

Information and Communication Technology in Medical Tourism Industry

เทคโนโลยีสารสนเทศและการสื่อสารในอุตสาหกรรมการท่องเที่ยวเชิงการแพทย์

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Abstract

This article is a documentary study which collects data and research from academic work, news, and articles related to medical tourism, information and communication technology (ICT) in medical tourism industry. The objective of this article is to study the medical tourism and the data of applying information technology in medical tourism industry. This study indicates that applying information and communication technology in medical tourism industry supports communication between service providers and clients; and helps arranging the system of information contents into an all-time accessible form; it can also simulate the form of the system and support planning for decision making before travel. Moreover, there are systems that facilitate communication to provide medical services and manage internal work with provider, e.g. Electronic Medical Record (EMR) system, Enterprise Content Management (ECM), Telemedicine, e-consult and e-doctor.

Keywords: Medical tourism, information technology, information communication and technology

บทคัดย่อ

บทความนี้เป็นการศึกษาเชิงเอกสารโดยการรวบรวมข้อมูลจากงานวิจัย ผลงานวิชาการ บทความ ข่าวสารที่เกี่ยวข้องกับการท่องเที่ยวเชิงการแพทย์ เทคโนโลยีสารสนเทศและการสื่อสารในอุตสาหกรรมการท่องเที่ยวเชิงการแพทย์ โดยมีวัตถุประสงค์เพื่อศึกษาข้อมูลเกี่ยวกับอุตสาหกรรมการท่องเที่ยวเชิงการแพทย์ การประยุกต์ใช้เทคโนโลยีสารสนเทศในอุตสาหกรรมการท่องเที่ยวเชิงการแพทย์ ผลการศึกษาพบว่า เทคโนโลยีสารสนเทศและการสื่อสารที่ประยุกต์ใช้ในอุตสาหกรรมการท่องเที่ยวเชิงการแพทย์ ช่วยสนับสนุนการติดต่อสื่อสารระหว่างผู้ให้บริการและผู้รับบริการได้สะดวก รวดเร็ว ช่วยในการจัดการระบบเนื้อหาข้อมูลข่าวสารในรูปแบบที่ผู้ใช้งานสามารถเข้าถึงข้อมูลได้ตลอดเวลา จำลองแบบระบบและสนับสนุนการวางแผนเพื่อการตัดสินใจก่อนการเดินทาง นอกจากนี้ยังมีระบบที่อำนวยความสะดวกในการสื่อสารเพื่อให้บริการด้านการแพทย์และจัดการระบบงานภายในของผู้ให้บริการ เช่น Electronic Medical Record (EMR) system, Enterprise Content Management (ECM), Telemedicine, e-consult, e-doctor เป็นต้น

คำสำคัญ: การท่องเที่ยวเชิงการแพทย์, เทคโนโลยีสารสนเทศ, เทคโนโลยีสารสนเทศและการสื่อสาร



Introduction

Tourism refers to a temporary travel of an individual from the regular residence to another place (not over 1 year in a row). The individual must be willing to travel for recreation, correspondence, and any other purposes which are not for working or finding income (Tugberk, U., 2010). Medical tourism is a form of tourism relating to medical treatment of the destination country. Medical tourism refers to the departure of international tourists from their own countries to receive outbound medical treatment, which possibly includes cosmetic surgery, dentistry, orthodontics, or orthopaedics under medical treatment of physicians in hospitals (Lunt, N. et al., 2017). Medical tourism was very popular in 1980 and 1990. And due to the factor of increasing medical expenses among Americans and Europeans, patients started to look for outbound medical treatment as another option, called "Tooth tourism" (Kate, P., 2008). Medical tourism has currently been more popular for several factors, i.e., lower medical expenses than their own countries, long waiting queues for medical treatment, insurance and income are not sufficient for medical treatment expenses, desire to receive medical treatment under new environments, and increasing trend of traveling for outbound medical treatment (Arune, I., n.d.).

