Health and Productivity Management as an Innovation Engine
—Dual Innovation through Process and Institutional Perspectives—

【Abstract】
Health and Productivity Management (HPM) is increasingly recognized not merely as an employee welfare initiative, but as a strategic investment driving corporate innovation. This paper explores HPM as a vital Innovation Engine through two complementary models: Process Innovation and Institutional Innovation driven by Fusion Innovation. First, we frame HPM as Process Innovation by applying the concept of "predictive maintenance of machinery" from manufacturing to the "predictive maintenance of human capital" in the modern Intangible Economy. Second, we propose viewing HPM as an Institutional Innovation achieved through the cross-disciplinary fusion of Public Health (primarily occupational health) and Business Administration, redesigning organizational structures. By examining these dual perspectives, this paper provides logical and empirical evidence demonstrating how HPM effectively enhances sustainable corporate value
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Chapter 1: Introduction

1.1 The Importance of Human Capital

The source of value creation in modern enterprises has shifted significantly from tangible assets (hardware), such as factories and machinery, to "human capital" (software/intangible assets)—such as the knowledge, skills, and vitality possessed by employees—transitioning into an "Intangible Economy" where human capital serves as the primary source of corporate value. In the S&P500, intangible assets account for approximately 90% of corporate value (market capitalization) (Ocean Tomo, 2020). While the majority of intangible assets consist of foundational assets and economic capabilities (corporate brand, customer base, organizational culture, management philosophy, networks, and trust) or intellectual assets (patents, trademarks, copyrights, software, and databases), global attention has recently gathered around human capital management, catalyzed by the U.S. Securities and Exchange Commission (SEC) mandating human capital disclosure for U.S. listed companies in 2020.

Similarly in Japan, starting in 2020, the Japanese government (primarily the Ministry of Economy, Trade and Industry (METI)) has taken the initiative to position "human resources" as the core of intangible assets through policy reports on human capital (METI, 2020) and other initiatives. In these reports, human capital is defined as the core of corporate management, stating that "enhancing the value of human resources increases the value of intangible assets, which in turn sustainably boosts corporate

value," thereby indicating its potential for innovation. Furthermore, in 2021, the Financial Services Agency and the Tokyo Stock Exchange revised the Corporate Governance Code—the principles of conduct that listed companies must follow to achieve sustainable growth and mid-to-long-term enhancement of corporate value—and in 2022, the "Guidelines for Human Capital Visualization" was published (Cabinet Secretariat, 2022). With the mandatory disclosure in annual securities reports in 2023 and further legal amendments expected in 2026, companies are increasingly required to disclose human capital in alignment with their management strategies.

1.2 The Limits of Traditional Health Management and Raising the Issue

While the importance of human capital has increased more than ever before, the perception of Japanese companies regarding "employee health," which sustains this capital, has long remained within an old paradigm. Particularly in Japan, unlike the private-sector-led medical insurance systems in countries such as the United States, there are strict legal regulations at the national level, such as the Labor Standards Act (1947) and the Industrial Safety and Health Act (1972), which have imposed obligations on companies, such as mandatory annual health checkups. Therefore, in many companies, employee health management and hygiene management have been positioned as a "mandatory cost (welfare expense)" in order to comply with laws and regulations, or as a reactive measure (disease management) when an illness occurs.

However, while the era of the industrial economy, which was centered on the manufacturing industry, guaranteed productivity through "the absence of illness or injury," the situation is different in the current economy where intangible assets are becoming primary. As mentioned above, the source for enhancing the value of intangible assets is the ideas and execution ability of employees, and the "people (human capital)" who generate them. In other words, with "passive health management" aimed solely at clearing legal regulations and avoiding risks, it is difficult to generate sustainable innovation in the intangible economy. Therefore, a new approach that draws out the physical and mental vitality of employees and fosters the source of innovation has become inevitable.

