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GUIDELINES FOR THE SUCCESSFUL MANAGEMENT OF HERBAL MEDICINE MANUFACTURING INDUSTRY

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ABSTRACT

Traditional Thai herbal medicine, once overlooked, is now gaining attention as Thailand addresses the challenges of an aging society. To tackle rising medical costs and boost the herbal medicine economy, the government has integrated it into the public health system. This research aimed to establish guidelines for successful management of the herbal medicine manufacturing industry, resulting in a structural equation model (SEM). A mixed-methods approach was adopted: qualitative research included in-depth interviews with 9 experts and focus group discussions with 11 experts, while quantitative research surveyed 500 herbal medicine manufacturers using questionnaires, analyzed through descriptive, inferential, and multivariate statistics. The study identified four key management guidelines in order of importance:1) Entrepreneurship ($\bar{X}$ = 4.22) had the most important aspect on the controlled document provision by recording every step of production for verification. 2) Pharmaceutical Industry Process ($\bar{X}$ = 4.14) had the most important aspect of employing scientific instruments in the quality control process. 3) Cooperation network ($\bar{X}$ = 4.07) showed the most important aspect of encouraging the cooperation between public sectors and the Thai Herbal Medicine Association to develop sustainable collaboration. 4) Market innovation and integrated communication ($\bar{X}$ = 4.06) had the most important aspect of implementing standard certified symbols such as GMP, PIC/S, Halal, etc. attached onto the products. The hypothesis test revealed that businesses with a production value of 20 million baht or more annually prioritized these management guidelines differently than those with lower production values, with statistical significance at the 0.05 level. The SEM analysis demonstrated a strong fit to empirical data, meeting criteria with a chi-square of 0.079, a relative chi-square of 1.159, a confirmatory model fit index of 0.963, and a root mean square error of approximation of 0.018.

Keywords: Management, Herbal medicines manufacturing, Structural Equation Model, Entrepreneurship, Market innovation, Integrated communication, Traditional Thai herbal medicine.

INTRODUCTION

The Thai government, through the Ministry of Health, has encouraged the use of herbal medicines in the health system by establishing foundations for the long-term development of Thai traditional medicine and herbs as part of the national health system. As a result, the success of the herbal medicine manufacturing industry is essential to the country's economic prospects in the global herbal medicine market, as well as its essential public health programs.

Considering the economic opportunities of the country in the global herbal products market, it was found that marketing data from many research institutes (Fortune Business Insight, 2024; Euromonitor International cited in DITP, 2024; Grand View Research, 2023)indicated that the global market for herbal medicines and herbal products for health will be valued at a substantial 200–300 billion US dollars by 2024, with a potential high growth rate of 6.5-11.2 percent per year. (CAGR)

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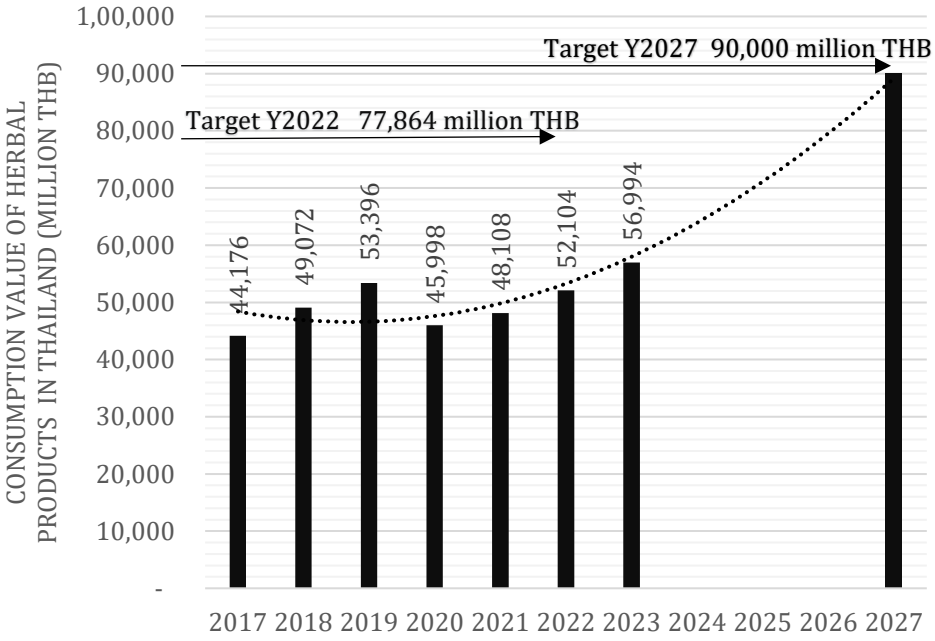

