

## A Review of Distance Decay Research Trends in Tourism from 2000-2020

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### Abstract

Distance decay defined as demand or volume decreases exponentially with distance increases. It is a gravity model of human geography that used to understand human behaviours, movements, and tourism flows, particularly in tourism planning and management. Thus, this paper attempts to outline a systematic literature review to provide a comprehensive understanding with different distance decay thematic studied in tourism research from the year 2000 - 2020. The review identified the research focuses with the research scopes studied and contribute to conceptual and theoretical basic understanding.

Keywords: distance decay; sustainable tourism development; science mapping

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### 1.0 Introduction

Distance decay is a gravity model of human geography (Eldridge & Jones, 1991). This concept used to understand human behaviours, movements and tourism flows, especially in tourism planning measured as physical distance, which defined the phenomenon primarily in terms of the interaction between two places, which decreases exponentially as the distance between increases (McKercher, 2008). Apart from that, distance decay is considered to be one of the essential concepts in geography (Eldridge & Jones, 1991), it has been extensively studied integrated with other disciplines of studies yet can be examined from several contexts. The recent topics discussed in the field of distance decay focused on ecotourism (Boori et al., 2015); economic geography in ecotourism planning (Mandić & Petrić, 2020); spatiotemporal analysis (Yan, 2011); factors that have influenced tourists' travel behaviours, demand and choice of destinations (Nilbe et al., 2014) as well as cultural distance decay (Qian et al., 2018). Although several topics have been studied in distance decay, but it still lacked a systematic literature review to outline the comprehensive picture of distance decay in tourism research.

The importance of understanding distance decay is to demonstrate an evolutionary mechanism which aims to improve the sustainable tourism development of tourism by balancing social, environmental, and economic growths. Thus, this paper attempts to outline a systematic literature review to analyze the distance decay research trends in tourism from the year 2000 – 2020 with the following objectives:

1. To understand the general research trend of distance decay in tourism research from the year 2000 – 2020.
2. To investigate the thematic studies carried out in distance decay together with further understand the sustainable tourism development.
3. To identify areas and gaps for future research.

## 2.0 Literature Review: Chronology of Distance Decay Classical Theory

### 2.1 Tobler's First Law

Distance decay widely applied in many other fields of research, and this frictional relationship of distance on human movements has recognized in Tobler's First Law. (Tobler, 1970) expressed this first law of human geography with "everything is related to everything else, but near things are more related than distant things." In general, Tobler mentioned that things are usually related to one another such as the degree of relation for "near things" is stronger than "distant things."

### 2.2 Distance decay theory began implemented in tourism research derived central theory

Past literature noted that the distance decay concept had not been exploratorily implemented in tourism research from 1960s to 1970s and this concept only merely applied as a value to proxy forecast tourism demand (McKercher & Lew, 2003). Greer and Wall (1979) were among the first introduced the concept of "impact of distance" in tourism research. A little prior research is available to explicitly investigates the impact of distance decay before the classical distance decay theory established (Hooper, 2014). The distance decay classic theory was defined by (Bull, 1991) – "where demand exponentially decreases as distances increase". Since then, the theory of distance decay found by Bull has become central to most of the studies related to the impact of physical distance.

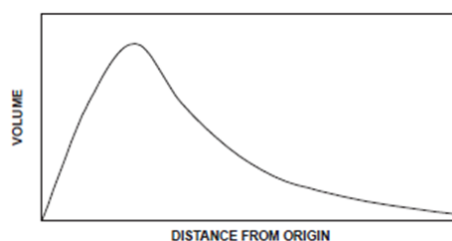


Fig. 1: Distance decay classic theory curve  
Source: (McKercher, Chan, & Lam, 2008)