The development of Information and Communication Technology (ICT) is another factor influencing medical tourism. In the past, tourism was only available in the traditional forms, i.e., tourism through outbound travel agencies (OTAs), through tour operators (TOs), through inbound travel agents (ITAs), or handling agencies (Buhalis, D. & Deimezi, O., 2004). Later on, ICT has played key roles in our daily life. It has been applied to various kinds of work, with smartphones connected through the internet as the tools for

information access. Users can access information all times. It supports works in tourism industry and leads to the drive of the industry, along with enhanced efficiency of transactions of both service providers and clients. For service providers, ICT helps increasing marketing opportunities and reducing organizational management cost. For clients or tourists, ICT helps facilitating search for information of tourist attractions, online booking/product and service order, identifying locations, and search for directions, etc.

Medical Tourism

Medical Tourism is a form of tourism and is part of health tourism. Medical tourism is currently famous and popular; with a long history. To clarify, Spa activity was begun in Roman period by using mountain spring water for treatment (Komsit, K. et al., 2018). World Tourism Organization (UNWTO) defined medical tourism as outbound medical travel; with the key purpose to use advanced health services in other countries or regions. The first concept of medical tourism refers to a variety of tourist activities for health care (Carmen, I., & Iuliana, C. 2014). There are several types of medical tourism, classified differently, i.e., 1) "temporary visitors abroad," going for either check-up or treatment; 2) "long-term residents," such as people moving to better locations for their health like many Americans going to Florida or the Caribbean; 3) "medical tourist from 2 adjacent countries sharing common borders" and have agreed upon sharing health care; and 4) "outsourced patients," sent abroad by their government due to neither local necessary treatment nor specialists (Lamk, A., 2011). Tourists go abroad for medical treatment in some other countries are regarded as

“medical tourists”. Medical tourists can be divided into 5 types as follows. 1) Mere tourists: Those who do not make any use of medical services in destination countries during their sojourn. 2) Medicated tourists: Those who receive medical treatment for accidents and health problems incidentally encountered in course of their sojourn in destination countries. 3) Proper medical tourists: Those whose visit destination countries for tourism as well as medical treatment. 4) Vacationing patients: Those who visit host countries, mainly for medical treatment, but makes incidental use of vacationing opportunities, especially during the convalescence period, following an operation or other treatment. 5) Mere patients: Those who visits destination countries only for medical treatment and do not make use of any vacationing opportunities they offer (Sasithorn, S., 2015).

Medical Tourism Industry in Thailand

Regarding medical tourism industry in Thailand, the government sector gives precedence to this matter and has followed the policy to support medical tourism as the medical hub in the region since 2004 up until present in compliance with the strategy of Thailand development as the international medical hub (2017-2026) by Ministry of Public Health (2017). According to the report of Kasikorn Research Center (2019), it was expected that in 2019, there will be around 39.00-39.80 million tourists coming to Thailand; or 2.1-4.1% from 2018, which contained 38.12 million tourists. This means it will increase up to 7.1%. Figure 1 displayed the numbers of tourists and revenue from tourism between 2015-2019.

