

Ideas of Applying the Project Management of Information System in the Development of Traditional Chinese Medicine Industry

Zhao Benli

Foshan Stomatological Hospital, Foshan, China
zblsdebank@foxmail.com

Abstract: Chinese medicine is the great creation of the Chinese nation and the treasure of ancient Chinese science, having a positive impact on the civilization progress of Chinese nation and even the world. In modern times, the application of the information technology and information systems project management to the development of traditional Chinese medicine (TCM) industry, and the integration of the connotation of scientific and standardized, effective, practical characteristics into each stage of the development elements of TCM industry will help to breakthrough the bottleneck of the of TCM industry development, and promote the development of TCM industry with high quality.

Keywords: Practice, traditional Chinese medicine, industry development, project management, information system

1.Introduction

Traditional Chinese medicine (TCM) is a great creation of the Chinese nation, a treasure of ancient Chinese science and a key to the treasure house of Chinese civilization. It has made great contributions to the reproduction of the Chinese nation and had a positive influence on the progress of world civilization. The general secretary Xi Jinping stressed that it is necessary to follow the law of TCM development, inherit the essence, keep the integrity and innovation, accelerate the modernization and industrialization of TCM, promote the high-quality development of TCM undertakings and industries, and introduce TCM to the world. With the promotion of information technology and information system project management, all fields and industries of human society have been accelerating into a new period of development, and a new economic form is taking shape. We should apply information technology and information system project management to the development of traditional Chinese medicine industry, and integrate its scientific standards, effective and practical connotations into the various elements and stages of the development of the TCM industry to help break the bottleneck of the development of the TCM industry in China and promote its high-quality development.

2. The establishment of traditional Chinese medicine industry information transmission model

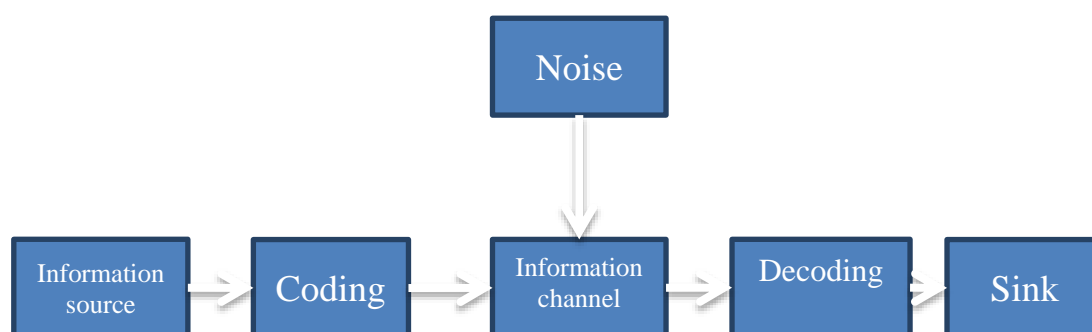


Figure 1: Information transmission model

Information is a valuable objective existence that can be used to eliminate uncertainty. Traditional Chinese medicine is the cream of the experience and wisdom of the Chinese nation in fighting against diseases for thousands of years, and contains extremely rich information resources. "Even a wine with

strong flavor is afraid of a deep alley." Under the background of the current information age, the inheritance and development of the TCM industry not only needs to protect the traditional skills of traditional Chinese medicine, but also needs to continuously expand the information transmission channels of the industry, and promote the development of the industry by using the core of information technology, namely communication, network and other information transmission technologies. Referring to Figure 1, information transmission model ^[1] of TCM is build combining the relationship among information source, sink, channel, and coding, decoding, noise and process with the actual situation of TCM industry to make a definition.

