

Exploratory Analysis of Health Tourism in Hermosillo, Sonora, and its Integration into the Digital Economy

Análisis exploratorio del turismo de salud en Hermosillo, Sonora y su incorporación en la economía digital

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Abstract

By the year 2019, the growth of the private medical industry was more prominent in the border cities of the state of Sonora due to the influx of foreign patients and approximately six hundred thousand Sonorans or their descendants residing in the state of Arizona (López, 2019). Among the border municipalities, Hermosillo stands out due to its internationally certified private hospital infrastructure. However, the lack of postoperative services, the absence of external agents promoting these services both abroad and within Mexico, and a disconnect in the value chain have hindered the growth of the medical industry in the capital (López, 2019). The concept of the digital economy does not yet have a widely accepted definition, as society is still in the early stages of digitalization. There is a gap between the available tools and their implementation to optimize the value chain and enhance customer experience. This document contextualizes Hermosillo, Sonora's private medical services industry within the digital economy through a documentary investigation of digital resources, analyzing political, economic, social, and technological aspects. Furthermore, the health crisis forced the digitalization of commercial

processes to achieve established objectives, positioning the medical industry as a key player in the digital economy.

Keywords: Digital Economy, Digitalization, Medical Industry, Health Tourism.

JEL Codes: I-11

Resumen

Para el año dos mil diecinueve el crecimiento de la industria médica privada se daba más en las ciudades fronterizas del estado de Sonora debido a la afluencia de pacientes extranjeros y unos seiscientos mil sonorenses o descendientes radicados en el estado de Arizona (López, 2019). Hermosillo destaca de los municipios fronterizos, gracias a la infraestructura privada hospitalaria certificada internacionalmente. Sin embargo, la ausencia de servicio postoperatorio al igual que agentes externos promotores de los servicios en el extranjero como en la república mexicana y una desconexión en la cadena de valor, han frenado el crecimiento de la industria médica en la capital (López, 2019). El concepto de economía digital no cuenta con una definición ampliamente aceptada, debido a que la sociedad se encuentra



en las primeras etapas de digitalización. Existe una brecha entre las herramientas y su instrumentación para eficientar la cadena de valor y la experiencia del cliente. El presente documento contextualiza la industria privada de servicios médicos de Hermosillo, Sonora en la economía digital mediante una investigación documental de recursos digitales, esto en materia política, económica, social y tecnológica. Aunado a lo anterior la crisis sanitaria forzó a la digitalización de los procesos comerciales para lograr los objetivos planteados, por lo que la industria médica se convirtió en un actor de la economía digital.

Palabras clave: Economía digital, Digitalización, Industria médica, Turismo de salud.

Códigos JEL: I-11

1. Introduction

The definitions of health tourism vary depending on the author consulted. According to the present research, it refers to the movement of a patient seeking treatment due to a lack of option in their home country, excessively long waiting periods, or high service costs. However, this study focuses on the definition provided by the World Tourism Organization (UNWTO) in collaboration with the European Travel Commission (ETC). This report proposes a coherent conceptualization that describes the intricate system of the industry. The recommended taxonomy and definition indicate that, in general terms, tourism is defined as: “*Tourism and travel are activities that can contribute to the creation or enhancement of well-being*” (OMT Y CET, 2018, p.9). Specifically, health tourism is defined as:

It encompasses those types of tourism whose primary motivation is to contribute physical, mental, and/or spiritual health through medical and wellness activities that enhance individuals’ ability to meet their own needs and function better in their environment and society (OMT Y CET, 2018, p.9).

The following table summarizes the types of tourism mentioned in the previous definition.

Table 1. The Three Segments of Health Tourism

Indicators	Types of Tourism		
	Retirement Tourism	Wellness Tourism	Medical Tourism
Consumption Factors	Retirees travel abroad to maintain or improve their standard of living from their productive years.	The desire to maintain or enhance overall well-being.	The pursuit of well-being through conventional medicine, treatment, or surgical intervention.
Providers	Depend on the retirement segment they serve and may include professionals with various certifications or none.	Individuals with different certifications and levels of qualification.	Healthcare professionals such as doctors, nurses, and specialists.
Types of Services	Vary based on the target market segment. Example: retirement homes, independent living.	Alternative medicine, yoga, or spas, among others.	Invasive procedures, treatments, or diagnostics.

Source: Market Opportunities and Prospects for Health Tourism in Mexico

Understanding the concept of “Health Tourism” as an activity that involves traveling outside one’s place of origin with the sole objective of improving health and well-being, it is also essential to identify the factors that have shaped this industry in recent years and contributed to its constant growth.

