple databases (Aria and Cuccurullo 2017). The study has relied on VOSviewer (1.6.11) for scientific mapping due to its wider acceptability and interactive mapping features, i.e., network, density, and overlay visualizations (Khanra et al. 2020; Liu et al. 2020; Prashar and Sunder 2020). To identify core and emerging themes, the study relied on co-occurrence network analysis which is based on similarities between key terms (Ali and Golgeci 2019). Academicians use co-occurrence networks to map the conceptual space of literature pertaining to a specific field (Zupic and Cater 2015). For normalization of the strength of links, the study relied on association strength measure as it is the best normalization method for co-occurrence data (Eck and Waltman 2009). We have elaborated the entire methodological process in Fig. 1.

3 Bibliometric analysis

3.1 Trend analysis

Figure 2 indicates a yearly number of publications in the fields of business, administration, and accounting, covering the subject of "contagious diseases and tourism." The study into this domain is uneven between 2003 and 2020. It is very clear from the general pattern in the papers in this unique area became exceptional in 2020. The authors Fig. 2 that were able to track the related research in 2003, based primarily on severe acute respiratory syndrome (SARS). For instance, the effect of SARS on hotels in Hong Kong was examined by Chien and Law (2003). Research on the SARS was given due attention between 2003 and 2006 (Camitz and Liljeros 2006; Wilder-Smith 2006). A range of researchers studied the impact of SARS in its origin (China) and globally. Likewise, in 2009 the H1N1 flu epidemic simulated researchers to study its effects on travel and tourism, which began to decline after 2013. In addition, many other virus strains, including Zika, Ebola, bird flu, etc., to name just a few spreaded worldwide, negatively influence the tourism industry, and researchers continued to write on these pandemics until 2019.

Conversely, from Fig. 1, the abrupt change in the number of studies in this area can be seen in 2020, because of the worldwide outbreak of the COVID-19 pandemic. This number does not leave many surprises, considering the intensity and extent of this pandemic. In summary, however, the inference may be reached that any time a pandemic or infectious epidemic occurs around the globe, the research at that time could be abruptly increasing.

