



Business strategies for the healing industry from a holistic health perspective in the AI era

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Abstract

With the rapid penetration of digital health technologies and the structural upgrading of global health demands, the healing industry—centered on the philosophy of holistic health—has become one of the most dynamic emerging fields in the digital era. Unlike the passive model of traditional medicine, which centers on disease treatment, the healing industry is oriented toward proactive health management and covers four dimensions: physical, mental, spiritual, and social health. Driven by artificial intelligence (AI), it is undergoing profound changes in service forms and business models. Using literature analysis and integrative research methods, this paper systematically constructs a four-dimensional “body–mind–spirit–social” analytical framework for the holistic health industry based on academic literature on digital health and healing technologies. It examines industrial development, AI application pathways, and business innovation models in each dimension. The study finds that generative AI, wearable sensing, and immersive extended reality are reshaping the value chain of the healing industry, enabling large-scale personalized health services and moving health services from institutional settings to daily life and from standardization to precision. At the same time, technological empowerment brings governance challenges, including data privacy, algorithmic bias, blurred professional boundaries, and widening health inequalities. The paper concludes with recommendations for industry management, policy regulation, and social participation, arguing that the sustainable development of the healing industry must return to the essence of holistic care and achieve a dynamic balance between technological innovation and risk governance.

Keywords: Holistic health, healing industry, artificial intelligence, digital health, strategy

Introduction

In the third decade of the twenty-first century, global health is undergoing a profound paradigm shift. Sunyaev *et al.* (2024) ^[28] note that digital health technologies are fundamentally changing the supply of medical and health services, moving them from centralized, institutional settings to decentralized, everyday contexts and from passive disease response to proactive health prevention. This shift has not only reconfigured the boundaries of traditional medical systems but also generated a large industrial field centered on proactive health promotion and characterized by cross-sector integration: the healing industry. The rise of the healing industry stems from a deeper transformation in individuals' health roles. Frist (2014) ^[7] proposes the concept of the “patient-consumer,” arguing that information technology has empowered individuals to control their own health. Consumers are no longer passive recipients of medical services but active health managers and decision-makers. This role change has produced profound shifts in demand: people's health concerns now extend beyond disease treatment and symptom elimination to physical fitness, stress relief, body–mind balance, and quality-of-life optimization. A hospital-centered medical system can hardly satisfy such diversified and proactive health needs, creating broad market space for the healing industry. The post-pandemic era has further accelerated this process. Anto-Ocrah *et al.* (2023) ^[1] point out that the pandemic not only raised public awareness of health issues but also changed habits of health-service access; digital, contactless health services have become more widely accepted. Meanwhile, psychological stress, social isolation, and lifestyle changes during the pandemic have made people more aware that health is an integrated concept encompassing physical, psychological, and social

dimensions. Single-dimensional medical interventions are insufficient for complex health challenges. This cognitive shift has moved the holistic health philosophy—emphasizing integrated balance across body, mind, spirit, and society—from the margins to the mainstream and made it the core ideological foundation of the healing industry.

Holistic Health and Healing Industry

1. Concept and Core Dimensions of Holistic Health

Holistic health is the core philosophical foundation of the healing industry. Its essence is to view the person as an organic whole unifying body, mind, spirit, and society rather than as a simple sum of organs and functions. Anto-Ocrah *et al.* (2023) ^[1] distinguish Wellness from Health, noting that the former emphasizes proactivity and process—an active pursuit of a holistic health state encompassing physical fitness, nutrition, stress management, and environmental sensitivity. In other words, holistic health is not a static state of absence of disease but a continuous practice. Healing is not merely curing disease but helping individuals restore overall balance and achieve self-growth. This shift from “passive treatment” to “active health” is the deeper philosophical basis for the rise of the healing industry. Contemporary holistic health is usually structured around four dimensions: body, mind, spirit, and society. These are not independent but mutually penetrating and dynamically related. Physical health is the most basic layer, involving physiological function, nutritional status, exercise capacity, sleep quality, and disease resistance; it is the material carrier of health. Mental health concerns emotional regulation, stress coping, cognitive function, and psychological resilience; it is the intermediary bridge between physiology and spirituality. Spiritual health goes beyond specific religious belief and points to the search for meaning,

establishment of values, self-awareness, inner peace, and deep connection with nature and community. Social health emphasizes relationship quality, social connection, belonging, and community participation; it is the social support network of individual health (Lu, 2026)^[17].

2. Scope and Value-Chain Structure of the Healing Industry

As a core component of the health economy, the healing industry covers all products and services aimed at promoting holistic health and characterized by non-invasiveness and experience orientation. Unlike traditional medical industry centered on disease treatment, the healing industry helps individuals achieve self-health management, body-mind balance, and quality-of-life improvement through diversified products, services, and experiences. From the supply side, the industry can be divided into five categories. The first is health products, including functional foods, dietary supplements, natural skincare products, and aromatherapy products; this is the largest physical-product segment. The second is health services, including fitness coaching, nutritional counseling, psychological counseling, massage and aromatherapy, and mindfulness courses; professional service is the core value. The third is experience economy, including forest healing, health tourism, hot-spring resorts, and retreat centers; it emphasizes holistic scene experience. The fourth is digital health, including health apps, wearables, online courses, and AI health coaches; it is the fastest-growing field in recent years. The fifth is spatial facilities, including healthy buildings, smart communities, and healing-space design; it combines spatial environment with health philosophy. From the value-chain perspective, the industry includes upstream, midstream, downstream, and peripheral support. Upstream is R&D and design, including health-food formula development, healing-course development, AI algorithm training, and spatial design; it is the source of innovation. Midstream is production, manufacturing, and service provision, including food processing, venue operation, online platform operation, and consulting services; it is the core value-creation link. Downstream is channel sales and customer relationship management, including physical stores, e-commerce platforms, booking platforms, and membership systems; it is the terminal of value realization. Peripheral support includes certification, data analysis, brand marketing, payment, and insurance. Unlike traditional manufacturing, value creation in the healing industry relies heavily on experience design, professional knowledge, and customer relationships; the service process itself is a core link of value realization. The industry also shows significant cross-sector integration: health tourism combines tourism and health services; smart wearables combine electronics manufacturing and health services; corporate health benefits combine human resource management and health promotion. Such integration expands industrial boundaries and generates innovative business models.

