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## Bibliometric Analysis on Tourism in Bangladesh

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### Abstract

*The bibliometric analysis presented in this paper has been carried out for the purpose of analyzing the trends and distribution of tourism literature in Bangladesh. The paper focuses on Bangladesh originated papers available in Scopus database only. 117 documents were filtered from 206 documents based on relevance. Annual scientific production, sources, authors and citations were ranked and analyzed to determine the distribution of these variables across the documents. Network analysis using 'authors' keywords has been utilized to visualize and analyze the prominent ideas under discussion within the framework of available documents. The analysis revealed several distinct topics namely ecotourism, tourism in Sundarbans, hospitality sector, governance, domestic-regional tourism. Thematic evaluation helped to visualize the evolution or trend in topics being discussed in these documents based on two distinct periods of time. Thematic mapping revealed that the dominant research of tourism literature in Bangladesh has shifted from domestic tourism research to theoretical framework development. It also reveals that the base themes of tourism research have evolved from conservation, biodiversity protection to sustainable tourism. Emerging topic in tourism research is the impact of social media in tourism.*

**Keywords:** tourism, tourism development, tourism and environment, bibliometric analysis, ecotourismSS

### Introduction

The tourism sector of Bangladesh has been contributing to its economy for quite a long time. But unfortunately, scientific research on the sector has begun only recently. Bangladesh lacks a strong export base. But the export policy of 2018-2021 discussed tourism sector as one of the two “Special Development Service Sectors” that can contribute to the export of Bangladesh (Ministry of Commerce, 2020). The importance and potential of the tourism sector in the economy of Bangladesh are undeniable. Unfortunately, the sector lacks proper management and ethical practices, as discussed in section 6.7 of this paper.

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This paper uses bibliometric analysis to determine the subject matters focused on tourism literatures in Bangladesh to compare and derive conclusions on the scope of tourism research.

Bibliometric Analysis is a useful tool to analyze trends and distribution of existing literature in a specific field of research. It is a meta-analysis used to derive overall quantitative conclusions from a large number of publications. Such analyses help discover issues that have or have not been explored in a specific field of research. Thus the development process of that research field can be kept on track. For example, the existing literature in the tourism sector in Bangladesh focuses only on the overall tourism, its role on the economy and its development potential. But the potential of other subcategories of tourism such as medical tourism, sports tourism, hotel tourism etc. remain unexplored. However, such research is necessary in order to enhance the tourism sector. Bibliometric analysis also helps determine the magnitude of collaboration within the local and foreign authors of a specific research field. The specialization of journals can also be determined using bibliometric analysis.

For this research, data was collected from the “Scopus” abstract and citation database. “Tourism” and “Bangladesh” terms were used to find out the expected documents. 206 documents were found after searching the database. After sorting and cleaning, a sample of 117 documents was produced. From these documents, 458 “author keywords” and 478 “keywords plus” were found. “Authors keyword” was used to conduct this research. The analysis found 5 themes or topics in the research on Tourism in Bangladesh. They are (i) Ecotourism (ii) Tourism in Sundarbans (iii) Hospitality sector (iv) Governance (v) Domestic and Regional Tourism. More themes should have been found but the dataset only produced these five themes. This also indicates the poor research condition in this sector. Thematic evolution analysis finds that research in this area is quite new and yet to evolve. To find the thematic evaluation, the time span was divided into two slices (i) 1985-2017 (ii) 2018-2021. The base of tourism research evolved from ecotourism focusing on conservation and protection, hospitality research to governance and sustainable ecotourism. Dominant topics evolved from domestic and regional tourism to developing theoretical frameworks. An emerging topic in tourism research is now the impact of social media.

In the following section, this paper presents background and rational of the study. The methods are discussed in section 4. The results and discussion are included in Section 5. Finally, Section 6 presents implication of the study and finally the conclusions is discussed.

### **Background & Issues**

The first bibliometric paper was introduced by Alfred James Lotka. In 1926, he published a paper on the frequency distribution of scientific productivity. At the same time, he also introduced the first law of bibliometrics, 'Lotka's law. After 8 years, in 1934 the term "bibliometrie" in French was used for the first time by Paul Otlet. Later in the same year, Samuel Bradford published his work on analyzing the frequency distribution of articles across journals in a specific discipline and his work also became a key law of bibliometrics. These works were unnoticed until Derek John de Solla Price published his studies entitled "Science since Babylon" in 1961 and "Little science- Big science" in 1963. (Thomson et al., 2015)

Modern Bibliometrics was first introduced by the work of Eugene Garfield. He developed the Science Citation Index (CSI) in 1955. It was a new approach for literature study by tracking and systematizing the process of citations for individual articles. As the discipline began to mature, new terms such as bibliometrics, scientometrics, cybermetrics, webometrics, and altmetrics appeared in different fields of study. Following all these developments, bibliometric principles are widely used in some major areas such as scientific disciplines, science policy and methodology research. Nowadays, research institutions and organizations are heavily relying on more sophisticated bibliometric techniques to analyze the research data more efficiently (Batistič & Van der Laken, 2019; Luo et al., 2022; ecom, 2021).