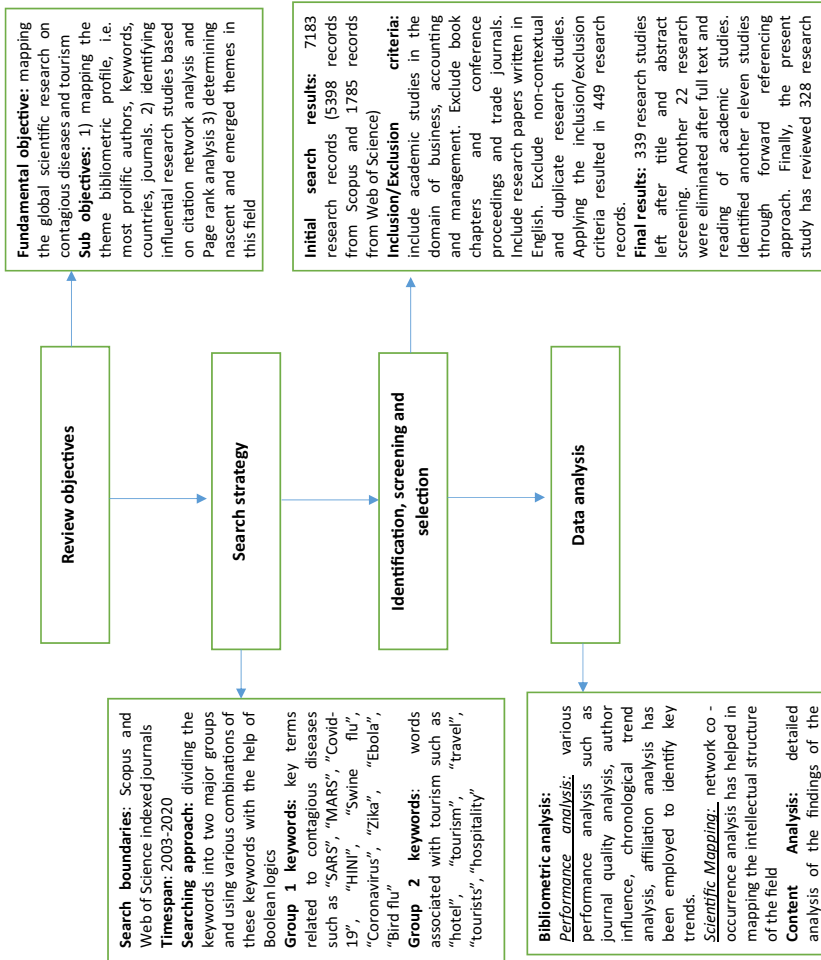


Fig. 1 Detailed methodological process

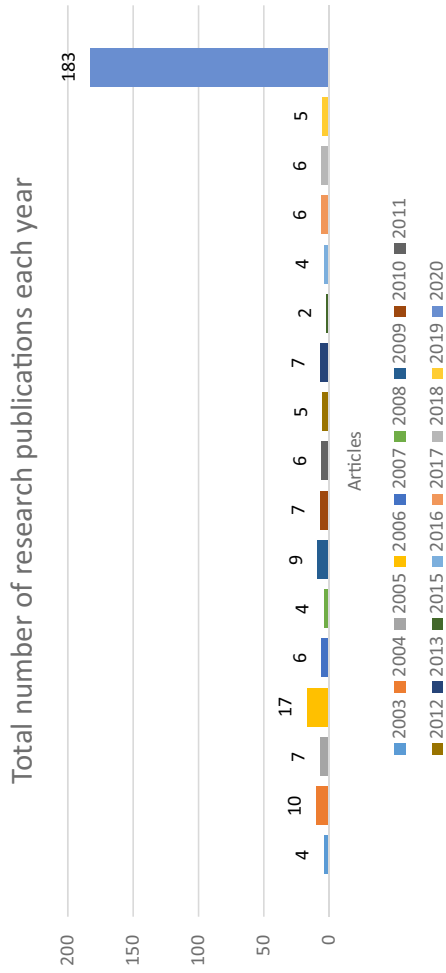


Fig. 2 Publishing trend in the field of contagious diseases and tourism

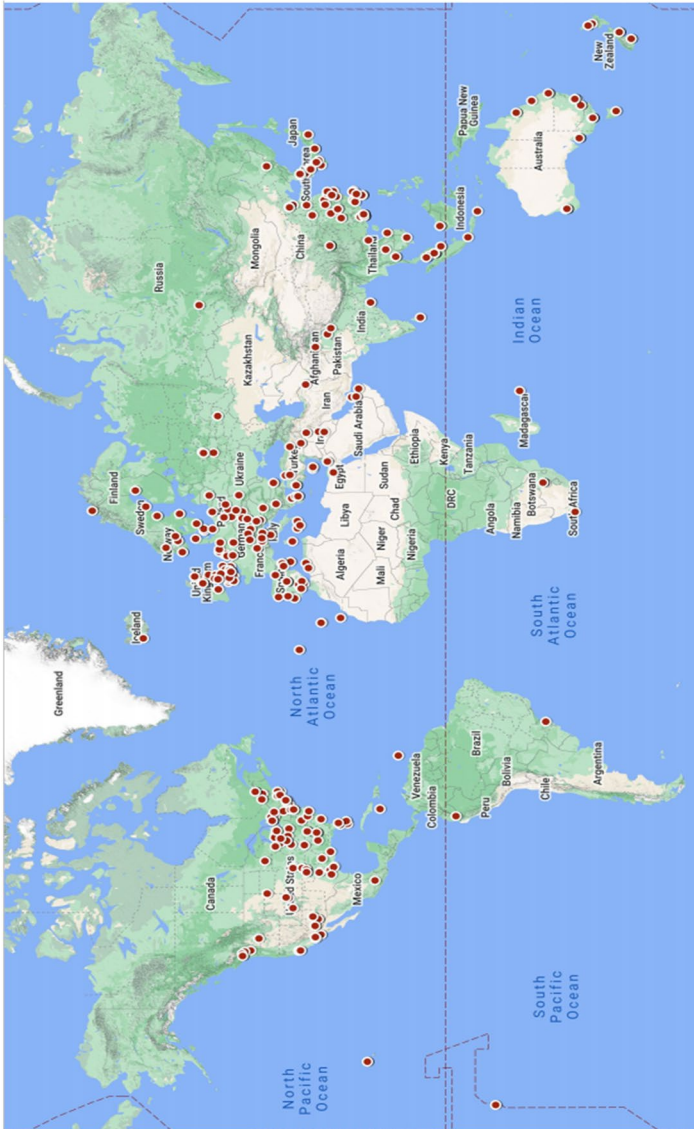


Fig. 3 Geographical location of all contributing organizations

3.2 Affiliation statistics

The authors' affiliations were extracted from the CSV file. Using gpsvisualizer.com, the geographical distribution of the organizations contributing to the literature on "contagious diseases and tourism" is displayed in Fig. 3. The size of red circles represents the proportion of contributions by each organization. Table 2 represents the percentage contribution to the literature on the current theme distributed among geographical regions. The number of contributing organizations from Europe, America, Africa, Asia, and Oceania is 187, 162, 17, 214, and 60, respectively. It is visible that Northern America and Eastern Asia dominated the research on the current theme with 24.46% and 24% contributions, respectively. Overall, the geographical scope suggests that study and practice in the "contagious diseases and tourism" theme have drawn organizations and research centers worldwide.

3.3 Journal quality analysis

Table 3 lists the leading outlets contributing to the field of contagious diseases and TTH. Among these journals, *Tourism Geographies* (36), *Current Issues in Tourism* (24), and *Annals of Tourism Research* (16) are the most prolific journals. Nevertheless, *Tourism Management* and the *International Journal of Hospitality Management* lead in quality parameters, i.e., impact factor, total citations, and cite score.

3.4 Author influence

The main characteristics of the most prolific authors are presented in Table 4. *Law, R* has published the highest number of research papers on contagious diseases and tourism.