### 2.3 The importance of distance decay in achieving sustainable development

Based on the past literature (Nyaupane & Graefe, 2008; Zhang et al., 2007) addressed distance decay as potential implication in sustainable nature-based tourism development by revealed the sociodemographic and behavioural characteristics among visitors based on distance travelled. Besides, (Sun & Lin, 2019) found that sustainable tourism transport required further management and intervention on the distance attribute in order to deliver the climate and socially desirable. (Mou et al., 2020) researched distance decay and attractions' popularity heavily influenced the spatial pattern of tourist flow. This is because of uneven allocation in tourism resources within the tourism city such as the differ tourism resources allocated between coastland and inland areas that caused the phenomena of distance decay and resulted in unbalancing competition among the destinations. The study also further acknowledged the significance of reducing recourse differences help in balance sustainable tourism development which is crucial for future tourism management. Apart from that, (Mandić & Petrić, 2020) identified the distance between the hotels and national park shows a significant impacted towards the hotel prices. The study established a distance effect in preventing commercial activities from taking advantage of the national park which eventually brings positive implication towards the future sustainable nature-based tourism development.

### 2.4 Reasons for distance decay has been unpopular in tourism research

According to (McKercher et al., 2008; McKercher & Lew, 2003) mentioned there are more advance forecasting techniques being developed to produce much accurate estimation in tourist flows. Hence, this has made distance decay technique a less viable option for tourism research. Today, as the popularity of distance decay technique goes down, it makes it even difficult to appear in most tourism literature. Besides, the modelling and forecasting of tourist flows rely on the distance principle heavily as the cost of travel. Furthermore, (McKercher, 2018) identified the reason behind the fall in interest towards distance decay in the research community is the fact that certain synthetic conditions require the approval of regulations and laws to proceed for macro-level of study and requires to support by huge databases.

## 3.0 Methodology

To extract the relevant articles, keywords have been selected to extract potential articles from the Google Scholar, Scopus, and Web of Science (WoS) databases. These three databases provided a wide range of datasets in primarily index journals. Table 1 showed the combination keywords used in search, filter, and sort of articles. Besides, to meet the research objectives, "CiteSpace" employed as an analysis tool to visualize the findings in science mapping format (Chen, 2016) and integrated with overview analysis (comply the first objective) and breakdown analysis (comply the second objective). The reason of employed "CiteSpace" as an analysis tool is because of "CiteSpace" is a visual analytic tool for finding trends and patterns in the scientific literature, and it is designed as a tool for progressive knowledge domain visualization which is suitable to apply in review paper study. Furthermore, (Chantre-Astaiza et al., 2019) also identified that "CiteSpace" has frequently used in tourism research.

Table 1. The selected keywords used to extract relevant sources

Keywords Combination		
distance decay	+	tourism
impact of distance	+	tourism
travel distance	+	tourism

### 3.1 Overview analysis

Overview analysis performed to identify the general trend (Yuan et al., 2019). It is applied to understand the overview of distance decay in tourism research.

### 3.2 Breakdown analysis

This analysis is introduced by (Kessler, 1963) named breakdown analysis which developed on top of BC analysis and it is a bibliometric method made for statistical analysis of academic literature and references (Yuan et al., 2019). BC analysis was chosen in this work to identify the topical similarity within a group of publications that share a common knowledge platform. By integrating "CiteSpace" software and breakdown analysis, the useful information and relationships insights can be obtained easily and visualize in the form of clusters and timelines.

## 4.0 Findings

### Section I - Distance Decay Overall Growth in Tourism Research

#### 4.1: Overall trends

Figure 2 illustrated the annual number of articles published from the year 2000-2020 for distance decay in tourism research. Although distance decay has a long history in tourism since the 1970s, yet only a small number of annual publications can find in the research database. Besides, the unstable annual number of publications in distance decay indicated the publication increased dramatically in the year 2008 (7 publications) before the number of paper decreasing. In the year 2018, the number of published articles reached a peak with seven publications. Unfortunately, the number of publications has continued to decline again until 2020. This result support (McKercher, 2018; McKercher et al., 2008; McKercher & Lew, 2003)views that distance decay is an unpopular theme in tourism research from the past to the present.