3. Deep Impact of Digital Transformation on the Healing Industry

Digital technologies are fundamentally reshaping the trajectory of the healing industry. Sunyaev *et al.* (2024)^[28] note that digital health technologies move health services from centralized, institutional settings to decentralized,

everyday contexts and from passive response to proactive prevention. This trend is particularly evident in the healing industry and has three deep impacts. First, service scenarios become ubiquitous. In the past, healing services depended heavily on physical places such as gyms, spas, and clinics. Digital tools break spatial limits, allowing health services to penetrate daily life—AI-guided meditation at home, stress monitoring through wearables in the office, and personalized health courses during commuting—achieving all-weather, all-scenario health management. This greatly expands the reach and frequency of healing services. Second, service supply becomes personalized. Traditional healing services are mostly standardized products facing all consumers, making it difficult to accommodate individual differences. AI enables mass customization. Based on users' physiological data, lifestyle, health goals, and preferences, AI systems can dynamically generate personalized nutrition advice, exercise prescriptions, meditation guidance, and sleep plans. This personalization improves service effects and enhances user participation and satisfaction. Third, the logic of value creation is reconstructed. In the traditional healing industry, value mainly comes from product functions and professional services. In the digital era, data become a core factor of production. Users' health, behavioral, and feedback data are used not only to optimize individual service experiences but also to train algorithms, improve products, and discover new health patterns, forming a data-driven positive cycle. Sunyaev *et al.* (2024)^[28] emphasize that digital health is essentially a data-driven paradigm; data are used for real-time feedback and for driving research and innovation. This shift is a core feature distinguishing the digital healing industry from traditional industries.

4. AI's Role and Value Pathways in the Healing Industry

AI is the core technological driver of digital upgrading in the healing industry, with value in five areas. First, data analysis and insight: AI integrates physiological data, dietary records, sleep data, and emotion diaries to identify risk factors and behavioral patterns and extract deep regularities. Second, personalized recommendations: based on user characteristics and data feedback, AI provides customized nutrition advice, exercise prescriptions, and meditation guidance, personalized services for each individual. Third, content generation: generative AI automatically produces personalized health copy, meditation audio, and training plans, greatly reducing content-production costs and improving richness and update speed. Fourth, intelligent interaction: natural language processing and computer vision enable smart customer service, virtual coaches, and emotion recognition, improving interactivity and immediacy. Fifth, decision optimization: AI helps enterprises with customer segmentation, demand forecasting, operational optimization, and risk management. Pfitzer *et al.* (2025)^[22] note that the successful scaling of digital health technologies depends on multiple factors, including business-model flexibility, regulatory compliance, health-impact validation, consumer awareness, and strategic alliances; AI can empower these dimensions. For example, AI can help enterprises identify user needs more precisely, optimize service processes, and improve retention. AI-driven health-data analysis also provides technical possibilities for validating the effectiveness of healing

services, enhancing scientific credibility and supporting scale development. Although the healing industry and digital health technologies are developing rapidly, their development is not unrestricted. Anto-Ocrah *et al.* (2023) ^[1] caution that the design of digital health and healing services often carries Western cultural and upper-middle-class value assumptions and may not fit the needs and perceptions of different cultural backgrounds and socioeconomic groups. For example, in some cultures, mental-health issues remain stigmatized, and seeking psychological healing services may face social pressure. For lower-socioeconomic groups, paying for health services may not be a priority, and digital tools may face barriers related to the digital divide.

Physical Health Dimension

Physical health is the foundational dimension of holistic health and the most mature and largest segment of the healing industry. With advances in genomics, microbiome science, and AI, the field is undergoing a deep transformation from “universal recommendations” to “precision interventions.” Precision nutrition, personalized exercise prescriptions, and smart sleep management are emerging rapidly and becoming core drivers of innovation (Lu, 2026).

1. Scientific Basis and Industrialization of Precision Nutrition

Traditional nutrition science centers on universal dietary guidelines emphasizing general principles of balanced diet. However, increasing evidence shows significant individual differences in metabolic responses to food; the same diet may have vastly different health effects on different people. A core determinant of such differences is the gut microbiome. Gibbons *et al.* (2022) ^[8] note that individual differences in gut microbiota composition are key determinants of varied responses to dietary, prebiotic, and probiotic interventions. Gut microbiota information can more accurately predict individual responses to specific diets and inform more effective personalized nutrition interventions. The human gut hosts trillions of microorganisms that participate in digestion and nutrient absorption and influence neuroendocrine function, immune regulation, and even emotion and cognition through the gut–brain axis. Inter-individual differences in gut microbiota composition far exceed genomic differences, explaining why standardized dietary advice has uneven effects.

Zeevi *et al.* (2015) ^[33], in a classic Cell study, provided strong empirical support. The study continuously monitored blood glucose in 800 participants and recorded postprandial glucose responses to more than 46,000 meals. It found that even identical foods produced highly different postprandial glucose responses across individuals; some foods that had mild effects on most people could cause sharp glucose fluctuations in specific individuals, and vice versa. This directly challenged the effectiveness of universal dietary advice and demonstrated that “one-size-fits-all” nutrition guidelines cannot meet individualized health needs. Zeevi *et al.* (2015) ^[33] further used machine-learning algorithms integrating blood parameters, dietary habits, anthropometric data, physical activity, and gut microbiota to build a model that accurately predicted individual postprandial glucose responses, validated in independent samples. A blinded randomized controlled trial based on the algorithm showed that personalized diets significantly reduced postprandial

glucose responses and were accompanied by consistent changes in gut microbiota composition. This demonstrated the potential of AI and big data in precision nutrition and marked the entry of nutrition science into the precision era.

Livingstone *et al.* (2022) ^[16] review precision nutrition, noting that current research and applications integrate genetics, epigenetics, genomics, metabolomics, and metagenomics and are advancing rapidly with high-throughput multi-omics and big-data systems. Different pathways interpret individual differences from different levels and provide multidimensional bases for personalized nutrition interventions. Genomics interprets individual metabolic tendencies toward nutrients; for example, specific gene variants affect caffeine metabolism speed, lactose tolerance, or fat-metabolism efficiency. Metabolomics detects metabolite profiles in blood and urine to reflect current metabolic and nutritional status in real time. Metagenomics analyzes gut microbial gene composition to reveal microbial-level differences in nutritional response. These multi-omics data, combined with dietary records, lifestyle, and environmental exposure, are integrated through machine-learning algorithms to output more precise personalized nutrition advice. As testing costs continue to fall, precision nutrition has moved from the laboratory to industrial application. Consumer-facing precision nutrition platforms collect user data through stool microbiome tests, blood tests, and questionnaires and use AI algorithms to provide personalized dietary advice and supplement recommendations. Consumers can sample at home, mail the sample, and receive tailored nutrition plans on their phones, greatly lowering the threshold for precision nutrition.