Table 2 Contribution of organizations based on their geographical regions

| Geographical region | No. of organizations | Contribution in percentage (%) |
|---------------------|----------------------|--------------------------------|
| <i>Europe</i> | | |
| Northern Europe | 25 | 3.84 |
| Eastern Europe | 23 | 3.54 |
| Western Europe | 95 | 14.62 |
| Southern Europe | 44 | 6.77 |
| <i>America</i> | | |
| Northern America | 159 | 24.46 |
| South America | 3 | 0.46 |
| <i>Africa</i> | | |
| Northern Africa | 5 | 0.76 |
| Southern Africa | 10 | 1.53 |
| North East Africa | 2 | 0.30 |
| <i>Asia</i> | | |
| Eastern Asia | 156 | 24 |
| South-Eastern Asia | 34 | 5.23 |
| Western Asia | 18 | 2.76 |
| Southern Asia | 6 | 0.92 |

Table 3 Most frequent journals

| Journal | A | Cite score | TC | Impact factor |
|--|----|------------|-----|---------------|
| Tourism Geographies | 36 | 5.0 | 172 | 6.640 |
| Current Issues in Tourism | 24 | 7.5 | 490 | 7.430 |
| Annals of Tourism Research | 16 | 6.8 | 174 | 9.011 |
| Tourism Management | 15 | 12.8 | 722 | 10.967 |
| International Journal of Contemporary Hospitality Management | 14 | 7.2 | 159 | 6.514 |
| International Journal of Hospitality Management | 14 | 8.0 | 248 | 9.237 |
| Sustainability | 12 | 3.2 | 17 | 3.251 |
| Tourism Economics | 12 | 2.7 | 80 | 4.438 |
| Asia Pacific Journal of Tourism Research | 9 | 3.3 | 113 | 3.667 |
| Journal of Air Transport Management | 9 | 5.6 | 7 | 4.134 |

A no. of articles, TC total citations

Table 4 Top 10 contributing authors

| Authors | NP | Total Citations | PY_start | H Index | G Index |
|------------|----|-----------------|----------|---------|---------|
| Law, R | 11 | 115 | 2003 | 6 | 10 |
| Wen, J | 6 | 34 | 2020 | 4 | 5 |
| Ritchie, B | 4 | 166 | 2016 | 3 | 4 |
| Chen, M | 4 | 139 | 2007 | 3 | 4 |
| Chen, C | 4 | 130 | 2008 | 4 | 4 |
| Song, H | 4 | 126 | 2012 | 2 | 4 |
| Hall, C | 4 | 108 | 2020 | 2 | 4 |
| Lee, C | 4 | 76 | 2011 | 2 | 4 |
| Han, H | 4 | 67 | 2012 | 1 | 4 |
| Kozak, M | 4 | 19 | 2020 | 2 | 4 |

Likewise, the author also has the highest H index articles and published a pioneer research article in this field. *Wen, J* is on second on the list of most prolific authors. All research publications by *Wen, J* are centered on COVID-19 and tourism and have appeared in 2020. However, in terms of total citations, *Ritchie, B*, and *Chen, M* are on the top.

3.5 Citation analysis

Table 5 reports the most influential research papers based on local citations along with global citations. Major stress in global citation analysis is on overall citations of a research article, whereas local citation focuses only on citations within a particular bibliometric dataset (e.g., 328 research articles in the present case). *Gössling et al. (2020)* is the most influential research study on contagious diseases and tourism, followed by *Novelli et al. (2017)*. *Gössling et al. (2020)* (the most cited paper) compared the impact of COVID-19 with other earlier global pandemics and crises and examined the changes these pandemics made in the landscape of tourism. *Novelli et al. (2017)* emphasized that comprehensive risk assessment is a pertinent disaster planning and preparation strategy, particularly for countries with limited resources. Similarly *Huang et al. (2020)*

Table 5 Top 10 papers by local citations

| Author (year) | Local citations | Global citations | Local citations (%) |
|---------------------------|-----------------|------------------|---------------------|
| Gossling et al. (2020) | 22 | 79 | 27.85 |
| Novelli et al. (2017) | 14 | 31 | 45.16 |
| Kuo et al. (2011) | 11 | 84 | 13.10 |
| Hall et al. (2020) | 11 | 27 | 40.74 |
| McKercher and Pine (2004) | 9 | 53 | 16.98 |
| Higgins-Desbiolles (2020) | 9 | 20 | 45.00 |
| Lee et al. (2020) | 7 | 67 | 10.45 |
| Mao et al. (2010) | 5 | 34 | 14.71 |
| Hung et al. (2018) | 5 | 9 | 55.56 |
| Gretzel et al. (2020) | 5 | 10 | 50.00 |

based on case study method outlined the potential role that hotel industry could play at the time of pandemics. They also emphasized that hotels should be ready with contingencies plans as their strategy for crisis preparedness. Gretzel et al. (2020) achieved better local to global citation percentages because this study focused on COVID-19 and impact of COVID-19 are being researched in different domains including tourism. For instance, Gretzel et al. (2020) discussed the transformative effect of COVID-19 on tourism; hence, scholars researching the future of tourism have also cited their work.

3.6 PageRank analysis

The major limitation of citation analysis is its complete ignorance of the prestige of a research article (Xu et al. 2018). PageRank analysis overcomes this issue by focusing on both the popularity and prestige aspect of a research paper. The top 10 influential research studies based on PageRank analysis are shown in Table 6. From the table, we can infer that popularity does not guarantee prestige. For example, Hung et al. (2018) are among the top 10 cited papers; however, this paper does not appear in the list of top ten papers based on PageRank analysis but amongst top 20 papers. In the top cited

Table 6 Top 10 papers by pagerank analysis

| Authors | Page rank | Local citations | Global citations |
|---------------------------|-----------|-----------------|------------------|
| Gossling et al. (2020) | 0.030572 | 22 | 79 |
| Hall et al. (2020) | 0.025121 | 11 | 27 |
| Novelli et al. (2018) | 0.017028 | 14 | 31 |
| Kuo et al. (2011) | 0.016043 | 11 | 84 |
| Higgins-Desbiolles (2020) | 0.015747 | 9 | 20 |
| Lee et al. (2012) | 0.015396 | 7 | 67 |
| McKercher and Chon (2004) | 0.013892 | 9 | 53 |
| Page et al. (2012) | 0.013805 | 4 | 58 |
| Mair et al. (2016) | 0.013618 | 4 | 102 |
| Gretzel et al. (2020) | 0.013503 | 5 | 10 |

papers table (Table 4) also it was not in top 5 papers. Hence there is not much deviation found in the studies in terms of popularity and prestige.