Table 2. Factors Driving the Growth of the Health Tourism Industry

The increasing elderly population leads to higher demand for long-term specialized healthcare and caregiving services.
According to UN data, more than half of the world’s population currently lives in urban areas, and this figure is expected to rise to two-thirds by 2050. Life in large cities can influence people to seek options that counteract chronic diseases associated with urban lifestyles.
The rise in available time and financial resources allocated to leisure activities—such as travel, entertainment, and healthcare—has fueled the demand for wellness-oriented travel and a healthier lifestyle.

Source: Exploration of Health Tourism – Executive Summary.

Health tourism emerges as an option that contributes to the development of countries and regions, significantly impacting finances through its multiplier effect. According to El Financiero (2023), this sector influences medical services and complementary industries such as logistics, gastronomy, hospitality, and tour

operators. In 2019, global healthcare expenditures represented 10% of the world's gross domestic product (World Health Organization, 2019). Furthermore, according to Mordor Intelligence (2024), the global medical tourism market is estimated at \$84.92 billion in 2024 and is expected to reach \$239.37 billion by 2029, growing at a compound annual growth rate (CAGR) of 23.03% during the forecast period (2024-2029). Currently, according to the World Trade Organization (WTO), Mexico has established itself as one of the global leaders in medical tourism, alongside countries such as Thailand, Costa Rica, India, Malaysia, Singapore, and South Korea (El Financiero, 2023). Additionally, Mexico has developed an extensive network of trade agreements, including fourteen free trade agreements, thirty reciprocal investment promotion and protection agreements with thirty-one countries or administrative regions, and nine limited-scope agreements under the framework of the Latin American Integration Association (ALADI) (Government of Mexico, 2023). One example is the Sonora-Arizona Commission, established in 1959 (Rubio, 2023). This collaboration has led to the implementation of strategies to leverage comparative and competitive advantages, facilitating the development of cross-border projects and trade corridors. These efforts promote the integration of both states in commercial, social, and cultural aspects (Government of the State of Sonora, 2024). In recent years, Mexico has ranked as the second-largest destination for health tourism worldwide, receiving 1.2 million visitors annually. The country welcomes patients from various nations, primarily seeking services related to cardiothoracic surgery, plastic surgery, ophthalmology, oncology, dentistry, gastroenterology, reproductive medicine, orthopedics, and gynecology, among others (Hernández, A. 2023). Sonora possesses several advantages that favor the development of medical tourism, including hospital capacity, healthcare professionals, and the *Law for the Promotion of Tourism of the State of Sonora and its Regulations*, which support the search for more and better services. Additionally, its proximity to the United States, the world's largest healthcare market, creates a favorable environment for U.S. residents to seek healthcare services in Sonora. The lower cost of medical services compared to other countries, along with well-developed transportation infrastructure, allows for continuous patient flow. Furthermore, Sonora boasts significant hotel and resort capacity,

with more than 17,000 rooms and an extensive service network. The state also has specialized tourism service companies, as well as natural attractions and recreational activities that may be of interest to visitors and their companions (Datatur, 2020). In the specific case of Hermosillo, the city's characteristics make it an attractive destination for medical services. By 2020, Hermosillo had 48 healthcare centers and 2,544 healthcare spaces. The city's leading private clinics and hospitals include *Hospital San José*, *Centro Médico del Noroeste*, *CIMA*, *Licon*, *Sanatorio San Francisco*, and *Clínica San Benito* (Ministry of Health, 2020). For these reasons, it is essential to consider health tourism as a viable option for business development and meeting the healthcare needs of patients worldwide. A key factor in increasing the competitiveness of Sonora's private medical services in health tourism is its integration into the digital economy. Every revolution transforms industries, and Industry 4.0 is inherently reshaping the global medical tourism landscape. The emphasis on connectivity and automation opens the door to endless possibilities in a rapidly growing sector. For healthcare professionals, this transformation expands their reach and access to new markets while facilitating global collaboration with colleagues. Patients benefit from greater convenience, control, and transparency in finding healthcare services. Businesses can create new business models, optimize processes, and increase profitability. These are just a few of the benefits for all stakeholders involved in the industry.

2. Methodology

This study is based on an exploratory documentary investigation of health tourism at the national, state, and local levels. It involves a content analysis of digital sources such as industry reports, research papers, scientific articles, opinion pieces, and journalistic reports. Additionally, databases and statistical resources from Mexico, the World Bank, and the World Health Organization were considered.

2.1. Problem Statement

The Mexican medical tourism industry has positioned itself as one of the global leaders in the sector, according to the World Trade Organization (El Financiero, 2023). However, despite its potential, it faces challenges that hinder its full development. Industry experts emphasize the need to implement strategies to attract more patients, improve



workforce training, and establish an appropriate legal framework. Misael Uribe, Director of International Medicine at *Hospital Médica Sur*, highlights the lack of available information and stresses the importance of leveraging Mexico's existing infrastructure, certifications, favorable location, and competitive pricing in the medical tourism sector (Luna, 2023).