The functional food and dietary supplement market is also transforming under precision nutrition. Traditional supplements often promote universal efficacy of single ingredients, such as “probiotics regulate digestion” or “vitamin C boosts immunity,” seeking general value for everyone. New-generation products emphasize targeting and personalization, moving from “mass supplementation” to “customized supplementation.” McClements (2020) notes that food structure design, nanotechnology, and AI are bringing new R&D tools to the food industry, helping scientists and manufacturers develop foods that are tastier, more convenient, healthier, and more sustainable. AI can rapidly screen and design food formulas through simulation and optimization, finding the optimal balance among ingredients, structure, taste, and health efficacy, greatly shortening R&D cycles. Examples include personalized probiotic formulas based on gut microbiota testing, vitamin supplementation customized to genetic testing, and metabolism-regulating foods optimized by AI. This precision transformation also brings business-model innovation. In the past, functional foods were mainly sold as standardized products through physical channels. Increasingly, brands adopt a “testing + product + service” subscription model: users first take a test, receive a personalized assessment report, then receive customized supplements regularly, with continuous tracking and dynamic formula adjustment. This model increases added value and user stickiness and allows brands to accumulate user data to further optimize algorithms and products.

Precision nutrition has broad application prospects in chronic disease management. Chen and Chen (2022) ^[5] specifically note that personalized nutrition for people with diabetes and at high risk of diabetes has become a research

and industry hotspot. The integration of continuous glucose monitoring (CGM) and other sensing technologies with genomic and microbiome data makes personalized nutrition advice for diabetes patients more feasible and effective. For diabetes patients, postprandial glucose control is central to disease management, and glucose responses to food vary greatly among patients; standardized diabetes dietary advice often has limited effect. Combining CGM data with personalized nutrition algorithms can precisely identify each patient's dietary blind spots and customize the most suitable diet, thereby controlling glucose more stably and reducing complication risks. This makes nutrition intervention more refined and actionable than coarse guidelines. Precision nutrition also has important value in preventing and managing obesity, hyperlipidemia, and cardiovascular disease. Precision nutrition interventions can control risk factors, slow disease progression, and even reverse early metabolic abnormalities. This moves precision nutrition from a consumer health product toward clinical and public-health fields, making it an important tool for chronic disease prevention and control.

Despite broad prospects, precision nutrition faces challenges. It is found that the relationships among nutrition, microbiome, and health are extremely complex (Gou *et al.*, 2023) ^[10]. Many unknowns remain, and translating research into stable and reliable commercial services requires caution. The human body is a highly complex dynamic system; causal relationships among diet, microbiota, and health are intertwined. Most studies remain at the associational level, and definitive causal evidence is insufficient. Overstating precision nutrition effects may mislead consumers. At the industry level, governance issues include: first, truthfulness of product claims—some operators exaggerate testing and product efficacy and engage in misleading marketing; second, standardization of testing services—different manufacturers vary in testing methods, analytical standards, and interpretive capacity, making quality difficult to guarantee; third, data privacy—genetic and microbiome data are highly sensitive personal information, and collection, storage, and use pose security risks; fourth, consumer cognitive gaps—many consumers lack sufficient understanding of the scientific content and limitations of precision nutrition and may develop unrealistic expectations. If unresolved, these issues will constrain long-term healthy development.

2. Industrial Innovation in Exercise and Sleep Technology

Sleep is a core pillar of physical health. Insufficient sleep or circadian rhythm disruption is closely associated with obesity, diabetes, cardiovascular disease, cognitive decline, and even mental disorders. The sleep industry is a rapidly rising field, covering sleep-monitoring devices, sleep-aid products, sleep-improvement services, and sleep medicine. From the healing-industry perspective, sleep uniquely links physical and mental health: stress and anxiety are important causes of insomnia, and insufficient sleep further impairs emotional regulation, forming a vicious cycle. Watson and Fernandez (2021) ^[31] note that AI is driving a revolution in sleep medicine. By integrating clinical data, environmental data, and objective physiological measurements, AI can better understand sleep and sleep disorders and play roles in screening, phenotyping, diagnosis, and treatment, ultimately

achieving precision sleep medicine. Traditional sleep medicine relies heavily on polysomnography in sleep laboratories, which is costly, difficult to schedule, and unable to reflect real daily sleep states in a single test. AI combined with wearables enables long-term, continuous, home-based sleep monitoring.

Exercise is another core pillar of physical health. Regular exercise improves cardiorespiratory function, increases muscle mass, improve body composition, regulates metabolism, enhances immunity, and promotes secretion of brain-derived neurotrophic factor, thereby improving cognitive function and mood. The exercise-service industry is a mature segment of the healing industry and continues to upgrade with digital technology. Huang *et al.* (2025) ^[11] show that AI combined with wearable bioelectronics is revolutionizing digital healthcare, moving medical models from passive reaction to proactive prevention and from homogenization to personalization. Wearables equipped with multimodal sensors and AI analytics can monitor cardiac activity, biomarkers, and exercise status in real time, bringing three changes to exercise health. First, motion recognition and posture correction, through computer vision or wearable sensors, AI systems can analyze users' movements in real time, compare them with standard movements, and provide immediate posture feedback, reducing injury risk. Users training alone at home can receive effects similar to a coach's guidance. Second, personalized exercise prescription generation, based on fitness level, health status, training goals, and recovery state, AI dynamically adjusts training intensity, content, and frequency, avoiding overtraining or undertraining and improving efficiency and safety. Third, deep interpretation of exercise data, AI not only records exercise volume and calories burned but also analyzes fitness trends, identifies potential injury risks, and provides targeted advice. These advances move exercise services from the "venue + equipment" model to a "data + guidance" model. Traditional gyms mainly provide equipment and space; increasingly, fitness brands emphasize data-driven scientific training, using wearables and AI systems to provide full-process exercise guidance, enhancing professional value and user retention.