### **Research Problem and Rationale of the Research**

Tourism in Bangladesh could be an emerging source of export earnings. But research in this area is at its rudimentary stage as an increasing trend has only recently been witnessed after 2010. Before that, this area was discussed but received little attention; hence, a small number of significant publications have been available. Even now, many aspects of this subject are not explored and discussed comprehensively and scientifically. Bibliometric analyses help discover issues that have or have not been explored in a specific field of research. The objective of this paper is to find out the research trend in this sector, identifying what types of research have been done so far, what are the most impactful research in this field, who are the most productive and impactful author in this field and finally find out what types of researches are required to enrich this field. Without proper research and study, tourism sector of Bangladesh will not flourish.

### **Literature Review**

It seems that sustainability in tourism is the most analysed topic in bibliometric analysis on tourism research (Moyle et al., 2020; Jiménez-García et al., 2020; Della Corte et al., 2019; Niñerola et al., 2019; Garrigos-Simon et al., 2018; Sánchez-Cañizares et al., 2018; Ruhanen et al., 2015). As global warming is a burning issue at present, most of the

literature in tourism research may be focused on sustaining the natural beauty of tourist spots for a constant inflow of future revenues. Furthermore, the discussion of sustainability in tourism connects efficient tourism management, ethical tourism practises, conservation of resources and so on. The aforementioned papers did not focus on just one country; rather, country collaboration and author collaboration worldwide were a repeated fact in these papers, proving that most of the countries are collaborating on sustainable tourism at present. But there are bibliometric analyses on country-specific tourism research, such as the case in this paper.

Among the most cited bibliometric analysis papers based on country-specific tourism research, Turkey is upfront. There has been several bibliometric analysis on the tourism research in Turkey (Duran Cankül, 2021; Çetin, 2019; Yilmaz, 2019; Güzeller & Çeliker, 2018; Bozok et al., 2017; Köseoglu et al., 2015; Evren & Kozak 2014). Although bibliometric analysis papers focus on the papers related to or originated from Turkey, none were confined to only Turkish journals. Similar bibliometric analyses on tourism research of individual countries have been conducted on Brazil, but the analyses were confined to Brazilian journals only (Fontan Kohler & Antonio Digiampietri, 2021; Köhler et al., 2019). Such analyses were also observable in the case of China and Spain (López-Bonilla et al., 2021; Qiuyun et al., 2014).

The recent bibliometric papers available in “Google Scholars” also focus not only on country-specific tourism research but also on subcategories of tourism such as family tourism, sports tourism, medical tourism, rural tourism, wine tourism, adventure tourism, film tourism, smart tourism, halal tourism etc. (Suban, et al., 2021; Hidayat et al., 2021; Shnyrkova et al., 2020; Virani et al., 2020; Jiménez-García et al., 2020; Li et al., 2020; Körössy & dos Santos Paes, 2020; Johnson & Samakovlis, 2019; Cheng et al., 2018; Bozok et al., 2017; Sánchez et al., 2017)

Bangladesh is also progressing in the field of bibliometric analysis although there has not been any such analysis in the field of tourism research in Bangladesh. Majumder et al. (2015) conducted a bibliometric study on the South East Asia Journal of Public Health from 2011 to 2015. The paper analyses the percentage share of original research, annual scientific production, the share of production by a number of authors, rate of degree of collaboration and country ranking in share of publications in the journal. The paper suggests the indexation of other popular search engines such as PubMed to attract global researchers and increase the citations of the papers. Another bibliometric study conducted by Miah et al. (2008) measures the quality of the publication and authorship of forestry research in Bangladesh. The paper focuses on three journals published by Chittagong University. Analysis on the number of total publications and citation analysis revealed the productivity of the journals. Publications primarily focused on Silviculture, but they gave less emphasis on the field of climate change, physiology, machineries, production technology, social forestry, wood chemistry, and forest soil.

Only the library and information science sector (LIS) has witnessed two bibliometric papers in Bangladesh. Khan et al. (1998) conducted a bibliometric analysis on the papers and studies of library and information science during 1966 to 1997 which is based on the analysis of growth and size of the LIS literature in Bangladesh, language of the publication, authorship pattern, characteristics of the contributing periodicals and geographical distribution of periodicals. His Study suggests the involvement of government, higher education and research organizations in the creations of required facilities and coordination to shift the focus of LIS study from situation overview to practice, use and application of information and communication technologies. A similar analysis on LIS has been conducted by Islam & Roy (2021) from the period 1971 to 2020. Sm& Rahman (2008) applied Lotka's law of full productivity and Bradford-Zipf on the nutrition literature of Bangladesh from 1987 to 2006.

Jarin et al. (2021) conducted a bibliometric analysis on the characteristics of integration of knowledge in education literature using 102 documents from Web of Science (WOS) index journals. The key themes are: knowledge transfer, higher education, university, innovation and management. The study uses only the WOS database and is restricted to certain keywords. Another bibliometric study conducted on research output of Bangladesh in S&T reveals that Bangladesh has produced 11688 papers and received between 100 to 415 citations on average during the period 2001 to 2010 (Gupta et al, 2013). Another bibliometric analysis was conducted on the literature of diarrhoeal diseases investigating the growth in literature in this field along with collaboration and co-authorship. The study also analyses Bradford Zipf, Lotka's law and Bradford's law to determine the characteristics of journals but they were inapplicable for such literature in Bangladesh. Moreover, the h-index was also analyzed to determine the impact of the literatures (Khatun & Ahmed, 2011).

