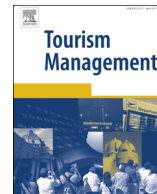




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The main paths of medical tourism: From transplantation to beautification



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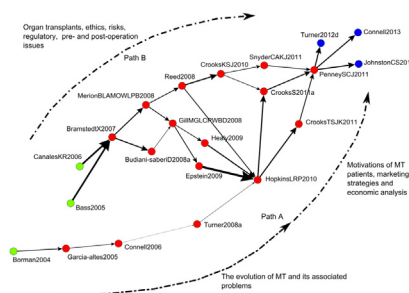
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HIGHLIGHTS

- We collect and analyze 392 medical tourism related academic papers.
- The main path analysis reveals two major medical tourism research streams.
- Ethics and risks related to organ transplantation are largely discussed.
- Economic and marketing issues need more discussion.
- Beautification appears to be the potential growing segment.

GRAPHICAL ABSTRACT



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ABSTRACT

Medical tourism, combining the very polarized purposes of pleasurable travel and potentially stressful health care services, is an emergent and growing business worldwide. Medical tourism patients are willing to travel abroad to seek better quality, lower cost, domestically unavailable, no wait-time destinations for non-emergency medical care. There are numerous related studies in the academic literature that are substantiated with multidisciplinary and diverse backgrounds. This study uses the main path analysis, a unique quantitative and citation-based approach, to analyze the significant development trajectories, important literature, and recent active research areas in medical tourism. We find that there are two distinctive development paths: one path focuses more on the evolution of medical tourism, the motivation factors, marketing strategies, and economic analysis; the other path emphasizes organ transplant and related issues. These two paths eventually merge to a common node in the citation network, which foretells transplantation to beautification as the future research direction trend.

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1. Introduction

Medical tourists are patients who travel internationally for non-urgent medical treatments like organ transplants, stem cell

treatments, reproductive services, cosmetic surgery, and dental care, etc. High costs, lack of insurance, under-insured, long waiting-times, and domestically unavailable treatments are some of the causes to go abroad to seek medical services (Borman, 2004). There are also locally illegible or prohibited treatments, some which are considered as experimental treatments that can be found from offshore sources. Increasing globalization, intensifying competition, and advancing transportation, communication, and information technologies have

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also been responsible for the phenomenal growth of cross border health care services.

As a manifestation of globalization and privatization, the MT industry has grown in recent years especially in Asian countries like India, Thailand, Singapore, and Malaysia. High velocity growth has also shown up in countries like the United States, Canada, Brazil, South Africa, Indonesia, Mexico, Cuba, and the Philippines (Crooks, Kingsbury, Snyder, & Johnston, 2010). One of the major drivers for MT's fast growth is fueled by the rising costs of medical treatment. For example, the rising costs of medical treatment in the United States are pushing the movement to outsource medical treatment. As a comparison, charges for common procedures such as a heart bypass can be 12:1 between the United States and Thailand, or 3:1 between the United States and Singapore for knee replacement (Turner, 2012b).

Several papers (Connell, 2006, 2013; Crooks et al., 2010; Hopkins, Labonte, Runnels, & Packer, 2010) have been published in an attempt to summarize the current literature related to the MT industry. Connell (2006) examined many medical tourism-related studies in the literature to evaluate the magnitude, the longevity, the growth, and the trend of the industry, indicating that MT is likely to increase even faster in the future as many countries are vying to enter the vibrant market while several Asian countries are dominant in the industry and have created new dimensions of the globalization of MT. Crooks et al. (2010) reviewed patients' experience of MT from a set of published academic articles, media sources, and gray literature reports. The study summarizes the critical issues and development trends from both a cross sectional view and longitudinal aspect. Hopkins et al. (2010) undertook a systematic approach by collecting and reading MT-related papers from PubMed, Scopus, CINAHL, and CAB HEALTH databases, as well as Internet search engines to determine how MT might affect health equity within and between nations participating in this trade. Connell (2013) indicated that much of the medical tourism is short distance and diasporic, despite being part of an increasingly global medical industry. Quality and availability of care are key influences on medical tourism behavior, alongside economic and cultural factors.