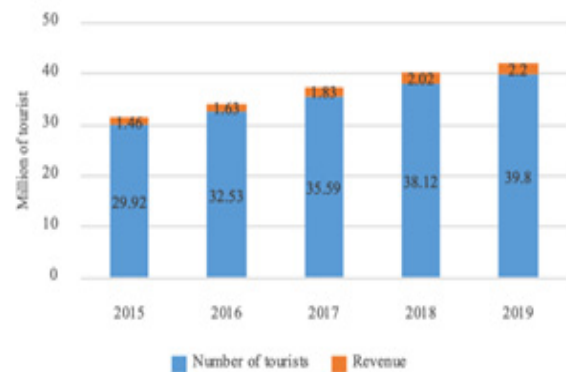


Figure 1 The numbers of tourists and revenue from tourism between 2015-2019

Source: Ministry of Tourism and Sports and Kasikorn Bank Research Center

The International Healthcare Research Center (IHRC) reported that health tourism of Thailand was ranked 6th in the world in 2017 for strengths and advantages in several aspects, to be described next. 1) Hospitals, personnel, and international standard service guaranteed by JCI (Joint Commission International Accreditation). In 2017, 56 hospitals in Thailand received JCI, the fourth most in the world. 2) Natural attractions and diverse cultures; low-cost tourism; extensive flights for travel; and coordination rapidity. 3) Not much high costs when comparing with the quality (BTL Bangkok, 2018). Table 1 displayed international medical treatment costs.

Table 1*Comparison medical treatment cost 2019*

Medical treatment	USA	Colombia	India	S. Korea	Mexico	Thailand	Vietnam	Malaysia	Singapore
Heart Bypass	\$123,000	\$14,800	\$7,900	\$26,000	\$27,000	\$15,000		\$12,100	\$17,200
Angioplasty	\$28,200	\$7,100	\$5,700	\$17,700	\$10,400	\$4,200		\$8,000	\$13,400
Heart Valve Replacement	\$170,000	\$10,450	\$9,500	\$39,900	\$28,200	\$17,200		\$13,500	\$16,900
Hip Replacement	\$40,364	\$8,400	\$7,200	\$21,000	\$13,500	\$17,000	\$9,250	\$8,000	\$13,900
Hip Resurfacing	\$28,000	\$10,500	\$9,700	\$19,500	\$12,500	\$13,500		\$12,500	\$16,350
Knee Replacement	\$35,000	\$7,200	\$6,600	\$17,500	\$12,900	\$14,000	\$8,000	\$7,700	\$16,000
Spinal Fusion	\$110,000	\$14,500	\$10,300	\$16,900	\$15,400	\$9,500	\$6,150	\$6,000	\$12,800
Dental Implant	\$2,500	\$1,200	\$900	\$1,350	\$900	\$1,720		\$1,500	\$2,700
Lap Band	\$14,000	\$8,500	\$7,300	\$10,200	\$6,500	\$11,500		\$8,150	\$9,200
Gastric Sleeve	\$16,500	\$11,200	\$6,000	\$9,950	\$8,900	\$9,900		\$8,400	\$11,500
Gastric Bypass	\$25,000	\$12,200	\$7,000	\$10,900	\$11,500	\$16,800		\$9,900	\$13,700
Hysterectomy	\$15,400	\$2,900	\$3,200	\$10,400	\$4,500	\$3,650		\$4,200	\$10,400
Breast Implants	\$6,400	\$2,500	\$3,000	\$3,800	\$3,800	\$3,500	\$4,000	\$3,800	\$8,400
Rhinoplasty	\$6,500	\$4,500	\$2,400	\$3,980	\$3,800	\$3,300	\$2,100	\$2,200	\$2,200
Face Lift	\$11,000	\$4,000	\$3,500	\$6,000	\$4,900	\$3,950	\$4,150	\$3,550	\$440
Liposuction	\$5,500	\$2,500	\$2,800	\$2,900	\$3,000	\$2,500	\$3,000	\$2,500	\$2,900
Tummy Tuck	\$8,000	\$3,500	\$3,500	\$5,000	\$4,500	\$5,300	\$3,000	\$3,900	\$4,650
Lasik (both eyes)	\$4,000	\$2,400	\$1,000	\$1,700	\$1,900	\$2,310	\$1,720	\$3,450	\$3,800
Cornea (per eye)	\$17,500	N/A	\$2,800	N/A	N/A	\$3,600		N/A	\$9,000
Cataract surgery (per eye)	\$3,500	\$1,600	\$1,500		\$2,100	\$1,800		\$3,000	\$3,250
IVF Treatment	\$12,400	\$5,450	\$2,500	\$7,900	\$5,000	\$4,100		\$6,900	\$14,900

Source: <https://medicaltourism.com/Forms/price-comparison.aspx>

According to the table 1, shows the price comparison of medical treatment in various countries in 2019. The average medical costs in Thailand are 61-62 % that in India, 55-56 % in Malaysia, 41-42 % in South Korea, 54-55 % in Colombia, 47-48 % in Mexico, 44-45 % in Singapore. Price is an important factor that influences the patient's choice of destination for medical tourism.