### **Materials and Method**

To conduct this research the "Scopus" abstract and citation database was used. It was accessed on 3 October 2021. This database was selected because it collects scientific publications with the most significant impact and can be used as the main criterion for making academic decisions. Other publications in this paper's area of interest might not be indexed in this database. But, the quality of those publications can't be assured. As such, these papers were not considered to include in the sample.

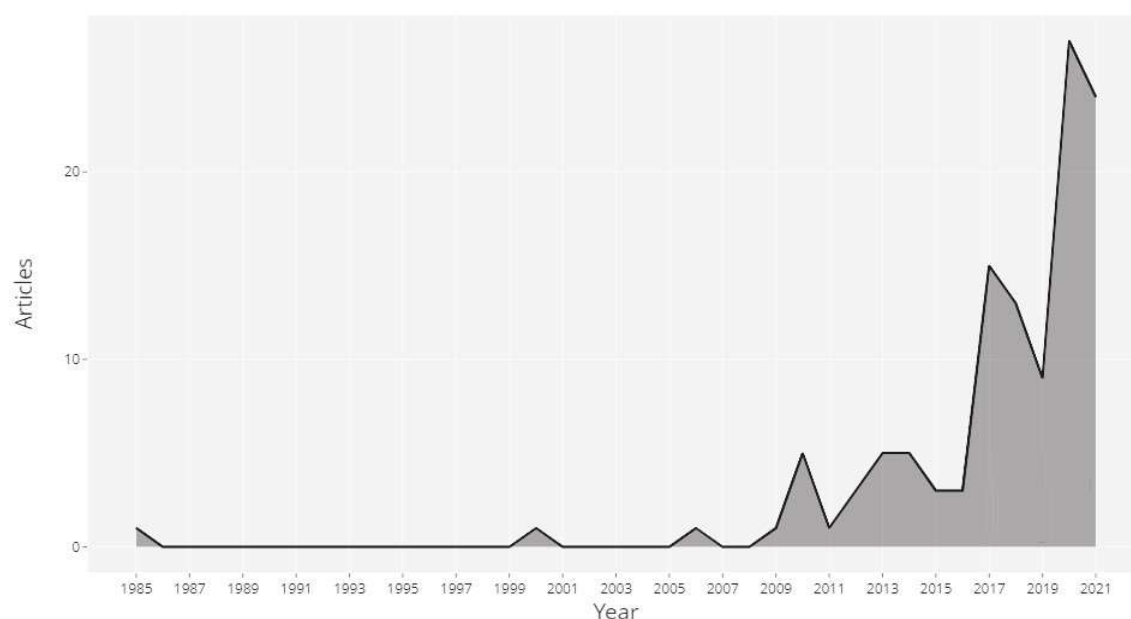
The search of documents in this database was carried out using the terms "Bangladesh" and "Tourism". Those documents are selected which have these terms in the title, abstract, and/or keywords. Initially, 206 documents were found. After cleaning the data, only 117 documents remained. Documents other than from social science journals (i.e medical science, geology) and papers with incomplete information were excluded. After filtering, a sample of 117 publications dated from 1985 to 2021, with an average citation of 4.66 per document, was produced. Which was later used for the

bibliometric analysis in this paper. The analysis was divided into three parts: (i) Descriptive Analysis, (ii) Content Analysis and (iii) Conceptual Analysis.

To conduct this study the following software were used: (i) RStudio and (ii) Openrefine. The “Bibliometrix” (Aria et al, 2017) package in R studio was utilized. Openrefine (Verborgh et al, 2013) an open resource software is used to clean the data.

## Result and Discussion

### Annual Scientific Production



**Figure 1: Annual Scientific Production**  
(Source: Scopus Data, Graph prepared by Biblioshiny)

According to the “Scopus” database, the first publication on this topic was in 1985. After that, there was no significant publication until 2000. From 1985 to 2000, only one paper had been published. Publication on this topic was low from 2001 to 2015 (only 24 publications) and the average number of citations per year per publication was 0.8967. After 2015 research on this topic began to increase. From 2016 to 2021, the number of publications on this topic was 91 with an annual growth rate of 51.57% and the average citations per year per publication was 0.7506.

### Most Relevant Sources

The sources mentioned in the table above accommodate the majority of the significant publications on tourism research in Bangladesh. These sources can be utilized by the new researchers who wish to start research on the tourism sector of Bangladesh. But, this table does not reveal the most impactful sources.



**Table 1: Most Relevant Sources**

Sources	Number of Articles
Journal Of Sustainable Tourism	6
Geojournal Of Tourism And Geosites	4
Tourism Recreation Research	4
Wilderness Of Wildlife Tourism	4
International Journal Of Tourism Policy	3

*Source: Scopus Database*

According to table 1, the most relevant source with this research topic is “Journal of Sustainable Tourism”. This journal contains 6 articles which focus on tourism in Bangladesh. “Journal of Sustainable Tourism” is a peer reviewed journal which mainly focuses on theoretical, conceptual framework and empirical research.