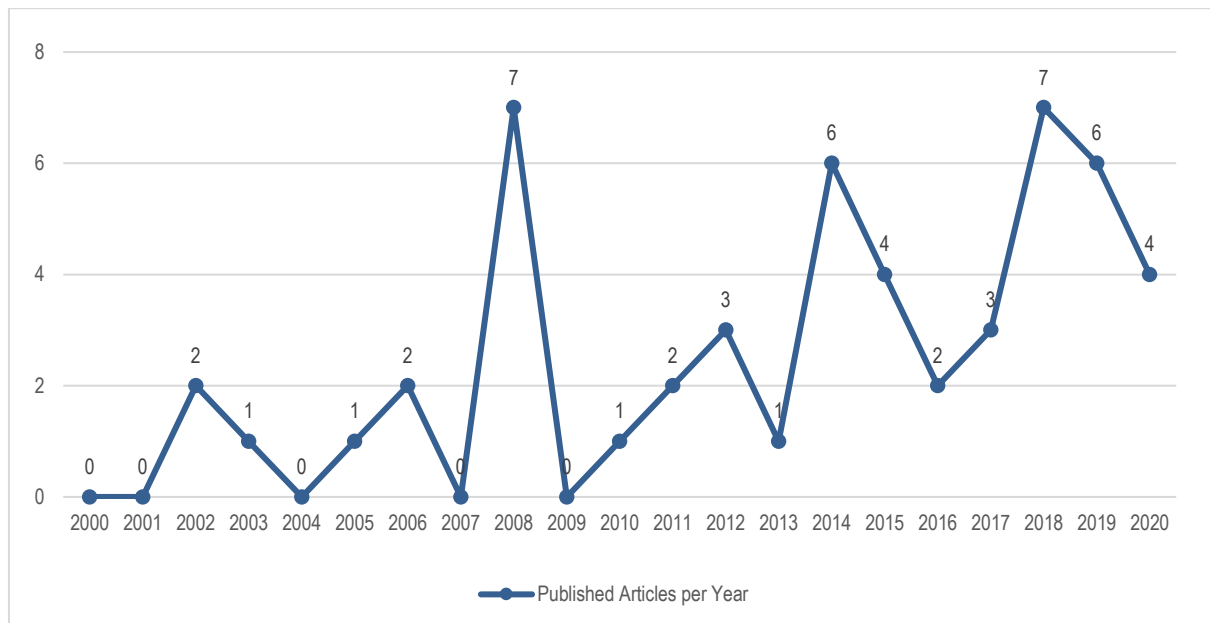


Fig. 2: Distribution of the published articles from year.2000-2020

#### 4.2 Publication sources platforms

Figure 3 presented the numbers of articles published in a different journal of platforms. With a total of 52 articles published (from 2000-2020), the majority are journals (49 papers), and only three conference papers. In addition, Journal of Travel Research and Tourism Management shown five papers published. While for other journal platforms that not stated individually are those journals such as International Journal of Tourism Sciences, Journal of Hospitality and Leisure Marketing, Sustainability (Switzerland), International Journal of Tourism Cities, GeoJournal and etc.