Despite the numerous scholarly attempts to identify, understand, and elaborate upon the nature and the associated issues related to the MT industry, this body of research could be described as heterogeneous (examining this industry from diverse risks, ethics, economics, marketing, and other perspectives) and fragmented (covering only a few specific dimensions of cross border patient, agent, health care professionals', and legislators' interactions). This article attempts to fill this gap by using a systematic approach that simultaneously captures the associations among the key issues and concerns and to deliver a comprehensive scope and the extent of the MT industry.

The novelty of our study lies in methodological and systematic grounds. Methodologically, we adopt a "main path" approach that delivers the longitudinal development trajectory of the MT field. The main path method has been applied successfully to review the development of several technological and academic fields (Chen, Liu, & Lin, 2013; Colicchia & Strozzi, 2012; David, Fernando, & Itziar, 2011; Liu, Lu, Lu, & Lin, 2013a, 2013b; Lu, Lin, Liu, & Yu, 2012; Lu & Liu, 2013; Martinelli, 2012; Verspagen, 2007). To the best of our knowledge, the main path method has not been used in the areas of tourism studies. Systematically, we sort out the taxonomy of the major topics that are of greater concerns at each specific time frame that have been critical to the success of MT development. We also identify the shift of the emphases of the industry both in terms of the critical issues and the direction of future business expansion.

Apparently, the critical issues of MT are dynamic and layered, as the direction of the MT industry development is multifaceted. A

structured literature review with underpinning taxonomy should add value to the industry. The main path analysis can help identify the mainstream literature and the related main themes, which imply potential future research trends. Specifically, the emergent literature in current burgeoning areas can help detect the potential future growing business in the MT industry. Many critical concerns and unresolved issues can be identified to help improve the overall quality of the industry. Moreover, the motivation factors of the MT patients, key marketing decision processes, and the direction of business expansion may be recognized. Business managers in related industries can therefore allocate resources and accordingly direct their attention.

The remainder of this article is formatted as follows. First, we present the main path method used in the study. Second, we review the extant research on MT and elaborate upon the nature of its development. Third, we conduct the main path analysis to formulate the associations and trajectories of the literature selected on the main path. Fourth, we analyze and discuss the findings referring to each of the research trajectories. Fifth, we derive conclusions and present directions for further research.

2. Methodology

2.1. Main path analysis

We apply the main path method to map the major development of MT. Hummon and Doreian (1989) first introduced the method that used citation information to trace the main ideas that flow in a scientific discipline. This is based on the assumption that when a new publication cites a previous work, knowledge flows from the previous work to the citing publication. The method is network-based, where the scientific publications are seen as nodes of a network, and citation information links knowledge flows among nodes. The citation network thus created is a non-weighted directed network.

Tracing the flow of ideas in a small citation network may be easy, but the same task done for a large network is not trivial. Hummon and Doreian (1989) suggested a way to simplify the task in a large citation network: tracing only the 'main path'. The method he presented is divided into two steps. The first step identifies the importance of each citation link in the network according to its position in the network structure. The second step searches in the network for the most significant path(s) based on the importance of the citation link obtained in the first step. They applied the method to trace a small set of DNA papers. The papers on the main path were identified as being the most important papers by other researchers who applied a completely different methodology.

The importance of each citation is measured by counting the number of times a citation link has been traversed if one exhausts the search from a set of starting nodes to another set of ending nodes. There are several algorithms to conduct the count. The literature mentions node pair projection count (NPPC), search path link count (SPLC), search path nodes pair (SPNP), and search path count (SPC) (Batagelj, 2003; Hummon & Doreian, 1989). These counts are similar, but subtle differences exist among them. Many previous studies indicated that these algorithms produce similar results (Batagelj, 2003; Martinelli, 2012; Verspagen, 2007). Our pilot study applies SPC, SPLC, and SPNP algorithms to medical tourism data and finds that they produce almost exactly the same results except that the SPC algorithm includes an additional node. In light of (Batagelj, 2003) suggesting using SPC as the first choice, we present and discuss our results based on the SPC algorithm.

We use the example network in Fig. 1 to explain how SPCs for each citation link are calculated. In a citation network, a 'source' is a node that is cited, but cites no other nodes; a 'sink' is a node that

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