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Research on the Application of Traditional Chinese Medicine Chrono-Health Preservation Theory in the Design of Smart Sachet Products: A Case Study of PulseTime Sachet

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Abstract: Against the backdrop of upgraded health consumption and the modern dissemination of Traditional Chinese Medicine (TCM), how to transform traditional TCM health-preservation theories into product forms compatible with contemporary lifestyles has become an important issue in both TCM innovation and college student entrepreneurship practice. The TCM theory of chrono-health preservation emphasizes the coordination of human qi and blood circulation with circadian rhythms and seasonal changes, featuring a distinct holistic perspective, rhythmic view, and individualized regulation. However, in practical dissemination, this theory often remains limited to health education and experiential advice, lacking sustainable, perceptible, and interactive product carriers. As a new type of TCM-related product integrating wearable, cultural, and health-management attributes, the smart sachet offers a promising medium for the modern transformation of TCM chrono-health preservation. Taking the TCM chrono-health preservation smart sachet PulseTime Sachet as an example, this paper combines TCM chrono-health preservation theory, product design logic, and innovation and entrepreneurship practice to explore its application pathways in herbal modular design, constitution-based recommendation, intelligent sensing and feedback, emotional regulation experience, and business model construction. The study argues that, without altering the core principles of TCM theory, smart sachets can realize the everyday expression of TCM health preservation through digitalized, scenario-based, and personalized design, thereby enhancing young people's acceptance of and engagement with TCM culture. At the same time, such products still face practical challenges in regulatory compliance, technical stability, and user education, which require further improvement in subsequent development.

Keywords: TCM chrono-health preservation, smart sachet, TCM innovation, product design, innovation and entrepreneurship

1. Introduction

In recent years, with the continuous advancement of the Healthy China strategy, the public's health awareness has undergone a significant shift, and consumer demand has gradually moved from disease treatment toward preventive care, condition regulation, and lifestyle optimization (Central Committee of the Communist Party of China & State Council, 2016). Among urban young adults aged 18–45 in particular, unhealthy lifestyles such as staying up late, prolonged sitting, mental stress, and irregular eating habits are widespread,leading to an increasingly prominent sub-health condition. Correspondingly, TCM health-preservation products that combine cultural identity, emotional value, and practical efficacy are gradually becoming an important part of the health consumption market. As a representative of traditional medical systems, TCM is also entering

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modern consumption scenarios through cultural-creativity, digitalization, and service-oriented transformation, thereby forming new industrial forms (Liao Ruojun et al., 2025).

In this context, the TCM theory of chrono-health preservation has considerable translational value. Based on the concept of "correspondence between humans and nature," this theory emphasizes that the activities of human zang-fu organs, qi, and blood should adapt to daily temporal cycles. It advocates "nourishing in accordance with time" and "regulating according to temporal conditions." From the perspective of modern health management, this theory shows internal compatibility with chronobiology, circadian medicine, and behavioral intervention logic (Yu Xinglei & Sengge, 2026). Its strengths lie not only in guiding daily schedules, diet, exercise, and emotional regulation, but also in its practicality, accessibility, and suitability for everyday implementation (Zhou Wanzhu & Yan Junfeng, 2021). Therefore, if the theory of chrono-health preservation can be translated into wearable, interactive, and sustainable product forms, its practical communicative power may be significantly enhanced.

However, traditional TCM health products have long been constrained by single forms, insufficient interaction, and limited application scenarios. Products such as sachets, herbal pouches, and mugwort ornaments possess certain cultural and basic health-preserving functions (Zhang Haiou, 2025), yet most remain static commodities lacking data feedback, individual adaptation, and long-term service mechanisms. As a result, they are unable to fully satisfy the contemporary consumer demand—especially among young users—for personalization, intelligence, and experience-oriented consumption (Bai Jie et al., 2025). Meanwhile, younger generations are changing the ways in which they receive and understand TCM culture. They are more inclined to engage with traditional culture through aesthetic design, social communication, digital interaction, and scenario-based experiences. Therefore, the modernization of TCM products should not be limited to merely "turning herbs into commodities," but should further consider "how commodities can become entry points for cultural communication and health management."

