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The interrelationship between health policy and economic and industrial policy in Japan

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Abstract

In Japan, the relationship between health policy and economic and industrial policy involves both conflict and cooperation. This article explores the historical and contemporary relationship between measures related to health implemented by the Ministry of Economy, Trade and Industry (METI), which administers economic and industrial policy, and measures related to economic growth implemented by the Ministry of Health, Labour and Welfare (MHLW), which is responsible for health policy, focusing on the interplay between them.

Historically, both ministries can trace their roots to the Ministry of Home Affairs, which pursued the Meiji-era goals of "Fukoku Kyouhei" (enriching the country and strengthening the military), indicating that health and industry were originally aligned toward national development. During the late 19th and early 20th centuries, Japan's industrialization led to deteriorating working conditions and workers' health. In response, the Ministry of Agriculture and Commerce (predecessor of the METI) enacted the Factory Act and established the health insurance system to achieve "Fukoku Kyouhei." As industrialization led to environmental pollution and public health crises in the 1950s, the MHLW (formerly the Ministry of Health and Welfare) took measures to protect the health of the population from pollution, while the METI (formerly the Ministry of International Trade and Industry) implemented policies to ensure that pollution would not hinder economic and industrial development. The MHLW strongly opposed the principle of "harmonization with sound economic development," asserting that economic development should not be pursued at the expense of health. Promoting industries aimed at improving health can serve as a driver of economic development. Representative examples include health-related products, such as pharmaceuticals, medical devices, and regenerative medicine products. Both the MHLW and METI engaged in research, development, and dissemination of these products, although their objectives differed. It is suggested that health policy has undergone a historical transition: it was initially subsumed under economic and industrial policy, later became independent and even oppositional, and ultimately came to coexist with economic and industrial policy.

The METI undertook initiatives to develop the healthcare industry as a service sector. In recent decades, the METI has expanded its role in health through initiatives such as Health and Productivity Management, which encourages companies to invest in employees' health to improve productivity and corporate performance. The METI supports startups, international expansion of healthcare, and utilization of personal health records. In addition, the METI addresses various diseases and health issues, including dementia, women's health, mental health, and pollen allergies.

Although the MHLW and METI approached health-related social issues and needs in a way that appeared to be mutually competitive, they collaborated to implement legislation and institutional frameworks, such as transfer of worker protection measures, some of the measures for pollution control, development of medical and welfare equipment, and establishment of medical information systems. This highlights the inherent

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alignment between health policy and economic and industrial policy.

Regarding health-related products, the MHLW should engage in both regulation and promotion, whereas the METI is solely responsible for promotion. The METI's engagement in the health sector, such as developing pharmaceuticals and regenerative medicine products within the bioindustry, constitutes only a subset of its core mandate to promote economic and industrial development. Therefore, the METI is relatively unconstrained in pursuing innovative or experimental initiatives aimed at improving health. In other words, it can undertake roles that the MHLW cannot fulfill, and the two ministries are able to engage in a complementary relationship.

keywords: health policy, economic and industrial policy, worker protection, environmental pollution, bioindustry

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I. Introduction

It is well known that there is a relationship between economic growth and health improvement. Health is a form of (human) capital that enables productive activities in a market setting [1,2]. Previous studies have expanded on this idea and explored how improving population health can enhance labor productivity and foster long-term economic growth [3,4]. However, historical evidence shows that industrialization, especially in its early stages, worsens health outcomes [5,6], although the decline in mortality in England and Wales in the 19th century was primarily due to improved economic and social conditions [7]. In current academic discourse, empirical studies have demonstrated a correlation between economic growth and health improvement [8,9]. Given the close interconnection between health improvements and economic development, policies aimed at advancing each domain should be strategically coordinated.

Health policy and economic and industrial policy are closely related in Japan. Health policy falls under the jurisdiction of the Ministry of Health, Labour and Welfare (MHLW), while economic and industrial policy falls under the Ministry of Economy, Trade and Industry (METI). The METI's mission is to develop Japan's economy and industry by focusing on promoting economic vitality in private companies and smoothly advancing external economic relationships, and to secure stable and efficient supply of energy and mineral resources [10]. The MHLW undertakes the mission of improving and promoting social welfare, social security, and public health, and of developing labor conditions, enhancing the working environment, and securing employment opportunities, to ensure and improve the quality of life for people and to contribute to economic development [11]. Despite the clearly delineated jurisdictions of the MHLW and METI, the intrinsic interdependence between health policy and economic and industrial policy has led both ministries to actively engage in initiatives that intersect with each other's domains. These interactions have, at times, resulted in policy conflicts, while at other times they have fostered inter-ministerial cooperation.

This article aims to describe the historical development and current state of measures related to health implemented by the METI, which administers economic and industrial policy, and measures related to economic growth undertaken by the MHLW, which is responsible for health policy, and to examine the interplay between measures implemented by both ministries. Moreover, this article aims to clarify the fundamental nature of the relationship between health policy and economic and industrial policy, and to discuss future directions for the development of both policy domains.