2.1 Wearable Integration in Cardiovascular Health

Wearable technology is particularly noteworthy in cardiovascular health. Hung *et al.* (2022) ^[12] note that although wearables have great potential for personalized cardiovascular care, most medical institutions and physicians have not incorporated them into routine clinical practice; effectively integrating wearable data with medical systems remains a challenge. Consumer wearables already provide heart-rate monitoring, ECG recording, atrial fibrillation detection, and blood oxygen monitoring, enabling continuous cardiovascular monitoring in daily life and timely detection of abnormal rhythms, providing data support for early screening and long-term management of cardiovascular disease. For high-risk groups, continuous monitoring can capture intermittent abnormalities better than periodic hospital examinations. However, consumer devices have limited accuracy, insufficient clinical recognition, and inconsistent data standards, constraining integration with formal medical systems.

3. AI-Driven Personalized Health Management Service Models

Integrating nutrition, exercise, sleep, and other aspects to build comprehensive personalized health management is an important direction of the healing industry. Traditional health management relies heavily on one-on-one professional consultation, which is costly, limited in scale, and difficult to provide continuous tracking and real-time intervention in daily life. AI can break these limits and build a closed-loop service model of “data collection–AI analysis–personalized recommendations–behavior tracking–dynamic optimization.” Specifically, a personalized AI dietary analysis process usually includes four steps. First, users upload dietary information via phone photos, voice input, or manual records; AI uses image recognition and natural language processing to identify food types and estimate portions and nutrients. Second, combining basic information, physiological data, activity level, and health goals, nutrition algorithms assess the rationality of the current diet. Third, specific dietary adjustment suggestions are provided, including food substitution options, timing advice, and supplement recommendations. Fourth, execution and body-data changes are continuously tracked, and recommendations are dynamically adjusted.

In exercise, AI virtual fitness coaching emphasizes real-time interaction and posture correction. Users open a phone or connect a smart mirror and follow a virtual coach; the system captures movement trajectories via camera and compares them with standard movements using pose-recognition algorithms; when posture errors or inadequate movements are detected, verbal prompts and adjustment guidance are given immediately; after the session, a performance report records completion, accuracy, and calories burned and arranges subsequent course progress. Such AI-driven health-management services often use subscription models. Compared with one-on-one human coaching or dietitian consultation, AI services have extremely low marginal costs and can reach broader consumer groups at affordable prices. AI services are not limited by time or space, can be accessed anytime and anywhere, and fit better into daily life.

However, AI health-management services face key challenges. First, professionalism and safety: Are AI recommendations sufficiently scientifically grounded? For users with special medical conditions, could AI advice pose health risks? Strict content-review and risk-warning mechanisms are needed, and AI services must be clearly positioned as health promotion rather than medical diagnosis and treatment. Second, user participation and retention: many users are excited initially but gradually drop off. Gamification, community mechanisms, and personalized content are core operational issues. Third, data quality and algorithmic bias: if training data are too homogeneous, algorithms may be less accurate for other groups and may even produce misleading advice. Pfister *et al.* (2025) [22] emphasize that health-impact validation is a key factor in the successful scaling of digital health technologies. Whether health-and-wellness products or digital therapeutics, solid evidence is needed to be supported. For AI-driven personalized health management, rigorous clinical trials or real-world studies to verify health benefits are not only responsible to consumers but also necessary for building brand trust and professional recognition. Services lacking empirical support will struggle

to avoid the label of “concept marketing” and gain long-term market acceptance.

Mental Health Dimension

Mental health is an important component of holistic health and one of the most concerning health issues in modern society. With accelerating social rhythms and rising life stress, stress-related psychological distress has become a global public-health issue and has driven rapid development of the digital mental-health industry. AI, brain-computer interfaces, and immersive technologies are reshaping psychological healing services. From mindfulness meditation apps to AI emotion recognition, from VR exposure therapy to generative psychological counseling, digital psychological healing has become one of the most innovative fields in the healing industry (Lu, 2026) [17].

1. Development Context of the Digital Mental Health Industry

In modern society, stress has become a normalized life experience. Workload, interpersonal conflict, and life uncertainty accumulate over time, affecting mental health and quality of life and causing physical health damage and productivity loss. Traditional face-to-face psychological counseling struggles to meet huge market demand due to limited resources, high costs, and stigma. This supply–demand gap provides broad space for digital mental-health products. Compared with traditional psychological services, digital mental-health products have three advantages. First, high accessibility: accessing services anytime and anywhere without time or location constraints and avoids the stigma of face-to-face counseling. Second, lower cost: digital products have extremely low marginal costs and can serve broader groups at affordable prices. Third, strong privacy: users can use services anonymously and are more willing to express their states and feelings honestly. These advantages make digital mental-health products an important supplement to the psychological service system and a fast-growing point in the healing industry.

2. R&D and Application of Mindfulness Technology

Mindfulness originates from Eastern meditative traditions. After modernization, it has become a psychological training method centered on “consciously and non-judgmentally attending to the present.” Numerous clinical studies confirm that mindfulness practice effectively reduces stress, relieves anxiety and depression symptoms, improves emotional regulation, and enhances attention. Its mechanisms involve changes in brain structure and function, autonomic nervous system regulation, and stress-hormone regulation. Past evaluations of mindfulness relied mainly on subjective questionnaires and lacked objective physiological indicators. Shang *et al.* (2023) [26] used deep learning and traditional machine learning to investigate the effects of short-term mindfulness-based stress reduction training on state and trait levels, validating significant effects on EEG activity through EEG data analysis. This provides objective neuroscientific evidence for mindfulness efficacy and a methodological basis for AI-based objective evaluation. The industrial value of such research is that it makes mindfulness practice quantifiable, monitorable, and optimizable. Previously, users could only judge by feeling whether they practiced well; now, through EEG devices and AI analysis, they can objectively see changes in focus and