Against this background, the PulseTime Sachet, a TCM chrono-health preservation smart sachet, proposes a new product concept. Based on the traditional herbal sachet as its carrier, with seasonal health preservation and hourly regulation as its theoretical basis, and supported by modular design, intelligent identification, constitution testing, and app-based feedback, it forms an innovative product that integrates TCM cultural communication, daily wearing, emotional regulation, and health reminders. The project shows strong interdisciplinary characteristics, involving not only TCM theory but also industrial design, intelligent hardware, user experience, and business operation, thus possessing both research and entrepreneurial value.

Accordingly, this study focuses on the question of how the theory of TCM chrono-health preservation can empower the design of smart sachet products. Taking PulseTime Sachet as a case, it analyzes its product logic, application mechanism, and market value, and further discusses the feasibility and practical significance of such products in innovation and entrepreneurship projects undertaken by TCM university students. This study argues that the modernization of TCM does not imply a simple technological replacement of traditional theories, but rather their contemporary transformation through productization, digitalization, and scenario-based design on the basis of respecting their core principles.

2. Core Value of TCM Chrono-Health Preservation Theory and the Basis for Its Modern Transformation

TCM chrono-health preservation is an important embodiment of temporal medicine in Chinese medicine. Its core lies in following the rhythm of qi and blood circulation in the human body and arranging daily living, diet, emotions, and self-care in a rational manner so as to nourish the

zang-fu organs, balance yin and yang, and prevent disease. The Huangdi Neijing (The Yellow Emperor's Inner Canon) long ago proposed that "humans correspond with heaven and earth and respond to the sun and moon," emphasizing the close relationship between human life activities and natural rhythms. This idea constitutes the theoretical origin of TCM chrono-health preservation (Huangdi Neijing Suwen, 2012). In Leijing, Zhang Jiebin (2025) further elaborated on the holistic concept of "correspondence between humans and nature," arguing that the waxing and waning of zang-fu functions correspond to seasonal and diurnal changes, suggesting that people should regulate themselves in accordance with time in order to maintain the harmonious operation of yin-yang, qi, and blood. Liu Lihong (2021), a contemporary TCM scholar, has also pointed out that the key to TCM health preservation lies not in isolated interventions but in conforming to the body's own operational, allowing self-repair and balance restoration within temporal rhythms. It can thus be seen that chrono-health preservation is not merely a set of daily routine suggestions, but a systematic health-regulation method rooted in the holistic worldview of TCM.

Traditional medicine holds that the circulation of meridian qi follows regular patterns of flow and fluctuation throughout day and night, and that each of the twelve two-hour periods corresponds to the peak functional activity of specific meridians and zang-fu organs. Therefore, different time periods call for different health-preservation strategies. For example, at zi time (11 p.m.–1 a.m.), when the Gallbladder Meridian is most active, one should be asleep to support the rising of gallbladder qi; at chou time (1 a.m.–3 a.m.), when the Liver Meridian is active, deep sleep helps liver blood return and be stored; at chen time (7 a.m.–9 a.m.), when the Stomach Meridian is vigorous, breakfast should be taken to promote the stomach's transforming and transporting functions (Guangdong Provincial Administration of Traditional Chinese Medicine, 2025). In relevant discussions, Li Shizhen emphasized the importance of "regular daily life" for harmonizing the zang-fu organs, while modern TCM scholar Deng Tietao likewise argued that TCM health preservation stresses "following nature, adapting to time, and adapting to the individual," among which "adapting to time" is the core of chrono-health preservation. This time-axis-based model of health preservation reflects TCM's profound understanding of life rhythms and also provides a theoretical foundation for modern health management.