Before proceeding to the next section, an overview of the historical transformations in the organizational structure of Japan's governmental ministries is provided. The department responsible for health, which corresponds to the current MHLW, was initially part of an education-related ministry [12-14]; however, in 1875, it was transferred to the Ministry of Home Affairs and became the Bureau of Public Health [12-14]. The Ministry of Agriculture and Commerce, which was the predecessor of the present METI, was established in 1881 to consolidate the administration of commerce and industry, which had previously been carried out separately by the Ministry of Home Affairs, among others [14,15]. The roots of both the MHLW and METI can be traced to the former Ministry of Home Affairs. The Meiji government, established in 1868, developed a range of modernization policies to pursue the goals of "Fukoku Kyouhei" (enriching the nation and strengthening the military) [13]. Given that the Ministry of Home Affairs was responsible for promoting "Fukoku Kyouhei," promoting health and encouraging industry were pursued to achieve the same objective [16].

The Ministry of Health and Welfare (MHW), which was the predecessor of the present MHLW, was established in 1938 by integrating departments such as the Bureau of Public Health of the Ministry of Home Affairs [12-14,17].

In 1947, responsibilities related to labor were transferred to the newly-established Ministry of Labour [12,14]; however, under the reorganization of the central government in January 2001, the MHW and Ministry of Labour were once again merged to form the present MHLW. The Ministry of Agriculture and Commerce was subsequently reorganized multiple times and, in 1949, became the Ministry of International Trade and Industry (MITI) [14,15]. Following reorganization of the central government in January 2001, it was renamed the METI.

The relationship between health policy and economic and industrial policy involves both conflict and cooperation. The conflict aspect corresponds to the adverse effects of industrial development on health during the early stages of industrialization in Western countries [5,6]. Similar events also occurred in Japan. However, the Japanese government has initiated countermeasures to avert a downward spiral, in which industrial development adversely affects health, leading to economic stagnation. The details of these events are described in Section II. The cooperation aspect refers to policies implemented by the METI to foster economic and industrial development through measures that contribute to health improvement and policies implemented by the MHLW to improve health through measures that support economic growth. A detailed description of these policies and measures is provided in Section III.

II. Measures against the adverse effects of economic and industrial development on health in Japan

1. Measures to protect the lives and health of workers

(1) The Factory Act as the first worker protection legislation in Japan

Promotion of industrialization in Japan started in the latter half of the 19th century to pursue "Fukoku Kyouhei," and major industrial sectors, such as mining and manufacturing, were government-owned [13]. Accident prevention measures for mining were stipulated in laws enacted in 1873 [13,14], while assistance for workers employed in government-owned factories in the event of occupational accidents was stipulated in the 1875 Ordinance [13,18-20]. In 1880, the government began selling government-owned businesses to the private sector [12]. Although the number of workers employed in private factories had increased [13], factory workers, especially female and young workers employed in textile factories, were forced to work long hours under difficult working conditions and poor working environments, causing their health to deteriorate [12,13,18,21].

Under these circumstances, the Ministry of Agriculture and Commerce, the predecessor of the METI, began conducting surveys to draft legislation for worker protection [12-14,21]. The Ministry of Agriculture and Commerce drafted a bill in 1887 [13,14,18,20,21], 1897 [12,14,20,22], and 1898 [13,14,20]; however, all of these were abandoned. The proposed draft faced strong opposition from capitalists and factory owners on the grounds that it would discourage industrial development [12,13,18,20]. While the Ministry of Home Affairs did not play a direct role in worker protection during the late 19th century, Shinpei Goto, a medical officer at the Bureau of Public Health, published a seminal paper in 1888 that emphasized the critical importance of occupational health [18,21].

Subsequently, the Ministry of Agriculture and Commerce conducted surveys of the actual conditions of factories and prepared a report in 1903 [18,20]. Simultaneously, the Ministry of Home Affairs conducted a similar survey [14,18]. The purpose of the survey conducted by the Ministry of Home Affairs was to use it as a reference, because although the legislation for worker protection fell under the jurisdiction of the Ministry of Agriculture and Commerce, it included matters concerning hygiene [18].

Following the Russo-Japanese War (1904–1905), frequent labor disputes occurred due to a recession and other factors [12,13,20]. From the perspective of maintaining public order, awareness had increased, leading to enactment of the Factory Act to protect workers [12,13,18,20]. The Ministry of Agriculture and Commerce submitted a draft of the Factory Act to the Diet in 1907 [13], 1909 [14,20], and 1910 [14,21]. After amendments to the drafts, the Factory Act, which was the first worker protection legislation in Japan, was promulgated in 1911 [12-14,18,20-22] and formally enacted in 1916 [12-14,20,21,23].

Since its promulgation, the Factory Act had been under the jurisdiction of the Ministry of Agriculture and Commerce [18]. When the Bureau of Social Affairs, which was established within the Ministry of Home Affairs in 1920, became an external bureau of the Ministry of Home Affairs in 1922, responsibility for labor affairs, including the Factory Act, was transferred from the Ministry of Agriculture and Commerce to the Bureau of Social Affairs [14,23]. The Bureau of Social Affairs was then integrated into the MHW established in 1938 [12,14]. Subsequently, measures for worker protection and occupational health were transferred to the Ministry of Labour established in 1947 [12], and reintegrated into the MHLW in 2001.