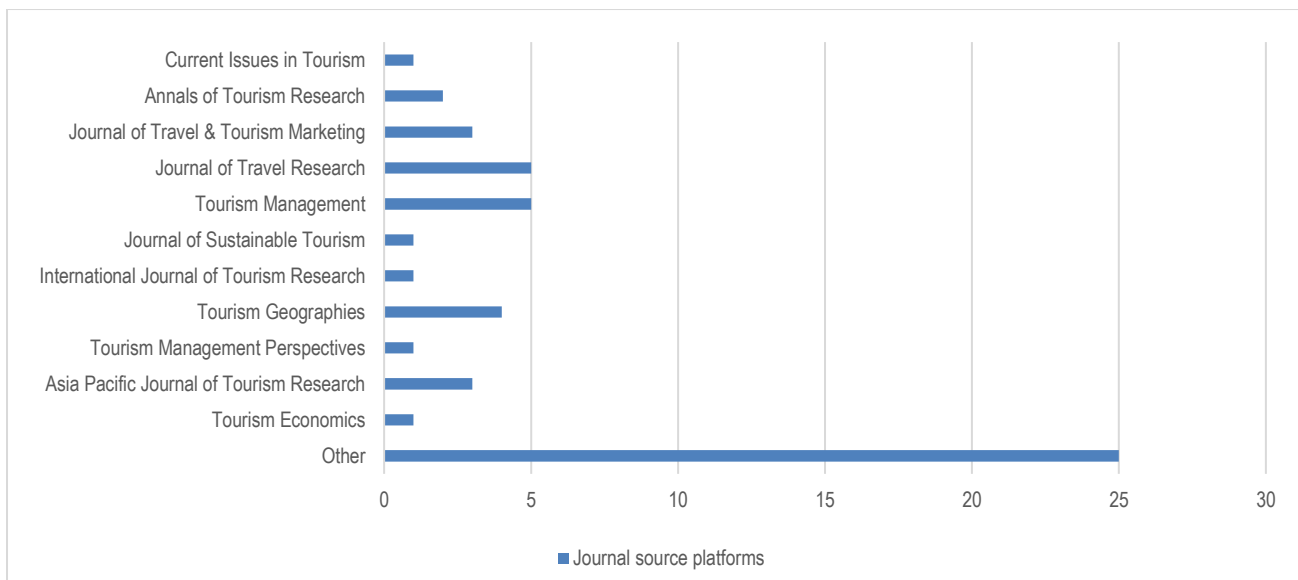


Fig. 3: Distribution of the published articles in different source platforms

### 4.3 Thematic studies in distance decay

Figure 4 showed the thematic studies covered in distance decay. The existing research identified that distance decay has mainly been studied in spatial distribution (approximately 67%) and follow by environmental studies (13%). While for cultural distance studies and other thematic, such as tourism economics and human geography, each accounted for 9.62% equally. The main reason behind the popularity of spatial distribution and environmental studies due to spatial distribution studies focus on spatial-temporal analysis, and distance decay is mainly used to understand human movements. Therefore, spatial distribution studies ranked high popularity thematic covered by distance decay, whereas for environmental studies, as the awareness on environmental and resources sustainability raised, environmental studies gradually become essential.

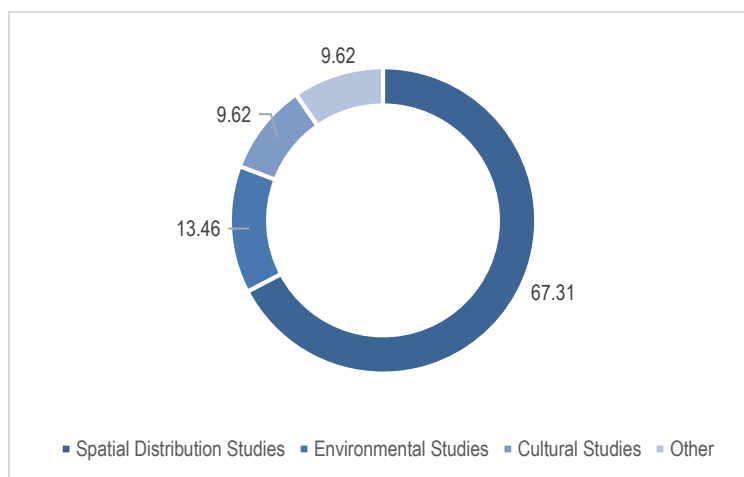


Fig. 4: Distribution of thematic studies in distance decay

## Review II- Thematic Research in Distance Decay to Further Understand Sustainable Tourism Development

### 4.4 Evolution for distance decay in tourism research

Based on the critical analysis in section I, this section aimed to investigate further with the concept and scope studied in the primary thematic, as stated in figure 4. Figure 5 presented the evolution of distance decay in tourism research, and the result was generated in the timeline pattern by using "CiteSpace". Generally, distance decay studies have experienced three phases of evolution. The first phase (2000-2007), research focus concentrated on cultural distance decay and spatial distribution. In the second phase (2008-20013), the research focus remained similar. In which, spatial distribution studies still the main. Interestingly, in the third phase of evolution, the research focus emerged with significantly emphasized on environmental studies, followed by spatial distribution studies, cultural distance decay studies and economic studies. The phrase three showed the balancing in research concentration from the sustainable development perspective.