### **Most Productive Authors**

Tourism research in Bangladesh has witnessed a large number of authors. According to the “Scopus” database 328 authors contributed to tourism research in Bangladesh. Each of these articles has an average of 2.8 authors. Only 3 authors have 4 or more publications. 85.7% of the authors have produced only one scientific paper. This indicates a low concentration in the field of tourism in Bangladesh.

**Table 3: Most Productive Authors**

Author	Number of Publications
Hoque MA	4
Islam MM	4
Quaddus M	4
Shanka T	4
Abdullah SK	3

*Source: Scopus Database*



**Table 4: Most Cited Papers**

Authors	Title	TC	CPY	Source
Uddin MS	Economic valuation of provisioning and cultural services of a protected mangrove ecosystem: A case study on Sundarbans Reserve Forest, Bangladesh	67	6.70	Ecosystem Services
Richter LK	Policy choices in South Asian tourism development	30	.789	Annals of Tourism Research
Chishti MZ	Examining the asymmetric effects of globalization and tourism on pollution emissions in South Asia	27	9.50 0	Environmental Science and Pollution Research
Salam MA	Ecotourism to Protect the Reserve Mangrove Forest the Sundarbans and its Flora and Fauna	25	1.87 5	Anatolia
Mahon BE	Effectiveness of typhoid vaccination in US travelers	21	2.33	Vaccine
Abbreviations: TC: Total Citation, CPY: Citation Per Year				

*Source:* Scopus Database

### Most Cited Papers

Table 4 presents the list of most cited papers on the subject area. The names of two of the most impactful journals appeared in this table “Annals of Tourism Research” and “Anatolia”. These two journals were also in table 2 which presented the list of the most impactful journals. From this table it can be seen that one of the most productive authors is “Uddin MS”.

The article titled “Economic valuation of provisioning and cultural services of a protected mangrove ecosystem: A case study on Sundarbans Reserve Forest, Bangladesh” received the highest number of citations but the highest annual citation was received by the article titled “Examining the asymmetric effects of globalization and tourism on pollution emissions in South Asia”.

### **Keyword Analysis**

Total sample produced 458 authors keywords and 478 keyword plus. These keywords are useful to find the out most studied topics in the area of interest. For this analysis, this study mostly used the ‘authors’ keyword. Because these keywords are selected by the authors of the publications and these words represent their work more precisely. On the other hand, keyword plus are those words which occurred repeatedly in the publications title or abstract. Often articles or prepositions are identified as keywords by the software and mislead the bibliometric analysis. Out of 478 keywords only 6 appeared more than 10 times. “Bangladesh” and “Tourism” are the most appeared keywords. This means these two keywords will be in the centre of the network. Other frequently used keywords are “Ecotourism”, “Satisfaction”, “Sundarbans”, “Governance” and “Tourism Development”.

### **Co-occurrence Network Analysis**

This analysis shows the keywords that appear together. This helps to understand the topics discussed in this paper’s field of interest. It also identifies the most important and recent topics discussed in this field. Co-occurrence network has 30 keywords with a minimum number of 2 occurrences. The most recurring keywords are in larger nodes. Distance between the nodes shows the relationship between keywords. The shorter the distance the stronger the relationship. “Biblioshiny” package of R is used to produce the network. The programme identified 8 clusters. Clusters can be identified by their colour. Nodes of the same colours belong to the same cluster.

A pink cluster is visible at the centre. In this cluster, the keywords are Bangladesh, tourism, globalization, south Asia, protection, marketing, contingent valuation method, co-management. This cluster includes keywords that cover the most discussed topics in the tourism research in Bangladesh. Bangladesh is a potential ecotourism spot. Ecotourism is the concept of sustainable tourism that focuses on conserving the environment. Protected areas of Bangladesh like Sundarbans, Laucharia Uddan are potential ecotourism spots. Ecotourism in these areas can create employment. The success of ecotourism depends on proper marketing and quality services to ensure customer satisfaction (Roy, M et al., 2020). The idea of ecotourism is sustainable tourism where tourists enjoy the natural beauty and enjoy the local culture without hampering them. In many cases, it can’t be achieved because local people are not aware of and trained on to handle tourists and their demands. As such an adaptive co-management

model can solve this issue. The idea of tourism in Bangladesh needs to be globalized. Bangladesh can be a potential ecotourism spot in South Asia. It requires more marketing and government intervention. The problem with ecotourism is measuring the value of that spot. The value of places like Sundarbans and Laucharia Uddan can't be determined. So, some researchers suggested a contingent valuation method to determine the value of these tourist spots. Determining the values of these spots will enable the policy makers to take more precise decisions.

The brown cluster emerged from the pink cluster focuses on the ecotourism aspect of Bangladesh. This cluster has four keywords. Sundarbans is world's largest mangrove forest situated in Bangladesh. The keyword Sundarbans indicate research in ecotourism in Sundarbans. "Employment" indicates research on the impact of tourism on the livelihood of people in Sundarbans. "Fisheries" indicates that a significant amount of research on tourism has been done to find out how sport fisheries in wetlands can affect the livelihood and employment.

The green cluster emerging from the node "Bangladesh" represents research in ecotourism in Sundarbans. "Mangrove" indicate the Sundarbans while "Climate Change" shows research is done on the impact of climate change on Sundarbans. It might also indicate how tourism can help fight climate change and conservation of Sundarbans (Hossain, M. et al., 2021, Khan, M. S et al., 2021).