(2) The health insurance system as another measure for worker protection in Japan

Although the Factory Act provided assistance in cases of injury, illness, or death due to work [14,20], it did not cover medical expenses for illness or injury not caused by employment. In the 1880s, reports concerning Germany's

social insurance system were published [13,19,21,22]. In 1892, Shinpei Goto, who had been appointed as Director of the Bureau of Public Health within the Ministry of Home Affairs, emphasized the importance of instituting a health insurance system in Japan [13,14,19,21,22]. In particular, Goto conceptualized health insurance not only as a measure for poverty relief, but also as a strategic instrument for safeguarding the productive capacity of the labor force, consistent with Fukoku Kyouhei [19,21,22]. In 1897, the Ministry of Home Affairs formulated a legislative proposal entitled the "Act on Sickness Insurance for Workers"; however, it was not passed into law [12-14,19,20,22]. Likewise, in 1905, the Ministry of Agriculture and Commerce drafted a health insurance bill for factory workers in connection with the Factory Act, which was then under legislative consideration; however, this bill also ultimately failed to materialize [12-14,22].

Following the promulgation of the Factory Act in 1911 and the First World War (1914–1918), labor strikes and industrial disputes escalated significantly due to factors such as inflation and a resulting decline in workers' real wages [12,13,20,22]. Establishing a health insurance system became increasingly pressing to stabilize workers' livelihoods, secure a reliable labor force, and achieve Fukoku Kyouhei [12,19,22]. Various ministries, including the Ministry of Agriculture and Commerce, Ministry of Communications, and Ministry of Home Affairs, had conducted research on health insurance [19,22]. However, in August 1920, the Ministry of Agriculture and Commerce formally established a Labor Division, thereby initiating a full-scale investigation and formulation of the health insurance system [12-14,19-23]. In 1921, the Ministry of Agriculture and Commerce completed a draft of the Health Insurance Act Outline [13,14,22,23], and in 1922, the Health Insurance Act was officially promulgated [12-14,20-22]. In that same year, administrative responsibilities related to health insurance were transferred from the Ministry of Agriculture and Commerce to the Bureau of Social Affairs, an external bureau of the Ministry of Home Affairs [14,19,22]. The Bureau of Social Affairs was then integrated into the MHW established in 1938 [12,14].

2. Measures to protect the lives and health of community residents from environmental and industrial pollution

The rapid development of industries not only caused harm to workers' health, but also environmental harm to surrounding communities [13,21,24]. From the early years of the Meiji era in the late 19th century, Japan had already begun to experience pollution issues, including soot and smoke [13,21,24] and wastewater [13] from factories, as well as toxic contamination [13,14,21,24] and smoke damage [13,21] caused by copper mining operations. The Factory Act, promoted by the Ministry of Agriculture and Commerce and promulgated in 1911, focused primarily on worker protection and offered limited provisions for pollution control [13,24]. Conversely, the Ministry of Home Affairs introduced the Factory Regulation Ordinance in 1890 to address pollution. Nevertheless, this initiative was ultimately abandoned due to opposition from the Ministry of Agriculture and Commerce, which contended that such regulations would impede industrial development [18].

After World War II, Japan experienced rapid economic growth, which led to a marked population concentration in urban areas, a transformation of the industrial structure toward heavy and chemical industries, and a widespread increase in automobile usage. These developments collectively contributed to the emergence of pollution issues around 1955 [12,13,17,24,25]. Consequently, a series of pollution-related diseases occurred in rapid succession: the Itai-itai disease in 1955 [17,24], Minamata disease in 1956 [13,17,24], Yokkaichi asthma in 1961 [13,24], and Niigata mercury poisoning in 1965 [13,14,24]. The MHW conducted comprehensive epidemiological investigations into these conditions and attempted to identify their etiological factors [13,14,17].

The MHW and MITI drafted legislative proposals for pollution control in August and September 1955, respectively [13,24]. Furthermore, in December 1955, the MHW prepared a revised draft, taking into account the proposal submitted by the MITI. However, due to strong opposition from industrial organizations and other relevant government ministries, the bill was ultimately not submitted to the Diet [13,24].

In 1958, the first legislative measures for pollution control, specifically targeting prevention of water pollution, were promulgated [12,13,17,24,25]. To prepare for air pollution legislation, the MITI and MHW established research committees in 1959 [24] and 1960 [14,24], respectively. In 1961, the MITI drafted a bill to regulate industrial smoke emissions [13,24]. After extensive inter-ministerial consultations [13,24], a jointly administered law regulating smoke and soot emissions was promulgated and enacted in 1962 [13,14,17,24,25]. In addition to the objective of preventing public health hazards caused by air pollution, the law explicitly stated the need to harmonize environmental protection with sound development of industry [24].

The MITI and MHW established specialized sections for pollution control in 1963 and 1964, respectively [13,24]. In 1964, the Pollution Control Promotion Liaison Council was established to coordinate pollution administration among relevant ministries and agencies [13,14,24,25]. In 1966, the MHW, in response to a request from the Council, drafted

the Basic Act for Pollution Control [13,14,24], which was promulgated in 1967 [13,14,17,25]. During the legislative process, there was considerable debate over the appropriate framing of the principle of "harmonization with sound economic development" [24]. Although the stated objectives of the Basic Act were to protect public health and preserve the living environment [17], the MHW strongly asserted that health protection and economic development could not be harmonized [13,17,24], thereby asserting the primacy of health over economic considerations. Consequently, only preservation of the living environment was harmonized with sound economic development [13,17,24]. In the 1970 amendments to the Basic Act and related legislation, the provision concerning "harmonization with sound economic development" was eliminated [13,14,24]. Finally, in 1971, the Environment Agency (currently the Ministry of the Environment) was established to consolidate pollution-related administrative functions that had previously been dispersed across multiple ministries [13,14,17,24].

