

# SOCIAL AND ECONOMIC ASPECTS OF HEALTH AND MEDICAL INNOVATION IN THAILAND

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Innovation has long been recognized as a driving engine of economic growth. After the global financial crisis, Thailand turned its attention to an innovation-driven growth strategy, instead of an export-oriented growth strategy—and recently became an upper-middle-income economy. According to the Tenth National Economic and Social Development Plan, which covers the period from 2007 to 2011, the strategy was deployed nationwide with a focus on economic development and competitiveness. Since adopting this strategy, the concept of innovation has evolved and been broadly adopted as a means toward sustainable development. Presently the focus has been expanded in the Twelfth Plan, covering the period from 2017 to 2021, to include all aspects of development. Health and medical innovation are playing a crucial role.

As the country is experiencing transitions in demography and epidemiology—with an increase in life expectancy and a decrease in fertility—the health and medical system has had profound impacts on economic, social, and health service development. At a glance, Thailand's life expectancy has increased steadily, from 71.1 years in 2000 to 75.5 years in 2016.<sup>1</sup> Also, the rate of fertility and mortality is declining. In 2010, it was reported that around 11.9% of the Thai population, or 68 million people, are aging over 60 years; this is expected to reach 25% in 2030.<sup>2</sup> Moreover, the population—which was predominantly rural and poor—has recently changed to the one that is almost equally balanced between urban and rural populations. While urbanization offers many opportunities, including potential access to better health service, it also introduces health challenges relating to the environment, non-communicable diseases (NCDs), unhealthy diets, and physical inactivity.

On the other hand, Thai medical services are recognized globally as having an outstanding medical foundation, including premium medical services, qualified healthcare specialists,

and various internationally accredited medical facilities. With over 50,573 well-trained physicians and more than 1,000 public and 300 private hospitals nationwide, a diverse range of treatments and world-class facilities are offered.<sup>3</sup> Thailand was ranked first in top destinations for medical tourism, and the number of foreign patients receiving treatment reached 2.35 million people in 2014.<sup>4</sup> This is the result of long-term developments in medical education. Nevertheless, the demand for doctors, medical personnel, and healthcare service in the country still cannot be met.

Given these challenges and opportunities, innovation is considered to be a means toward sustainable health and medical transformations. However, a broad range of benefits and impacts of innovation could be induced in two main aspects—social and economic. Various forms of innovation have been introduced into the health and medical system, ranging from policy innovation to technological innovation. In order to develop a comprehensive understanding of how innovation has affected the reform of the Thai health and medical system, we will focus on two aspects of innovation—health policies and the medical industry.

## Innovation in health policies

Demographic changes, through an aging population, affected the rising cost of medical care, the quality of care, and health security for individuals;<sup>5</sup> consequently, the health system needed to be reformed. Through government policies, the reforms aimed to shape the context of the health system in terms of efficiency, effectiveness, quality, safety, and affordability—which is not only limited to healthcare services but also extends to processes, systems, policies, and organizational structures for the purpose of creating new value for patients.

The health system reform in Thailand has employed the concept of a Participatory Public Policy Process (PPPP). Three main sectors were identified to participate in the reform to promote healthy public policy:<sup>6</sup>

1. Knowledge or technical sectors, which includes scholars, professionals, and policy researchers in all relevant areas of both public and private institutes;
2. Social sectors that open opportunities for everyone, from individuals, groups, civil society organizations, mass media, non-governmental organizations, and private sector agencies; and
3. Political and civil service sectors, which includes state agencies, political organizations, and local government organizations.

The fundamentals of health reform have started with reframing the health system from “ill-health oriented” to “good-health oriented.”<sup>7</sup> The concepts of health promotion and health prevention have become part of the reforms to the Thai health system.<sup>8</sup> Also, healthcare financing must be developed to ensure accessibility to adequate and quality healthcare for all. All of these concepts lead to innovation in Thailand health policies such as financing for health promotion, universal health coverage providing all Thai people access to health services, and participation from related sectors to develop public health policies in the National Health Assembly.