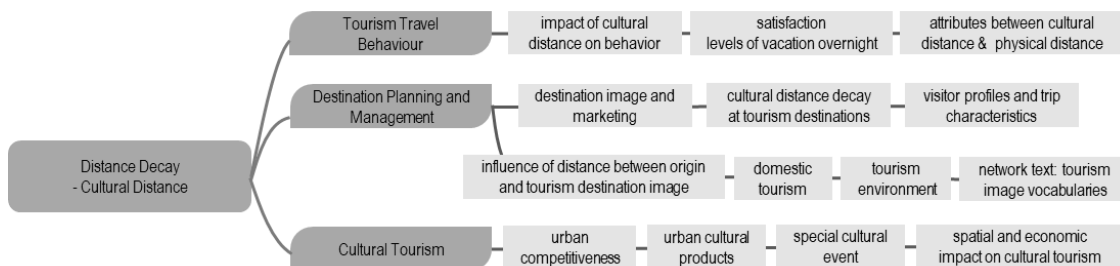


Fig. 8: Scopes of study in the thematic of cultural tourism study

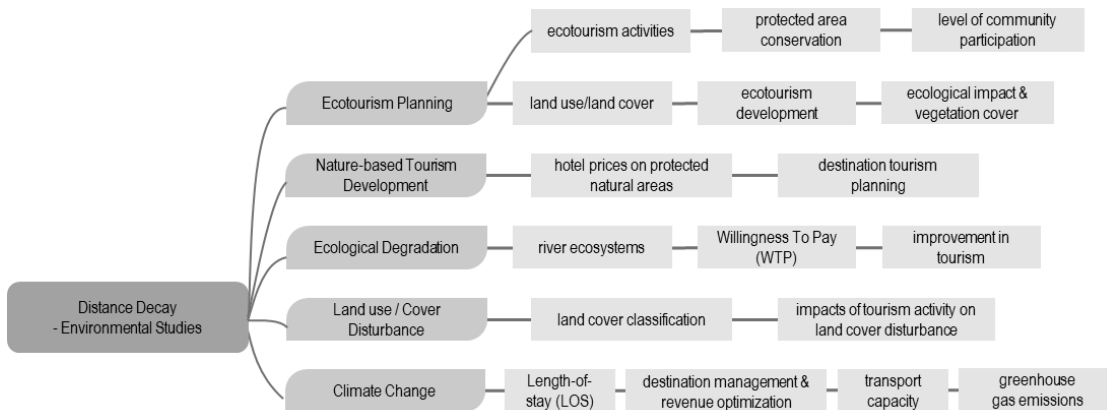


Fig. 9: Scopes of study in the thematic of environmental study

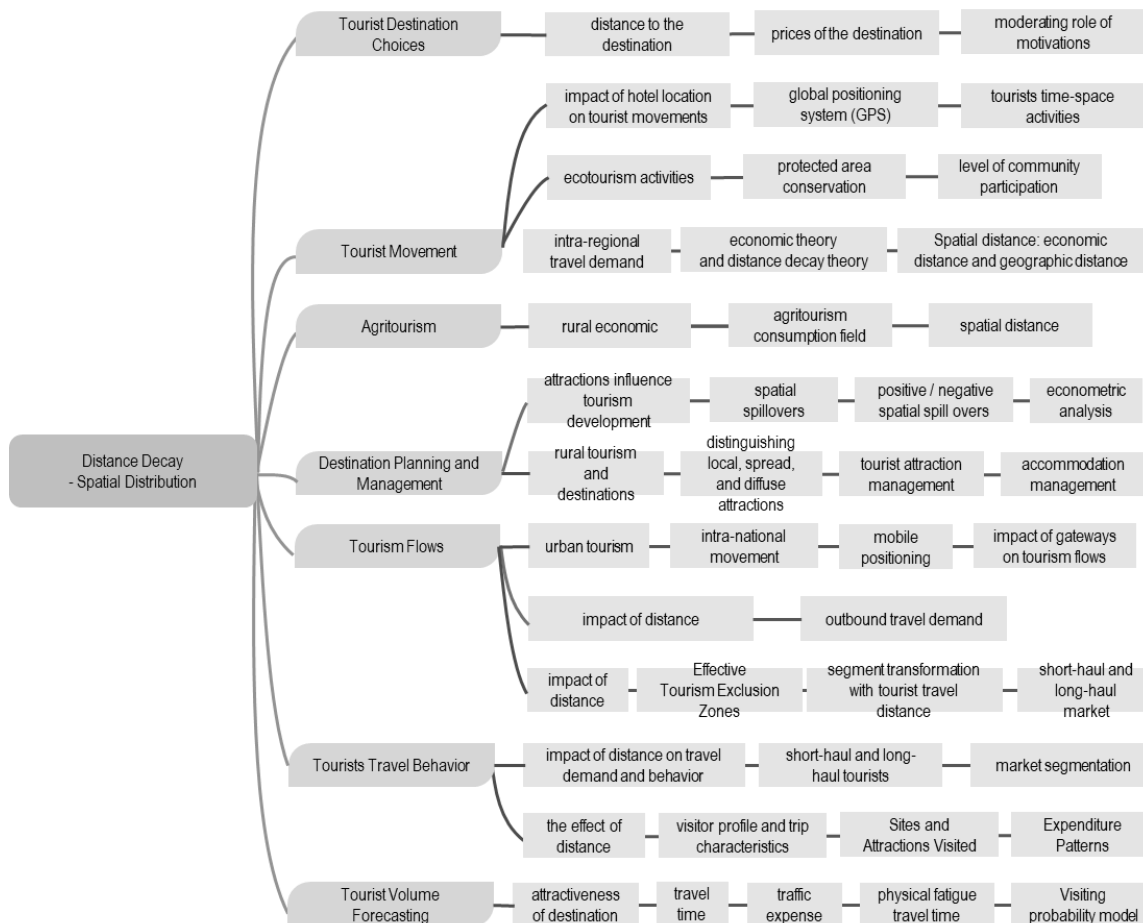


Fig. 10: Scopes of study in the thematic of spatial distribution study



#### 4.6 References co-citation network in distance decay studies

Figure 11 illustrated the references co-citation network for distance decay generated in cluster form by "Cite Space". References co-citation network efficient approach for scientific knowledge visualization (Chantre-Astaiza et al., 2019). The