Since the establishment of the Environment Agency, the MITI has retained jurisdiction over matters pertaining to industrial pollution and mine safety administration [10]. Since the Meiji era, protection of mine workers and prevention of mining-related pollution have been under the jurisdiction of the Ministry of Agriculture and Commerce, MITI [15], and subsequently the METI. In 1968, the MHW officially identified mining operations as the primary source of cadmium discharge, which was the causative agent of Itai-itai disease [13,14]. In response, the MITI developed a subsidy program in 1971 to support pollution control construction in abandoned and closed mines [26]. Furthermore, since 1973, the MITI has reinforced the national framework for addressing pollution caused by the metal mining industry [27].

III. Measures that pursue both health improvement and economic/industrial development concurrently

1. Encouraging the industrial development of health-related products

(1) Legal provisions concerning health-related products

Products that are intended to improve health and treat diseases include pharmaceuticals, medical devices, and regenerative medicine products, all of which fall under the jurisdiction of the MHLW [11]. The MHLW is responsible for related regulations, including securing the quality, efficacy, and safety of these products and preventing the occurrence and spread of health hazards resulting from their use [11]. Simultaneously, the MHLW should play a role in promotion of these products, including research and development, improvement and coordination of production, distribution, and consumption of these products [11].

On the other hand, the METI is tasked with overseeing the promotion, improvement, and coordination of activities related to the export, import, production, distribution, and consumption of general goods. Pharmaceuticals and regenerative medicine products do not fall within the scope of its jurisdiction, whereas medical devices do [10]. Regarding medical devices, research, development, and dissemination of social welfare equipment, such as wheelchairs, walkers, handrails, and ramps, are jointly administered by the MHLW and METI [28].

(2) Pharmaceuticals

While the Japanese government initiated regulatory measures for patent medicines in 1870 [12-14,16,21] and imported medicines in 1874 [12-14,16,21,29], it concurrently aimed to promote domestic pharmaceutical production to reduce reliance on foreign imports [13,21]. In 1885, a semi-governmental pharmaceutical company was established under the guidance of the Bureau of Public Health of the Ministry of Home Affairs [13,21,29]. Because of the shortage of pharmaceuticals caused by the disruption of imports from Germany during the First World War (1914–1918) [12-14,21,29], the Institute of Hygienic Sciences, administered by the Ministry of Home Affairs, conducted research on pharmaceutical manufacturing methods, disclosed these methods, and provided technical guidance to domestic manufacturers starting in 1914 [12-14,25]. In 1915, subsidies were allocated to manufacturers to encourage domestic production [12-14,21,29]. Moreover, in 1932, the Ministry of Home Affairs launched a program to provide subsidies for the manufacturing and research of pharmaceutical and dental materials [12-14].

During World War II, Japan transitioned to a wartime administrative structure, under which the production and distribution of pharmaceuticals were subjected to comprehensive governmental regulation and control [12-14,17]. After the war, control over pharmaceuticals was largely abolished around 1950 [13,17,25]. From 1951 onward, the MHW provided research funding to promote the development of antibiotics, as well as subsidies for pharmaceutical industry rationalization to support stable factory production [25]. In 1955, the MITI implemented promotional and related initiatives aimed at facilitating the export of pharmaceuticals [30]. In 1967, the MHW implemented measures to safeguard the rights of innovator pharmaceutical companies that developed new drugs, to incentivize innovation in drug development [17,25]. Regarding patents related to pharmaceuticals, only patents for manufacturing methods had previously been granted [31]. However, around 1954, the MITI initiated deliberations on whether to extend patent protection to substances themselves [31], and in 1976, it amended the

Patent Act to allow substance patents for pharmaceuticals [32]. Consequently, Japanese pharmaceutical companies began to shift their focus toward research and development of new drugs, to remain competitive in the global market [32].

The MHW established an advisory council to formulate strategies for promoting the pharmaceutical and medical device industries in 1982 [13,14], as well as a dedicated section responsible for promoting the development and production of pharmaceuticals incorporating advanced technologies in 1983 [13]. In 1984, the council issued its final report entitled, "Strategies for Promoting Research and Development of Pharmaceuticals through Biotechnology" [13,14]. Since 1981, the MITI has promoted research and development in biotechnology and fostered the development of the bioindustry as a new industrial sector encompassing the chemical, fermentation, resource and energy, and pharmaceutical industries [33]. In 1985, the Japanese government introduced a tax incentive scheme that allowed companies to deduct expenses from corporate tax when purchasing equipment necessary for research utilizing advanced technologies, such as biotechnology [13,32]. Furthermore, in 1987, the MHW established a public loan and investment scheme to support research and development of pharmaceuticals and medical devices utilizing advanced technologies conducted by private-sector companies [13]. (Note: This scheme was officially ended in 2008 [34].) In 1992, the MHW introduced a comprehensive initiative to support research aimed at creating innovative and original pharmaceuticals [35].