4 Content analysis

A co-occurrence network map of keywords helps in the identification of thematic clusters that originate primitive blocks for the investigating field (Caputo et al. 2021). Co-occurrence means “the frequency that a keyword appears with other keywords” (Farrukh et al. 2020). The core idea is that keywords that are grouped into the same cluster are likely to reflect similar themes. Following the recommendations of Manesh et al. (2021), the present study has taken the authors’ keywords (used in title, abstract, and keywords section) as the basic unit of analysis and kept only those keywords that occurred at least five times. For network visualization, the study relied on VOSviewer open-source tool as it offers scroll functionality and normalisation algorithms. The ‘comma separate value’ (CSV) file was used as an input file, and density-based spatial clustering was employed. For normalisation, we applied an association strength measure. This whole process resulted in the formulation of four major clusters. As shown in Fig. 4, each cluster is represented by a different colour. Further, a detailed investigation of research studies in each cluster recognises current themes and emerging trajectories in the field.

4.1 Cluster 1: COVID

COVID 19 received an overwhelming response from the academic fraternity. For the present study, we took stock of the existing papers published on this theme in the context of the TTH industry, and available literature can be classified into largely two streams. The papers written on the first theme assessed the impact of COVID-19 on the TTH industry, while others predicted the future of tourism in the post-COVID-19 era. The impact of COVID-19 on the TTH industry has been studied from different aspects. Few scholars have reported the role of COVID-19 on different sectors such as aviation (Gallego and Font 2020), hotels and restaurants (Dube et al. 2020), peer to peer accommodation (Farmaki et al. 2020; Litvin 2020), among others. Studies based on the real-time data collected from the period of approximately two years (November 2018 to December 2020) pointed out that consumers were pessimistic about their future travel plans, particularly for Asian countries (Uzuner and Ghosh 2020; Gallego and Font 2020). Interestingly, Falk and Hagsten (2020) found that COVID-19 already spread in the Scandinavian region before announcing travel restrictions; hence these restrictions were too late to be introduced and did not help much in impeding the spread of the virus. Dube et al. (2020) collected real-time data and reported zero sitting customers (guests) in hotels or restaurants across many countries due to lockdowns and restricted movements. Besides this, scholars from different parts of the world reported the impact of COVID-19 on TTH in their respective countries. For example, European scholars (Filimonau et al. 2020; Gil-Alana and Poza 2020; Mariolis et al. 2020; Williams 2020) examined the impact of COVID-19 on employment, organisations, economy, among others. Mariolis et al. (2020) revealed that the Greek economy would witness a decrease in gross domestic production (GDP) up to 6%. Filimonau et al. (2020) in a quantitative study, interlinked the perceived job security with organisational commitment and found that anti-COVID-19 actions affect perceived job security. On the other