Figure 1

Consumption value of herbal products in Thailand (Department of Thai Traditional and Alternative Medicine, 2023)

The Thai government prepared National Herbal Action Plan No. 1 (2017-2022) to support the herbal industry, with a target consumption value of 77,864 million baht, but according to the Department of Thai Traditional and Alternative Medicine's annual report (DTAM, 2023), the value at the end of 2022 was only 52,104 million baht. Thai consumption accounts for less than one percent of the global market. However, the government has continued to support and push by creating the National Herbal Action Plan No. 2 (2023-2027), which sets a goal of 90,000 million baht in herbal product consumption by 2027. Figure 1 shows these in detail.

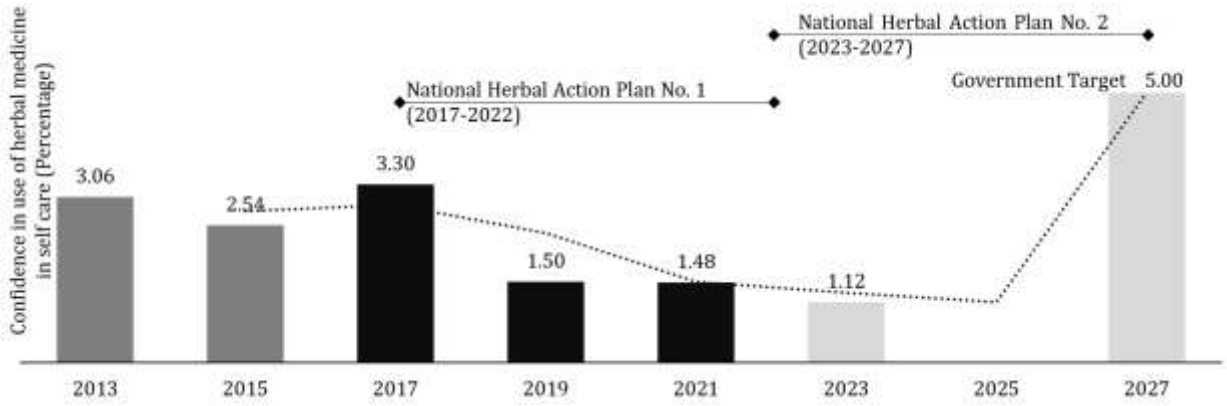

Figure 2 Confidence in the use of herbal medicines in self-care
(Department of Thai Traditional and Alternative Medicine, 2023)

Meanwhile, the government encourages and supports the use of medicinal products. It turned out that the percentage of Thai people who are unwell and pick to use herbs for their personal health care (goal 5.00) is dropping. Figure 2 demonstrates that confidence in the use of herbal medicines decreased from 3.30 percent in 2017 to 1.5 percent in 2019, 1.48 percent in 2021, and 1.12 percent in 2023. As a result, raising the consumption value of herbal products in Thailand and spreading them into the global market poses an enormous challenge.