relaxation and brain-activity changes from practice. This enhances motivation and provides a scientific basis for personalized mindfulness design. With smartphone become popularized, mindfulness apps have proliferated and become main products in the digital mental-health market. Such apps usually provide guided meditation, breathing exercises, sleep stories, and mindfulness music; users select themes and durations. However, traditional app content consists of pre-recorded fixed audio; users can only passively choose and cannot receive guidance customized to their current emotional state. Fixed content also loses novelty after repetition, leading to user churn. Generative AI brings new momentum. Jiang *et al.* (2025) ^[13] propose a generative multisensory meditation system, a frontier exploration in this direction. The system uses AI-generated content (AIGC) to create personalized immersive mindfulness experiences, dynamically adjusting meditation content—voice guidance, background sound, and visual scenes—according to users’ psychological states. User studies show that generative meditation enhances neural activation in self-regulation-related brain regions and has positive effects on emotion regulation and engagement. Compared with pre-made content, generative meditation has three advantages. First, high personalization: the system can generate customized guidance in real time according to users’ current emotions, preferred guidance style, and desired duration, truly providing “the most suitable practice at this moment.” Second, infinitely rich content: each practice can have different content and experience, solving the problem of repetition and boredom. Third, dynamic adaptability: the system can adjust rhythm and depth based on real-time feedback, providing more considerate guidance. If generative AI improves the richness and personalization of meditation content, immersive technology combined with brainwave feedback further improves interactivity and effectiveness. Wang *et al.* (2025) ^[30] propose an EEG-based positive-feedback mechanism for VR mindfulness meditation, integrating EEG data into a VR meditation system to form a “detection–assessment–feedback” closed-loop training model. The mechanism works as follows: users wear VR headsets and EEG devices and enter a virtual meditation scene; the system collects EEG data in real time and calculates emotional state and relaxation level; when users enter a deeper relaxed or focused state, positive visual or auditory feedback is given—for example, the scene becomes more serene and beautiful, and light becomes softer; the system also dynamically adjusts the rhythm and content of guidance. Randomized controlled trials verify that VR mindfulness training with brainwave positive feedback significantly improves emotion regulation and engagement, outperforming passive VR meditation content. This closed-loop training represents a higher-level form of digital mindfulness technology. It is no longer one-way content playback but a dynamic human–computer interactive training process; AI is not only a content generator but also a coach and feedback provider that responds to state changes in real time. Although still in research and early commercialization, with the spread of consumer EEG and VR devices, it may become a mainstream form of digital psychological healing.

3. Emotion Detection Technology and Digital Healing Innovation

Emotional state is a core indicator of mental health and an important entry point for psychological healing. Past assessment relied mainly on subjective self-report

questionnaires, which are prone to bias and difficult to monitor continuously. AI emotion recognition makes objective, continuous emotion monitoring possible. Arabian *et al.* (2023) ^[2] demonstrate the potential of wearables for emotion detection. Their system collects electrodermal activity (EDA) and ECG data from smart wearables and uses machine learning to classify emotional responses and arousal intensity. Results show that ECG signals can achieve 94.19% accuracy in emotion detection. This means that smart watches and other daily wearables can identify users’ emotional fluctuations with considerable accuracy, providing an important data foundation for digital psychological healing. Beyond physiological signals, emotion recognition has other technical paths, including text-based sentiment analysis, speech-based emotion recognition, and facial-expression-based emotion recognition. Multimodal data fusion further improves accuracy and reliability. These mature technologies enable emotion monitoring to be integrated into daily life unobtrusively, providing possibilities for early warning and timely intervention. Emotion recognition can be used not only for monitoring and assessment but also transformed into a healing tool itself. Li *et al.* (2025) developed HealBubble, demonstrating the healing potential of combining generative AI and emotion visualization. The system combines large-language-model emotion inference with generative visual design to concretize users’ inner emotional states into “emotion bubbles” through color, shape, and dynamic visual elements, integrating emotion diary, meditation space, and anonymous community modules. The core value of this design is that it lowers users’ barriers to emotional expression. People often find it difficult to accurately describe emotions in words; for groups not good at emotional expression, verbalizing emotions is itself stressful. Visualized “emotion bubbles” help users perceive, accept, and sort out emotions in a gentle, non-invasive way. Research shows that this interaction effectively improves emotional awareness and acceptance and has good psychological healing effects. Such innovation shows that AI can not only replicate existing healing methods but also create entirely new digital healing experiences. Past psychotherapy and counseling relied mainly on language; AI can create visual, gamified, and interactive healing tools, providing more diversified healing options for users with different characteristics.

Although AI emotion recognition is developing rapidly, its application has significant limitations and risks that must be treated cautiously. First is the boundary of accuracy. Human emotions are extremely complex subjective experiences; their expression is strongly influenced by culture, gender, personality, and social context. The same expression, voice, or physiological feature may correspond to entirely different inner emotions. Current AI emotion-recognition systems are mostly trained in standardized laboratory environments and often perform much worse in real-life scenarios. Overestimating accuracy may lead to erroneous assessment and inappropriate intervention. Second is algorithmic bias and fairness. If training data come mainly from specific cultures, ages, or genders, recognition accuracy for other groups may be significantly lower. For example, some facial emotion-recognition systems have higher error rates for women and people of color. If such bias is applied in mental-health assessment, emotional distress in some groups may be underestimated or misjudged, causing health inequalities. More fundamentally, there are privacy and autonomy issues. Emotional states are extremely private

personal information, even more sensitive than general physiological data. Emotion monitoring without consent seriously violates personal privacy and psychological autonomy. In workplaces, schools, and other settings with power asymmetries, if employers or teachers can monitor employees' or students' emotional states through AI, serious surveillance pressure may arise and harm mental health. Moreover, reducing complex human emotions to machine-readable categories may bring concerns of oversimplification and objectification. Therefore, AI emotion recognition in the healing industry must follow strict ethical principles. Radanliev (2025) ^[24] emphasizes that AI systems in wearables must integrate privacy, ethics, transparency, and accountability into every stage of development and align with relevant regulations and standards. Specifically, five principles should be followed. First, informed consent: clearly inform users of the purpose, scope, and use of data collection; users decide autonomously whether to enable functions and can turn them off at any time. Second, data minimization: collect only the minimum data necessary for the service and avoid excessive or irrelevant information. Third, data security: ensure encrypted storage and secure transmission of emotional data to prevent leakage and misuse. Fourth, transparency: clearly explain the system's capability boundaries and possible errors to avoid over-reliance or misunderstanding. Fifth, human primacy: AI emotion recognition is only an auxiliary reference; final assessment and intervention must be the responsibility of human professionals.