Theoretically, TCM chrono-health preservation is characterized by holism, regularity, and practicality. Its holistic nature lies in its refusal to view zang-fu functions in isolation; rather, it integrates the human body with nature, time, emotions, diet, and daily routine for comprehensive regulation (Sun Xiaosheng & Jiang Qiyu, 2013). Its regularity is reflected in its clear temporal framework for understanding human rhythms, which facilitates standardized expression. Its practicality is shown in its ability to provide concrete guidance for daily behaviors and thus its high executability. Wang Qi (2019), in his research on constitution theory, emphasized that health preservation should be based on the dual foundations of "overall regulation" and "individual difference," which is internally consistent with the chrono-health preservation principle of "nourishing according to time." Compared with some highly specialized TCM theories, chrono-health preservation more readily enters ordinary people's daily lives and is therefore more suitable as a basis for health product design (Wu Zhicheng, 2026).

From the perspective of modern transformation, chrono-health preservation possesses strong practical value. In modern society, many health problems do not stem from acute disease but from long-term rhythm disorders, resulting in chronic fatigue, sleep disturbances, emotional fluctuations, and decreased immunity. American chronobiologist Franz Halberg (1983) proposed the concept of "chronomedicine," emphasizing that human physiological functions exhibit circadian rhythmic changes and that health management should attach importance to the impact of time on the occurrence, treatment, and rehabilitation of disease. This view is highly

consistent with the TCM understanding of "regulation according to time," indicating that traditional TCM theories and modern chronomedicine may be dialogically and mutually illuminating. Such health issues are typically lifestyle-related and therefore suitable for improvement through continuous health interventions. The chrono-health preservation emphasis on regular routines and temporal adaptation is highly compatible with modern health behavior management (Hu Jianbei, 1989). If embedded into smart products, this theory can be transformed from abstract knowledge into perceptible user experiences, while digital means can support users in forming health-preserving habits and enhancing long-term adherence.

At the same time, chrono-health preservation is also an important component of TCM cultural communication. Compared with more specialized TCM theories such as syndrome differentiation and pharmacological doctrines, chrono-health preservation is better suited to public dissemination because of its accessible language, clear logic, and concrete scenarios. For example, recommendations such as "go to bed before 11 p.m.," "eat a warm breakfast in the morning," and "take a moderate rest in the afternoon" all offer strong everyday guidance (Li Minxue & He Ling, 2025). Ye Tianshi of the Qing dynasty emphasized that the art of health preservation lies in "knowing time and season," meaning that one should adjust one's lifestyle according to temporal changes. Modern TCM science communication researchers such as Tong Xiaolin (2025) have also argued that modern dissemination of TCM should shift from "knowledge expression" to "lifestyle transformation," enabling audiences to understand and practice TCM concepts in concrete scenarios. If such ideas can be integrated into product design, "knowing health preservation" may be transformed into "being able to practice health preservation." Therefore, chrono-health preservation is both a theoretical resource of TCM and a high-quality entry point for TCM product design.

3. Product Design Logic and Functional Architecture of the PulseTime Sachet

The PulseTime Sachet project takes the theory of TCM chrono-health preservation as its design core and uses the sachet, a traditional herbal carrier, as its foundation. Through modern design language and intelligent interaction technologies, it reconstructs the traditional sachet into a health product that combines aesthetics, functionality, and cultural meaning. Its design logic is not a simple "smartification" of the traditional sachet; rather, it builds a complete usage chain around "herbal formula–temporal regulation,user feedback,personalized service," transforming the sachet from a mere decorative or fragrance-bearing object into a daily item capable of participating in health management.

First, in terms of structural design, the PulseTime Sachet adopts a modular model of "reusable outer pouch with replaceable inner herbal pack" (see Figure 1). The outer pouch is mainly made of embroidered silk or other materials featuring Oriental aesthetics, emphasizing visual appeal and cultural memory; the inner pack consists of independently sealed herbal sachets, which are easy to replace, maintain, and update with the seasons. This structural design reduces long-term user costs while also creating room for serialized product operation. According to the characteristics of spring, summer, autumn, and winter, the product can launch different seasonal series such as "Spring Awakening," "Summer Clarity," "Autumn Moistening," and "Winter Storage," allowing users to naturally perceive the temporal logic of TCM health preservation during seasonal transitions.