Similarly, Jorge Azpiri, Director of Development and Expansion at *TecSalud*, expresses concern that despite Mexico's exceptional geographic location and significantly lower costs compared to the United States, the country has yet to fully capitalize on its potential in this industry (Luna, 2023). Javier Potes, Director of the *Mexican Hospital Consortium*, points out the absence of a unified strategy in developing medical tourism in Mexico, emphasizing the need for more effective coordination to attract a greater number of international patients (Luna, 2023).

According to Ayala Espinosa (2023), the growth of medical tourism in different states not only helps attract more visitors but also creates opportunities for the development of medical manufacturing and pharmaceutical e-commerce in various regions. Experts suggest that integrating the industry into the digital economy will be a key element in future strategies to boost the growth of medical tourism in Hermosillo, Sonora.

2.2. Objective

To identify the viability of the digital economy as a tool for the development of the private medical industry in Hermosillo, Sonora, within the scope of medical tourism. This study aims to recognize the opportunities presented by the integration of digital technologies in this sector.

3. Literature Review

3.1. Medical Tourism in Mexico

It is estimated that health tourism began in the late 20th century (Connell, 2013). This industry is characterized by its regional and cross-border development, demonstrating significant global potential. The economic value derived from health tourism-related activities has increased over the years: in 2016, its value stood at \$4.792 billion, rising to \$5.064 billion in 2017, and exceeding \$5.3 billion

in 2018. The industry's growth rate between 2013 and 2018 was estimated at 33.7%, with an expected annual trend growth rate of approximately 13.5% for the 2024-2030 period (Secretaría de Turismo, 2022). It is estimated that the revenue generated per medical tourist in Mexico ranges between \$5,000 and \$20,000, depending on the treatment. Regarding accommodation, medical tourists are expected to stay in the country for approximately five to fifteen days (Deloitte, 2019). By 2021, the healthcare sector in Mexico reported an economic contribution equivalent to 6.2% of the national Gross Domestic Product (GDP) (Instituto Nacional de Estadística y Geografía, 2022). During the first half of 2022, Mexico issued 201,495 medical passes to foreign nationals, generating an estimated economic inflow of approximately 80 million pesos (Secretaría de Turismo, 2022). According to Hernández Castillo (2023), health tourism in Mexico has thrived due to three key factors: certified medical professionals, modern healthcare infrastructure, and competitive pricing. Patients can save between 36% and 89% on treatments and outpatient procedures compared to costs in the United States, France, Germany, Canada, and Italy. The ratio of specialist doctors to general practitioners is 63.4%, surpassing the average of 57.7% among member countries of the Organization for Economic Co-operation and Development (OECD) (Hospital CMQ, 2023). This competitive advantage strengthens Mexico's position in the healthcare sector, offering a broad range of high-quality specialized medical services. Additionally, the country's geographic proximity to one of the world's largest markets, the United States, has been a key factor in the success of health tourism (Banco Nacional de Comercio Exterior, 2022). American travelers account for 70% of revenue in the Mexican healthcare sector. Studies indicate that demand for medical services in the United States is expected to increase, particularly among the "baby boomer" generation, which will require greater medical attention as they surpass the age of 70. Furthermore, according to the U.S. government, approximately 30 million Americans lack health insurance, representing 12.1% of the population. The United States is considered a significant market, as it has one of the most expensive healthcare systems globally (Centro de Investigación de Alimentación y Desarrollo, 2015). Regarding wellness tourism, the overall industry value stands at \$17.9 billion, with an average annual growth rate of 16%. A wellness

tourist spends approximately 53% more than other types of tourists (Deloitte, 2019). In Mexico, this segment represents 2.6% of the tourism industry. Specific regions within the country have emerged as leading wellness tourism destinations, earning international recognition, such as Tulum, which has been designated the “Yoga Capital of the World” (La Pancarta, 2017). Other prominent wellness tourism destinations in Mexico include Baja California, Baja California Sur, Monterrey, Jalisco, Nayarit, Colima, Guerrero, Oaxaca, Chiapas, Tabasco, Yucatán, Quintana Roo, San Luis Potosí, and Guanajuato. The main activities associated with wellness tourism include traditional pre-Hispanic medicine, temazcales, healthy eating, spas, yoga, detox programs, beauty treatments, and anti-aging therapies (Deloitte, 2019). Additionally, retirement tourism presents significant potential in Mexico. Tourists within this segment allocate substantial financial resources, as they tend to stay in their destinations for an average of sixteen days. They also travel internationally approximately three times per year, with an average expenditure of around \$3,000 per traveler and an annual household income of \$123,676. It is estimated that by 2050, approximately four million retired Americans will seek to reside in Mexico. These tourists are drawn to the country due to its proximity to their home nations, attractive culture, healthcare services, and recreational opportunities (Deloitte, 2019).