The explanation of the main elements in the transmission model of traditional Chinese medicine industry is as follows: the information source of traditional Chinese medicine industry refers to ancient books and documents of traditional Chinese medicine, the academic thought and diagnosis and treatment experience of famous Chinese medicine experts, folk Chinese medicine technology and methods, traditional Chinese medicine secret recipe, prescription, diagnosis and treatment methods and technology, and Chinese medicinal materials, etc. ^[2]. The traditional Chinese medicine industry not only refers to the relevant subjects engaged in the traditional Chinese medicine industry, but also includes the explicit and implicit audiences affected by traditional Chinese medicine. In terms of coding, decoding and noise, based on the understanding of traditional Chinese medicine business and information system knowledge domain, the combination points and contents of each are compared abstract and concrete to achieve a better understanding. The information acquired by the sink of traditional Chinese medicine industry satisfies its need to eliminate uncertainty, and the value of this demand is determined by the quality of information, the attributes of which include the degree of accuracy in describing the state of various things in the traditional Chinese medicine industry, the completeness of its description, reliability, timeliness, economic degree, verifiability and security.

With the help of the information transmission model, we can comprehensively and accurately understand why the cultural publicity and knowledge popularization of TCM through radio, television, newspapers, Internet and other media should comply with the relevant national regulations. No organization or individual is allowed to make false or exaggerated propaganda about traditional Chinese medicine or to seek improper profits in the name of traditional Chinese medicine. Chinese medicine professional and technical personnel should be hired to meet the requirements.

3. The establishment of TCM industry development information system and structure

A system is a unity with overall function and comprehensive behavior composed of interrelated, interdependent and interacting things or processes. It is characterized by purpose, integrity, hierarchy, stability, openness and robustness ^[3]. Information system is inputting data, processing, and producing information. The information system for the development of traditional Chinese medicine industry refers to the logistics, capital flow, information flow, talent and intelligence flow formed by the combination of relevant people and things, which are all part of the system in a large scale.

In terms of the industrial chain of traditional Chinese medicine ^[4], it generally includes: first, pharmaceutical manufacturing, such as Chinese medicine decoction pieces and Chinese patent medicine; second, raw materials and equipment, such as Chinese medicinal materials planting, animal breeding, mineral collection, pharmaceutical excipients, pharmaceutical packaging materials, pharmaceutical equipment, etc.; third, pharmaceutical circulation, such as pharmaceutical wholesale, pharmaceutical retail, pharmaceutical e-commerce, etc.; fourth, terminal market, such as medical institutions, health service institutions, pharmacies, shopping malls and supermarkets; fifth, derivative products, such as health food, drinks, cosmetics, etc. (Figure 2).



Figure 2: Diagram of traditional Chinese medicine industry chain

The external system of TCM industry development includes TCM industrial chain, policy, economy,

society, technology and other dimensions^[5], which is conducive to the development of TCM industry. (Figure 3).

From the policy perspective, the Party and the government attach great importance to TCM work. Especially since the 18th CPC National Congress, the CPC Central Committee with comrades Xi Jinping at the core has placed TCM work in a more prominent position. Both the central and local governments have introduced a series of policies to promote the high-quality development of TCM industry and achieved remarkable results. For example, The State Council issued Several Policies and Measures on Accelerating the Development of TCM Characteristics. The Administration of Traditional Chinese Medicine and the National Health Commission issued the Implementation Plan for Improving the Capacity of Traditional Chinese Medicine Rehabilitation Services (2021-2025). The 14th Five-Year Plan of major provinces and cities in China has a layout, for example, Beijing has a layout to support the inheritance and development of traditional Chinese medicine skills and promote the revitalization and innovation of traditional techniques such as Yanjing Eight Wonders. The government has attached equal importance to traditional Chinese and Western medicine and complement each other's strengths, established a service system, service model and personnel training model that suits the characteristics of traditional Chinese medicine, and given full play to its unique strengths. The government has increased support for TCM technology innovation projects and key demonstration projects on innovation platforms, and protected and made good use of TCM intellectual property rights. Jiangxi province has a layout leading by traditional Chinese medicine processing and manufacturing, with the assist of Chinese herbal medicine planting and traditional Chinese medicine health services, focusing on the fusion of business forms to push the research and development and industrialization of Chinese medicine pharmaceutical key technology, traditional Chinese medicine pharmaceutical equipment, medical equipment, establish national level demonstration zones of comprehensive reform of traditional Chinese medicine, build important national industry base of TCM, and develop China's leading and world-class province of traditional Chinese medicine. The government has vigorously developed TCM healthcare and forest health care, and build a number of distinctive health and old-age care bases by relying on TCM, mountains and rivers, hot springs, forests and other resources and ecological advantages. In areas such as electronic information, traditional Chinese medicine, new materials and green agricultural products, we will cultivate a number of standard "leaders", speed up the formulation of a standard system for new business forms and models, and promote more standards to meet advanced domestic and international standards.

