

The future of health tourism in the industrial revolution 4.0 era

Brian Kee Mun Wong and Sarah Alia Sa'aid Hazley

Abstract

Purpose – *The technological advances in the Industrial Revolution (IR) 4.0 era escalate the advancement of the healthcare industry, including the health tourism phenomenon. Based on the current trend in connected health care (e.g. mobile healthcare technology; digital health, etc.), this paper aims to propose that the distance between healthcare providers around the globe and its potential patients can be vastly reduced to almost on a real time basis.*

Design/methodology/approach – *A secondary literature review is conducted to identify the key development of IR 4.0 technologies in the healthcare industry and its possible trend leading the health tourism sector.*

Findings – *The adoption of IR 4.0 technologies is expected to make seeking treatments overseas more affordable, accessible and health records readily available on a real-time and secured basis. However, it is worth to note that the growth of health tourism raises the eyebrows of society from the security, social and economic perspectives.*

Originality/value – *This paper contributes to our understanding that the emergence of IR 4.0 technologies changes the landscape of the health care and health tourism industry. Continuous technology advancement is expected to further shape the future trend and escalate the commercialization aspect of the health tourism industry.*

Keywords *Future trends, Industrial revolution, Technologies, Health tourism, IR 4.0*

Paper type *Trends paper*

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Introduction

Healthcare is a robust industry, which is tightly related to other sectors such as travel and tourism, wellness and information, communication and technology. The merging of health care and travel sectors has seen it become a prominent movement in the past decade or so. It has created a phenomenal enhancement in human mobility worldwide. In fact, the concept of healthcare travel has its history dating back to the ancient times when people travelled places, searching far and wide, for the best healthcare services.

Ancient civilizations conceded the therapeutic effects of thermal medicine, hot springs and sacred temple baths (Gianfaldoni *et al.*, 2017). The earliest health complexes within a hot springs' vicinity were built by the Sumerians (about 4000 BC), whereas the ancient Greeks built the Asclepia Temple in honour of their God of Medicine, Asclepius (Health-Tourism.com, 2020). The temple formed one of the world's first health centers where people from different parts of the world travelled to seek solutions for their medical ailments. The ancient Greeks laid the first foundation of a comprehensive healthcare travelling network ever since.

In the modern era, healthcare traveling has evolved to include well-being enhancement and leisure, as patients require time to recuperate and recover. The evolution has obligated destination marketers to relook into the purpose of healthcare travelers when visiting a destination. The combination of health care, travel, tourism and wellness concepts eventually created the concept of health tourism. The term, "health tourism" or "medical

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tourism” has been used since the 17th century (Yusof *et al.*, 2019). In fact, health tourism, medical tourism and wellness tourism are commonly used interchangeably, and perhaps it is essential to note that each of the terminologies is, in fact, different (Wong and Musa, 2013). Health tourist, thus, in this context, is defined as tourist who travel elsewhere to seek and receive health, medical and/or wellness services for different reasons.

Health care has always been evolving gradually with its medical technologies (Allen, 2019; Lobo, 2020), however new diseases are always demanding for new treatments and these treatments are not always offered at one's preferred area or location. Hence, the technology advancement is not only enhancing medical precision and quality but also bringing healthcare services closer and faster to the patients, revolutionizing the healthcare travelling requirements. Health tourism has gradually integrated the demand for sophisticated and cultivated medical treatments and of the devices above par the personalized ones (Bhattacharyya, 2020; Hong, 2016; Medical Technology, 2020). The Industrial Revolution 4.0 (IR 4.0) is a much talked about term in this current technology-dominated economy.

While the first IR introduced the use of steam-powered and mechanics to increase production, the Industry 2.0 popularized the electricity and mass-production processes. The third IR brought the first wave of digitalization of technology, enhancing economies to go beyond political and geographical boundaries and at a faster speed. The latest, fourth IR, is an advancement of Industry 3.0 where the physical, digital and biological spheres are connected (Bernasconi, 2016), continues to disrupt business practices and the society's ways of life. Among the IR 4.0 technologies include Internet of Things (IoT), automation, robotics, virtual reality, artificial intelligence (AI), cloud solutions and big data analytics. Despite the technology advancements not only benefits the development of health tourism industry but also the tourism industry, in general; this paper focuses on the earlier context.