3.2. Capacity of the Healthcare System in Mexico

Based on the analysis of projections regarding the demand for healthcare services, it is essential to assess Mexico's capacity to attend to patients. In this regard, as of 2018, Mexico had ninety-eight hospitals accredited by the federal Ministry of Health and seven certified by the Joint Commission International. Some of these hospitals are located in states such as Baja California, Baja California Sur, Mexico City, Chihuahua, Jalisco, Sonora, Nuevo León, Puebla, Quintana Roo, San Luis Potosí, Tamaulipas, and Yucatán (Banco Nacional de Comercio Exterior, 2022). By 2020, seven federal entities concentrated 53% of private healthcare establishments, of which 10.9% provided specialized care. Among 15,399 medical offices, 35.7% were designated for general and emergency medical consultations, while 64.3% were used for specialized consultations. Additionally, the country had 5,141 operating rooms, 1,041 clinical analysis laboratories, 458 mammography units,

424 computed tomography (CT) scanners, 95 radiotherapy units, and 1,148 intensive care units (ICUs) for adults (Instituto Nacional de Estadística y Geografía, 2022). Furthermore, in 2021, outpatient services in Mexico accounted for 71.9% of medical consultations, highlighting the importance of ambulatory care (diagnostics and treatments). General and family medicine services represented 22.4%, emphasizing the significance of primary healthcare. Hospitalization and support services accounted for 13.6%, while dentistry comprised 6.94%. Additionally, urology and pediatrics represented 3.47% and 2.84%, respectively, indicating the availability of specialized services in these areas. Lastly, surgical services accounted for 2.52% (Data México, 2022).

3.3. Medical Tourism in Sonora

According to Bancomext (2022), Sonora is among the Mexican states that receive the highest volume of health tourism, alongside Baja California, Baja California Sur, Mexico City, Chihuahua, Jalisco, Nuevo León, Puebla, Quintana Roo, San Luis Potosí, Tamaulipas, and Yucatán. In this context, Sonora serves a profile of foreign patients with limited healthcare coverage, positioning the state as a potential health tourism hub over the next ten years (Imparcial, 2023). The primary retirement communities in Sonora are in San Carlos, Puerto Peñasco, and Álamos. According to Deloitte (2019), these communities represent a significant opportunity for medical tourism in the state. Considering this, Sonora is developing strategies to attract more patients. Furthermore, according to the 2021-2022 government report of the State of Sonora, in 2021, the state government collaborated with the University of Arizona, Section 43 of the National Union of Health Sector Workers (SNTSSA), El Colegio de Sonora, and the University of Arizona's School of Public Health to offer the “Diplomado de la Salud” program. This initiative aimed to contribute to the training and professional development of health promoters working in various sectors and institutions. Additionally, Sonora participated in the “Meta Salud Diabetes” educational program. These efforts have enhanced Sonora's visibility as a healthcare destination, making it a focal point for international healthcare initiatives. Given the benefits stemming from the Sonora-Arizona relationship, the state's border cities have experienced significant growth in private

healthcare services, catering to approximately 600,000 Sonoran nationals, as well as American and Canadian patients. These international patients seek dental treatments and specialized medical services due to cost savings, quality, and infrastructure (Alvarado, M., 2018). In October 2023, the Sonora-United States Commission was relaunched, expanding collaboration to include California, New Mexico, and Texas. This initiative involved restructuring the original sixteen focus areas into seven key axes: Quality Education, Health and Well-being, Sustainable Energy, Water and Environmental Resilience, Economic Development and Global Promotion, Public Safety, Infrastructure and Logistics, and Tourism. Among these, health tourism is a priority for strengthening Hermosillo's position as a medical industry hub. Through this initiative, Sonora is reinforcing cross-border cooperation, positioning itself as a healthcare solution for the neighboring country while fostering an international partnership based on collaborative efforts and effective solutions (Gobierno del Estado de Sonora, 2023). Regarding the state's installed capacity to meet the growing demand for health tourism services, the National Statistical Directory of Economic Units (2024) reports that Sonora has approximately 4,266 healthcare facilities, including medical and dental offices, other healthcare consultation centers, and outpatient care centers for non-specialized patients. This information is detailed in Table 2.

Table 2. Healthcare Facilities in Sonora

ACTIVITY	SONORA
Medical offices	2193
Dental offices	1242
Other health care offices	779
Outpatient care centers for patients who do not require hospitalization	52
Total	4266

Source: National Statistical Directory of Economic Units.