Spiritual Dimension

Spiritual health is the deepest dimension of holistic health, involving the search for life meaning, experience of inner peace, and connection with transcendence (nature, the universe, community). In modern society, material affluence has not automatically brought inner peace; existential anxiety and spiritual emptiness have driven demand for spiritual healing. Spatial environment is an important carrier of spiritual and sensory experience. The rise of healthy buildings, biophilic design, and smart healing spaces embodies the industrialization of spiritual-health needs (Lu, 2026) ^[17].

1. Connotation of Spiritual Health and Value of Spatial Healing

Under the holistic health framework, spiritual health is not necessarily tied to specific religious belief. It refers more to an existential sense of settlement: when people experience meaning, connection, and affirmation of their value in life, the spiritual dimension is healthy; conversely, existential emptiness, loss of values, and meaninglessness indicate spiritual imbalance. The realization of spiritual health often depends on specific spatial experiences. Natural environments, quiet spaces, and aesthetically ordered places can evoke inner peace and connection and nourish spiritual health. This is the core logic of spatial healing: through careful design of the spatial environment, acting on the five senses and psychological state, it achieves relaxation, energy restoration, and inner peace. The five senses are important channels of spatial healing. Vision, hearing, smell, taste, and touch not only receive external information but also directly act on the nervous system and emotional

centers. A good healing space is necessarily a space of sensory harmony: visual greenery and soft light, natural sounds and quietness, fresh scent, and comfortable tactile materials together create a healing atmosphere. This holistic sensory experience is difficult for any single healing product to replace.

2. Theoretical and Empirical Basis of Biophilic Design

Biophilic design is a core theory of contemporary healthy-space design. Its core idea is to systematically introduce natural elements and processes into building spaces to satisfy humans' innate need for life and nature and thereby improve occupants' health and well-being. Common methods include introducing natural light and green views, indoor plants and vertical greening, natural materials, natural sounds, biomimetic forms and textures, and varied spatial experiences. Gillis and Gatersleben (2015) ^[9] review psychological research on the health benefits of biophilic design and find considerable evidence that natural elements bring health and well-being benefits, such as stress reduction, attention restoration, and mood improvement. Contact with nature effectively reduces sympathetic nervous activity, decreases stress-hormone secretion, and improves cognitive function and emotional state—a consensus finding in psychology. For people living long-term in urban artificial environments, natural elements in buildings are an important way to compensate for insufficient nature contact and maintain health. However, Gillis and Gatersleben (2015) ^[9] also note that compared with visual natural elements, empirical evidence for other biophilic attributes such as natural materials and natural processes is relatively lacking. Buceta-Albillos and Ayuga-Téllez (2024) ^[3] also note that although biophilic design is widely recognized, scientific research quantifying its positive impact on human well-being remains limited—a major limitation of the field. In other words, the value of biophilic design is widely recognized at the conceptual level, but empirical data remain insufficient; specific effects, mechanisms, and dose-response relationships of different design methods require further research.

3. Rise and Industrial Practice of Healthy Buildings

Since the twenty-first century, healthy buildings have emerged rapidly as a new field, introducing health issues into the full life cycle of architectural design, construction, and operation. Unlike traditional buildings that focus mainly on structural safety and functionality, healthy buildings further make occupants' physical and mental health a core design goal, optimizing air, water, light, thermal comfort, acoustic environment, and spatial configuration. Quesada-García *et al.* (2023) ^[23] note that COVID-19 catalyzed demand for healthy spaces. Healthy buildings are rising as an emerging paradigm; their connotation is not merely the absence of harm but active support for occupants' health at cognitive, emotional, and physiological levels. The pandemic made people deeply aware of the direct impact of building environments on health and increased willingness to pay for healthy spaces, moving healthy buildings from a niche high-end market to a broader mass market. Healthy buildings are not only a design philosophy but also a systematized certification system. The most representative internationally is the WELL Building Standard, which focuses on how buildings affect human health and sets detailed specifications and measurement standards across

ten concepts: air, water, nourishment, light, movement, thermal comfort, sound, materials, mind, and community. Such certification systems promote standardization and normalization of the healthy-building industry.

Office space is one of the most active markets for healthy buildings. Employers increasingly recognize that healthy office environments can improve employees' physical and mental health, productivity, absenteeism, satisfaction, and retention, with clear commercial returns. However, Tan *et al.* (2021) ^[29], studying the global office market, show that although healthy buildings have potential value in rent premiums and productivity improvement, market adoption is constrained by the lack of empirical data linking health attributes to financial returns. Real-estate owners recognize the trend but remain—wait-and-see—in the absence of clear ROI data. Healthy buildings often mean higher construction and operating costs; if these inputs cannot be shown to bring corresponding economic returns, large-scale adoption is difficult. This reflects a transitional feature of healthy buildings as an emerging field: conceptual recognition leads, but market mechanisms are not fully mature. In the future, with accumulation of empirical evidence, improved health awareness, and regulatory refinement, market penetration is expected to continue rising, making healthy buildings a mainstream direction.

4. Technological Innovation in Smart Healing Spaces

AI and IoT are injecting new momentum into healthy buildings, moving them from “static design optimization” to “dynamic intelligent regulation.” A smart healing space, on the basis of traditional healthy buildings, introduces extensive sensing devices, networked devices, and AI control systems to achieve real-time monitoring, intelligent regulation, and predictive management of the building environment. Specifically, AI applications in healing spaces are reflected at three levels. First, indoor environmental quality monitoring and dynamic optimization, Sensors for air quality, temperature and humidity, luminance, and acoustics throughout the space collect real-time data; AI algorithms regulate air conditioning, fresh air, lighting, and curtains in real time to maintain environmental parameters most suitable for health and comfort. Unlike traditional fixed-temperature and timed control, AI control can dynamically adjust according to outdoor climate, indoor occupancy, and user states, balancing health, comfort, and energy saving. Second, personalized environmental adaptation based on user states. Combined with wearable or contactless physiological detection, AI systems can perceive residents' stress, sleep, and emotional states and automatically adjust environmental parameters to assist relaxation or focus. For example, when stress is high, the system dims lights, plays soothing music, and releases relaxing fragrance; when the user is sluggish, it switches to bright natural light, fresh fragrance, and lively rhythmic music. Such environment dynamically adjusted to human states has more precise healing effects than static healthy design.