IR 4.0 is shaking the healthcare industry by storm with a robust transformation within the mobility enhancement concept (Landman, 2018). This mobile health care is expected to make health care more affordable, accessible and health records readily available and secure. Some of mobile healthcare devices and infrastructure that helps to shape the future include telemedicine, wearables, digital sensors and biotelemetry, remote patient monitoring, virtual rehabilitation and intelligent fabric. It has not only benefited many patients but also enabled healthcare providers to streamline processes, synthesize information and provide real-time updates. The latest innovation in healthcare technologies will provide a much competitive advantage, especially in developing faster and more effective treatment (Bernasconi, 2016).

Telemedicine is among the initial stage of IT-enabled collaboration within the healthcare industry. The benefit of implementing telemedicine has been widely appreciated by healthcare professionals particularly in managing chronic diseases. It enhances patients' mobility virtually, making geographical location less of a factor in obtaining healthcare services. This enables patients from remote areas to access the best health care from a touch of their smart phone. A research conducted at Mayo Clinic, USA, revealed an astonishing acceptance level of mobile technology, where more than 80% of the patients indicated interest in using mHealth applications. In 2011, the US Secretary of Health and Human Services recognized mHealth services as one of the biggest health-related technology (Nehra *et al.*, 2017).

The technology is very much relevant and useful for health tourism, particularly in enhancing the process of pre- and post-operative care, in both medical and customer service perspectives (Medical Tourism Magazine, 2020). Tele-consultations can be performed remotely by anesthesiologists and surgeons to assess health tourists' healing and wound recovery process even when they reside in their home country. Healthcare professionals at the health tourism destination can follow-up with the patients' local primary care providers in their home country via teleconferencing and/or telehealth applications. For example, the

online-based Chinese American Physicians E-Hospital was launched in 2015, providing health tourists the tele-consultation services and international transfer from their home country to the USA for treatment. This enables more convenient and hassle-less health tourism experience to the USA (Hong, 2016).

The mobile health care further innovates into related digitalized products such as wearables, digital sensors and biotelemetry. Among the diagnostic procedures to perform digitally via wearable devices and sensors include blood glucose levels, electrocardiogram, pulse and blood pressure checking and blood oxygen saturation levels. The data collected digitally will then connect to the mobile application installed in the user's (i.e. health tourist) smart phone. Regular health progress can be transmitted to the health care professionals and in return proactive measures for better health control can then be recommended to the users, digitally and remotely.

IoT is conquering every aspect of human life and work environment. This is no exception to the healthcare industry. In fact, the term of Internet of Medical Things was highlighted by the Department of Health, Abu Dhabi (2020) during the 12th annual World Medical Tourism & Global Healthcare Congress in 2019. The wearables and sensors that form part of IoT are indicated to be beneficial to healthcare professionals are gaining effective benefits (Junata and Tong, 2018). The use of fitness-tracking bands, smart watches and smart textile can easily collect data on patients' health conditions and connect with the healthcare professionals in other parts of the world. While these technological devices may apply to any individuals, the usage is prominent for health tourists who may opt to have follow-up with their doctors in another country remotely, as data can be transmitted to them on real-time basis (Psiha and Vlamos, 2017).

The data from the sensor was then transmitted via IoT sensor platform, to a dedicated android app developed on a Google Nexus 5X smart phone. However, the development is yet to be compatible with smart phone options. An example of such technology usage in health care is the cloud-based wearable IoT sensor systems that measure asthma patients' exposure to aldehydes, in real-life settings (Li *et al.*, 2019). The recent 5G medical technology development further enhances the patterns of production and consumption of health tourism services, such as smart wearables (e.g. clothes that measure heart rate, blood pressure, body temperature, skin moisture, etc.) and active device location tracking (Psiha and Vlamos, 2017). Such development is highly applicable and useful for health tourism, as it allows continuous communication and data updates through cloud computing between the health tourists (at home country) and the healthcare professionals (at health tourism destination).

Next, the virtual rehabilitation application will also be benefiting the health tourism industry. It is a system that integrates wearable sensors and records range of motion. The data are analyzed for the therapists to guide the patients in real time via a mobile device (e.g. tablet, smart phone). The National University of Singapore has launched an IoT-based rehabilitation program for stroke patients in 2016. However, there are very few studies on the adoption rate of these innovations among local communities and health tourists, seeing Singapore as among the top health tourism destinations globally.