Figure 1 shows the location of these health care units across the state of Sonora, represented by points on the map. These units are mainly concentrated in the central, southern, and northern regions of the state, particularly along the border with the United States.

Figure 1. Distribution of health care units in Sonora.



Source: National Statistical Directory of Economic Units.

Most of these health centers and hospitals are distributed across the cities of Hermosillo, Nogales, Guaymas, Navojua, and Ciudad Obregón (Cárdenas, P., 2020). Among them, approximately ten medical units meet relevant standards, including those granted by the General Health Council, the *Joint Commission International*, Accreditation Canada International, and the American Association for Accreditation of Ambulatory Surgery Facilities (Centro de Investigación de Alimentación y Desarrollo, 2015). Regarding healthcare personnel, the number of physicians per thousand inhabitants in Sonora has increased in recent years. By 2019, it was estimated that there were 2.9 physicians per thousand inhabitants, including general practitioners, specialists, interns, and residents from both public and private institutions. In comparison, the World Health Organization considers an acceptable rate to be 3 physicians per thousand inhabitants, meaning that Sonora is close to reaching this level. In terms of nurses, it was estimated that there were 3.4 nurses per thousand inhabitants (Pineda, N., n.d.). Currently, Mexico has a legal and regulatory framework for medical and health tourism. In 2022, the Senate approved a reform to promote this type of tourism in the country, fostering collaboration between the Ministry of Health and the Ministry of Tourism to establish quality standards in medical services. In addition, the creation of the National Registry of Destinations was approved, aiming to classify tourist zones according to their development level, with the objective of designing specific strategies for each destination (Senado de la República, 2022).

3.4. Hermosillo as a Development Hub for Medical Tourism

The characteristics of the city, along with its economic development and growth, have made it attractive in several ways. It stands out as an appealing and competitive city for investment. According to the World Bank's "Doing Business" index, Hermosillo was classified as a location with high potential for developing economic activities due to its general characteristics (Davis, D., et al., n.d.). These aspects also make it an attractive destination for investment in medical tourism, given its short distance from the United States and its transportation infrastructure, which can position it as a healthcare center for medical tourism. Moreover, it has qualified healthcare personnel. According to the National Statistical Directory of Economic Units (Directorio Estadístico Nacional de Unidades Económicas), Hermosillo has 1,578 healthcare units in the urban area, corresponding to 80.7%, while 19.3% are located in rural areas (Directorio Estadístico Nacional de Unidades Económicas, 2024). Table 3 shows the healthcare units by type of service distributed in the city of Hermosillo, Sonora.

Table 3. Healthcare Units in Hermosillo, Sonora.

ACTIVITY	SONORA
Medical offices	850
Dental offices	399
Other health care offices	305
Outpatient care centers for patients who do not require hospitalization	24
Total	1578

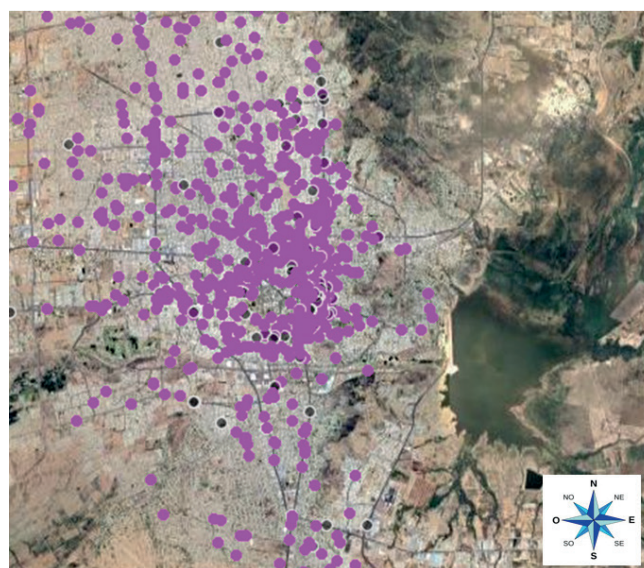
Source: National Statistical Directory of Economic Units.

Among the healthcare units, 71.9% of the facilities correspond to outpatient consultation services, 13.6% to hospitalization services, and another 13.6% to support services. Additionally, by 2021 there were 317 medical offices, of which 54.6% belonged to hospitals and 45.4% to clinics. Of these, 22.4% provided general and/or family medicine, 2.25% surgery, 3.15% gynecology and obstetrics, 1.89% internal medicine, 2.83% pediatrics, 6.94% dentistry, 0.31% dermatology, 1.57% ophthalmology, 2.28% otorhinolaryngology, 11.98% psychiatry, 1.57% traumatology and orthopedics, 3.15% reproductive health/family planning, 18.92% psychology and/

or mental health, 3.15% gastroenterology, 1.89% emergency medicine, 0.94% cardiology, 0.94% neurology, 3.47% urology, 2.20% oncology and dysplasia, and 13.56% other medical specialties (Data México, 2022).