1.3 "Health and Productivity Management" as an Innovation Engine

As one solution to this issue, a concept that has uniquely developed in Japan is "Health and Productivity Management (HPM). "HPM is an approach that views initiatives for maintaining and improving employee health as a "strategic investment to enhance future profitability" (METI, 2020) and implements them from a management perspective. The Japanese government (also primarily METI) has promoted this as a national strategy since the 2010s; by 2026, over 100,000 companies in Japan have made declarations to engage in these efforts, and more than 26,000 companies have been certified as "Certified Health & Productivity Management Outstanding Organizations" (METI, 2026), demonstrating that this initiative is beginning to firmly permeate Japanese enterprises.

The purpose of this paper is not merely to view this Japan-originated concept of "HPM" as a framework for health promotion, but to academically redefine it as an "Innovation Engine" that drives sustainable corporate growth and to demonstrate its effectiveness. Specifically, we will unravel HPM through the following two innovation lenses.

- HPM as Process Innovation: We discuss the mechanism as a Process that maximizes organizational performance by applying the concept of "Predictive Maintenance," which has traditionally been conducted for machinery and equipment in the manufacturing industry, to "human capital" in modern industries.
- HPM as Institutional Innovation through Fusion: We clarify that it is a modern institutional innovation that redesigns the structural nature (institution) of a corporate organization through the fusion of disparate fields: "Public Health (primarily from an occupational health and medical perspective)" and "Business Administration (primarily from an HRM and strategic perspective)."

Chapter 2: Literature Review & Conceptual Framework

2.1 History of Health and Productivity Management (HPM)

The origin of the concept linking employee health with management strategy dates back to "The Healthy Company" advocated by Robert H. Rosen in 1992 (Rosen, 1992). In this concept, knowledge from clinical psychology and organizational management was fused, demonstrating that consideration and investment in the physical and mental health of employees directly lead to improved organizational productivity and business performance.

In Japan, since the 2000s, through the activities of organizations such as the NPO Research Institute of Health and Productivity Management, HPM has achieved unique development driven by Japan's specific laws and regulations. Subsequently, in 2015, the Ministry of Economy, Trade and Industry (METI) together with the Tokyo Stock Exchange (TSE) selected the "Health & Productivity Stock Selection" (METI and TSE, 2015) targeting listed companies, and in 2017, established the aforementioned "Certified Health & Productivity Management Outstanding Organizations Recognition Program" targeting all companies in Japan, which continues to the present. Driven by such national policy promotion, HPM has rapidly permeated as an important agenda in corporate management.

The background to this rapid spread is considered to be influenced by the characteristics of Japanese management. Traditional Japanese companies had a deeply rooted culture that viewed the company and employees as a long-term community, represented by the lifetime employment system. Therefore, instead of viewing employee health management simply as a legal obligation or cost, a foundation was formed to accept and promote it as a (health) investment that goes beyond legal regulations.

2.2 Previous Research on Innovation Theory

To academically support the approach of this paper presented in Chapter 1, we first

review the evolution of existing innovation theories. To date, innovation research has developed diverse theories focusing primarily on technological and market innovations. At the origin of innovation theory, Schumpeter (1934, 1942) defined innovation as "new combinations" and "creative destruction," categorizing it into product innovation, Process Innovation, and market development. Furthermore, Drucker (1985) elevated this into practical strategies for business organizations. Subsequently, Christensen (1997, 2016) proposed "sustaining innovation," which maintains existing markets, and "disruptive innovation" (e.g., Jobs to be Done theory), which brings about new value standards, while Kim and Mauborgne (2005, 2023) established theories for creating new, uncontested markets, such as the "Blue Ocean Strategy" and "Nondisruptive Creation." However, much of this previous research on innovation has concentrated on the innovation of products and services—"What" to make (product innovation)—and the manufacturing processes and technological domains—"How" to make them, particularly Technological Innovation. Traditionally, within the realm of Process Innovation, the primary focus has been on the efficiency and risk avoidance of "hardware" (physical equipment), such as Factory Automation (FA) in the manufacturing industry and the Predictive Maintenance of machinery using AI and IoT (Mobley, 2002; Lee et al., 2015). In the modern era, where the source of value creation has shifted from machines to "people," how to apply and expand these innovation concepts into the domains of "human capital" and "organizational institutions" has become a key academic question.