In terms of economic dimension, China's national economy was generally stable from 2020 to 2021, and the quality of development was steadily improved. The annual GDP was 100.92 trillion yuan and 114.37 trillion yuan respectively. The national disposable income was 32,200 yuan and 35,100 yuan respectively. The stable economic growth has provided a good economic environment for the development of traditional Chinese medicine in China.

From the social dimension, with the development of TCM technology and the accumulation of practical application experience, TCM is increasingly used in clinical practice, which has promoted the development of TCM in China. According to the National Health Commission, there were 4,221 TCM hospitals, 2,772 TCM outpatient clinics, 48,289 TCM clinics and 33 TCM research (institutes) in 2019.

From the technical dimension, processing is a key link in the formation of Chinese herbal decoction pieces, differentiating from natural medicines. In recent years, the research on the processing technology of TCM decoction pieces mainly focuses on the needs of industrialization development, and strives to achieve the standardization of processing technology, objectification of process parameters and modernization of processing equipment, so as to create a modern TCM decoction piece industry. In the future, traditional Chinese medicine processing technology research will mainly be carried out from two aspects: inheriting traditional processing technology and innovating and developing modern processing technology. In terms of inheriting the traditional processing technology, experimental methods are mainly used to study the processing technology, optimize the processing parameters, and realize the normalization of the process and the objectification of the process parameters. In the aspect of innovation and development of modern processing technology, it is mainly to explore and establish new processing methods on the basis of researching and revealing the purpose and principle of processing, realize scientific processing and targeted processing, and improve the processing efficiency and clinical efficacy of Chinese herbal decoction pieces.

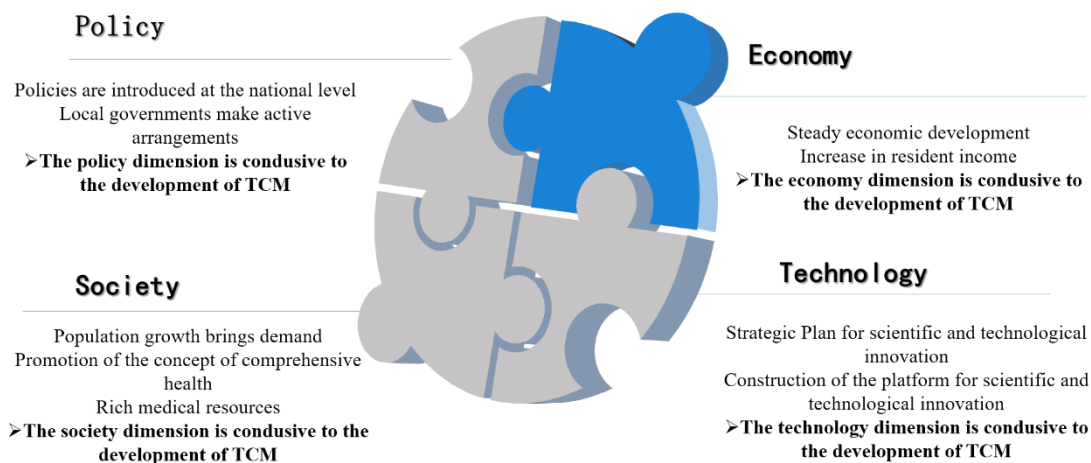


Figure 3: The external environment of the TCM industry development

4. Break through the bottleneck of the development of TCM industry with project management practice

Project management is highly practical ^[6], which has been recognized as a theoretical method summarized on the basis of long-term practice and research. It requires the application of various knowledge, skills, means and technologies in project activities to achieve the requirement of the project. Carrying out systematic process management by applying and integrating project management processes such as initiation, planning, implementation, monitoring, and closure. Project management plays a good role in breaking through the bottleneck of the development of traditional Chinese medicine industry. Although the reform and development of traditional Chinese medicine in China has made remarkable achievements, at the same time, we should also see the following development bottlenecks, such as the policy of equal emphasis on traditional Chinese and Western medicine still needs to be fully implemented, the governance system following the law of traditional Chinese medicine needs to be improved, the development basis and talent construction of traditional Chinese medicine are still relatively weak, and the quality of traditional Chinese medicine is uneven, lack of inheritance, innovation and role of traditional Chinese medicine ^[7].