The following map shows the distribution of healthcare units in the city of Hermosillo. Each point represents a healthcare unit. It is possible to observe that the highest concentration of these units is in the city center, followed by the northern and southern areas respectively.

Figure 2. Distribution of Healthcare Units in Hermosillo, concentrated mainly in the central area of the city.



Source: National Statistical Directory of Economic Units.

Regarding projections on the capacity to provide healthcare services, the city of Hermosillo has a significant supply through Higher Education Institutions with training programs related to medical tourism. These programs will ensure, in the short, medium, and long term, the availability of qualified personnel to meet market demand. In 2022, there were 63,800 higher education enrollments in Hermosillo across various fields of study, of which 52,100 were in health-related areas. Specifically, 4.08% corresponded to general nursing and obstetrics, 2.69% to general medicine, 2.21% to dentistry and general stomatology, 1.69% focused on therapy and rehabilitation, 1.67% on medical diagnosis and treatment technology, and 0.083% on medical specialties. In the service-oriented fields, gastronomy and food services accounted for 0.62%, public safety 0.46%, personal care and beauty



services 0.27%, and hospitality and tourism 0.24%. Other relevant areas for the analysis included business and commerce (3.56%), marketing (1.93%), and law (6.67%). Additionally, software development represented 2.43%, while tourism management and restaurant administration accounted for 0.7%, and information technology represented 0.53% (Data México, 2022).

Concerning the installed capacity to receive tourists, according to 2020 data, Hermosillo had 94 lodging establishments, of which 6 were classified as five-star, 21 as four-star, 12 as three-star, 14 as two-star, and 41 without classification. This represents a total of 5,855 rooms. The city also had 586 leisure establishments, such as restaurants, nightclubs, coffee shops, refreshment stands, etc., and 199 establishments dedicated to tourism-related activities, such as travel agencies, reservation services, water parks and swimming facilities, car rentals, golf courses, convention centers, tourism education centers, tourist guides, tourist assistance modules, land, water, and other types of tourist transportation, handicraft shops, among others (Datatur, 2020).

3.5. Conceptualization of the Digital Economy

Due to the constant evolution experienced in recent years with Information and Communication Technologies (ICT), it is complex to establish a single concept that encompasses everything related to this topic. In fact, the 2019 report on the digital economy by the United Nations (UNCTAD, 2019: p.4) states:

Given that the world is still in the early stages of digitalization, the evolving digital economy and several other related economic terms lack widely accepted definitions. This may reflect the rapid pace of technological progress. The time required to reach agreement on standard definitions often lags the speed of technological change (UNCTAD, 2019: p.4).

One way to understand this concept is by considering the historical context of the global economy. Until the 20th century, the economy was divided into two major categories: agriculture and industry. The industrial economy is particularly noteworthy due to the emergence of computers and the rise of the internet from the 1980s to the 2000s, which once again transformed the way products and services were produced and consumed (see Table 4). This

transformation led, in the 21st century, to the globalization of data, a phenomenon known as the digital economy.

Table 4. Stages of the Industrial Revolution.

First Revolution	Second Revolution	Third Revolution	Fourth Revolution
Use of water and steam power to mechanize production.	Application of electric power to mass production.	Use of computers and ICT for production automation.	Convergence between Information Technology (IT) and Operational Technology (OT), as well as innovations such as the Internet of Things (IoT), Artificial Intelligence (AI), among others.

Source: "Economics of Technological Leapfrogging": UNIDO, 2018.

Likewise, the term "Digital Economy" reflects the changing nature of technology and its use by businesses and consumers (Barefoot et al., 2018). By the late 1990s, the process of internet adoption had matured, and the first analyses of its economic impacts emerged. During the 2000s, there was a rise in the so-called "Internet Economy" due to its significant impact on economic indicators. The definitions and topics related to the internet economy encompass the analysis of policies, digital technologies, and the growth of digitally-oriented businesses and ICTs as key players (OECD, 2012 and 2014). Moreover, in more recent studies, the focus has shifted towards the diffusion of digital technologies, services, products, and skills across economies, highlighting the influence of "digitalization" and "digital transformation" in traditional sectors and exploring cross-sectoral digitalization trends (OECD, 2016 and 2017; UNCTAD, 2017) (UNCTAD, 2019, p.4).