A red cluster emerged from the node "Bangladesh", where the keywords risk, loyalty and satisfaction are visible. This cluster indicates the hospitality industry. For a tourism business to sustain it must focus on hospitality. It has to ensure quality service to satisfy customers (tourists). Only then will they have loyal customers and business will sustain (Bhuiyan et al. 2019).

The purple cluster includes "Adaptive Co-management", "Protected Areas", "Governance". A significant amount of research shows that to encourage tourism in protected areas like Sundarbans, Chera-deep etc. good governance is a necessary condition. But good governance will only bring welfare to local people when it is done in an adaptive co-management manner. Local people will also be a part of governments planning and policy design. Good governance can promote tourism. It needs to be done through co-management for maximum outcome (Adiyia et al., 2015; Islam et al., 2018; Islam et al., 2017).

The blue cluster contains keywords "Altitude", "Domestic Tourist", "Responsible Tourism Management", "Domestic Tourist", "Sustainable Tourism", "Cox's Bazar". This cluster represents the domestic tourism researches in Bangladesh. Cox's Bazar is the largest sea-beach in the world and one of the main tourist destinations for Bangladeshi people. Cox's Bazar can also be a global tourist attraction as well as local. A significant amount of study had been done regarding domestic tourism and it's potential. Literature study also reveals that to enrich Cox's Bazar as a tourist spot, more responsible management is required. Research was also conducted to show how



**Figure 2:** *Co-occurrence Network Analysis*  
(Source: Scopus Database, Network prepared by Biblioshiny Package)

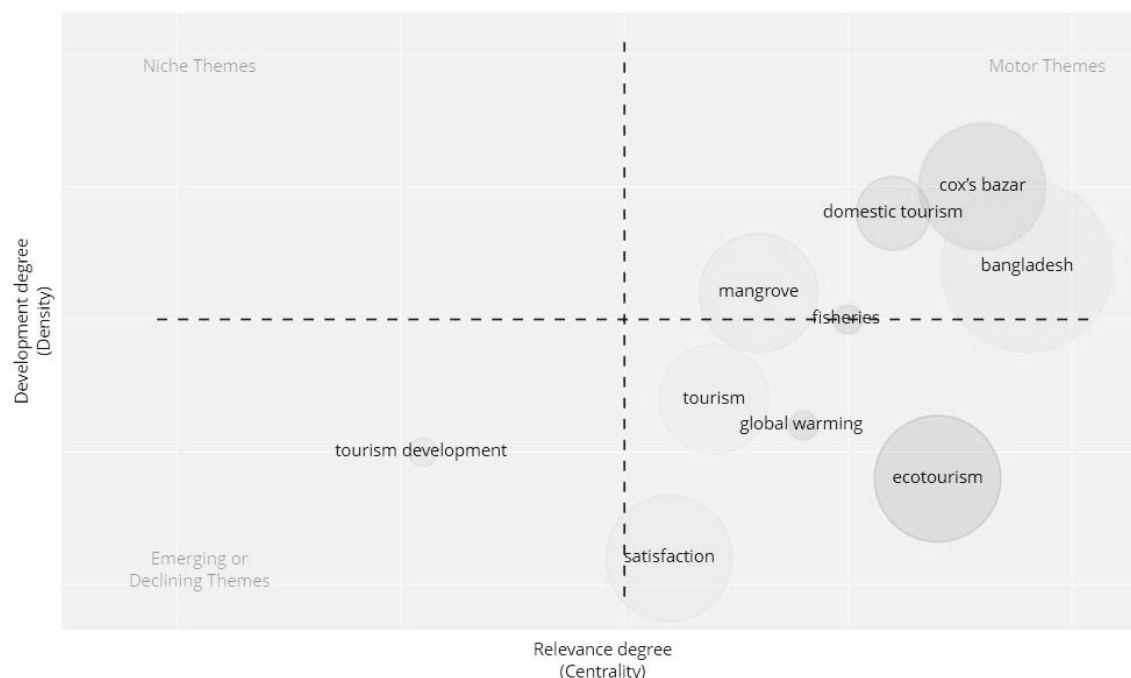
There are two other clusters, an ash cluster and a yellow cluster. The first cluster has “innovation” & “mobile learning”, and the latter cluster has “beach destination” and “destination image”. Apparently, these two clusters show no meaning and no connection with the rest of the clusters. This means these two clusters fall under the tourism domain, but more research is required to establish a connection. All the data to create this map is provided in Appendix 7.1

Using figure 2 we can find 6 specific research areas. (i) The pink cluster shows research development on ecotourism in Bangladesh. (ii) The green cluster shows tourism research development on mangrove areas and livelihood in mangrove areas. (iii) The blue cluster shows research development on domestic tourism. (iv) The red cluster shows the development of hospitality research in the tourism sector. (v) Purple cluster indicates research on tourism has concentrated on the effect of governance and co-management on sustainable tourism especially in wetlands. (iv) The orange cluster represents research on new theory and application.

### Thematic Evaluation Map

Thematic evaluation map will show us how different topics under tourism research have evolved over time. For this analysis this paper divided time span into two

slices: 1985-2017 as depicted in figure 3 and 2018-2021 as depicted in figure 4. The rationale behind taking these two slices is that tourism research in Bangladesh is quite recent. Such research began in 1985 but witnessed an upsurge around 2017. As such taking smaller time slices will not render any better result because there was very little, inconsistent research and hence no evaluation of topics.