## Financing for health promotion—ThaiHealth

In the last few decades, Thailand has been facing the double burden of communicable and non-communicable diseases. NCDs—such as cardiovascular disease, cancer, diabetes, and chronic respiratory diseases—have emerged as a leading cause of disease burden. Fundamentally, these diseases share similar risk factors to tobacco use, alcohol consumption, dietary imbalances, and insufficient physical activity. Although health promotion and disease prevention have been recognized as cost-effective investments that can improve lifestyles and society, the majority of health expenditures from the Ministry of Public Health focus on curative services. Therefore, the concept of innovative and sustainable funding for health promotion has been explored and implemented.<sup>9</sup>

After the long process of national policy development and health system reform, Thai parliament enacted the Health Promotion Foundation Act in 2001. This act established the Thai Health Promotion Foundation (ThaiHealth) as a state agency with annual revenue around US\$120 million—derived from a “sin tax” or excise tax of 2% on tobacco and alcohol.<sup>10</sup> ThaiHealth was established to manage the health promotion fund and to support health promotion activities at both the individual and organizational level in all areas relevant to health promotion, including a healthy society and environment. As an autonomous agency, ThaiHealth coordinates with partners in both public and private sectors. ThaiHealth also provides a

dedicated infrastructure for health promotion, offering several advantages such as flexibility, financial security, and effective strategy. ThaiHealth employs a “Tri-Power Model”—which not only supports direct activities but also supports knowledge development related to evidence-based action and policy, the social movement to raise public awareness and action, and the goal of fortifying political authority involvement (Figure 17.1).<sup>11</sup>

**Achievement and challenges**—The initiation of ThaiHealth is regarded as the most important landmark signifying the strength of health promotion in Thailand. For example, one of the campaigns against smoking, conducted during the previous decade, changed the perception and social norm related to secondhand smoke. Additionally, there have been several successful campaigns to promote physical activity and improve emotional and spiritual health, such as the “Bike for Mom” project and the campaign to stop drunk-driving. ThaiHealth introduced an innovative and sustainable financing system for health promotion. This system provides sustainable financial resources and also accelerates, supports, and promotes health promotion activities.

However, this financing system still has some challenges. As a new concept, it took time to build up a clear understanding of the concept and its indirect benefits to the public and key stakeholders. Furthermore, some campaigns for health promotion might be against some industries and businesses, which makes it challenging to secure political support to counter any opposition. To overcome the challenges, ThaiHealth must develop an understanding of health promotion to the public and key stakeholders at large, as well as improve the evaluation and effectiveness of health promotion at project, program, and strategic levels.

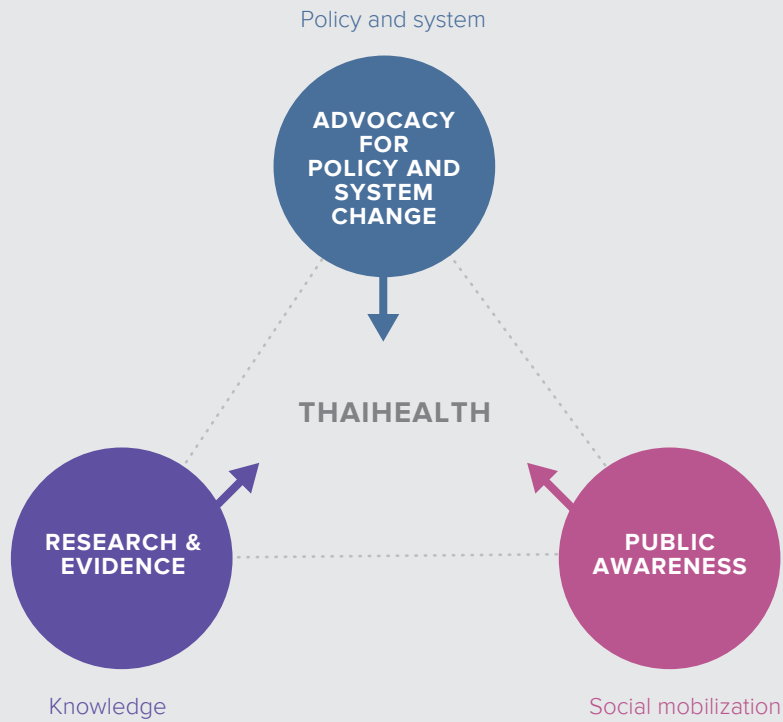
## Universal health coverage for Thailand’s health security