Figure 1. Design rendering of the outer pouch packaging of the PulseTime Sachet(Drawn by the author)

Second, in terms of formulation logic, the product emphasizes both "adapting to time" and "adapting to the individual." TCM chrono-health preservation stresses conformity with temporal rhythms, while TCM syndrome differentiation stresses individual differences. Therefore, the herbal combinations in smart sachets should not rely on a single fixed formula, but instead should be dynamically adjusted according to season, constitution, and usage scenario. For example, spring formulas may focus on soothing the liver, regulating qi, and easing emotional stagnation; summer formulas may emphasize clearing the heart, relieving summer heat, and transforming dampness through aromatic herbs; autumn formulas may nourish the lungs, moisten dryness, and stabilize emotions; winter formulas may warm yang, dispel cold, and calm the mind to support sleep. For users with different constitutions, formulas may be further subdivided into qi-deficiency, yang-deficiency, yin-deficiency, and phlegm-dampness patterns, thus making the product better suited to individual needs (Qiang Siping & Ma Hongyu, 2025). The significance of this design lies in translating the TCM principle of "health preservation based on pattern differentiation" into a form understandable to users.

Third, in terms of intelligent functions, the PulseTime Sachet uses flexible sensors, NFC chips, and mobile app linkage to realize basic sensing and feedback functions (see Figure 2). Flexible sensors may be used to collect data such as skin surface temperature, ambient temperature and humidity, and wearing status, while NFC chips can identify product batches, read formula information, and display usage instructions and health-preservation suggestions. Through visualized interfaces, the app provides users with feedback on usage and offers corresponding recommendations according to time period, season, and personal constitution (Xi Cailian & Lin Rong, 2022). Strictly speaking, these functions do not constitute medical diagnosis, but they play a clear role in health management and user education. On the one hand, they enhance users' perception of the product's technological character; on the other hand, they transform TCM health preservation from static knowledge into a dynamic interactive experience.

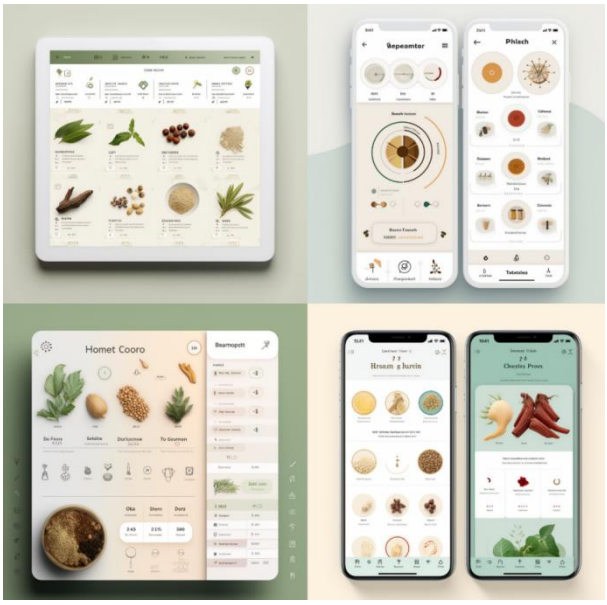

Figure 2. Conceptual Design of the App Interface for the PulseTime Sachet(Drawn by the author)

In addition, the product explicitly considers emotional value in its design. Modern health consumption concerns not only physical condition but also psychological feelings and emotional regulation. Accordingly, the PulseTime Sachet introduces microcapsule fragrance release and friction-triggered aroma release mechanisms, allowing users to perceive the release of herbal scents

during daily wearing, touching, or arranging the sachet. As a strong sensory stimulus, smell is closely related to emotional memory and stress relief (Li Mei, 2025). For urban white-collar workers and students living under long-term pressure, the mild release of herbal aroma can not only create a soothing experience but also strengthen the product's sense of companionship and ritual. From the perspective of consumer psychology, such emotional value is often directly related to user retention.