Tourist Life Cycle

Tourist life cycle is processes or activities in tourism journey. A tourist journey generally can be categorized into three phases, i.e., 1) Pre-trip phase: tourists seek information for planning, booking and decision making. 2) On-trip phase: visiting in destination and accommodation. 3)

Post-trip phase: reminiscing about the journey and sharing the gained impressions and experiences (Kadri, S. & Agni, D., 2011; Christoph, G., 2009) The tourist life cycle was displayed in Figure 2.



Figure 2 *Tourist Life Cycle*

Source: A survey on tourist trip planning systems. (Kadri, S., & Angi, D., 2011).

Medical Tourism Value Chain

The term value chain refers to activities within and around an organization, where a distinction is made between primary and support activities (Chantal, H. & Siripen, S., 2013). Medical tourism value chain consists of three stages, i.e., pre-procedure stage, procedure stage and post-procedure stage. 1) Pre-procedure stage; tourists obtain information through various channels (provider, personal contacts, media /internet, insurance agent (health and travel insurance), travel agents, medical tourism

facilitators). 2) procedure stage; this is the most important phase, which typically starts when the tourist reaches the destination country and includes all ancillary services like for example airport transfer and accommodation until the medical procedure has been completed. And 3) Post procedure stage; post-operative and follow-up care (The Indian Institute of Tourism and Travel Management, 2011; Herberholz, C. & Supakankunti, S., 2013). Figure 3 displayed the medical tourism value chain.

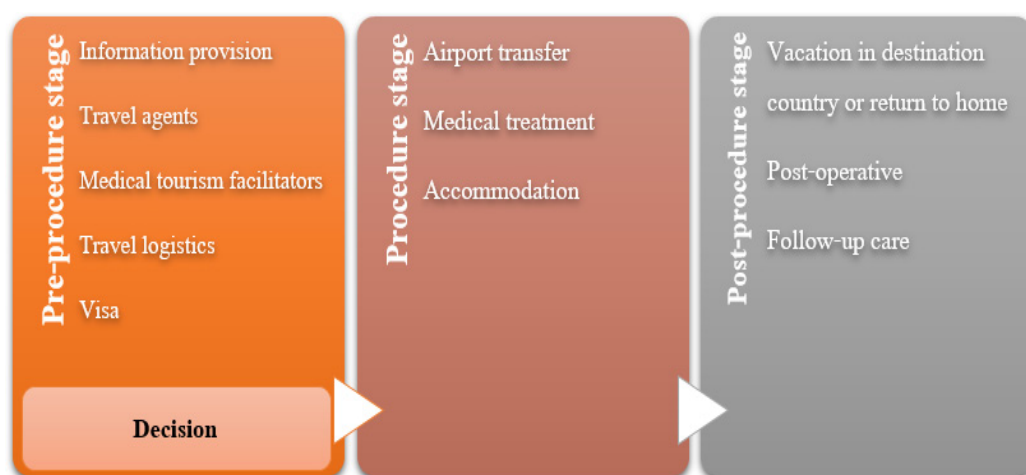


Figure 3 Medical Tourism Value Chain

Information Technology VS Information Communication Technology

Information Technology (IT) refers to systems and processes of using telecommunication devices and software programs for data storage, collection, processing, and presentation in any applicable forms (Jittima, T., 2003). Information Communication and Technology (ICT) refers to technology or processes that create information (Collecting data for storage; for processing; or for analysis into information. And to download data and information from different sources; and quickly send information in an expected form when needed by users) to fulfill user demand.

The purpose is to provide good quality information to users (Accurate, reliable, complete, valid, up-to-date, and in compliance with user demand; with convenience and rapidity in any proper forms).