2.3 Conceptual Framework : Process, Institutional/Organizational, and Fusion Innovations

Therefore, this paper positions HPM within the following two theoretical frameworks to unravel its mechanisms.

The first framework is the application of Schumpeter's aforementioned "Process Innovation" to human capital. While traditional Process Innovation aimed at the Predictive Maintenance of "physical machinery" in factories, HPM functions as a Predictive Maintenance process for the "minds and bodies of employees (software)," which is the greatest source of value creation.

The second framework is a classification using two axes: the target of innovation ("technology" or "institutional/organizational") and the approach method ("incremental" or "fusion"). Within this framework, HPM dealt with in this paper falls under both "Institutional and Organizational Innovation" and "Fusion Innovation."

"Institutional and Organizational Innovation," as represented by the invention of the "joint-stock company," transforms the mechanisms of society; however, compared to "Technological Innovation," its value is often evaluated ex-post (after several years have passed). Because HPM also redesigns the structural nature of an organization as a management strategy, it is considered to fall under Institutional and Organizational Innovation. Furthermore, from the perspective of the "Fusion Innovation" approach, just as traditional "economics" combined with "psychology" to give birth to the new field of "behavioral economics," there is a history of cross-disciplinary combinations

generating powerful innovations. HPM can also be described as a modern Fusion Innovation that redesigns organizations through the integration of disparate fields: "public health (primarily from an occupational health and medical perspective)" and "business administration (primarily from an HRM and strategic perspective)."
In the subsequent chapters, based on this framework, we will specifically unravel the micro-mechanism of applying Process Innovation (predictive maintenance) to "people," who are the greatest source of value creation (Chapter 3), and the macro-mechanism of HPM functioning as an "Institutional Organization × Fusion" innovation (Chapter 4).

Chapter 3: HPM as Process Innovation

3.1 Concept Shift: From "Predictive Maintenance of Machinery" to "Predictive Maintenance of Human Capital"

This chapter positions health and productivity management (HPM) as a "Process Innovation" and clarifies its mechanisms. Process Innovation refers not primarily to the innovation of the product itself (Product Innovation), but to the innovation in the "production process" or "provision process" that creates it.
"Predictive Maintenance of machinery and equipment," which has been continuously pursued in the manufacturing industry, is an approach that detects signs of abnormality based on data before the line stops, and proactively performs part replacement and adjustments. As stated several times, the "equipment" that creates the greatest value in the Intangible Economy is not physical machinery in a factory, but "employees (human capital)." Therefore, we consider it possible to apply the traditional Process Innovation concept of Predictive Maintenance for physical machinery to the "Predictive Maintenance of human capital," which is the source of value creation.

3.2 Specific Mechanisms of HPM as Process Innovation

To clarify this concept shift, Table 1 compares "Predictive Maintenance of machinery" in the traditional manufacturing industry with "Predictive Maintenance of human capital (HPM)" in the Intangible Economy across five comparison items (1. Management target, 2. Sensors/data, 3. Signs of abnormality, 4. Preventive intervention, and 5. Desired outcome).