results showed a single cluster pattern for figure 6a and diffusion cluster pattern for figure 6b. Based on the cluster networks, it showed the references co-citation from the year 2011 to 2020 indicated more equivalent linkages compare with the co-citation network of the year 2000-2010. This is because of different thematic studies have been carried out (according to figure 5), as compared with the year 2000-2010, which majority focus on spatial distribution studies.

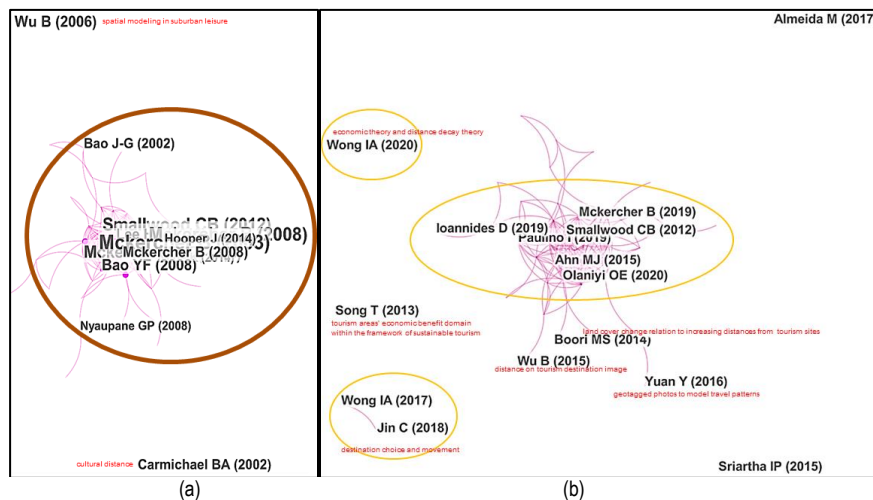


Fig. 11. (a) References co-citation network from year 2000-2010; (b) References co-citation network from year 2011-2020