The development bottleneck of traditional Chinese medicine industry needs a long-term and continuous solution process, but it is divided into stages and the strong practicality of project management may be a good solution from the perspective of each reform implementation period ^[8]. For example, in the establishment of multidisciplinary integration of scientific research platform; Key technology and equipment of traditional Chinese medicine; Research and interpretation of basic theories, rules of diagnosis and treatment and mechanism of TCM; Development of new Chinese medicine; In terms of the planning and management mechanism of TCM research, we should make full use of the strong practical nature of project management to accelerate TCM research and innovation. First, project management should be highly targeted. The object of project management is a project, that is, a series of temporary tasks. "Series" has a unique connotation here -- it emphasizes that the object of project management is a whole system composed of a series of tasks, rather than a part or several parts of this whole ^[9]. From this perspective, the bottleneck of the development of traditional Chinese medicine industry can be accurately determined by identifying the key points or key difficulties, setting them as project objectives and applying the scope management method in project management. Second, project management is innovative. Project innovation generally includes technological innovation, management innovation, and process innovation. The bottleneck in the development of traditional Chinese medicine industry needs creative approaches to break through ^[10].

5. Promote the sustainable development of TCM industry with the process management of information system projects

The development of traditional Chinese medicine industry has the requirements of separated stages, sustainability, high quality and efficiency, which is consistent with the process management thinking of information system project, and can be used to promote the sustainable development of traditional

Chinese medicine industry. According to the fifth edition of the Project Management Body of Knowledge Guide published by the Project Management Association, there are five process groups for project management ^[1]: starting process group, planning process group, execution process group, supervision and control process group and closure process group; 10 knowledge areas: overall project management, project scope management, project progress management, project cost management, project quality management, project human resource management, project communication management, project stakeholder management, project risk management and project procurement management. A total of 47 processes from 10 knowledge domains can be divided into 5 process groups with accurate correspondence, as shown in Table 1 Project Management Process Group.

Table 1: Project Management Process Group

Knowledge domain	Starting process group	Planning process group	Execution process group	Control process group	Closure process group
Overall project management	1. Formulate the project charter	2. Formulate a project management plan	3. Direct and manage project work	4. Supervise project work 5. Implement overall change control	6. End the project or phase
Project scope management		1. Plan scope management 2. Collect demands 3. Define scope 4. Create WBS.		5. Confirm the scope 6. Control the scope	
Project progress management		1. Plan progress management 2. Define activities 3. Order the activities 4. Estimating resources for activities 5. Estimate the duration of the event 6. Formulate progress plan		7. Control the progress	
Project cost management		1. Plan cost management 2. Estimate costs 3. Budgeting		4. Control costs	
Project quality management		1. Plan quality management	2. Implementing quality assurance	3. Control the quality	
Project human resource management		1. Plan human resource management	2. Prepare project team 3. Build the project team 4. Manage the project team		
Project communication management		1. Plan communication management	2. Management communication	3. Control communication	
Project stakeholder management	1. Identify stakeholder	2. Plan stakeholder management	3. Manage stakeholder participation	4. Control stakeholder participation	
Project risk management		1. Plan risk management 2. Identify risks 3. Conduct qualitative risk analysis 4. Conduct quantitative risk analysis 5. Plan risk countermeasures		6. Control risks	
Project procurement management		1. Plan procurement management	2. Implementation of procurement	3. Control procurement	4. End procurement