Table 1: Comparison between Traditional Manufacturing (Predictive Maintenance of equipment) and the Modern Intangible Economy (Predictive Maintenance of human capital)

Comparison Item	[Traditional Manufacturing] Predictive Maintenance of Equipment	[Modern Intangible Economy] Predictive Maintenance of Human Capital (HPM)
1. Management Target	Physical machinery and equipment on production lines (Maintenance of hardware)	The "minds and bodies of employees," which are the greatest source of value creation (Maintenance of software and human capital)

2. Sensors / Data	Machine data such as operating time, temperature, vibration, and operating noise (Real-time monitoring via IoT sensors)	Sleep duration, autonomic nerve function, stress checks, and PHR data
3. Signs of Abnormality	Component wear, abnormal heat generation, and abnormal noises (Signals just before failure)	Sleep deprivation, excessive stress, and presenteeism (A state of reduced productivity due to physical or mental unwellness despite being at work)
4. Preventive Intervention (Countermeasures)	Proactive part replacement, lubrication, and adjustments to avoid complete machine failure and stoppage	Preventive measures such as data-based sleep improvement programs and lifestyle improvements to avoid leaves of absence and performance drops (failure)
5. Desired Outcome	Avoiding losses from sudden operational stops (Stable operation of the production line)	Avoiding opportunity loss and employee dropout due to physical and mental unwellness (Maximizing work engagement and productivity)

In other words, the Predictive Maintenance of human capital is achieved by providing appropriate care and support as an "investment in human capital" in order to draw out the physical and mental vitality of employees.

3.3 Predictive Maintenance Process of Human Capital Utilizing PHR (Personal Health Record)

Just as IoT sensors collect operating data in real-time in the Predictive Maintenance of the manufacturing industry, the utilization of healthcare data such as PHR is indispensable for the Predictive Maintenance of human capital. In Japan, PHR is defined as "personal health and medical information over a lifetime," and since it was specified in the "Growth Strategy Follow-up" by the Cabinet Secretariat (2019), the formulation and revision of guidelines have been underway to promote its proactive and strategic utilization. Notably, Japan has a statutory health checkup system, which is rare globally; in terms of accumulating comprehensive health checkup data on a national scale, the country's volume of health-related data holdings is among the largest in the world.

By continuously accumulating and analyzing data on employees' sleep duration and autonomic nerve activity, legally mandated stress check results, and PHR related to daily health conditions, it becomes possible to objectively detect potential physical and mental unwellness or presenteeism (signs of reduced productivity) before the individuals themselves become aware of them. Furthermore, as a result of Technological Innovation, not only traditional scales, blood pressure monitors, and activity trackers, but also wearable devices such as Apple Watch, Fitbit, and Oura Ring are becoming widespread, which will make it even easier to acquire objective biometric data in the

future (Arai and Gemba, 2026). On the other hand, in Japan, strict regulations are imposed on the utilization and service development of PHR from the perspective of the Personal Information Protection Law and others, resulting in a current situation where its practical application has not progressed as much as in countries like the United States.

However, overall, implementing a data-driven Predictive Maintenance process based on objective biometric data and PHR within an organization goes beyond merely promoting individual health. By optimizing the entire process of employees' physical and mental conditions, it serves as a powerful foundation for building an organization that is highly conducive to the continuous creation of sustainable innovation.

Chapter 4: HPM as Institutional and Organizational Innovation through "Fusion"

4.1 Redesigning Organizational Institutions through Cross-Disciplinary Fusion

As discussed in Chapter 2, health and productivity management (HPM) falls under "Institutional and Organizational Innovation" through the fusion of disparate fields: "public health (primarily from an occupational health and medical perspective)" and "business administration (primarily from an HRM and strategic perspective)." While traditional employee welfare and occupational safety and health have been uniform and static forms of management based on legal regulations, HPM is an approach that places human capital at the core of corporate value creation and redesigns the structural nature and culture of the organization. To clarify this uniqueness, by organizing it using a two-axis matrix based on the target of Innovation (whether "Technological" or "Institutional and Organizational") and the approach (whether "Incremental" or "Fusion"), the health and productivity management addressed in this paper is positioned as shown in Table 2.