## 5.0 Discussion

### 5.1 Main findings

Generally speaking, the application of distance decay to tourism research was still in a pre-mature stage based on the annual publications from the year 2000 until 2020 (2.6 publications per year), although distance decay has gone through a long history since the 1970s. Nevertheless, based on the literature, distance decay research is undergoing a broader scope of study with different thematic studies. Besides, the leading journal with the most related articles are Journal of Travel Research, Tourism Management and Tourism Geographies. The thematic distribution has shown that spatial distribution was the main topic discussed throughout the 20 years and following by environmental and cultural.

As highlighted in the review, the evolution of distance decay in tourism indicates a significant variant. Although spatial distribution has been the primary topic of study but based on the "Cite Space" analyzed result, spatial distribution no longer engrossed in the research after the year 2013. This is because environmental studies in distance decay have fostered a new wave of research focuses on ecotourism, natural-based tourism, ecological degradation, and others, which show the new research interested in distance decay. Although distance decay is not popular among the recent studies, it is understandable that researchers will eventually discover its usefulness and potentials in the foreseeable future. Furthermore, based on the critical analysis from the literature review and past publications, numerous studies focus on environmental studies build on distance decay theory are expected to draw attention from researchers and reveal in the publications in future.

Besides, the references co-citation analysis network indicated the change of cluster result (from single cluster to diffusion clusters) based on "Cite Space". The result identified a network of most cited references connected by co-citation links and presented the intellectual structure of the knowledge domain and focused on the interrelationships among influential references in the literature. (refer to figure 6 a,b). The result showed the references co-citation network for the year 2011-2020 has a more extensive cluster with more cited references compared with the year 2000-2010. This is because of the total publication for the year 2000-2010 contain only 14 papers. Conversely, the total publication for the year 2011-2020 was 38 papers (refer to figure 2) and subjected to the different thematic studies have been conducted after the year 2013 this explains the formation of a single cluster (year2000-2010) and diffusion clusters (2011-2020).

### 5.2 Limitation

The limitation that must be considered - distance decay is an inconspicuous field in tourism research caused a minimal number of distance decay research articles allowed to be investigated. Distance decay is not the primary and popular theme in tourism development research, and past literature has stated the reasons why distance decay has been unpopular in tourism research as well. Therefore, by understanding the underlying causes, the limitation allows to turn into a new opportunity and provide ample areas and gaps for researchers to carry out an in-depth study in order to enrich the sustainable tourism development research as well as able to reveal a more comprehensive research trend of distance decay.

## 6.0 Conclusion & Recommendations

This review paper provided a conceptual and theoretical basic understanding of distance decay in tourism research, by genuinely explored the thematic and detailed scope of studies which illustrated the research interests of distance decay. It also extensively provides a systematic review that allows the future research community to fill up the research area and gaps.

For future recommendations, (Sun & Lin, 2019) found out only a limited number of studies have addressed the potential implications of distance decay for sustainable nature-based tourism development. Therefore, to fill up the research gaps mainly in environmental planning and management, as environmental issues are becoming increasingly crucial (Mandić & Petrić, 2020) which required a detailed ecologically sustainable approach to ensure the ecological integrity in ecotourism development. Hence, future research can be cross-disciplinary by combining subjects in environmental planning and management and builds on the theory of distance decay. With the development of ecotourism, it is necessary to undertake research studies such as environmental carrying capacity integrated with distance decay theory, especially for the coastal area, protected areas and national parks during the period of seasonal tourism. Those studies allow to contribute a comprehensive picture particularly in the prevention of overtourism, minimize the impact of tourism development on coastal erosion and forest removal or change forest land cover, at the same time maintaining infrastructural development via ecotourism to address economic (tourism revenue), social (tourism activities and communities well-being), and environmental (ecological integrity) needs.

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