The Roles of Information Communication Technology in Tourism Industry

ICT in tourism industry is currently applied through the internet, which is very necessary to tourism for service providers and clients. ICT in tourism industry causes changes in several aspects, i.e., organizational structure, business roles, relationships between sellers and customers /clients, product and service presentation

forms, and employment. The development of the internet and communication devices has engendered the revolution of the structure of tourism industry and affected tourism dealers directly. That is because suppliers of tourism product and services can offer direct sale to consumers. Dealers linking between consumers and supplier have to confront with the problem of being cut off or replaced by online dealers.

The roles and significance of ICT in tourism industry can be concluded into 5 points as follows. 1) Selecting & developing attractions by applying ICT to create them so that they can be viewed by tourists. Information of expected attractions will also be created, including other information provided for tourists to choose based on their interest. 2) Marketing, with ICT applied to marketing promotion. Marketing research is brought to national marketing; whereas advertising and PR are brought to international marketing. 3) Customer relationship management by advance booking system and tourism management for pre-trip, on-trip, and post-trip. 4) Operations, i.e., purchase, service and supply management; and value chain management in tourism. 5) Tourism management and follow-up, i.e., geographic information system (GIS) for GPS navigation (Paisarn, K. & et al., 2010).

To Apply Data and Information for Medical Tourism

The development of ICT helps supporting data and information access in tourism industry in the era of cyber tourism. Tourists can access information of tourism and product as well as service booking on their own instead of the traditional tourism. Cyber tourists basically contain 3 types of behavior, i.e., 1) pre-purchased: Travel planning, searching for product and other

relevant information; 2) on-going: For future planning; and 3) post-purchased: For comments, suggestions, and sharing experiences to others (Pisarn, K., 2011).

To apply data and information in medical tourism, it can be divided into 4 objectives for use and users as follows. 1) The government or government agencies apply it for planning and operational improvement. 2) Tourists use it for tourism planning. 3) Tourism businesses apply it for business improvement, planning, marketing, and PR. 4) Medical service providers apply it for service presentation and providing contact information with hospital. Regular and medical tourism is divided into 3 stages of implementation as follows. 1) Pre-trip or Pre-procedure stage: It is the stage of travel planning, selecting destinations, searching for tourism information before making decision to travel, and booking tickets. 2) On-trip or Procedure stage: It is the stage of travel, medical treatment, and recuperation in attractions selected. 3) Post-trip or Post-procedure stage: It is the stage of returning to origin countries, follow-up after treatment, giving comments on tourism and medical treatment. Types of information use can be divided based on usability as follows.

1. Searching for information of tourism and medical matters, i.e., search engines (Google, for instance), and tourism websites ([<https://thai.tourismthailand.org/home>], for instance), medical service websites (Websites of leading, reputable, and accredited hotels [<https://www.bangkokhospital.com>], <https://www.bumrungrad.com>], for instance), YouTube channels of tourism VDO presentation, social medical presenting online tourism information (Facebook, Twitter, LINE, for instance), websites supporting

tourism planning (Trip Advisor [www.tripadvisor.com], for instance).

2. Product and service booking, i.e., airline service websites (AirAsia [https://www.airasia.com] and [https://www.thaiairways.com], for instance), hotel service websites (Agoda [www.agoda.com] and Booking [https://www.booking.com], for instance), visa service websites (Request for a visa to Australia [https://www.vfsglobal.com/Australia/Thailand/], for instance), car rental websites (Carrental [https://www.carrentals.com/], for instance).

3. Communication while traveling and receiving medical treatment, i.e., instant messaging (LINE, Whatsapp, Facebook Messenger through 3G, 4GLte, or WiFi on communication devices); and sending information through email, for instance.