On the whole, with the national centenary development plan and five-years development plan and other important milestone, combined with the development feature of TCM industry, the overall goal of

industrial development in every important time node should be managed, the connection between the overall goal and the daily work of the organization should be established, so as to let each activity of the development of TCM industry become a part of or a process of the overall management knowledge domain. A management plan for the development of the TCM industry at this stage should be formulated, and form documents of how to implement, supervise and control the development activities of each project., then guide and manage the implementation process of the relevant body's action implementation, and complete the work with clear development plan; monitor and control the work, and take corrective or preventive measures to control the implementation effect in various processes required for starting, planning, executing and ending the project. The whole process focuses on the overall change control. The change is allowed and runs through the development of the industry from beginning to end, but it can only be changed after the change request is put forward and approved by the implementation of the overall change process. Each milestone needs to be followed by lessons learned to free up organizational resources for the next phase of new work.

In terms of the scope management of TCM industry development, it is necessary to prepare a scope management plan, which describes in writing how to define, confirm and control the scope of development, so as to provide guidance and direction on how to manage the scope in the whole project. Then it is necessary to collect the needs of industry development participants, identify, record and manage the needs of relevant stakeholders; define the boundaries of industry development by specifying which of the collected requirements will be included in the scope of industry development and which will be excluded. The industry development WBS is then created to break down the deliverables effort of industry development into smaller, more manageable components to provide a structured view of what is being delivered for each major milestone. It is also necessary to define the deliverable criteria and monitor the scope status to maintain the stability of the scope benchmark throughout the phase.

From the perspective of the development progress management of TCM industry, it is necessary to make a progress management plan and decompose the WBS work package into activities, which can be used as the basis for estimating, schedule planning, execution, supervision and control of the industrial development work. It is necessary to sequence activities, identify and document relationships among development activities, and define a logical sequence of efforts in order to achieve maximum efficiency within all established development constraints. It is necessary to estimate activity resources and activity duration, including estimating materials, staff, the amount and type of equipment or supplies, and the working time needed to complete one activity, and make clear the type, quantity and features of the resources needed to complete the activity and the amount of time it will cost, in order to make more accurate cost estimate. It is necessary to formulate the industrial development schedule. The order, duration, resource demand and schedule constraints of activities are analyzed, so that a project schedule model is created to substitute activities, duration, resources, resource availability and logical relations into the schedule planning tool, so as to form a schedule model containing the planned date of each activity. Finally, control and monitor project progress and activity status, update development progress, manage progress benchmark changes and take corrective and preventive measures when necessary to reduce risks.

In terms of cost management of the development of traditional Chinese medicine industry, it is necessary to formulate a cost management plan and approximately estimate the funds required to complete the project activities, aggregate estimated costs for all individual activities or packages of work and establish an approved cost benchmark according to which to monitor and control industry development cost performance. The operation process also requires control cost and monitor project status, and if you identify discrepancies between reality and plans, correct them through procedures and tools.

From the perspective of quality management in the development of traditional Chinese medicine industry, it is necessary to formulate a quantitative management plan, clarify the quality requirements and standards of the stage deliverables, and prepare countermeasures to ensure that the quality requirements are met. At the same time, it is necessary to implement quality assurance and control, audit quality to ensure that reasonable quality standards and operational definitions are adopted and promote quality process improvement, monitor quality and record the results of quality activities so as to evaluate performance and recommend necessary change processes. Inefficient process or results of product quality activities and recommend need to be identified and take action to eliminate these causes. The deliverables and work in the validation phase meet the stated needs of key stakeholders.

Traditional Chinese medicine industry development also involves human resource management, communication management, stakeholder management, risk management, procurement management, and industry cycle management content, etc. Applying the implicit underlying thinking and explicit

management methods, tools and technology to the management of TCM industry development will promote its sustainable development.

6. Conclusion

With the promotion of information technology and information system project management, a new economic form is taking shape. To break through the bottleneck of modernization, industrialization and high-quality development of traditional Chinese medicine needs to integrate with information technology and information system project management. It is necessary to apply the implicit underlying thinking of information system project management and the explicit management methods, tools and technologies to the development management of traditional Chinese medicine industry, which will promote its sustainable development.

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