Because pharmaceutical companies are discouraged from developing orphan drugs due to limited market size and low profitability, the MHW has provided research funding support since 1979 [34,35], and introduced a formal system to promote the development of orphan drugs in 1993 [32,34,35]. Within the framework of this system, pharmaceuticals and medical devices designated as orphan products have become eligible for a range of supportive measures, including provision of subsidies, scientific advice and guidance during development, tax credits for research and development expenses, priority review, and extension of the re-examination period [34,35].

In 2000, the MITI launched initiatives explicitly aimed at drug discovery as part of research and development efforts in biotechnology, including the development of foundational technologies such as bioinformatics [36]. In 2002, the MHLW released the "Pharmaceutical Industry Vision," which included an action plan aimed at establishing a globally attractive drug discovery environment and enhancing the international competitiveness of the pharmaceutical industry in Japan [37]. This vision underwent several revisions in 2007, 2013, 2015, and 2021, and continues to serve as a framework for promoting related policy initiatives [38].

In January 2007, the "Public-Private Dialogue for Innovative Drug Discovery" was established as a forum for discussions regarding strategies aimed at fostering innovation in the pharmaceutical sector and enhancing the global competitiveness of Japan. The participants included the MHLW, METI, and Ministry of Education, Culture, Sports, Science and Technology, as well as representatives from industry and academia [39,40]. Subsequently, in April 2007, a five-year strategy for creating innovative drugs and medical devices [41] was formulated, promoting a range of measures, including intensive infusion of research funding, cultivation of venture enterprises, and development of infrastructure for clinical research and trials. Eventually, the Cabinet formulated the Healthcare Policy in 2014 [42] to further develop this strategy, and the Japan Agency for Medical Research and Development (AMED) was founded in 2015 based on this policy. Historically, research and development budgets for drugs and medical devices were fragmented across multiple ministries, including the MHLW, METI, and Ministry of Education, Culture, Sports, Science and Technology [43]. However, the AMED has now taken over the centralized management of all budgets.

(3) Medical devices and social welfare equipment

In 1950, the MITI reached an agreement with the MHW to exclude electromedical equipment from regulation under the Pharmaceutical Affairs Act [44]. In 1957, the MITI enacted the Act on Temporary Measures for the Promotion of the Electronics Industry, and in 1964, it began facilitating loans to promote electromedical equipment [45]. In 1963, the MITI held its first overseas exhibition aimed at facilitating the export of medical devices [46].

In 1964, the MHW launched a grant program to support research on emerging medical technologies, such as automated specimen analysis, artificial organs, and electromedical equipment [13,17]. In 1973, the MITI provided subsidies to private companies for research and development of medical device technologies [27]. In 1976, the MITI established a system for commissioning research and development of medical devices, such as artificial organs, automated analyzers, and social welfare equipment, including electric wheelchairs and braille reproduction systems, to the Collaborative Innovation Partnership [47]. In the same year, the MITI encouraged private-sector firms to form such partnerships and, under joint supervision with the MHW, founded the Medical and Welfare Equipment Research Institute as a collaborative innovation partnership [47]. In addition, the MITI provided loans for the commercialization of innovative new technologies and products, and tax incentives for research and development expenditures [48].

In 1984, the MHW established a section dedicated to han-

dling medical devices [13,14]. The Japan Association for the Advancement of Medical Equipment (JAAME) was founded in 1985 to advance projects related to medical devices, such as research and development and information collection and dissemination [13,14]. In 1990, the MHW established a specialized section for medical devices and launched a new program to promote joint public–private research and development in this field, with the JAAME serving as its core organization [49]. Following the enactment of the Act on the Promotion of Research, Development and Dissemination of Social Welfare Equipment [28] in 1993, the MITI launched a program to provide research grants to private companies to accelerate the development and practical application of social welfare equipment [50]. In 1996, the MITI established a specialized section for medical and welfare devices [36].

In 2003, the MHLW released the "Medical Device Industry Vision," which included an action plan aimed at enhancing the international competitiveness of the medical device industry of Japan [34]. In the same year, the METI convened the Medical Device Industry Roundtable to deliberate on strategies for enhancing the international competitiveness of the imaging diagnostic equipment industry [51]. Furthermore, the METI and MHLW held a meeting to exchange views on the advancement of policies related to the medical device industry [51]. They engaged in collaborative efforts to implement a series of initiatives: formulating guidelines for medical device development commencing in 2004 [52]; supporting research and development through matching funds beginning in 2005 [52]; promoting the application of robotic technologies for caregiving and social welfare from 2010 [53]; and establishing and operating a seamless support network from the early stages of development through commercialization beginning in 2014 [54]. Finally, in 2014, the Act on the Promotion of Research, Development, and Dissemination of Medical Devices for Enhancing the Quality of Healthcare [55] was enacted.