Thailand has been recognized as a developing country that has been successful in implementing universal health coverage (UHC). In 2002, the National Health Security Act established the National Health Security Office (NHSO). Universal health coverage contributes to the health security of the Thai population, allowing access to necessary health services without catastrophic healthcare expenditures—particularly for poor people or vulnerable groups. In other words, the UHC provides public health security to the Thai people who do not have coverage from any health insurance scheme. As a result, more than 90% of the Thai population is presently covered by three public health insurance schemes—the Civil Servant Medical Benefit Scheme (CSMBS) for civil servants and their dependents, the Social Health Insurance Scheme (SHI) for private sector employees, and UHC for the rest of the population.

**Achievement and challenges**—Apart from improving health security for Thai people, the UHC also contributes to the quality of healthcare services because of the scale of the program. The purchaser, in particular the NHSO, can negotiate with the service providers on both price and quality of care. Strategic

FIGURE 17.1

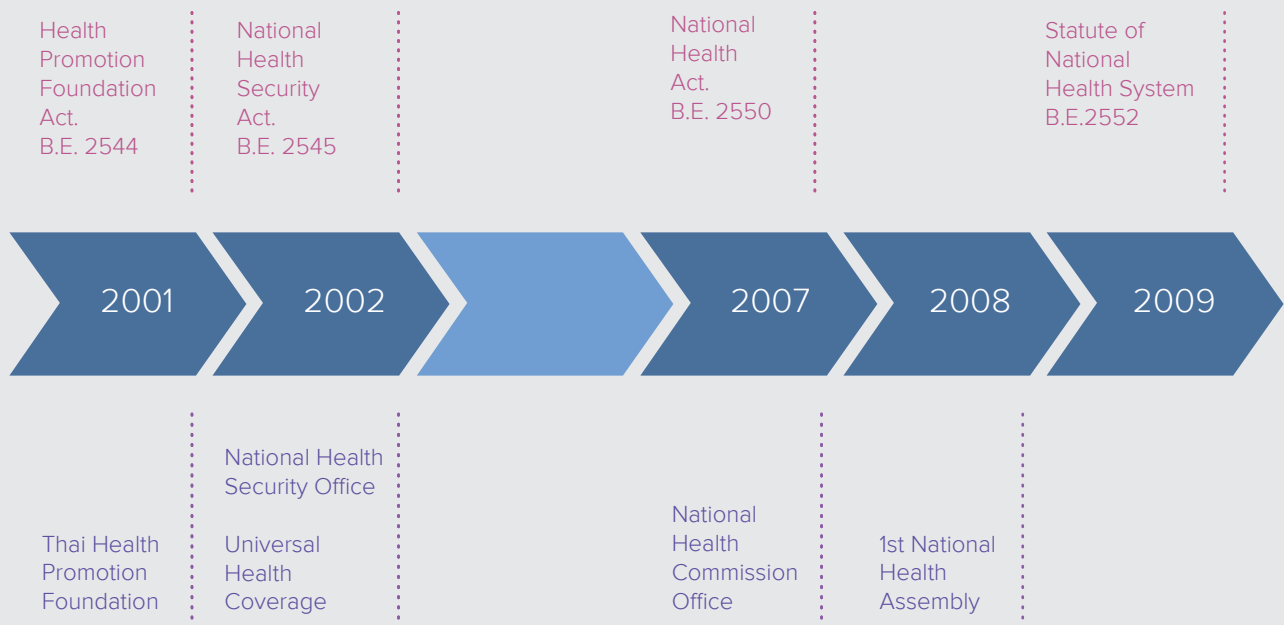
### “Tri-Power Model” of ThaiHealth



Source: Adapted from Wasi, 2000 and Sopitarchasak et al., 2017.