Furthermore, through an H5 customization platform, the PulseTime Sachet enables personalized services. Users can choose the shape, color, embroidered text, and formula combination of the sachet according to personal preferences, and after completing a constitution test, they receive recommended solutions (see Figure 3). This customization mechanism means that users are no longer merely purchasing a product, but are participating in the product-generation process. The deeper their participation, the stronger their identification with the product. From the perspective of innovation and entrepreneurship, personalized customization not only improves user experience but also helps build brand differentiation and repurchase mechanisms, making it a key component of the smart sachet's business model.

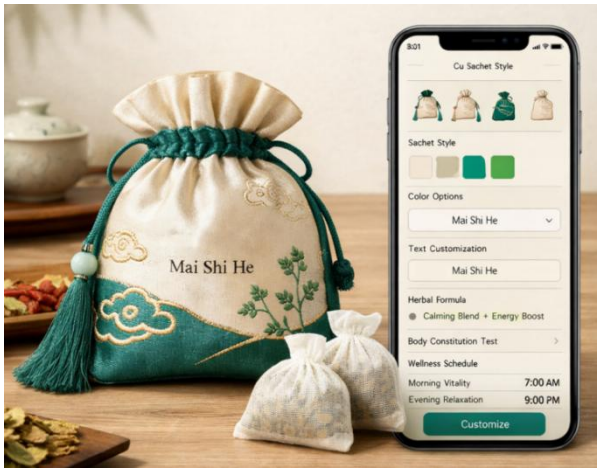

Figure 3. Design rendering of the PulseTime Sachet and its app interface (Drawn by the author)

4. Application Mechanisms of TCM Chrono-Health Preservation in Smart Sachets

The key to applying the theory of TCM chrono-health preservation in smart sachets lies not in mechanically transplanting concepts, but in establishing a transformation mechanism linking "theory–product–use." Specifically, the application path of the PulseTime Sachet is mainly reflected in three dimensions: time-based adaptation, constitution-based adaptation, and feedback-based adaptation.

The first is time-based adaptation. TCM chrono-health preservation emphasizes that different time periods require different regulation priorities, and smart sachets can realize time-based use through app reminders, product mode switching, and formula suggestions. For example, during the morning wake-up stage, stimulating and refreshing herbal scents may be used to help users enter a wakeful state (Sun Lingzhi, 2026); in the afternoon, soothing and stress-relieving formulas may be adopted to cope with work fatigue and emotional fluctuations; at night, calming and sleep-supportive formulas may be used to help establish a bedtime relaxation ritual. In this way, the product transforms "health preservation by time" from an abstract concept into executable actions, thereby enhancing the practical vitality of the theory.

The second is constitution-based adaptation. TCM emphasizes that "each person has a different constitution," and different constitutions require different regulation strategies. Through online constitution testing, the smart sachet classifies users into several types and then recommends corresponding formulas in combination with season and use scenario. For example, for users with qi deficiency, formulas may focus on tonifying qi and strengthening the spleen; for sedentary users with fatigue, aromatic formulas that invigorate the spleen may be emphasized; for those under emotional stress, liver-soothing and depression-relieving formulas may be preferred; and for those with poor sleep, calming and sleep-aiding formulas may be prioritized (Zhu Bingqian, 2024). The advantage of this constitution-based recommendation mechanism is that it translates the traditional TCM way of thinking based

on syndrome differentiation into relatively easy-to-understand user language, thus preserving its theoretical origin while lowering the threshold of comprehension.