The MHLW has reformed the regulatory framework for medical device review and approval since 2008, including accelerating the review of new medical devices and shortening the time required for approval [39]. In 2020, the MHLW formulated action strategies for facilitating the practical implementation of SaMD (Software as a Medical Device) [56], and in 2023, the MHLW and METI developed revised strategies [57]. Meanwhile, the METI has implemented a series of policies to advance the medical device industry, including: promoting medicine–engineering collaboration in 1999 [36]; encouraging small and medium-sized enterprises (SME) and cross-industry participation in 2011 [53]; establishing a hub for the medical and welfare equipment industry to support the reconstruction of Fukushima Prefecture, an area severely affected by the Great East Japan Earthquake in 2011 [53]; fostering international business development of integrated medical devices and related services in 2012 [58]; supporting venture companies in 2019 [59]; strengthening domestic production systems for emergency supply based on lessons learned from the COVID-19 pandemic in 2021 [60]; developing regional innovation ecosystems in 2021 [60]; and formulating the "Vision for the Medical Device Industry 2024" [61].

(4) Regenerative medicine and gene therapy

The MHW developed a research program on gene therapy in 1997 and on regenerative medicine in 2000 [62]. Meanwhile, the METI supported research on regenerative medicine in 2001 as part of the development of the bioindustry [63]. Following Professor Shinya Yamanaka's establishment of human induced pluripotent stem (iPS) cells in 2007, the MHLW accelerated research on iPS cells [64], whereas the METI launched technology development initiatives for the practical utilization and industrial implementation of stem cells, including iPS cells in 2009 [58].

In 2013, the Act on Securing Quality, Efficacy and Safety of Products Including Pharmaceuticals and Medical Devices [65] and the Act on the Safety of Regenerative Medicine [66] were enacted. Under these acts, "regenerative medicine products" were newly defined and became subject to regulatory oversight. In the same year, the Act on the Comprehensive Promotion of Measures to Ensure that the Public Can Receive Regenerative Medicine Quickly and Safely [67] was also enacted, thereby promoting regenerative medicine in parallel.

Since 2019, the METI has implemented technological developments aimed at industrialization, not only for regenerative medicine but also for gene therapy [59], and developed foundational technologies for the efficient manufacturing of human cell-processed products, as well as cultivation and production technologies for therapeutic vectors [60]. In 2024, the MHLW amended the Act on the Safety of Regenerative Medicine to include gene therapy, which does not use processed cells within its scope of application [38].

2. Application of information and communication technology in the field of health and medical care

In 1973, the MHW established a dedicated section for medical information systems [14] and allocated a budget for commissioned work on system development [13]. In that same year, the MITI developed medical information systems, including telemedicine, emergency medical services, and hospital automation [27]. In 1974, under the joint jurisdiction of the MHW and MITI, the Medical Information System Development Center (MEDIS-DC) was established and commissioned to develop medical information systems [13,14,47].

The MITI and MHW developed diagnostic support systems in 1984 [68] and 1987 [35], respectively. The METI and MHLW launched pilot projects on community medical information-sharing systems in 2006 [40] and 2007 [34], respectively. The MITI initiated the development of telemedicine in 1973 [27], while the MHW launched projects to disseminate telemedicine in 1997 [37]. In 2008, a joint review of strategies for promoting telemedicine was undertaken by the MHLW, METI, and Ministry of Internal Affairs and Communications [39].

Regarding the use of personal health and medical information, in 1992, the MITI and MHW collaborated in developing a filing system that employed a high-capacity portable medium [50]. In 2010, the METI developed a framework for leveraging personal health information based on the concept of personal health records (PHRs) [69]. Since 2019, the METI [59] and MHLW [70] have actively promoted PHRs.

3. Initiatives launched by the METI for health and medical care

(1) Healthcare industry as a service sector

Beyond the aforementioned efforts, the MITI and METI have undertaken a range of initiatives to address health and medical care. In 1976, the Industrial Structure Council, established by the MITI, explicitly stated the importance of presenting an industrial structure that is responsive to people's needs, such as food, clothing, housing, health, and intellectual life [47]. This marked the first instance in which "health" was referred to within the policy framework of the MITI. In 1979, the Council conceptualized medical care as a form of service and emphasized the necessity of advancing the service sector [48]. The Council also expressed expectations for the development of service industries, such as health and sports, in its 1987 report [71]. In 1994, the MITI initiated deliberations on policies aimed at fostering new business opportunities within the medical care sector, recognizing it as part of the broader service industry [50].

Since 2004, the METI has supported model projects initiated by local communities and health insurance societies to foster the development of advanced health service industries [72]. In 2014, the METI implemented a program for promoting industries to extend healthy life expectancy, which aims to develop health-related services outside the scope of the health and long-term care insurance systems, and to encourage health-conscious management and investment in employees' health by companies and health insurance societies [54]. The initiative for employees' health has evolved into the Health and Productivity Management (H&PM) Initiative.

(2) Healthcare industry expansion

The H&PM Initiative refers to the strategic management of employees' health from a managerial perspective [73]. Investment in employees' health fosters individual vitality and enhances workplace productivity [73]. These improvements are expected to positively influence corporate performance and increase shareholder value [73]. Since 2014, the METI has implemented the annual selection of outstanding companies practicing health management, known as the "Health and Productivity Stock Selection" [73]. In 2016, a certification program was established to formally recognize corporations that demonstrated excellent implementation of H&PM practices [73]. As part of its broader H&PM Initiative, the METI has also implemented measures for women's health [74] and mental health [75].