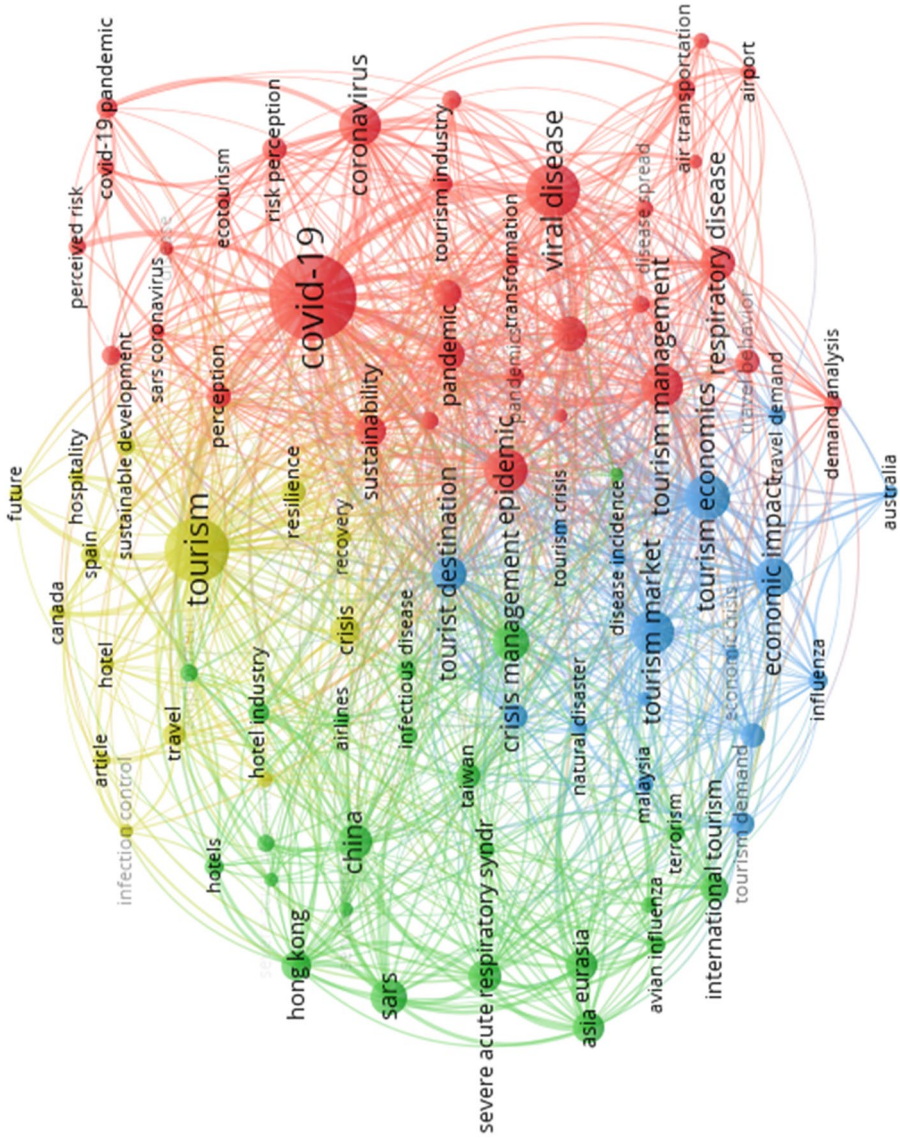


Fig. 4 Co-occurrence network analysis

hand, Williams (2020) shared the plight of organisations or workers employed in unorganised TTH. He suggested that the government can reach this segment through voluntary disclosure initiatives to provide temporary financial support. McCartney (2020) informed the dreadful impact of COVID-19 on the Asian economy. Foo et al. (2020) highlighted that the Malaysian tourism industry has been adversely affected by COVID-19 and discussed several stimulus packages offered by the government to boost the tourism industry. Many scholars have also premediated the impact of a virus outbreak on marginalised communities (Everingham and Chassagne 2020), geopolitical relations (Lee et al. 2020), education (Edelheim 2020; Wen et al. 2020), rural tourism (Vaishar and Štastná 2020), real estate sector (Majumder and Biswas 2021) among others. Scholars noticed that the existing COVID-19 might play a role as a catalyst of aggravating existing geopolitical tension between nations. Moreover, tourism as a discipline may also be less preferred in the future by the students due to the high exposure of the TTH industry to uncertainties (Edelheim 2020). Several studies (Edwards 2020; Higgins-Desbiolles 2020) note that society is also paying the price of COVID-19 as countries, particularly the poor countries, are not prepared to deal with the health crisis and are also not in a position to support their unemployed citizens. Scholars have also examined the impact of COVID-19 on consumer travel behaviour (Yang and Wong 2020; Zhang et al. 2020; Bae and Chang 2020) and the labour market (Huang et al. 2020). On the other hand, a substantial number of scholars opined that tourism in post-COVID times would be metamorphosed. Önder and Gunter (2020) opined that the application of blockchain technology in the TTH industry might improve the industry's work by leaps and bounds. Seyitoğlu and Ivanov (2020) highlighted that in the future, technology, particularly robots, will play a key role in service delivery systems as guests look for minimum contact with the employees (Hakseung and Juhyun 2020). Christou et al. (2020) also established that customers have positive perceptions about the usage of anthropomorphic robots in hotels. Many scholars (Cheer 2020; Mostafanezhad 2020; Lapointe 2020; Prideaux et al. 2020) hypothesized that the outbreak of COVID-19 is an opportunity to reshape tourism with a more inclusive approach, meaning connecting with host communities. For example, many new types of tourism are expected to grow in the future, such as intact tourism, six feet tourism, and indigenous tourism. In the future, efforts should be in developing domestic tourism too rather than just depending on inbound tourism (Hall et al. 2020).

4.2 Cluster 2: severe acute respiratory syndrome (SARS)

The Severe Acute Respiratory Syndrome, popularly known as SARS, is probably the first global pandemic that got considerable academic attention. SARS got its name from the World Health Organization (WHO) in March 2003, through the first case that appeared in November 2002 (Gu and Wall 2006). SARS outbreak is an example of a short-term crisis that lasted for approximately six months but had a significant political, economic, and medical impact on many South Asian countries, specifically China and Hong Kong. Scholarly research on SARS can be largely classified into two broad categories. The *first line* of studies (Yang and Chen 2009; Wang 2009; Zeng et al. 2005) has measured the economic impact of SARS, while the *second line* of studies (Lee and Warner 2006; Au et al. 2005) focused on the strategies espoused by the organisations during and post SARS period. As Asia was the epicentre of SARS; therefore, we find more studies authored by Asian scholars. For example, scholars have taken stock of outbound and inbound tourism of a particular country such as Cambodia (Selatan 2009), Taiwan (Chen 2011), Malaysia