4. Travel in destination countries, i.e., searching for directions/routes (Google Map, for instance).

5. Sharing experiences, i.e., tourism support websites (traveloka [https://www.traveloka.com] or Agoda [www.agoda.com], for instance) or tourism blogs (TripTH, with 2,745,929 followers; [https://www.facebook.com/TripTH.con/], Chillpainai, with 2,449,750 followers; [https://www.facebook.com/Chillpainai/], Sadoodta with 1,799,378 followers; and [https://www.facebook.com/sadoodtafanpage/], for instance).

ICT in Medical Tourism

Social media or social networks play an important role in shaping choices and decisions on medical tourism destinations (Laddawan, K., 2018). Websites are also considered an important marketing channel for showcasing doctors' experience and expertise and for providing information concerning available services, treatments, and equipment (Moghavvemi, S., &

et. al., 2017). Electronic Medical Record system (EMR) supports internal work with providers, i.e., decision support, monitoring, electronic prescribing, laboratory ordering etc.; maintain data set needed for medical audit and quality assurance, disease surveillance etc.; support for continuing medical doctors can take suggestions from other doctors (Sonali, P., 2013). Enterprise Content Management (ECM) technology can also manage clinical content like lab results, radiographs, wound-care photos, electro cardiograms and more. By integrating this content into the clinical content repository system, clinicians can quickly and easily access it without switching between applications (Eugene, C. 2016). Telemedicine is a technology that allows people and healthcare professionals to interact in real-time, as well as video conferencing that can be seen by both parties. e-consult as an asynchronous communication between healthcare providers that occurs within a shared electronic health record (EHR) or secure Web-based platform. Referring providers send a consultation request to specialists, who can respond by answering the consult question, requesting more information, and/or scheduling a specialist appointment (Varsha, G. V., et. al., 2015). e-doctor is a system to make an automatic diagnosis/prediction by means of answering if the patient has (or may have in the future) a specific health problem (Kampourakia, A., & et.al., 2013).

Conclusions

Medical tourism is a form of tourism mixed between outbound tourism and medical treatment at the same time. It is very popular nowadays because of considerable advantages, e.g., reducing queuing for medical treatment in their own countries, lower medical expenses

but with equal or better quality. Another factor bringing medical tourism is the development of ICT, applied through the internet. It helps supporting data and information for communication between service providers and clients.

The implementation of medical tourism is divided into 3 stages, i.e., before travel or travel planning (Pre-trip); during travel, medical treatment, and recuperation (On-trip); and post-trip. IT is applied in each stage, concluded in Table 2.

Tourism Behavior of Cyber Tourist	Tourism Stage	Implementation	Type of Information Use Based on Usability
Pre-Purchased	Pre-trip	<ul style="list-style-type: none"> - Searching for and selecting attractions - Searching for and selecting medical service places - Travel planning - Product and service booking 	<ul style="list-style-type: none"> - Search engines (Google) - Tourism websites (https://thai.tourismthailand.org) - Medical service websites (https://www.bangkokhospital.com) - YouTube (http://www.youtube.com) - Airline service websites (https://www.thaiairways.com) - Hotel service websites (www.agoda.com)
On-going	On-trip	<ul style="list-style-type: none"> - Communication when arriving in destination countries - Searching for directions /routes to travel in destination countries 	<ul style="list-style-type: none"> - Instant messaging programs (LINE, Whatsapp, Facebook Messenger) - Navigation program /application (Google Map)
Post-Purchased	Post-trip	<ul style="list-style-type: none"> - Sharing travel as well as medical treatment experiences - Follow-up after treatment - Suggestions and comments on service 	<ul style="list-style-type: none"> - Tourism support websites (https://www.traveloka.com) - Tourism blog (TripTH on Social Media) - Sending information through email

ICT in medical tourism industry, there are also many other technologies; social media and website, i.e., it supports communication both providers and medical tourists and presents medical tourism's information for pre-trip

decision. Electronic Medical Record system (EMR), Enterprise Content Management (ECM), Telemedicine, e-consult and e-doctor support internal work with providers which effect to facilitation medical tourists.



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