Third, intelligent integration of multisensory experiences, Smart healing spaces can achieve multimodal linkage of vision, hearing, smell, and touch to create a holistic healing atmosphere. Different healing modes correspond to different sensory combinations: relaxation mode—soft light, natural soundscape, herbal fragrance, suitable temperature; focus mode—bright uniform light, quiet acoustic environment,

fresh citrus fragrance; sleep mode—low-color-temperature dim light, white noise, lavender fragrance, slightly lower room temperature. Users can switch with one click to obtain a holistic multisensory healing experience. The service design of such smart healing spaces centers on “invisible technology” and “felt experience”: technology recedes behind the scenes, and users feel only comfort, thoughtfulness, and being understood. Achieving this requires precise environmental management and extension into disease management and postoperative rehabilitation, improving treatment outcomes and patient satisfaction. Healing-service providers can cooperate with insurance and medical institutions to obtain stable patient sources and payment sources and enhance professional credibility.

Governance Challenges of the Healing Industry

The rapid development and technological transformation of the healing industry bring innovation opportunities and many governance challenges. Blurred professional boundaries, insufficient consumer protection, algorithmic bias, data-privacy risks, and insufficient sustainability—if not effectively addressed—will harm consumer rights and constrain long-term healthy development. Building a governance system that balances innovation and risk, efficiency and fairness, is a necessary foundation for sustainable development.

1. Professional Boundaries and Consumer Protection

Many healing-industry services lie in a gray zone between medical and non-medical: they claim health benefits, often have some scientific basis, but are not part of the formal medical system, and providers may not have medical qualifications. This ambiguity gives space for innovation but also creates potential risks. National health regulations generally prohibit non-medical institutions and non-medical personnel from practicing medicine or claiming medical efficacy. However, healing products and services often use words such as “improve,” “regulate,” “soothe,” and “health care.” The boundary between these expressions and medical efficacy is often vague. Some operators may exploit legal gray areas to make substantive medical claims while avoiding medical regulation. This may mislead consumers, delay medical treatment, and cause unfair competition. With AI, the issue becomes more complex. If an AI system provides advice involving disease diagnosis or treatment, it may be deemed medical software and subject to medical-device regulations; if it only provides general healthy-lifestyle advice, it may be a general consumer product. The boundary is not always obvious and requires careful legal assessment. Many operators, to avoid regulatory costs, may deliberately blur product positioning and make borderline claims, creating potential consumer-safety risks.

Compared with medical professionals such as physicians, nurses, and psychologists, who have strict national examinations and licensing systems, many occupations in the healing industry lack unified qualification-certification standards, and practitioner quality varies. This affects service-quality stability and creates consumer-safety concerns. For example, improper massage may cause muscle damage or even spinal injury; improper psychological guidance may aggravate trauma; unprofessional nutrition advice may harm people with special diseases. Uneven quality not only harms consumer rights but also damages the industry's overall image. When

the market is filled with service providers of varying quality, consumers cannot distinguish good from bad and may distrust the entire industry, constraining long-term development. Establishing industry-recognized qualification-certification and service standards is a necessary path to maturity. Functional foods, dietary supplements, health equipment, and digital health services are high-incidence areas for illegal advertising. Some operators exaggerate product efficacy, use unverified ingredient claims, and use medical terminology to boost sales, seriously harming consumer rights. In the digital-marketing era, advertising channels are more diverse and decentralized; short videos, social media, and influencer placements are harder to regulate, and enforcement challenges are greater. In addition to stronger government inspection, industry self-regulation is important. Establishing commonly observed advertising-ethics norms, setting up independent review mechanisms, and strengthening regulatory education for practitioners can reduce false advertising at the source and protect industry reputation.

2. AI Governance

AI system performance depends on training-data quality. If training data lack demographic representativeness, algorithms may learn biases in historical data and reproduce or even amplify them in outputs. In the highly sensitive health field, algorithmic bias can have serious consequences. McKibbin *et al.* (2024) specifically note that AI systems in genomic medicine face the challenge of insufficient data diversity. Existing biomedical research data come mainly from European-ancestry populations, leading to poorer predictive accuracy for other groups and potentially exacerbating health inequalities. The same problem exists in various AI applications in the healing industry: from posture recognition to stress assessment, from nutrition recommendations to sleep analysis, if training data lack diversity, systematic disadvantages for vulnerable groups may result. For example, if a nutrition-recommendation algorithm is trained mainly on European data, predictions of Asian metabolic characteristics may be inaccurate; if an emotion-recognition algorithm's training samples are mainly from a specific cultural group, accuracy for other cultural groups may be low; if a health-risk-assessment algorithm's data come mainly from upper-middle classes, it may underestimate risks for disadvantaged groups. Such systematic biases affect service effectiveness and may exacerbate existing health inequalities, making digital health technology a driver of widening health gaps.

AI systems, especially deep-learning models, often have a "black box" character: they can give predictions but are difficult to explain. In general consumer scenarios, the black-box problem may matter little; in health, algorithmic decisions directly affect personal well-being, so explainability is crucial. If AI recommends dietary changes, it should explain why, the scientific basis, and possible benefits; if AI assesses high stress, it should explain which indicators the judgment is based on. This improves user trust and helps professionals check the reasonableness of AI recommendations and detect errors and biases in time. Explainable AI (XAI) is an important technical direction for improving transparency and credibility. Unlike traditional black-box models that only give results, XAI can explain the reasons and basis for specific decisions. Introducing

XAI into healing-industry AI applications is an important technical path for enhancing credibility and consumer protection. Health data are highly sensitive, and AI systems in the healing industry often need to collect large amounts of personal health data, including physiological data, dietary habits, sleep states, emotional states, and disease history. Once leaked or misused, such data can seriously harm individuals. Radanliev (2025) ^[24] emphasizes that AI systems in wearables must establish sound governance frameworks ensuring privacy, ethics, transparency, and accountability and aligned with current regulations. Specifically, data governance should follow the principle of data minimization—collect only the minimum data necessary; informed consent—clearly inform users of data use and obtain consent; security protection—use encryption and de-identification to protect data; user autonomy—give users rights to access, correct, and delete data. Beyond privacy protection, accountability is also important. When an AI system errs and harms users, who bears responsibility—developers, operators, or users? Current legal norms are incomplete, and responsibility attribution is unclear. Establishing clear AI accountability mechanisms and clarifying rights and obligations is indispensable.