(Tang and Lau 2017), China (Zeng et al. 2005; Zhang et al. 2005), Hong Kong (Au et al. 2005). Zhang et al. (2005) examined the post-SARS sentiments of Chinese domestic tourists through the survey method. They found that both internal and external motivation factors were responsible for low leisure demand. They further pointed out a shift in destination choices and argued that people have more inclination towards eco-tourism and countryside locations. Au et al. (2005) postulated that SARS might have long-term impact on the Hong Kong tourism industry. They suggested that authorities should address this issue by designing country-specific promotional policies rather than just a common strategy. Chien and Law (2003) compared the impact of SARS on Hong Kong with other countries like China and Singapore. The results asserted that Hong Kong was the worst affected country by SARS pandemic. The negative sentiments were also reflected by the Taiwan stock markets, and the hotel occupancies were as low as 40 percent in five -star hotels in spite of the reduction in average room rates (Chen et al. 2007). The calling off of the “Golden Week” (official labour day of China) added to the misery of the TTH industry (Dombey 2015). However, after tumbling for few months, TTH industry rolled up its arms and shown its resilience by implementing recovery plans. Scholars (Chen et al. 2007; Lee and Warner 2005) learnt that organisations in worst-hit countries started adopting cost-effective measures as an immediate remedy such as operating at less capacity, encouraging staff for non-paid leaves, discouragement to overtime work payment, restructuring of kitchens, among others. Besides this, all the measures pertaining to tourists’ health and safety were ensured to restore their confidence (Wang 2009). In sum, SARS tested the resilience power of TTH industry and taught them how to survive in difficult situation.

4.3 Cluster 3: crisis management

The tourism industry experiences a variety of crises ranging from natural disasters to terrorist attacks or currency fluctuations to the spread of epidemics. Still, not every organisation is prepared to handle these uncertainties (Tew et al. 2008). In the context of tourism, crisis management has been defined as a series of efforts that organisations put to comprehend, mitigate, and avert the crisis (Chen 2011). These actions are integrated in such a way that their stakeholders’ interests also remain intact. Mair et al. (2016) highlighted three steps of effective crisis management, starting with the planning stage wherein organisations prepare themselves before happening of crisis. The second step pertains to the management’s response during the occurrence of a pandemic and the last step as a lesson that organisations have learned that reflects in their future course of actions. The crisis management literature in TTH is found to be more generic in nature. Scholars have examined the state of crisis management regarding different unfavourable situations such as natural disasters, terrorist’s attacks, and economic downturns, ignoring the management of health-related emergencies. Only a handful of studies (Irvine and Anderson 2013; Tse et al. 2006) exclusively focused on crisis management with respect to infection-related diseases. For example, Page et al. (2012) presented a case study on Scotland’s response towards Hand & Mouth disease spread. Similarly, Novelli et al. (2018), while studying the impact of Ebola in the Gambia reported that pandemics have significant social and economic repercussions, particularly in developing countries. The same observations are also made by Yeh (2020) during the spread of the COVID 19 pandemic. They mentioned that lack of resources and the absence of tourism planning besides weak governance structures further screw up the recovery process for developing countries. Few scholars (Irvine and Anderson 2013; Page et al. 2006) opined that communication plays a key role during the outbreak of viruses and

media. Social media platforms should scrutinise the messages carefully. McKercher and Pine (2013) found that the mishandling of media during the SARS crisis by Hongkong left a lingering impact on the tourist. They chose other non-traditional destinations even after the country was declared SARS free World Health Organization (WHO). Yu et al. (2020) suggested that social media should refrain from exaggerating the facts and spreading racial discrimination. Further, technology can be utilised by the TTH industry to automate the processes in order to mitigate biological risks. Lai and Wong (2020) found that Israel is the leading country for providing crisis management frameworks that are largely followed by the rest of the world. Hao et al. (2020) propounded new strategies including retraining of human staff to develop multitasking capabilities amongst them, adoption of austere hygiene practices, stress on contactless services, operate as quarantine stations particularly for inbound tourists to maintain the balance between demand and supply. Gu and Wall (2006) besides discussing the three above mentioned stages of crisis management discussed about several promotional measures such as promoting Chinese tourism at International events (China and France Cultural Year), launching new campaigns—“China-Charm Forever” and “2008 Beijing—China Welcomes You”, spending heavily for advertisement on International Channels, focusing on intracontinental travel among others taken by Chinese government to normalise the TTH industry. Tew et al. (2008) hinted that pandemics will keep on occurring in future and organisations should offered many strategic lessons to the organisations should look for collaborations and cooperation at international, national and local levels. In another study, Lai and Wong (2020) compared through an empirical study the epidemic crisis management practices followed by the hotel industry of Macau during the first and second wave of COVID-19. They found that during the first wave, several marketing tactics like discounts on room prices or providing additional services were not working during the second wave of the current epidemic. In both the waves human-resource-related tactics such as no pay leave or reduced number of working hours to cut labour cost were followed. However, hotels are not offering voluntary early retirement to their skilled staff as after the end of the epidemic; their services will be required more in order to revive. Hotels have learnt a lot from past pandemics like SARS and do not look for government bailout packages for sustaining.

4.4 Cluster 4: sustainability

Sustainability has been linked to almost every discipline, including tourism, and attracting a lot of academic attention too. Besides this, sustainability is the central theme for many studies focusing on sub-domains of tourism industries such as restaurants, cruising, events, theme parks, to name some (Kasim et al. 2014). However, the focus on sustainability in contagious diseases related to tourism literature is comparatively recent. This content analysis found that it was only during the 2020 or current COVID-19 pandemic when scholars integrated these two domains (contagious diseases and sustainability) though in a few top-ranked (e.g., *Tourism Geographies*, *Journal of Sustainable Tourism*, *Crisis Management*) journals. Before that, there was hardly any study that has linked sustainability with disease-related tourism studies. During the COVID-19 pandemic period, scholars were scouting sustainable development of tourism wherein all the efforts were directed towards saving the environment and keeping the hospitality and tourism industry flourishing simultaneously (Jones and Comfort 2020; Galvani et al. 2020). However, we could trace a few instances where sustainability has been portrayed as a post-pandemic plan to overcome extraordinary situations. For example, Choe et al. (2020) reported that after MERS South