The third is feedback-based adaptation. A smart sachet should not be a static commodity sold once, but rather a node within a continuously optimized health service system. Information such as users' frequency of use, experiential feedback, changes in preference, and herbal pack replacement intervals can all serve as important bases for subsequent iteration. Based on such data, the brand can optimize product series, adjust formula combinations, and improve interaction design. For users, this feedback mechanism creates the sense that the product "understands them" and "changes with them," thereby increasing their willingness to use it over the long term. Although such intelligent feedback currently manifests more as health reminders and service optimization (Li et al., 2025) than as efficacy monitoring in the strict medical sense, its orientation is consistent with modern health management concepts and has strong application prospects.

From a broader perspective, the application of TCM chrono-health preservation in smart sachets is essentially a translation of the TCM idea of "holistic regulation" into a continuous, perceptible, and operable consumer experience system(Li et al., 2025). In the process of wearing the sachet, smelling its fragrance, reviewing recommendations, and participating in customization, users not only gain physical comfort but also develop understanding and identification with TCM culture. This transformation from "cognition" to "experience" to "habit" is one of the most critical steps in the modernization of TCM products.

5. Innovation and Entrepreneurship Value and Market Feasibility of the PulseTime Sachet Project

From the perspective of innovation and entrepreneurship, the PulseTime Sachet project has a relatively clear product positioning and market logic. Its innovations are mainly reflected in three aspects. First, it takes TCM chrono-health preservation as its theoretical core, thereby avoiding the empty narratives often associated with generalized "guochao" or cultural-creative products. Second, it enhances product value through modular and intelligent design rather than relying solely on decorative attributes. Third, it constructs a sustainable business model through subscriptions, customization, and scenario-based services, thereby giving the product strong repurchase potential and room for expansion.

At the technical level, this project belongs to the exploratory direction of lightweight smart health products. Compared with high-threshold medical devices, the sensing, identification, and data service modules adopted in smart sachets are lighter, more cost-controllable, and more suitable for college student entrepreneurship teams to develop prototypes and conduct market validation at an early stage (Li Yuhui et al., 2015). The technical challenge lies not in complex algorithms, but in how to balance product aesthetics, functional realization, and cost control. For university-based projects, such moderately difficult interdisciplinary products are more likely to generate demonstrable, iterative, and promotable outcomes.

At the business-model level, the PulseTime Sachet has strong scalability. Basic sales may include the sachet body and the herbal packs; recurring revenue may be generated through quarterly or seasonal herbal-pack subscriptions; value-added services may be extended through corporate customization, health reports, cultural-tourism collaborations, and solar-term product series; and brand exposure may be achieved through offline pop-up events, "identify herbs by scent" interactive installations, and social media promotion (Zhang Yifan et al.,2023). Subscription models are especially significant because they can establish long-term user relationships on top of one-time purchases, shifting the product from a single transaction to an ongoing service model, which aligns with current trends in the health consumption market.

In terms of user market, urban white-collar workers, students, and users interested in TCM

within the 18–45 age group constitute a relatively clear target population. This group generally exhibits the following characteristics: first, they have health-management needs but often lack sustained motivation to maintain health-preserving habits; second, they are willing to accept products with aesthetic and social attributes; third, they possess a certain degree of identification with "Chinese-style," "guochao," and TCM culture. Smart sachets happen to lie at the intersection of tradition and modernity, culture and consumption, practicality and aesthetics, and therefore possess favorable market entry conditions. Meanwhile, the product may also be deployed across multiple scenarios such as TCM clinics, commercial districts, office buildings, cultural tourism destinations, and community health sites, thus forming a closed loop of "experience, communication, purchase, and repurchase."

Of course, market feasibility does not mean guaranteed success. Innovative TCM-related products still need to face several practical issues in promotion. The first is regulatory compliance: product publicity must avoid exaggerated medicalized claims and clearly define the product as a health-preservation aid. The second is user education: the concept of TCM chrono-health preservation itself entails a certain cognitive threshold and therefore requires science communication content, constitution testing, and scenario-based guidance to reduce comprehension barriers. The third is technical stability: lightweight hardware must strike a balance among flexibility, durability, and low power consumption to avoid damaging brand credibility through poor device performance. The fourth is herbal standardization: quality control, source traceability, and batch consistency of herbal formulas are important foundations for sustained product operation.