3.6. The Impact of the Digital Economy on Medical Tourism

Digitalization begins on the consumer side (Practice Business Solution, 2023), which creates a driving effect that establishes digital behaviors related to individual preferences in various areas such as entertainment, work, study, clothing, and lifestyle. These trends create synergy across the value chain of different industries, generating a positive impact from the large amounts of data generated by the consumer. Commercial organizations that use digital tools and applications can analyze all this consumption data, allowing them to optimize their

marketing strategies, improve customer experience, and develop products and services tailored to market needs. This approach drives business growth and profitability. This represents a digital revolution in the private business sector, with the use of digital platforms and reduced barriers to access, creating a new business environment (Valenzuela-Fernandez, Collantes-Inga & Durand-Hipólito, 2020). A digital platform is *“an environment in which users can perform tasks, manage activities, collaborate with other users, and interact through the tools and functionalities provided by the platform”* (Coppola, 2023).

This phenomenon is part of the Fourth Industrial Revolution, characterized by technologies such as 3D printing, IoT (Internet of Things), AI (Artificial Intelligence), smart cars, big data, and the on-demand economy (sharing economy). It can also include smart technologies, health technologies, renewable energies, and VR (virtual reality) (UNIDO, 2018). These technologies, driven on an unprecedented scale, complexity, and transformation, have changed how we live, work, and interact. In this context, precision and objectivity in policy formulation and governance become foundational pillars in a society marked by digitalization (Williamson & Piattoeva, 2018). On the other hand, Cisco (2020) highlights that analysts foresee regulatory changes that will drive greater technological adoption, despite the historically conservative nature of the health sector in its service models and regulations. The COVID-19 pandemic was a powerful catalyst in the digital transformation of the medical sector, allowing the identification of challenges and solutions (Ramirez Coronel, 2023). However, its impact on the tourism industry was negative (Bahena, 2020). One of the most notable changes was the use of teleconsultations, which allowed interaction between consumers and healthcare providers beyond the physical space of a medical center, encouraging service providers to adapt to consumer needs (Deloitte, 2023). “Teleconsultation, sometimes referred to as remote consultation or telehealth, refers to interactions between a doctor and a patient to provide diagnostic or therapeutic advice through electronic means” (Pan American Health Organization [PAHO], 2021). According to Marin (2022), the health sector has been one of the main protagonists of the pandemic and is undergoing a full transformation. These trends will shape the future of the sector, as

it will be more integrated, digitalized, and global, with a more preventive approach than a curative one, and patients will have greater control over their health. He also mentions that the use of AI, robotics, big data, remote patient monitoring (RPM), telemedicine, apps and mobile devices, and the design of liquid hospitals will revolutionize the future of health and access to medical care. Deloitte (2023) highlights its vision for health in 2040, where the convergence of exponential technologies and consumer demands will lead to significant changes. This will allow consumers to take a more active role in decision-making about their well-being and will increase the integration and use of health data to improve medical care and patient experience. Consequently, ten emerging models that have reconfigured the traditional functions of the medical sector and health care have been explored, divided into three main interconnected categories: Data and platforms will be essential in shaping the future health ecosystem, generating key information for decision-making and establishing the foundation for a consumer-oriented environment. The focus on wellness and care provision will concentrate on offering products, care, and well-being to consumers through care centers and health communities, both in digital and physical environments. The ability to deliver care will act as the connection between funders and regulators to drive the functioning of the healthcare industry. According to Global Market Insights, the global digital health market is expected to be valued at over \$600 billion by 2027, compared to \$200 billion in 2020 (Destéfano, 2023). In this regard, Salesforce (2023) reports that 400 global health industry leaders discuss how to drive productivity and efficiency through AI, as well as the effectiveness of data. The main priorities for these organizations are: process optimization and cost reduction (82%), fostering trust and customer satisfaction (79%), and optimizing business functions across the organization (71%); leaders also note that the main factors affecting productivity are manual processes and isolated data between departments. Over the past three years, Mexico has seen an increase in technological investments in the private health sector, driven by new players such as Healthtech companies focused on optimizing the value chain and improving patient experience through technology (Weecompany, 2023). In this sense, the director of CONCANACO SERVYTUR Mexico states:



Digitalization is key to the growth and competitiveness of tourism in Mexico, so public-private collaboration, training entrepreneurs, and providing technological tools to micro, small, and medium-sized enterprises are essential in 2024 (Tejada, 2024).