Korean government took a series of decisions or sustainability initiatives to save the tourism industry, such as free insurance or granting special loans programs, among others. In other words, sustainability has been termed as the recovery strategy that entails the tourism industry. However, sustainability has received a fresh perspective in epidemic-related tourism studies during the current pandemic situation. Haywood (2020) portrayed mindfulness as a means of sustainable tourism that includes more inclination towards domestic travel using technology and compassion tourism. Cooper and Alderman (2020) argued that sustainable tourism is understood in terms of just reducing greenhouse gas (GHG) emissions and complete ignorance towards loss in employment opportunities and revenue. They further pointed out that academic literature has failed to find the perfect accounting equation that balances economic viability and environmental responsibility, thus suggesting creating a sustainability fund to keep business moving. Jones and Comfort (2020), examined the relationship between sustainability and tourism industry during COVID-19 times and highlighted the unique challenges that industry is going through. They mentioned that few are seeing COVID-19 as an opportunity for nature to recover, but there is a dark side of it as well. Many people have lost their jobs, and various corporate sustainability programmes have come to a halt. The scholars are also discerning that shifts in the mindset of tourists of developed countries such as spending time with relatives than enjoying destinations due to COVID may lead to several economic and social challenges particularly for underdeveloped tourism-based economies (Cooper and Alderman 2020; Fennell 2020; Jones and Comfort 2020). Besides this, Fennell (2020) stated that companies should utilise technological capabilities to maintain the tag of resilient industry and achieve sustainable tourism. Ioannides and Gyimóthy (2020) suggested that sustainable tourism can be achieved by rethinking our existing capitalistic business models. We should start redesigning our training modules focusing on collaborative business models. Galvani et al. (2020) concluded that sustainable tourism could be achieved only by shifting in human knowledge, experience, desires, and consciousness. In contrast, Zenker and Kock (2020) are of the view that sustainability is largely driven by the efforts of internal stakeholders and organisational green practices behaviour. Albeit, after post COVID period, consumers are more inclined towards sustainable tourism (Zenker and Kock 2020).

5 Discussion

The present study attempts to contribute to the literature by collating all the scholarly published work on the theme of *contagious diseases and tourism*. Essentially, merely collating the papers will not be of much use until and unless we extract some insights through a systematic review. Although there are a number of studies available on contagious diseases in the context of tourism, but the combination of selected keywords (SARS, MERS, Covid-19, HINI, Swine flu, Coronavirus, Zika, Ebola, Bird flu, hotel, tourism, travel, tourists, hospitality), followed by bibliometric tools (Biblioshiny and VOSViewer) has not been found in the available literature. Hence, keeping in mind the findings, the present study's authors share some observations for similar studies in the future. The spread of contagious diseases is not uncommon, and the TTH industry always got badly affected by it. Albeit, the spread of coronavirus throws additional challenges on the industry because of its intensity and extent. It probably happened for the first time in the modern world that many countries closed the international borders simultaneously and restricted domestic movement too. Before that, particularly during the spread of SARS, international tourism was restricted

in a few countries of Asia, such as Hong Kong and China. While reviewing the studies, few differences can be clearly marked between SARS and the ongoing coronavirus period. First, coronavirus received more academic attention than the SARS pandemic. The major possible reasons behind this trend could be (i) COVID 19 has impacted almost every country (ii) the length of the coronavirus period, and (iii) a copious number of special issues on coronavirus. Second, the central theme of academic papers during the SARS period was either assessment of the negative impact of the same on TTH or the strategies adopted by the organisations to fight with it. However, during the COVID-19 pandemic, the focus of scholars is interdisciplinary and multidimensional. The impact of coronavirus is not examined just from the TTH industry point of view; rather, a comprehensive picture has been drawn using legal, social, ecological, geopolitical colours. Lastly, SARS has taught the TTH industry about crisis management while coronavirus is looking for structural changes by infusing sustainability as the main driver rather than just a namesake element. In sum, the frequent occurrence of these pandemics calls for pressing a RESET button in the TTH industry where countries dependent on tourism, in particular, will focus on supporting their own economies through propagating domestic tourism, and mass tourism may be replaced by *untact* tourism (Bae and Chang 2020).

6 Future research implications

After reviewing 328 studies on the theme of contagious disease and tourism, we identified four distinct clusters: Cluster 1: COVID-19; Cluster 2: SARS Cluster 3: Crisis management; and Cluster 4: Sustainability. Table 7 briefly mentions these clusters and the scope of future research in each cluster. A close examination of the selected studies instigates the research team to highlight certain gaps discovered while writing this paper. First, the research on contagious diseases should be a regular topic to study rather than an event study. We find certain points, particularly during and after the outbreak of any pandemic, when scholars engage themselves on this theme, and soon after that pandemic is over, the number of research work reduces substantially. Hence, we call for continuous academic research centered on contagious diseases.

Second, in spite of the availability of a number of studies on contagious diseases with special reference to the TTH industry, we discovered that only two continents, i.e., North America and East Asia are the major contributors in terms of publications. The submissive attitude of other continents on the same is another major gap that the authors found. COVID-19 has impacted almost every country. Authors argue that these kinds of situations can be better addressed if whole academia comes together and treats the contagious related issues as a pertinent issue for the TTH industry. Collaborations among global scholars can be another way to ensure maximum participation from all over the world. In addition, a memorandum of understanding between countries for boosting applied research may encourage scholars to undertake such issues for further exploration.