FIGURE 17.2

### Timeline of innovation in health policies



Source: Adapted from Rajan et al., 2017.

purchasing by NHSO resulted in improved and equitable access to certain high cost interventions, such as open-heart surgery, renal replacement therapy, and antiretroviral therapy. Improvement in the quality of hospital care is indicated by an increase in the number of hospitals that meet the standard requirements for hospital accreditation and a reduction in hospital standardized mortality ratio. However, there are a couple of future challenges for the UHC, for example, harmonizing the three public health insurance schemes and the equitable distribution of financial and human resources.<sup>12</sup> To overcome these challenges, policy recommendations have been suggested for future development. For example, on the issue of harmonizing the three public health insurance schemes, the government needs to streamline operations by standardizing common features—for example, the benefits package, the information system, and the payment method. At the same time, inequities in benefits and level of expenditure need to be reduced and inefficiencies across the schemes addressed.<sup>13</sup> Working towards achieving a more equitable distribution of human resources across the country must be planned and developed—and include capacity development in the health workforce.

## Sectors driving public health policies in the National Health Assembly

The National Health Assembly (NHA) is a platform for public policy development. The platform encourages participation of public and key stakeholders throughout the process of health policy development—including agenda setting, resolution drafting, stakeholder and public consultation, resolution adoption, implementation, monitoring, and evaluation. It is a year-round policy process, not just a onetime event, to assure that public health policies will be developed sustainably.

In Thailand, there are three types of health assemblies: area-based health assemblies, issue-based health assemblies, and the National Health Assembly (NHA). The health assemblies emphasize participatory democracy and promote active multisectoral involvement in the formulation of public health policies. At the provincial and regional level, area-based health assemblies identify local health issues and concerns and raise them to the national level. Issue-based health assemblies convene on topics based on specific health issues and concerns. All concerns and comments from area-based health assemblies and issue-based health assemblies are collected and drafted into NHA resolutions. The NHA encourages the engagement of representatives from the government, academia, and local communities, in order to finalize and bring the resolution to actions.

**Achievement and challenges**—The NHA has an impact on public policymaking in Thailand. The consensus-based resolutions of the NHA are submitted to the National Health Commission and further to the Cabinet of Thailand. Presently, 81 resolutions from 11 assemblies have been implemented, including resolutions on NCDs, such as childhood obesity management; national strategies on antibacterial resistance; health promotion, such as illegal advertisement of drugs and

health products; daily cycling; waste management; and housing. Moreover, six issues have been generated by the issue-based health assemblies: development of the national health information system, a bill on reproductive health protection, traditional medicine strategy, nanotechnology strategy for safety and ethics, health workforce educational reform, and a national strategic plan on health promotion at the end of life.<sup>14</sup>

With regard to the achievements above, there are a couple of challenges that need to be explored and addressed. Although the NHA is open for all sectors to participate, it is limited to active groups, rather than the whole society. In this sense, the question of whether the voices of participants—groups or networks—adequately reflect the real needs of the country has been raised. In addition, due to the nature of the resolutions implemented—which are voluntary rather than compulsory—it is difficult to evaluate the outcome and impact of the resolutions.

In conclusion, the reform of Thailand's health system has been significantly impacted by innovation in health policies. The most influential aspect of reform has been the public participation concept—where civil society organizations have been participating in health issues and learning about resolutions and initiatives implemented. The Health Promotion Foundation Act, enacted in 2001, led to establishing the Thai Health Promotion Foundation. This extended the concept of health beyond the physical to also include mental, social, and spiritual aspects of health. Additionally, innovation health financing has been introduced to build sustainable funding to support health promotion. In 2002, the National Health Security Act was legislated and universal health coverage (UHC) implemented, which contributed to health security and access to necessary services for the Thai population—particularly poor people and vulnerable groups. Moreover, one year after the National Health Act was legislated in 2007, formal “space” for the public to participate was introduced. The National Health Act conceived the National Health Commission Office (NHCO) with a mandate to convene the National Health Assembly, which is a health policy platform for the public—from the grass roots to civil society, academic institutions, departments, and ministries—to engage in the same place (Figure 17.2).<sup>15</sup>

## Innovation in Thailand's medical industry

Thailand has given the medical industry top priority as one of the driving engines for economic development. A range of policies have been deployed to utilize the existing medical foundation to its highest potential, strengthen competitiveness of the industry, and improve the quality of life for Thai citizens. Innovation is considered as a means towards these goals. Support and incentives are provided to create opportunities for continual success in related fields, including medical technologies, digitalization in healthcare services, and investment incentives.