**Figure 3:** *Thematic Evaluation, Time Span: 1985-2017*  
(Source: Scopus Database, Network prepared by Biblioshiny)

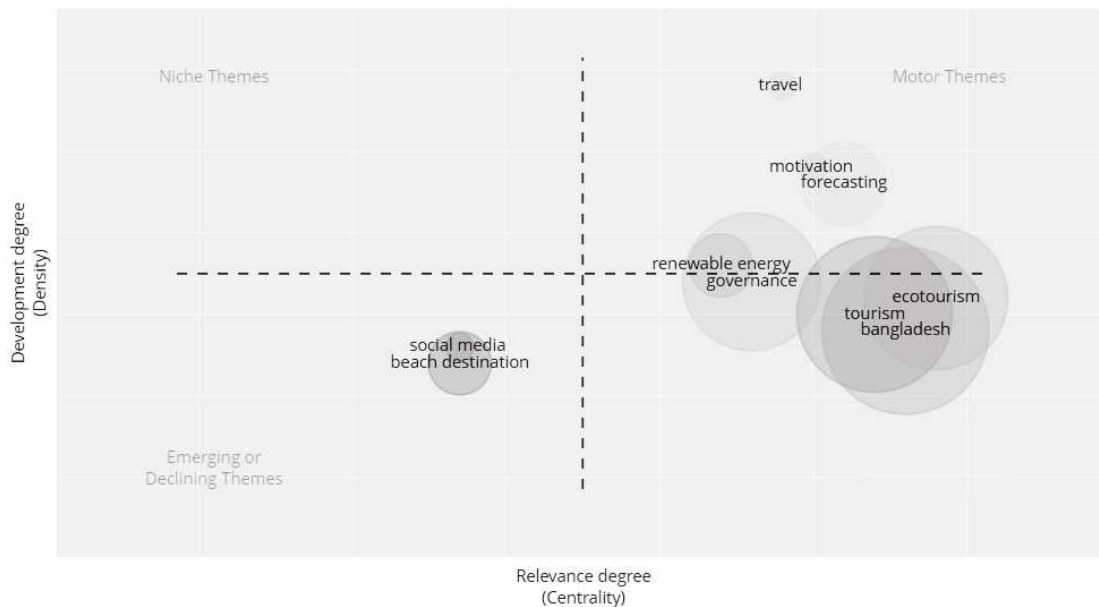
Here each bubble represents a cluster. Bubble name depends on the occurrence weight. Keywords with higher occurrence are shown as the bubble name. The bubble size is proportional to the word occurrence. The colour of the bubble does not represent the same clusters produced in figure 2.

In the map we can see that between 1985 and 2017, “tourism development” was an emerging topic. Volume of published research and “relevance degree” (centrality) both are low on tourism development. Research related to tourism development has started to receive attention from the researchers in the field of tourism research in Bangladesh.

The “ecotourism” cluster includes topics like biodiversity protection and protected area. The tourism cluster includes “tourism”, “conservation”. These two clusters represent ecotourism research. Ecotourism is one of the research areas found in the co-occurrence analysis. The “satisfaction” cluster includes topics like “loyalty” and “service quality”. So this cluster represents the hospitality sector. Hospitality sector was

also found as a distinct research area in the co-occurrence analysis. The tourism cluster includes “tourism” and “conservation”. This cluster mostly indicates towards the theoretical works done on tourism and environmental conservation. High centrality and low density indicates these topics are transversal. These topics are important but yet underdeveloped.

The “mangrove” cluster includes “mangrove”, “sundarbans” and “ecosystem service”. This cluster indicates tourism in Sundarbans. This research area was also found in the co-occurrence analysis. The domestic tourism cluster includes “domestic tourism”, “cox’s bazar” and “South Asia”. This cluster indicates regional and domestic tourism research area from the co-occurrence network. The other cluster “cox’s bazar” has four keywords. “Cox’s Bazar”, “Domestic Tourism”, “Attitude” and “Responsible Tourism Management”. This cluster might represent either domestic or regional tourism research area or hospitality research area analysis. The “bangladesh” cluster includes “Wetland”, “Biodiversity” and “Bangladesh”. In this time period, mangrove, domestic tourism and cox’s bazar became established as a motor theme. Research in domestic tourism and regional tourism have developed significantly as a research topic in tourism of Bangladesh and most of the research has been done on this topic in this time period. These three clusters have high density and high centrality. This indicates these topics are central and developed. Between motor and basic theme we have an orange cluster, “fisheries”. This cluster has only one keyword. Fisheries is a type of tourism entertainment which could play an important role both as making tourism famous and sustainable ecotourism. All the data to create this map is provided in Appendix 7.2



**Figure 4:** *Thematic Evaluation, Time Span 2018-2021*  
(Source: Scopus Database, Network prepared by Biblioshiny)

According to the thematic evaluation map between 2018-21, “social media” and “beach destination” became emerging topics in tourism research. Beach destination cluster includes two topics, beach destination and destination image. These two clusters might indicate research works on “the impact of social media in tourism”. But, in the co-occurrence network, this area of research cannot be identified. This is an emerging topic in the 2018-21 time slice. So, there might not be enough research work in this area. An isolated yellow cluster in Figure 2 which includes “beach destination” and “destination image”. This isolated cluster adds some support to this paper’s deduction.