Table 2: Innovation Classification Matrix and the Positioning of Health and Productivity Management

	Technological Innovation	Institutional and Organizational Innovation
Incremental Innovation	Continuous improvement of existing technologies (e.g., improving the accuracy of AI for production efficiency)	Minor updates to existing institutions (e.g., refining telework regulations)
Fusion Innovation	Integration of cross-disciplinary technologies (e.g., smart offices using AI and IoT)	HPM (Redesigning organizations through occupational health × business administration)

Until now, many Business Innovations have concentrated primarily on the technology domain, such as "Incremental Innovation" that continuously improves existing technologies (e.g., improving the accuracy of AI for production efficiency) and "Fusion

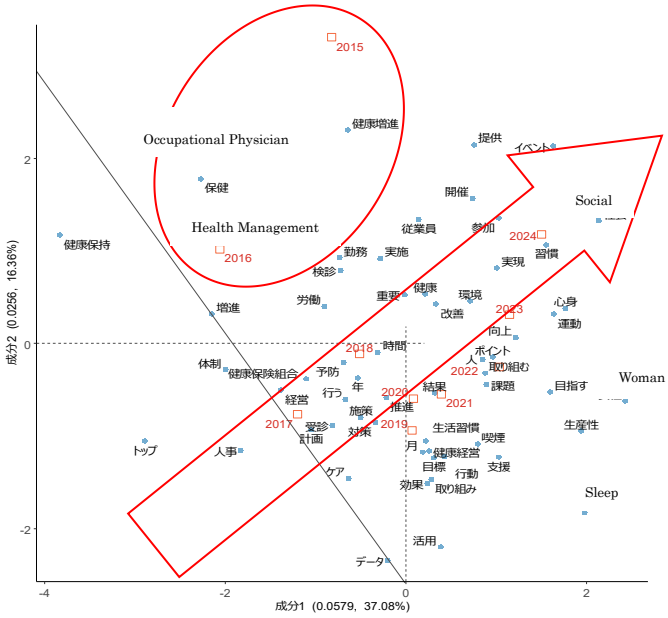
Innovation" that integrates cross-disciplinary technologies (e.g., smart offices using AI and IoT). On the other hand, innovation in the domain of organizational institutions has often been limited to "Incremental Innovation," such as minor updates to existing institutions (e.g., refining telework regulations). The HPM addressed in this paper is uniquely positioned in the quadrant of "Institutional and Organizational Innovation × Fusion Innovation" within this matrix. In other words, by combining knowledge from completely different fields, it achieves a "redesign of the entire organization" that goes beyond mere institutional updates.
In practice, a barrier of language and objectives has long existed between "occupational health departments," which aim for legal compliance and employee protection, and "management and HR (Human Resources) departments," which pursue productivity and profitability. However, HPM provided a common strategic goal that "investment in health enhances corporate value," along with objective data, which facilitated dialogue between the two and enabled practical fusion transcending departmental boundaries.

4.2 Empirical Analysis: Trajectory of Institutional Updates (Text Mining Analysis of Stock Selection Reports)
To objectively demonstrate how this "Institutional and Organizational Innovation × Fusion Innovation" has progressed within Japanese companies, a text mining analysis (using KH Coder) was conducted on the published reports of the "Health & Productivity Stock Selection" selected by the Ministry of Economy, Trade and Industry since 2015 (10 years' worth of data from FY2015 to FY2024) (Arai and Suzuki, 2026). As a result of the analysis, it was demonstrated that corporate initiatives (i.e., the structural nature of the institution) have undergone clear qualitative changes over time.

Initial Stage (2015-2016): Words such as "health checkup" and "occupational physician" appeared frequently, and initiatives were primarily an extension of traditional "safety consideration obligations" and "hygiene management."。
↓
Development Stage (2017 onwards): The focus shifted to measures that encourage employees' proactive behavioral changes (prevention), such as "lifestyle habits," "exercise," and "diet." Furthermore, due to the impact of the COVID-19 pandemic, changes in characteristic initiatives temporarily stagnated from around 2020 to 2022.
↓
Current Stage (2023 onwards): Keywords such as "sleep," "women's health," and even "resolving social issues" have rapidly increased.