## Medical technologies

The medical device sector in Thailand is considered a high-value industry. Despite unfavorable economic conditions, the sector gains advantages from a national medical hub policy that encourages foreigners to travel to Thailand for medical purposes. Since 2003, this medical hub policy has helped to support continuous growth in medical tourism. The number of foreign patients arriving in Thailand has soared to 2.5 million patients annually—and is continuing to grow.<sup>16</sup> Additionally, the Thai medical device industry has expanded continuously—both domestically and internationally. Although there are a wide variety of medical devices being manufactured domestically, concentration is on relatively low-end product categories, while a substantial number of high-end and sophisticated medical devices are being imported.<sup>17</sup> To upgrade the local production of medical devices, long-term and systematic development of local capabilities, knowledge, and innovation are required.

To accelerate the growth of the sector, the Thai government provides investment and support through research funding, public-private partnerships, and granting for prototype development. As a result, the technological progress in academic research creates tremendous opportunities for new investment in the medical device sector, such as medical diagnosis kits, medical robotics, and implanted medical devices. The following are examples of how the support could be used for leveraging the sector's transformation:<sup>18</sup>

- The Biomedical Technology Research Unit of the Faculty of Associated Medical Sciences, Chiang Mai Universities, developed a more convenient, less expensive, and highly accurate test kit for alpha thalassemia carrier screening. The device has been licensed to a private company for commercialization.
- The Thailand Center of Excellence for Life Sciences (TCELS) has established the Center for Advanced Medical Robotics, to broaden Thailand's research base through advanced medical robotics projects. With an extensive network of researchers, the sector is able to develop their own technological capabilities. Specialized medical robots have been prototyped and commercialized, including Dindow, an elderly care robot by CT Asia Robotics, Co., Ltd., and Sensible Tab, an arm rehabilitation robot by TMGO Co., Ltd.
- Chulalongkorn University and TCELS have completed the development of a unipolar modular hip prosthesis, which is more compatible with the anatomy of Asians, and they have secured funding to undergo standard testing in accordance with ISO 7206, ASTM 2009, ASTM 1875 and ISO 10993.

## Digitalization in healthcare services

There are great challenges and opportunities for digital technologies in the healthcare system. On the one hand, digital technologies will improve equality and convenience of Thai people in getting healthcare services. On the other hand, adoption of digital technologies to the healthcare system, in particular at a national level, is very challenging for the country—for example, in terms

of digital transformation and digital literacy. Moreover, access to medical records and data is important for enabling effective collaboration between patients and healthcare providers. With awareness of these challenges, the Ministry of Public Health (MoPH) deployed the eHealth Strategy in 2017 to serve as a mechanism for the development of the national health system. The strategy includes reform of digital technology operations, innovation in medical product manufacturing, and innovation in health services. However, this strategy is a long-term development plan that needs to be coordinated with Thailand's digital landscape and digital development plan.

The case of Bangkok Metropolitan Administration (BMA) highlights the impact of digitalization on healthcare service. BMA is using technology to enable the elderly to have more convenient access to healthcare. Similar to many other cities across the region, Bangkok is facing an increasing number of elderly people and a declining birth rate; among Bangkok's registered 10 million people, around 16% are over 60 years old.

The growing elderly population is increasing the burden on the city's working population, as people must juggle full-time jobs with caring for their elderly relatives. In addition, Bangkok is a large and crowded city with traffic conditions that make hospital visits inconvenient.

One solution is to bring care to the homes of the elderly. The Home Ward Referral Center, a new BMA unit, has been set up in order to provide home care for the elderly, improve the utilization of digital technology in public hospitals, and improve the accessibility of healthcare services to patients with difficulties in mobilization. Utilization of technologies is at the center of this innovative healthcare service, as sharing patients' medical records and personal data could enhance the capability of the center to provide healthcare staff and healthcare volunteers to check on elderly and disabled patients. Additionally, the updated data from the visits can also be shared with public hospitals so that doctors and nurses can better coordinate care. This could improve the patient experience, as patients don't have to repeatedly provide the same information to doctors—whether at home visits or hospitals. The BMA has also launched a pilot to introduce electronic patient records in 10 public hospitals. This is a crucial platform that is required for the city's public health system to use more advanced technologies, like analytics and artificial intelligence, in the future.