Other rehabilitation technologies include robotics (Department of Health, Abu Dhabi, 2020; Mann, 2013) (e.g. Cleveland Clinic Abu Dhabi implemented robotic surgery since 2017) and assistive technology (AT) (Carlson and Ehrlich, 2005). In fact, AT plays an intermediary role where it enables disabled individuals (e.g. severe paralysis) to transmit their messages/intentions to other devices (e.g. computers) within their surrounding environment (Ghovanloo and Huo, 2014). These technologies further upscale the offerings and competitiveness of health tourism destinations to lure health tourists.

Despite AI has existed sometimes back, the application of it in the healthcare industry is still at the infant stage. The behavioural and mental healthcare fields use AI to learn, understand

and reason to make better clinical decisions, diagnostics, testing and patient care management. Besides, AI technologies and techniques also enhance patients' lives via advance self-care tools. For example, the interactive mobile health applications study the patterns and preferences of users. By doing so, the AI may improve public health through the detection of health risks and recommending interventions.

The use of AI enables the interactions between health professionals and care seekers at a distant, providing necessary treatment recommendations (Luxton, 2016), a very useful communication and interaction tool between health tourists and the healthcare professionals overseas. In stepping up Abu Dhabi as a unique health tourism destination, the United Arab Emirates (UAE) has taken AI seriously in regulating the development of its healthcare industry by introducing the first AI policy, tabling out the UAE Artificial Intelligence Strategy and announcing it world's first Minister of State for Artificial Intelligence.

The integration of IR 4.0 technologies in general healthcare industry will benefit health tourism development as it will revolutionize patients' travel options and patterns, particularly for the initial checking and later follow-up stages. Such benefit becomes more significant among the elderlies and those who may have mobility issue to travel. Digitalized and connected health care saw increased investment over the past few years and the widespread use of technology-enabled health care further making the idea of "Smart Hospital" a reality (Frost and Sullivan, 2017). The call for the use of blockchain technology to enhance the safety and effective use of health data within the health tourism industry gained attention in the recent years (Iryo.network, 2018). The use of technology may free up face-to-face appointments for health tourists, particularly for follow-up sessions after returning to their home country, and thus generate more convenient and cost-effective experience.

The freer mobility of health tourists around the globe has relatively changed the requirements of demand and supply of healthcare products and services. It is no longer the developed nations that can reap the commercial benefits of the health tourism growth but also the developing nations. Though health tourism remains a niche contribution to the total tourism receipts of many destinations, the direct and indirect effects on the overall tourism industry is well appreciated (NaRanong and NaRanong, 2011). For example, the multiplying effects of health tourism towards other tourism sectors (e.g. hotels, airlines, food and beverages) have been reported to be between three to four times in Malaysia (Yusof, 2017). Thus, the growth of health tourism should be given ample attention for nations with a strong and competitive healthcare services.

Healthcare know-how and technologies are available in many parts of the world. The availability of IR 4.0 technologies also enhances expert mobility (e.g. doctors, nurses, professors and care takers) virtually and further enhances the readiness of developing nations to receive its health tourists with an open hand. Perhaps, with the adoption of IR 4.0 technologies among the health tourism facilities, health tourists may not necessarily require physical movement elsewhere anymore in seeking and receiving health services, such as simple health checks or health advice.

While it is believed that these technologies benefit patients in terms of precision and timeliness, the key concerns raised by critics include the absence of empathy and lack of trust in a robot's decision-making (Lobo, 2020; Tim, 2018). Other concerns of incorporating technologies into health tourism specifically may include data leakages, privacy matters, cybersecurity and over-commercialization concerns (Medical Technology, 2020). While the growth of health tourism is prominent, it is also essential to take note of its impact on the local healthcare system, healthcare resources management, cost-containment strategies and post-humanism matters.

The recent corona virus pandemic that puts global travelling almost to a halt is a good example of why the future of health tourism should evolve through the technology

advancement, specifically the IR 4.0 technologies as available currently. Health care is no longer just about local accessibility but cross-national borders, be it physically or virtually.

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