These empirical results indicate that the "institution" of HPM has broken away from the initial "hygiene management to protect employees from illness" and has deeply fused with management strategy. In other words, modern HPM has evolved into a "dynamic organizational redesign" to maximize the value of human capital, encompassing responses to diversity and the resolution of social issues.

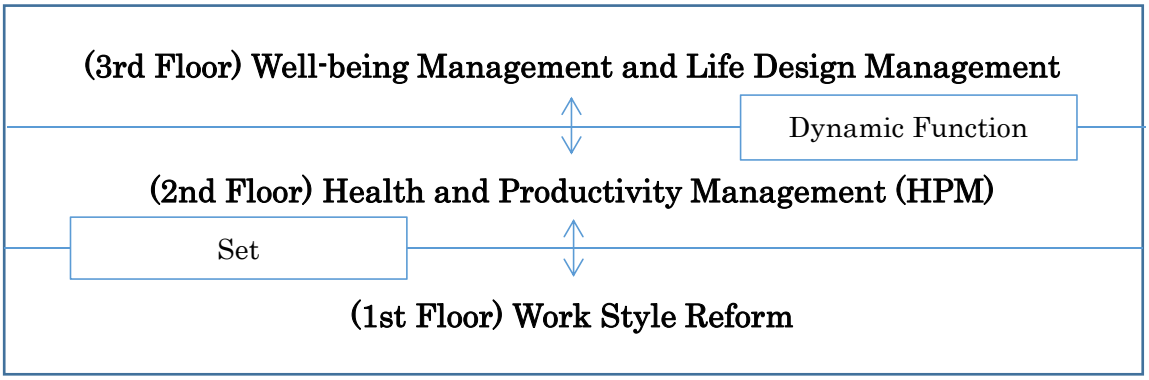
Figure 1 : Correspondence Analysis of Corporate Initiatives Over 10 Years (FY2015-2024)



4.3 HPM as the Foundation of the "Three-Story Theory" in Human Capital Management

As confirmed in the previous section, dynamically evolving health and productivity management (HPM) ultimately functions as the foundation for a company's sustainable value creation. In recent years, the importance of management strategies emphasizing "human capital" has been increasing in the global market; however, no matter how excellent the talent strategies and educational investments are, they cannot demonstrate their original results if the foundation of "physical and mental health" in the work environment has collapsed. The authors model this as the "Three-Story Theory in Human Capital Management," as shown in Figure 2 below.

Figure 2 : Conceptual Diagram of the Three-Story Structure in Next-Generation Human Capital Management



Source: Compiled by the authors

Only when the "Work Style Reform" on the first floor and "HPM" on the second floor function complementarily as a set, is the top third floor, "Well-being Management and Life Design Management," established. In other words, the institution of HPM, redesigned through fusion, becomes a firm foundation for human capital management, and is positioned as the most accessible and effective strategic intervention that connects to corporate sustainability (sustainability management).

Chapter 5: Discussion

5.1 The Ideal State of HPM

Based on the "Three-Story Theory in Human Capital Management" presented in Section 4.3, all measures in the first floor (Work Style Reform) and the second floor (HPM) are not intended to force behavioral changes or health promotion upon employees. Toward the realization of the top third floor (Well-being Management and Life Design Management), the ideal state that HPM should aim for is, from the employees' perspective, "a state where, before they know it and without worrying about (HPM measures), their physical and mental metrics have improved, they have become vibrant as individuals, and the organization has become activated." To achieve this, it is necessary for a data-driven "Predictive Maintenance process" to operate seamlessly in the background, while simultaneously having an "organizational culture (institution) where health and management are fused" firmly established as a foundation.