In this time slice, there is a new cluster “governance”. This cluster includes adaptive co-management, protected area, governance, satisfaction, loyalty, perceived value and sustainable tourism. This cluster represents the “Governance” area previously found from co-occurrence analysis. The protected area was previously included in ecotourism research but in the 2018 time slice it merged with Governance research. The ecotourism research evolved drastically. Currently, this cluster includes ecotourism, Sundarbans, employment, fisheries, motivation and sustainable development. Previously ecotourism research focused more on biodiversity protection. But, now ecotourism research focuses more on sustainability. Therefore, the focus of ecotourism research evolves from biodiversity protection to sustainability.

The “tourism” cluster includes “Tourism”, “South Asia” and “Globalization”. This cluster represents research in domestic and regional tourism. But previously this cluster was representing ecotourism research. Previously this cluster represented ecotourism but in 2018 time slice it evolved into domestic and regional tourism.

The “ecotourism” cluster has “Ecotourism”, “Sundarbans”, “Employment”, “Fisheries”, “Marketing”, “Mangrove Forest” and “Sustainable Development”. Three clusters form previous time period, namely “mangrove”, “fisheries” and “ecotourism” merged together and formed the new cluster “ecotourism” in 2018-2021 time slice. This indicates tourism in Sundarbans, potential of fisheries and ecotourism research evolved and merged under ecotourism research. In 2018-2021 time slice the ecotourism cluster moved towards motors themes. This also indicates that research in this sector has increased and it is developing. Soon it will be motor theme.

The “Bangladesh” cluster have “Bangladesh”, “climate change”, “cognitive valuation method”, “perception”, “St. Martin’s island”, “sustainability”, “vulnerabilities”. Previously Bangladesh cluster had only three keywords. Though topics in this cluster has evolved over time but in this time period Bangladesh cluster is in basic theme area.

In 2018-2021 time slice governance, ecotourism, sustainability, domestic and regional tourism and theoretical research become base themes in tourism research. But, in the first time slice, ecotourism, hospitality, etc. were the basic themes of tourism research in Bangladesh.



The “forecast” cluster includes forecasting, Sarima model, and tourist arrival. This cluster represents the theory and application of research area found from co-occurrence analysis. The “marketing” cluster includes marketing and management. This cluster represents the hospitality research area. Objective of the “travel” cluster is ambiguous. In 2018 time slice, theory and application areas and hospitality research were dominating the research in tourism sector of Bangladesh. In previous time slice dominating research areas were domestic and regional tourism. Research area represented by “renewable energy”, “travel” and “motivation” is unknown. One possibility is, it occurs due to error in the dataset. All the data to create this map is provided in Appendix 7.3

### **Implication of the Study**

Analysis of the co-occurrence network showed us two separate, disconnected clusters. They are ash and pink clusters. Content analysis reveals that the ash cluster indicates research on how mobile learning can promote innovation and improve tourism. The yellow cluster indicates research examining the nexus between social media and tourism. From the thematic evaluation map of 2018-2021 we see that emerging topics are “social media” and “beach destination”. Findings from the co-occurrence network and thematic evaluation map indicate that these two topics are relatively new in tourism research. More research is required in these two areas.

The thematic evaluation map also finds that “forecasting” is a trending topic. In recent times researchers are focusing more on developing sophisticated forecasting methods to predict the number of tourists in different seasons or times of the year. Microdata of tourism is required for this type of study to be successful. Countries like Sri Lanka and Nepal already have these micro database of tourists. For tourism research, Bangladesh should make a similar database by utilizing the entry port of Bangladesh.

This study also finds the most impactful researches, most productive authors, and most relevant sources for tourism research. Researchers can utilize these findings for further research in the tourism sector.

### **Conclusion**

The analysis of the papers revealed that research on tourism in Bangladesh is at its rudimentary stage and has only recently faced an upward trend from 2009. Between 2009-15 the number of publications on this topic was 26 with an annual growth rate of 37.9% and average citations per year per publication was 0.6174. Between 2016-21 the figure increased to 116 publications with an annual growth rate of 34.49% and average citations per year per publication was 0.7279.

The article titled “Economic valuation of provisioning and cultural services of a protected mangrove ecosystem: A case study on Sundarbans Reserve Forest, Bangladesh” received the highest number of citations but the highest annual citation was

received by the article titled “Examining the asymmetric effects of globalization and tourism on pollution emissions in South Asia.” Thus, these articles receive more attention when tourism in Bangladesh is considered from the perspective of tourism in South Asia.

The co-occurrence network showed 30 keywords with a minimum of 2 occurrences. 8 distinct clusters were identified. Among the clusters 6 distinct research areas were identified in the analysis which were relevant to tourism research in Bangladesh. The research areas are specified by the corresponding colour of the clusters. Two clusters are not connected with the other clusters. This indicates more research is required in that specific sector. Furthermore, the lower link strength of the clusters indicates that the overall research development in tourism literature in Bangladesh has been quite low. This means there are further scope of development of research in this sector.