In Mexico, 47% of the digital population visits travel websites before deciding, and 87% of these digital travelers perform searches from their mobile devices, according to a Comscore study. However, according to INEGI, only 14.3% of companies with websites manage to generate indirect income through this medium. Seventy percent of travel agents in Latin America and the Caribbean believe it is necessary to create innovative technological tools or complementary products to promote the region effectively (Concanaco Servytur Mexico, 2024). A Phocuswright report suggests six key trends that will impact tourism in 2024. The first is personalized AI to provide travel experiences tailored to individual traveler needs. The second is augmented and virtual reality, which will play an important role in travel planning by allowing travelers to explore destinations immersively. The third is voice and virtual assistants, as travelers are expected to use voice to search for information and recommendations. The fourth is automation and robotics to improve efficiency in services such as hotel check-ins. The fifth is blockchain technology, which is expected to improve payment security and the protection of personal data. Finally, the sixth trend is the subscription economy, where companies are expected to offer access to exclusive services through subscription models (Concanaco Servytur Mexico, 2024). In conclusion, Tejada (2024) affirms that collaboration between business chambers and the government, as well as other strategic allies, plays a fundamental role in the digitalization of tourism SMEs and in promoting Mexico as a top-tier destination.

4. Conclusions

Health tourism in Mexico has experienced significant growth in recent years, and it is expected to continue with an annual growth trend of 13.5% for the period 2024-2030 (Secretary of Tourism, 2022). The industry has benefited from certified medical professionals, modern medical infrastructure, and competitive pricing, offering health tourists savings of up to 89% compared to other countries

(Hernández Castillo, 2023). Additionally, Mexico surpasses the proportion of specialist doctors among general practitioners in OECD member countries (Hospital CMQ, 2023). This, combined with its geographic proximity to the U.S. market—considered one of the most expensive healthcare systems globally, with around 30 million uninsured Americans—has generated a 70% income for the national medical sector due to the influx of U.S. tourists (CIAD, 2015). Hermosillo offers a strong educational offering related to medical tourism, ensuring the availability of qualified personnel in the future (Data México, 2022). The city also has 879 establishments to host tourists, including lodging, recreation, and tourism activities (Datatur, 2020). However, sector experts point out the lack of joint strategies to attract more patients, train personnel, and create an appropriate legal framework (Luna, 2023). For example, the Sonora Cluster, while not mentioned in its development plans, seeks to promote a binational network with the main providers of Medical and Wellness Tourism and position the Sonora-Arizona megaregion at a regional and international level (Deloitte, 2019).

It is important to note that the growth of medical tourism creates the potential to boost the local medical industry and the development of new digital business models, such as Healthtech or online health insurance initiatives, e-prescriptions, teleconsultations, and digital pharmacies. Consequently, this will revolutionize the interaction between consumers and healthcare providers, driven by greater connectivity of data, compatible, accessible, and secure platforms, and increasing consumer participation, creating a new business environment. In this sense, precision and impartiality in policy development and governance are crucial in a society marked by digitalization, as Williamson and Piattoeva (2018) argue. Cisco (2020) suggests that regulatory adjustments are expected to drive greater technological integration, despite the healthcare sector's traditional caution in service approaches and regulations. These changes, though drastic, may be carried out progressively. For example, 400 global health industry leaders discuss how to drive productivity and efficiency through AI, as well as data effectiveness, aiming to reduce costs and optimize processes, foster trust and customer satisfaction, and optimize business functions across the organization (Salesforce, 2023). Therefore, digitalization plays a fundamental role

in the development and competitiveness of tourism in Mexico. Public-private collaboration, training entrepreneurs, and providing technological tools to micro, small, and medium-sized enterprises are essential in 2024. In summary, Hermosillo should leverage its medical tourism capacity and Mexico's favorable position in the digitalization index to offer medical tourism services both nationally and internationally through the digital economy. This can be achieved by implementing digital platforms that facilitate collaboration among various service providers in the industry to promote, guide, and market services offered from a medical and tourism perspective in the region. Furthermore, the data generated from this strategy will provide a deeper understanding of the consumer, opening opportunities for continuous improvement. This initiative not only optimizes the value chain but also enhances the patient's journey. In this regard, healthcare actors aiming to evolve must understand that the transition to a consumer-centric approach is not about digitizing existing work methods and operations, but reinventing operational models based on the consumer, prioritizing the improvement of their experience and strategically and coherently implementing digitalization. Deloitte (2023) emphasizes that healthcare actors who identify their customers' needs and understand how they should evolve will be better prepared to meet the demands of future consumers. By doing so, they will be able to maintain their relevance and competitiveness in an increasingly consumer-centric healthcare environment. Leveraging the opportunities provided by the digital economy for health tourism in Hermosillo, Sonora, is essential for boosting economic growth and increasing the region's competitiveness. At the same time, it will pave the way for a future where excellence in healthcare, interconnectedness across the value chain, and patient experience merge into a unique and attractive offering for the national and international market, as well as for new generations.

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