Therefore, from the perspective of entrepreneurial practice, the PulseTime Sachet is more suitable for a development route of "product validation first, model expansion later." That is, the product should first be piloted on a small scale in campuses, office settings, and local commercial districts, with user feedback collected to gradually optimize the product, before decisions are made about whether to expand to larger-scale channel deployment (Wu Yuetong et al., 2026). For student innovation and entrepreneurship projects, this route is more realistic and more conducive to forming a complete loop of research, competition participation, and project completion.

6. Existing Problems and Optimization Directions

Although the PulseTime Sachet demonstrates considerable innovation in concept, design, and business logic, its development still faces several limitations. First, the expression of TCM-related efficacy must be handled cautiously. Since herbal sachets are auxiliary health-preservation products and cannot replace medical treatment, sensitive terms such as "treatment," "cure," or "substitute for medicine" should be avoided in both academic writing and project promotion. Instead, more expressions such as "regulation," "assistance," "relief," and "recommendation" should be adopted. Second, the practical application of intelligent functions requires cost control. Excessively complex hardware stacking may weaken the lightness and friendliness of the sachet itself; therefore, low-threshold, low-cost, and iterative technical solutions should be preferred in the early stage. Third, users vary greatly in their understanding of TCM chrono-health preservation. Without effective science communication, the product may degenerate into an ordinary cultural-creative commodity and lose its theoretical support. Finally, the balance among herbal scent, embroidered aesthetics, and customization services also needs continuous adjustment during product development, so as to avoid blurring the product's main line due to excessive functions.

In response to the above issues, future optimization may proceed along several directions. First, constitution testing and the health-preservation knowledge base should be strengthened so that recommendations can become more scientific and individualized. Second, a standardized herbal supply chain and quality traceability system should be

established to ensure product safety and stability. Third, a simpler interaction interface should be developed to reduce users' learning costs. Fourth, by integrating solar-term culture, campus culture, and urban office scenarios, a continuous series of themed products may be launched to enhance brand communication. Fifth, cooperative models with universities, hospitals, and cultural-tourism institutions may be explored to strengthen the project's social influence and validation basis through cross-sector collaboration.

7. Conclusion

TCM chrono-health preservation theory takes time as its axis, the zang-fu organs and qi-blood as its core, and adaptation to nature and bodily regulation as its goal. It is an important component of the TCM health-preservation system with significant contemporary value. With the updating of health consumption concepts and changes in the modes of TCM cultural communication, knowledge popularization alone can no longer fully meet the needs of contemporary young people. Transforming TCM theories into experiential, wearable, and interactive product forms has therefore become an important direction for the modernization of TCM.

Using the traditional sachet as its carrier and supported by intelligent interaction and personalized customization, the PulseTime Sachet integrates the rhythmic thinking of TCM chrono-health preservation into daily life scenarios, demonstrating strong product innovation and cultural communicative value. Its significance lies not only in providing a new type of health-preservation product, but also in constructing a new path for the youth-oriented, everyday, and scenario-based dissemination of TCM culture. For university students' innovation and entrepreneurship projects, this product combines theoretical depth, design potential, and market prospects, and can effectively demonstrate the advantages of TCM students in interdisciplinary practice.

Certainly, as a new type of TCM-related health product, the smart sachet still requires continuous improvement in standardized expression, technical realization, user education, and supply-chain management. In the future, if real user research, trial feedback, and expert guidance from TCM practitioners can be further incorporated to improve the product system and service mechanism, it may become a representative practical case in the field of innovative TCM products. Overall, the TCM chrono-health preservation smart sachet is not merely a product concept, but also a meaningful attempt at the modern transformation of traditional TCM knowledge.

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Conflict of Interest

The authors declare that they have no conflicts of interest to this work.

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