Cascella *et al.* (2025) note that ethical practice of AI in medicine must adhere to core principles of autonomy, reliability, and non-bias and ensure strict data privacy and security standards; effective AI adoption requires thorough validation, transparency, and multidisciplinary team oversight. These principles also apply to the healing industry; because regulatory intensity is usually lower than in formal medicine, operators need self-regulation and proactive implementation of AI-governance best practices. In summary, AI governance in the healing industry should adhere to four core principles. First, user autonomy: respect users' right to know, choose, and control; do not manipulate or deceive. Second, safety and reliability: ensure algorithmic accuracy, stability, and security; validate sufficiently before launch; establish risk-response mechanisms. Third, fairness and non-bias: improve training-data diversity, regularly test algorithmic bias, and avoid exacerbating health inequalities. Fourth, transparency and accountability: clearly disclose AI capabilities and limitations, establish human-override mechanisms, and ensure ultimate responsibility is borne by humans. With rising global sustainability awareness, ESG (environmental, social, and governance) has become an unavoidable issue for enterprises. As an industry centered on "promoting health and well-being," the healing industry has a unique position and responsibility in ESG. In essence, the industry's existence contributes positively to social well-being (the S dimension), but this does not mean all business practices meet sustainability standards. In fact, there is much room for improvement in environmental sustainability and social responsibility. At the environmental (E) level, the industry faces challenges. For example, spa and aromatherapy industries use large amounts of disposable consumables and packaging, generating waste; health resorts and hot-spring hotels often consume large amounts of water, electricity, and hot-spring resources; without energy-saving and carbon-reduction design, environmental footprints can be considerable; excessive packaging and transportation carbon footprints of dietary supplements are common. The industry can implement environmental sustainability by prioritizing organic, fair-trade, and sustainably sourced materials; reducing plastic packaging

and adopting refill and recycling mechanisms; introducing energy-saving and carbon-reduction spatial design and operations; and establishing green procurement policies requiring suppliers to meet environmental and social standards.

Conclusions

This paper, from the core perspective of holistic health, systematically examines development trends, technology applications, and governance challenges of the healing industry. Through integrative analysis of academic literature, it reaches four core conclusions. First, the holistic health framework provides an integrative analytical perspective for understanding the healing industry. Unlike traditional research that often divides health issues into independent physiological and psychological domains, this study shows that innovation in the contemporary healing industry increasingly features cross-boundary integration: physical healing is often accompanied by psychological relaxation, and spatial experience simultaneously nourishes spirituality and social connection. A single-dimension perspective is insufficient to understand the complexity of the healing industry; the integrated “body–mind–spirit–social” framework better captures the core logic of industrial development and better responds to modern people’s holistic health needs (Lu, 2026). Second, AI is comprehensively reshaping the value chain and business models of the healing industry. From personalized nutrition recommendations and virtual fitness coaches to AI emotion recognition, from smart healing spaces to generative meditation content, AI has penetrated various aspects of the industry and enabled large-scale personalized services that were previously unimaginable. AI improves efficiency and precision and creates many new product types and business models, becoming a key driver of industrial upgrading. Data-driven value creation is gradually replacing traditional product and service logic as the core source of competitiveness.

Third, technological empowerment brings new risks and governance challenges. Health-data privacy, algorithmic bias and fairness, blurred professional boundaries, insufficient cultural sensitivity, and over-medicalization are increasingly prominent with deepening AI applications. These challenges cannot be solved by technical means alone; they require integrated regulation, ethics, industry self-regulation, and user literacy. Technological innovation without effective governance cannot bring true health benefits and may create new health inequalities and social risks. Fourth, sustainable development of the healing industry must return to the essence of “holistic care.” Regardless of technological progress and business innovation, the core power of healing always comes from holistic care for people. Business-model design, service-experience creation, and technology use should ultimately serve the promotion of real human well-being. Truly competitive and sustainable healing enterprises are those that achieve a good balance between science and experience, technology and humanity, efficiency and care.

Based on the findings, this paper proposes recommendations at different levels. For industry managers: First, establish a holistic health service mindset, break through the limitations of single products or services, integrate body–mind–spirit–social needs, provide more holistic healing experiences, and build differentiated advantages. Second, introduce AI

prudently, focusing on scenarios that truly create user value and avoiding technology for technology’s sake; establish sound AI-governance mechanisms to ensure data security, algorithmic fairness, and decision transparency, embedding risk control throughout technology development. Third, value service design and experience creation, implementing human care in every detail of the service journey; use AI for routine work and release human resources to high-value interaction, maintaining service warmth and professionalism. Fourth, implement ESG sustainable management, improving environmental protection, social responsibility, and corporate governance and integrating sustainability into the core business model. Fifth, establish self-regulation and quality-control mechanisms, observe professional boundaries, advertise efficacy honestly, proactively protect consumer rights, and jointly enhance industry credibility.

For policymakers: First, establish classified management and risk-grading systems for the healing industry, formulating regulatory standards for products and services of different risk levels, balancing innovation space and consumer protection, and avoiding over- or under-regulation. Second, improve digital-health regulations, clarify the legal positioning and regulatory requirements of AI health applications, and establish supporting norms for data-privacy protection, algorithmic governance, and consumer-rights protection, providing clear regulatory guidance. Third, support scientific research and empirical validation of the healing industry, encourage industry–academia collaboration on efficacy research, and build an evidence-based development environment. Fourth, incorporate the healing industry into overall health-policy layout, promote linkage between the medical system and preventive health industry, support innovative models such as social prescribing and community health, and build a more complete universal health system. Fifth, promote health equity, attend to disadvantaged groups’ access to health-promotion resources, and prevent the healing industry from becoming a field that exacerbates social inequality (OpenAI, 2026). For consumers and the public: First, establish correct holistic health concepts, understand health as overall body–mind–spirit–social balance, avoid relying on a single product or service for health, and develop an integrated healthy lifestyle. Second, cultivate media literacy and health literacy, view efficacy claims rationally, avoid excessive expectations and blind consumption, and learn to identify false advertising. Third, understand rights regarding personal health data, carefully choose health-service platforms, pay attention to data-privacy and use policies, and actively protect data sovereignty. Fourth, balance technology use and real life, use digital health tools as aids but do not let technology replace real interpersonal connection and natural experience, returning to the essence of healthy living.

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