The thematic mapping reveals that the initially dominated tourism research topic was tourism in Sundarbans, domestic and regional tourism. But, now the focus of research is more on theoretical development and application. The basic or transversal topics remain mostly the same but the sup-topics change drastically. Initially, ecotourism research was more focused on biodiversity conservation but later ecotourism research focused more on sustainability. Governance appeared as a new transversal topic. Another transversal topic is Bangladesh. Previously Bangladesh was a motor theme. But it is evaluated as a basic topic. This indicates the cluster Bangladesh is getting less attention as research in tourism develops. Though it's getting less attention sub-topics under this cluster has drastically changed.

The study has some limitations as the articles analyzed were collected only from the Scopus database. There are several studies not included in the Scopus database which could have increased the number of clusters in the co-occurrence network. In that case the results in thematic mapping might have differed and many irrelevant research works might have been included as well. The analysis was confined to tourism research in Bangladesh only. Further research can be conducted by incorporating other international databases such as Web of Science (WoS) and Social Science Citation Index (SSCI). Future research can also incorporate a comparative analysis on tourism research in Bangladesh and tourism research in rest of the world. It is also possible that when there is enough literature in this field, research in specific subcategories of tourism can be conducted.

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## 1. Appendix

### Co-Occurrence Network Analysis Data

Node	Cluster	Betweenness	Closeness	PageRank
satisfaction	1	46	0.005076142	0.038817365
loyalty	1	0	0.004545455	0.029540758
risk	1	0	0.004545455	0.024470932
cox's bazar	2	66	0.005025126	0.039782456
sustainable tourism	2	84	0.005524862	0.022032239
attitude	2	0	0.004524887	0.034663399
domestic tourists	2	0	0.004524887	0.034663399
responsible tourism management	2	0	0.004524887	0.03029028
mangrove	3	46	0.005405405	0.027513225
climate change	3	0	0.004329004	0.018934757
ecosystem service	3	24	0.004830918	0.032787664
governance	4	11.5	0.005376344	0.033002033
protected area	4	11.5	0.005376344	0.033002033
adaptive co-management	4	0	0.004784689	0.023701152
beach destination	5	0	0.001189061	0.033333333
destination image	5	0	0.001189061	0.033333333
ecotourism	6	24.5	0.005405405	0.049580129
sundarbans	6	0	0.005347594	0.022943603
fisheries	6	0	0.005347594	0.022943603
employment	6	0	0.004784689	0.014365135
bangladesh	7	257.5	0.006060606	0.146338563
tourism	7	125	0.005649718	0.083514327
south asia	7	0	0.005	0.027120407
marketing	7	0	0.004975124	0.013351433
perception	7	0	0.005291005	0.013578468
co-management	7	0	0.005291005	0.013578468
contingent valuation method	7	0	0.005291005	0.013578468
globalisation	7	0	0.005	0.022572371
innovativeness	8	0	0.001189061	0.033333333
mobile learning	8	0	0.001189061	0.033333333



**Thematic Mapping Period 1 Data**

Occurrences	Words	Cluster	Cluster_Label
3	cox's bazar	1	cox's bazar
2	attitude	1	cox's bazar
2	domestic tourists	1	cox's bazar
2	responsible tourism management	1	cox's bazar
2	domestic tourism	2	domestic tourism
2	south asia	2	domestic tourism
2	tourism development	3	tourism development
2	fisheries	4	fisheries
2	global warming	5	global warming
4	mangrove	6	mangrove
2	ecosystem service	6	mangrove
2	the sundarbans	6	mangrove
14	bangladesh	7	bangladesh
2	biodiversity	7	bangladesh
2	wetlands	7	bangladesh
3	satisfaction	8	satisfaction
2	loyalty	8	satisfaction
2	risk	8	satisfaction
2	service quality	8	satisfaction
5	ecotourism	9	ecotourism
2	biodiversity conservation	9	ecotourism
2	protected area	9	ecotourism
5	tourism	10	tourism
2	conservation	10	tourism

**Thematic Mapping Period 2 Data**

Occurrences	Words	Cluster	Cluster_Label
2	beach destination	1	beach destination
2	destination image	1	beach destination
19	tourism	2	tourism
3	south asia	2	tourism
2	globalization	2	tourism
18	bangladesh	3	bangladesh
2	climate change	3	bangladesh
2	contingent valuation method	3	bangladesh
2	perception	3	bangladesh
2	st. martin's island	3	bangladesh
2	sustainability	3	bangladesh

2	vulnerabilities	3	bangladesh
2	renewable energy	4	renewable energy
2	rohingya refugees	4	renewable energy
2	travel	5	travel
5	ecotourism	6	ecotourism
4	sundarbans	6	ecotourism
2	employment	6	ecotourism
2	fisheries	6	ecotourism
2	mangrove forest	6	ecotourism
2	marketing	6	ecotourism
2	sustainable development	6	ecotourism
3	governance	7	governance
3	satisfaction	7	governance
3	sustainable tourism	7	governance
2	adaptive co-management	7	governance
2	loyalty	7	governance
2	perceived value	7	governance
2	protected area	7	governance
2	forecasting	8	forecasting
2	sarima model	8	forecasting
2	tourist arrival	8	forecasting
2	social media	9	social media
2	motivation	10	motivation