5.2 Creation of Sustainable Corporate Value through Dual Innovation

The core of this paper lies in understanding HPM as a mechanism of innovation. In the Intangible Economy, it is essential to have a perspective of "Dual Innovation" that captures HPM through two complementary lenses: "Process Innovation (Predictive Maintenance of human capital)" and "Institutional and Organizational Innovation through 'Fusion' (redesigning the organization with well-being at its core)."

By adopting these two perspectives and transforming employee health into a core engine of value creation, sustainable corporate value is generated for the first time. In the midst of severe modern environmental changes (such as technological innovation and labor shortages), the "resilience (recovery power and robustness)" for companies to survive and continue growing is brought about precisely by this innovation engine. In other words, it can be said that health and productivity management (HPM) is not a method for cost reduction, but the most reliable investment strategy that enhances an organization's immunity against future shocks and promises sustainable growth.

5.3 The Potential of Institutional and Organizational Innovation in a Pandemic

Furthermore, this Institutional and Organizational Innovation has the potential to bring about broad spillover effects to society as a whole, rather than remaining confined within a single company. For example, during the novel coronavirus (COVID-19)

pandemic, factors such as the national habituation of hygiene behaviors like hand washing and gargling, as well as inherent cultural and national traits such as a preference for cleanliness, are often pointed out as reasons why morbidity and mortality rates among Japanese people were kept at a lower level compared to other developed countries. However, from the perspective of this paper, we cannot overlook the fact that HPM had already spread to a scale of nearly 20,000 companies in Japan before the pandemic occurred. The evaluation criteria for HPM included "infectious disease prevention" targeting seasonal influenza and other diseases from the beginning, and preventive behaviors were systematically recommended and institutionalized through many companies.

As a result, it is presumed that this foundation of widespread HPM functioned as a systemic and social breakwater against an unknown virus, helping to suppress the damage. This suggests the possibility that the "Institutional and Organizational Innovation" achieved through the fusion of health and management not only brought about productivity improvements in normal times, but also had a powerful and unexpected effect of enhancing the resilience of the entire society during an unprecedented public health crisis.

Chapter 6: Conclusion & Global Implications

6.1 Summary of This Paper

In this paper, we redefined "HPM," which has tended to be discussed within the framework of employee welfare benefits in Japan, as a core Innovation Engine that drives sustainable growth in the Intangible Economy. Specifically, we clarified its mechanisms through two innovation lenses (the perspective of Dual Innovation): "Predictive Maintenance of human capital (Process Innovation)" and "the fusion of health and management (Institutional and Organizational Innovation)."

6.2 Japan's Policy-Driven Innovation (METI Model)

What is noteworthy regarding the spread and deepening of HPM is the policy-driven approach by the Japanese government (particularly METI). The model presented by METI outlines a logic starting with "investment in human capital (health investment in employees)," which leads to "improvement of employee vitality," then to the "acquisition and expansion of sources of innovation," and ultimately to the "improvement of business performance and corporate value." This is a unique and powerful ecosystem where national policy itself encourages corporate behavioral changes and drives innovation across society as a whole, going beyond the independent efforts of a single company.

6.3 Future Developments (Global Implications)

As a future prospect, this "HPM" model originating in Japan has the potential to sublimate into a global standard, rather than remaining domestic.

First is the prospect for international standardization (ISO). Amid the emergence of international standards such as ISO 25554 (ISO, 2024) (Human resource management

– Wellbeing at work – Framework), which adopts Japan's HPM methodology as its foundational framework, Japan's sophisticated HPM model and empirical data cultivated by viewing "health as an investment" will serve as extremely important inputs for shaping next-generation global standards.

Second is the international expansion of new healthcare products and services. Healthcare solutions (prevention, sleep improvement, mental care, etc.) based on health data created by the permeation of HPM into society will be an important export-type innovation model for countries around the world struggling with aging populations and declining productivity. The innovation engine of HPM has the potential to serve as a guiding beacon toward a resilient future for organizations worldwide in the coming era of uncertainty.

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