The METI has been actively promoting the international expansion of not only pharmaceuticals and medical devices, but also the healthcare industry. In 2009, the METI carefully considered the feasibility of accepting foreign patients into the Japanese medical care system as part of the internationalization of medical services [76]. In 2017, the METI launched research and other initiatives aimed at promoting the global deployment of long-term care services [77]. In 2018, the METI established an accreditation system for medical travel assistance companies that provide support services for foreign patients traveling to Japan to receive medical treatment [78].

In 2015, the METI launched a project to promote behavioral changes that help prevent and improve lifestyle-related diseases, such as diabetes, by using personal health and medical information collected by companies and insurers and daily health data collected through wearable devices [79]. In 2019, the METI launched a demonstration project to enhance the therapeutic outcomes of existing pharmaceuticals and medical devices using health and medical data [59].

To support startups in the healthcare sector, the METI has organized the Japan Healthcare Business Contest (JHeC) to honor outstanding individuals, organizations, and companies since 2015, and established the Healthcare Innovation Hub (InnoHub) as a consultation desk for startups and ventures in 2020 [60]. In addition, the METI established regional hubs to promote the social implementation of products and services offered by startups, and published a growth and exit playbook to facilitate collaboration, investment, and acquisition between startups and established businesses [80].

In addition, the METI implemented measures to address various diseases and health problems. In 2019, it launched a program to develop and validate products and services aimed at reducing the risk and suppressing the progression of dementia at an early stage [59]. In 2021, the METI launched a demonstration project to address health issues

faced by working women using FemTech and to promote mental health in the workplace [60]. In 2023, the METI was involved in a cross-ministerial initiative to address pollen allergies [81].

IV. Future directions for developing Japan's health policy and economic and industrial policy

1. Fundamental nature of the relationship between health policy and economic and industrial policy

In Japan, from the late 19th century to the early 20th century, the Ministry of Agriculture and Commerce, the predecessor of the METI, implemented measures against the adverse effects of economic and industrial development on health. These included enactment of the Factory Act and establishment of a health insurance system. These initiatives aimed to achieve Fukoku Kyouhei. In addition, the Ministry of Home Affairs, the predecessor of the MHLW, pursued the same goal. In other words, at that time, "health was instrumental to economic advancement rather than an end in itself."

From the 1950s onward, the MHW took measures to protect population health from pollution, whereas the MITI implemented measures to ensure that pollution would not hinder economic and industrial development. The concept introduced to reconcile these two approaches was "harmonization with sound economic development." However, the MHW strongly opposed this idea, asserting that health should take precedence over economic interests. As a result, it was clarified that "economic development should not be pursued at the expense of health."

Conversely, promoting industries that improve health can serve as a driver of economic development. Representative examples include health-related products, such as pharmaceuticals and medical devices. The MHLW and METI have both engaged in research, development, and dissemination of these products, although their objectives differ. In other words, "health exists together with the economy" in contemporary society. Based on the foregoing discussion, health policy has undergone a historical transition: it was initially subsumed under economic and industrial policy, later became independent and even oppositional, and ultimately coexisted with economic and industrial policy.

2. Directions for collaboration between health policy and economic and industrial policy based on a comparison of the initiatives launched by the MHLW and METI

Although the MHLW and METI have approached health-related social issues and needs in ways that appear to be in competition with one another, legislation and institutional frameworks have been implemented through their collaboration. Administration of the Factory Act and the health insurance system was transferred from the Ministry of Agriculture and Commerce to the Ministry of Home Affairs. Regarding pollution, although the principle of "harmonization with sound economic development" often led to conflicting perspectives between the two ministries, specific regulatory measures, such as control of smoke and soot emissions, have been jointly administered. Moreover, social welfare equipment and medical information systems are jointly managed. These observations highlight the inherent alignment between health policy and economic and industrial policy.

Regarding health-related products, such as pharmaceuticals, medical devices, and regenerative medicine products, the MHLW should engage in both their regulation and promotion, whereas the METI is solely responsible for promotion. Regarding workers' health, the MHLW, being the authority that oversees occupational health, must address the needs of all workers. In contrast, the METI can focus on advanced initiatives, such as the H&PM Initiative. The MHLW should promote and extend social welfare and security and public health in all spheres of life, in accordance with Article 25 of the Constitution [82]. In contrast, the METI is tasked with implementing measures aimed at advancing economic and industrial development, and within this mandate, initiatives aimed at improving health are desirable, albeit not obligatory. The METI's engagement in the health and medical sectors constitutes only a subset of its core mandate to promote economic and industrial development. Pharmaceuticals and regenerative medicine products are categorized into the broader bioindustry [33,63], while the healthcare industry is categorized into the service sector, encompassing areas such as leisure and sports [71]. Medical and welfare equipment is considered to be an industry that is eligible for support under SME development policies [53]. Furthermore, the health and medical sector is a target area for regional industrial revitalization [40,51-53,63,69,72,76], support for startups and venture businesses [59,60], the advancement of IoT, big data, and artificial intelligence (AI) [77-79], and reconstruction assistance for regions affected by the Great East Japan Earthquake [53,54,58-60].