## Investment incentives

As government support of knowledge and innovation increases the potential growth of the sector, it seems that foreign direct investment in manufacturing facilities, global supply chain, and knowledge is required to strengthen linkages to the global market. To encourage foreign investment and business partnerships, the Board of Investment (BOI) offers various types of investment incentives, including import duty exemption, tax breaks, and land ownership rights to both foreign and Thai investors seeking to manufacture medical equipment in Thailand. On top of that, the manufacture of medical equipment receives the maximum 8-year corporate income tax exemption, regardless of location.<sup>19</sup>

Alongside investment incentives, several types of support are also provided by other government agencies to encourage collaboration in research and development (R&D) of new medical technologies, medical products, and services. Agencies include the:

- National Science and Technology Development Agency (NSTDA), a leading public research institute which provides channels of communication between Thai research institutions and the private sector;
- Thailand Science Park (TSP), a technology and innovation hub that includes R&D and innovation development for private sectors, providing services ranging from technology transfer to financial assistance and business incubation; and
- National Innovation Agency (NIA), a granting agency for innovation development, which supports up to 75% funding for prototype or pilot scale projects, and which also provides interest-free loans for up to 3 years to assist in the commercial operations of innovation projects.

In summary, Thailand's medical industry has responded to the economic development policy to strengthen the competitiveness of Thailand in this high-value sector. As the industry advances through knowledge and technologies, bridging the supply-side knowledge and the demand-side market becomes very important. Supports and incentives also need to be in place to facilitate the flow of technical knowledge from research institutes to innovative companies—and to encourage investments and partnerships. Digitalization is a crucial enabling tool for the effective collaboration between stakeholders and partners. Its deployment at the national level would significantly enhance the transformation of healthcare services at large. To elevate the medical industry, the government plays a crucial role in boosting knowledge creation and stimulating collaboration between supply-side and demand-side partners, through the provision of supports and incentives.

## Conclusion and policy recommendations

With regard to the two different aspects of health and medical innovation in Thailand, which are health policies and the medical industry, it is noticeable that innovation has a crucial role in health and medical transformations of the country. The health and medical system serve the country—as a profound public service for society and a growth engine for the economy. Innovation, therefore, requires integration of broad and comprehensive viewpoints, especially from policymakers, civil society, industries, entrepreneurs, and technology providers. On the one hand, innovation at the policy level is necessary for preparing the country to deal with structural reforms and future changes. In essence, it shifts the paradigm of thought, which greatly affects society. On the other hand, the development of health- and medical-related industries could strengthen Thailand's competitiveness and bring opportunities for economic growth. The support of the government makes Thailand fertile ground for medical industry investment. Yet, technological and knowledge infrastructure—both medical and digital—require

investment. The health and medical system is driven by knowledge-intensive activities and reliable services. Contextualization and inclusive engagement are imperative to the success of both upstream and downstream development.

### Notes:

- 1 World Health Organization, 2018.
- 2 Tejavivaddhana et al., 2018.
- 3 Tejavivaddhana et al., 2018.
- 4 Thailand Board of Investment, 2019.
- 5 Wasi, 2000; Bureau of Policy and Strategy, 2011.
- 6 Wasi, 2000; Bureau of Policy and Strategy, 2011.
- 7 Adulyanon, 2012.
- 8 Wasi, 2000; Bureau of Policy and Strategy, 2011.
- 9 Damrongplasit and Melnick, 2009.
- 10 ThaiHealth.
- 11 Adulyanon, 2012.
- 12 Evans et al., 2012.
- 13 Evans et al., 2012.
- 14 Rajan et al., 2017.
- 15 Rajan et al., 2017.
- 16 Hanvoravongchai, 2013.
- 17 Tunpaiboon, 2018.
- 18 Thailand Board of Investment, 2019.
- 19 Thailand Board of Investment, 2019.

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