Next, a substantial number of studies dedicated to this theme are conceptual, viewpoint papers or based on real-time data. Only a handful of studies (Bae and Chang 2020; Ritichainuwat and Chakraborty 2009; Yeh 2020) have examined the consumers' perceptions during or after the outbreak of contagious diseases. At the same time, understanding consumers' psychology is of utmost importance for framing any recovery strategy. Hence, we encourage more follow-up studies in this perspective.

Table 7 Cluster classification and future research directions

| Cluster no and label | Current research | Future research |
|-------------------------------------|--|--|
| <i>Cluster 1: COVID 19</i> | States about the impact of COVID-19 on different sectors of TTH industry, countries, stakeholders, and contexts. Besides this, future possible trends that will reshape tourism in post COVID-19 era (Gallego and Font 2020; Williams 2020; Mariolis et al. 2020; Filimonau et al. 2020; Gil-Alana and Poza 2020; Lapointe 2020; Prideaux et al. 2020; Cheer 2020; Mostafaezhad 2020; Onder and Gunter 2020) | To limit the physical contact TTH industry has started offering the technology mediated solutions to the travellers such as virtual tours, robotic services among others. Hence, consumers' willingness to adopt these new services should be examined. Apart from this newer applications based on advanced technologies such as artificial intelligence, robotics, and blockchain technology should be explored to provide physical distant services |
| <i>Cluster 2: SARS</i> | Explains about how tourism industry particularly operating in Asian countries wrangled with SARS and how they overcame from its negative impacts (Yang and Chen 2009; Wang 2009; Zeng et al. 2005; Chen et al. 2007; Lee and Warner 2005) | More studies should be carried out to understand the rippling effect of SARS on several sectors such as aviation, hotels, restaurant etc. within TTH industry. Furthermore, the impact of SARS or any other pandemic should be compared among different sectors of TTH industry |
| <i>Cluster 3: Crisis Management</i> | Elaborates about different stages of crisis and the strategies adopted by the organizations as the pandemic progresses (Tew et al. 2008; Chen 2011; Page et al. 2012; McKercher and Pine 2013; Hao et al. 2020; Lai and Wong 2020; Yu et al. 2020) | Innovative coping strategies should be designed for managing the crisis. Also, post-crisis studies should be conducted to effectiveness of existing coping strategies |
| <i>Cluster 4: Sustainability</i> | This cluster is an emerging concept in the area of contagious diseases and tourism. The scholars stated that sustainability in tourism needs to be understood beyond saving environment and aspiring prosperous travel and tourism industry (Kasim et al. 2014; Ioannides and Gimóthy 2020; Galvani et al. 2020; Cooper and Alderman 2020; Fennell 2020; Haywood 2020) | A deep thought is required to improve the long-term viability of tourism enterprises amid of uncertainties. This is a wake-up call for tourists, corporates, educators and governments to rebuild tourism industry with the perspective of equity |

Furthermore, scholars are regularly alarming organisations and government about the ecological issues that society is facing due to over-tourism still, no full-proof plan has till now could be chalked down to achieve the twin goal that is the growth of industry and environment protection. Hence, scholars should be regularly invited to deliberate upon this issue with urgency.

To sum up, academia and practitioners are the two important forces to drive the TTH industry to the level where not only resilience but also the resistance of the industry could be tweaked. During the current COVID 19 pandemics, only China is able to maintain its GDP in green while all other economies, including developed and underdeveloped countries, showed negative GDP. One possible reason could be that during SARS, China learned hard lessons, particularly how to survive without government aid and media management. Scholars also contributed by suggesting various recovery strategies. During the coronavirus period, Chinese organisations applied those learning which helped them in recovering faster than the rest of the world. Hence, academia and industry should work in tandem to achieve sustainable tourism without compromising on the growth of the TTH industry.

7 Conclusion

This study conducted the bibliometric and content analysis of the available literature surrounding contagious diseases in the TTH industry from 2003 to 2020 extracted from Scopus and Web of Science citation databases during December 2020. Four major themes, such as COVID-19, SARS, Crisis Management, and Sustainability, emerged from bibliometric analysis after applying the Biblioshiny package inbuilt in R software. COVID-19 has left such a significant impact on the TTH industry that the historical development tourism will be studied in two time zones; BC (before coronavirus) and AC (after coronavirus). Likewise, in any natural calamity or disaster, the outbreak of contagious diseases also constantly reminds us of the limited resistance the TTH industry has against these problematic situations. Nonetheless, each difficult situation has reshaped the tourism industry in its own way. For example, after September 11, 2001, there was a demand for short-duration visits and economical tour packages. The outbreak of Foot and Mouth disease encouraged rural tourism, albeit in Britain, while after SARS, culinary habits of the Chinese have changed a lot (Yeh, 2020). Likewise, COVID-19 is pushing people towards new types of tourism such as staycation, workation, six-feet tourism, among others. Apart from this, all the stakeholders of TTH industry should be thought along with the lines of “WE” rather than “ME.”

Though the present study contributed in a number of ways in literature, several methodological limitations should be highlighted. First, the present study faces publication bias as grey and unpublished literature was not a part of this review. Second, literature available only in English is included; hence future studies may examine the literature available in other languages. Though bibliometric is an objective and reproducible literature analysis method, a qualitative method provides a greater understanding of the phenomenon. Therefore, future studies may conduct other types of systematic literature reviews.

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