The METI is relatively unconstrained in pursuing innovative or experimental initiatives aimed at improving health. In contrast, the MHLW, which bears direct responsibility for health improvement, faces institutional limitations that hinder implementing bold or unconventional measures. Although the MHLW established a dedicated division for medical-related business and a study group to promote the

healthcare industry in the 1980s [14], these initiatives were not sustained. This historical context suggests that the MHLW faced difficulties in promoting the healthcare industry. However, this may be interpreted as the METI serving roles that the MHLW is unable to fulfill. Therefore, there is a complementary relationship between the two ministries, which reinforces the notion that health and economy are inherently interconnected.

3. Key features of the METI's engagement in the fields of health and medical care

Given that the METI does not hold direct jurisdiction over health and medical care, its involvement in these fields remains limited. Accordingly, the METI has approached health-related initiatives in a restrained and cautious manner to avoid encroaching on the responsibilities of the MHLW. Unlike medical devices, pharmaceuticals and regenerative medicine products are not directly under the jurisdiction of the METI. Therefore, the METI's contributions in these areas have primarily centered on advancing foundational technologies for drug discovery and product commercialization. Regarding the healthcare industry, the METI has focused its efforts on health-related services that fall outside the scope of health and long-term care insurance systems, i.e., services that are not under the jurisdiction of the MHLW. Starting from its annual report for fiscal year 2011, the METI began using the term "herusukea" [53]. In Japanese, both the terms "hoken" and "herusukea" refer to the concept of healthcare. However, since "hoken" is the term commonly used by the MHLW, it appears that the METI adopted "herusukea" to differentiate itself from the MHLW.

The H&PM Initiative, which seeks to advance corporate and industrial development through health, exhibits conceptual parallels with historical measures, such as the Factory Act and the health insurance system. While the Factory Act and the health insurance system were primarily reactive measures aimed at preventing the deterioration of workers' health, the H&PM Initiative represents a proactive approach focused on enhancing employee well-being. Governmental intervention in corporate affairs has long constituted a foundational element of Japan's industrial policy, and these policy mechanisms could be inherited by the METI from its predecessor, the Ministry of Agriculture and Commerce, over a century ago.

4. Limitations and implications for future work

While this article examined the interrelationship between health policy and economic and industrial policy, it should be noted that specific industries may have a negative impact on health. These include tobacco, alcohol, ultra-processed foods, and gambling, which are collectively referred to as the commercial determinants of health [83,84] or unhealthy commodity industries [85]. These industries are more closely overseen by a different ministry than the METI. For instance, industries such as tobacco and alcohol are subject to substantial involvement by the Ministry of Finance, primarily due to taxation considerations. Regarding gambling, regulatory responsibilities are distributed among various ministries depending on the type of activity: public horse racing is overseen by the Ministry of Agriculture, Forestry and Fisheries, while integrated resorts are overseen by the Cabinet Office and other ministries. Given that the present study focuses on the relationship between the MHLW and METI, future research should examine the development of these industries and their implications for health.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding the publication of this article.

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＜総説＞

日本における健康政策と経済産業政策の相互関係

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抄録

本稿では，経済産業省の健康への取り組み，厚生労働省の経済・産業への取り組みのこれまでの動向と今後の方向性について，両省の相互作用に焦点を当てて論述する．

両省は，明治期の「富国強兵」の政策を所管する内務省を起源としている．産業化の進展に伴う労働環境と労働者の健康の悪化が経済発展に及ぼす悪影響を回避するため，経済産業省の前身である農商務省は労働者保護施策（工場法の制定，健康保険制度の創設）を実施した．1950 年代の公害に対しては，厚生省（現・厚生労働省）は国民の健康を保護するための措置を講じた一方，通商産業省（現・経済産業省）は経済・産業の発展を阻害しないような対策を実施した．厚生省は「健全な経済発展との調和」の原則に強く反対し，経済発展は健康に優先されるべきではないと主張した．一方，医薬品，医療機器，再生医療等製品などの健康の改善を目的とする産業の振興は経済発展の推進力でもあり，厚生労働省と経済産業省は，目的は異なるものの，これらの製品の研究・開発，普及に取り組んできた．このように健康政策は，当初は経済産業政策に内包され，その後独立し，時には対立し，最終的には経済産業政策とともに歩むに至っている．

経済産業省は，ヘルスケア産業をサービス産業として発展させてきた．また近年，企業が従業員の健康に投資し，生産性および業績を向上させる「健康経営」など，健康への取り組みを拡大している．さらに，認知症，女性の健康，メンタルヘルス，花粉症など，様々な疾患や健康課題にも取り組んでいる．

厚生労働省と経済産業省は，健康に関する課題やニーズに対して互いに競い合うように施策を展開してきたが，労働者保護施策の移管，一部の公害対策，医療・福祉機器の開発，医療情報システムの構築の共管など，協働した取り組みも多い．これは，健康政策と経済・産業政策の間に本質的な整合性が存在することを示唆している．また医薬品，医療機器等に関して，厚生労働省は規制と振興の両方を所管しているのに対して，経済産業省は振興のみを担当している．そのため経済産業省は，厚生労働省ではできないような革新的・実験的な取り組みを推進することが可能であり，両省は補完的な関係を形成しうると考えられる．

キーワード：健康政策，経済産業政策，労働者保護，公害，バイオインダストリー