Therefore, the researcher is interested in studying the components of the management approach for the herbal medicine manufacturing industry to be successful classified by the annual production value, which will lead to increased confidence in the use and consumption of herbal medicine manufacturing industry. In addition to developing a

structural equation model that reflects these guidelines for the successful management of the herbal medicine manufacturing industry.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

A literature review of concepts and theories on how to successfully manage the herbal medicine industry was conducted. To propose a framework for establishing trust and promoting the use of herbal medicines in primary health care in accordance with government policies. The literature review is divided into four major components, which are as follows:

Entrepreneurship

Business owners are entrepreneurial in seeking recruitment, procurement, and the development of new products and process innovations. Organizations can create products and services that meet the needs of consumers on the spot and can appropriately pass on the value of products and services to consumers. This makes a business more competitive. (Low and Macmillan, 1988) Entrepreneurs must determine the level at which they should invest in technology to break even (Bettina et al., 2020). They must have leadership that is willing to develop, invest, plan, and manage finances to create new value, while accepting both risks and rewards. (Timmons and Spinelli, 2003). Further, the final quality of entrepreneurs must have been ethical. Ethical entrepreneurs not only avoid legal trouble but also create lasting brands that people respect and admire. (Wattanakomol, S., & Silpcharu, T., 2020).

Pharmaceutical Industry Process

Recognition of technology, in addition to entrepreneurial potential, will lead to success and sustainability (Kumar et al., 2018) and according to Pongsanam and Thaosombat (2023), the production management process must be innovative in terms of the related technology in all processes along the chain to reduce costs and increase competitiveness. Zhu et al. (2024) argued that connecting processing processes and equipment to the Internet is essential. Similarly, Tananchai et al. (2022) proposed that Thai law permits Thai traditional medicine to employ modern technology in the production of herbal medicines.

Cooperation Network

Strengthening the organization using the resources of others Kang et al. (2014) thought of building a cooperative network with farmers, growers, and collectors of medicinal plants to obtain quality raw materials, standards, and enough to feed the production process. In line with Thawornsujaritkul and Boonnual (2017) and Krishnan et al. (2021), stated the concept of innovative cooperation in the supply chain involves various stakeholders both inside and outside the company. The cooperation agreement changed from a company to a supply chain network, resulting in an improvement in the efficiency of the organization and the company's supply chain. In the same way as Kanyapong (2023) was found to be successful in promoting cultural content in the context of the creative economy industry. It is critical to emphasize the comprehensive integration of government agencies and the relevant private sector.

Market Innovation and Integrated Communication

According to Thuengsuk and Nurittamont (2019), who discovered that the perception of integrated marketing communication and word-of-mouth communication through electronic media has a positive influence on the image and intention of consumers to buy organic products, entrepreneurs should focus on all aspects of the marketing mix as well as the communication of knowledge and understanding of herbal products so that consumers understand the properties of treatment and alleviation. Assisted by the purchase of herbal products to promote health or effectively treat diseases (Supatanakornkun et al., 2023). The same is true for Jang and Cho (2022), Purchase intent behavior occurs when a consumer intends to buy a product and is willing to make a purchase decision based on the best option given the factors; marketing innovation, marketing communication, corporate image, and brand value are examples.

Following the concepts and literature review, the researcher implies four latent variables as guidance for the successful management of herbal medicine manufacturing. In statistics, the exogenous variable is entrepreneurship (EnT), while the three endogenous variables are pharmaceutical industry process (PhP), market innovation and integrated communication (MIIC), and cooperation network (CoN). The researchers propose six hypotheses, and a conceptual model illustrated in Figure 3 as follows:

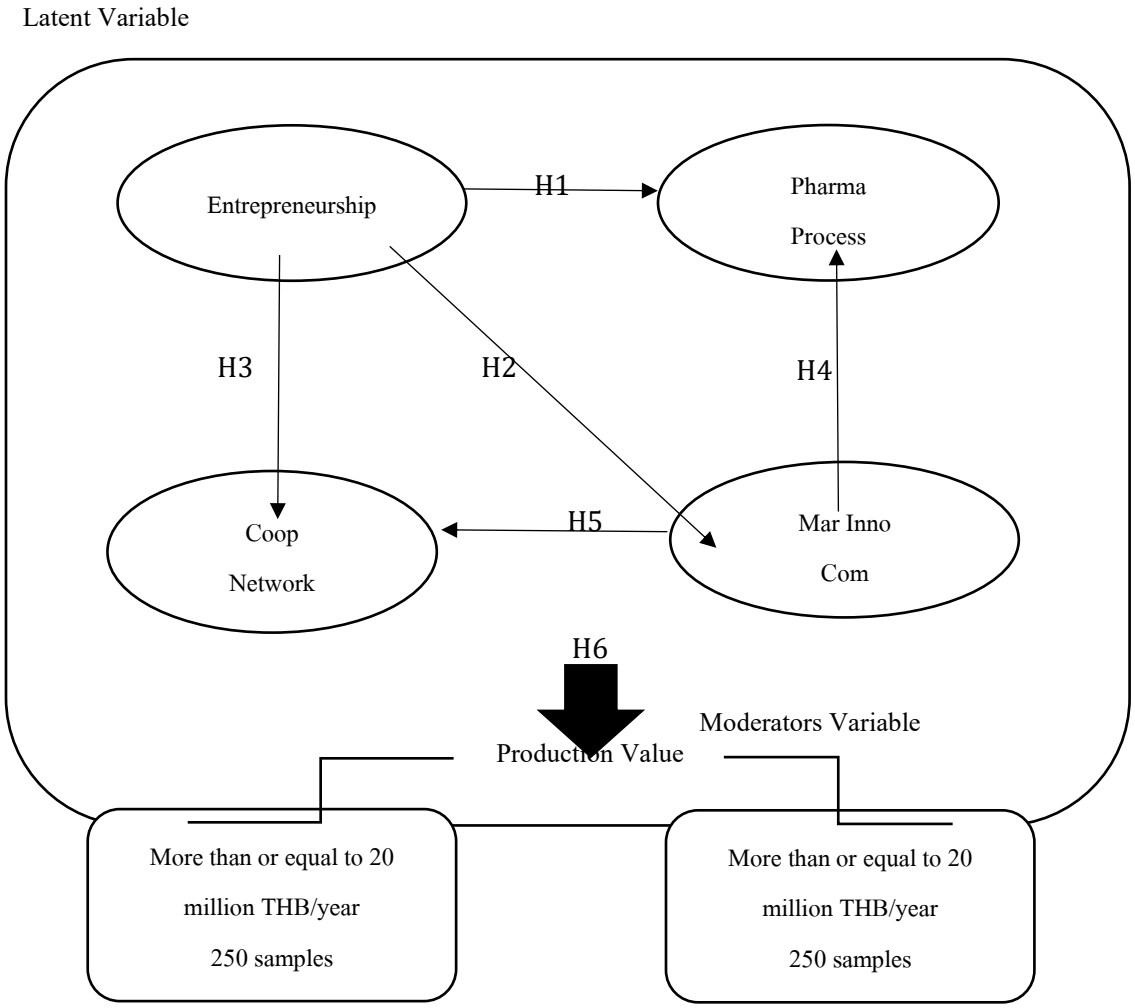

Figure 3 Research Conceptual Framework of Guidelines for the successful management of herbal medicine manufacturing industry

H1: Entrepreneurship has a direct influence on the Pharmaceutical Industry Process

Bettina et al. (2020) and Kumar et al. (2018) announced that it would enhance a business's success and sustainability. Entrepreneurs must adopt various forms of technology via their business structure. In business management, it is necessary to evaluate existing tangible such as raw materials and intangible assets or resources, including an organization's technology, innovation, knowledge, and expertise. In line with Korntana et al. (2021), who confirmed that creating added value in the natural and herbal products business, entrepreneurs need to apply science and technology to obtain valuable products that are different from what is available in the market which could lead success in the market to the organization.

H2: Entrepreneurship directly influences Market Innovation and Integrated Communication

Jang and Cho (2022), if entrepreneurs persuade consumers to buy products, the business will be successful in the long run and have a competitive edge. Market innovation and integrated communication influence purchasing decisions. Pribanus et al. (2023) conducted a study to determine the impact of brand experience, brand preferences, and brand trust on customer satisfaction and repeat purchase intentions. This study found that entrepreneurs should cultivate and utilize their brand experiences. Brand preference and trust are strategic tools for increasing customer satisfaction and encouraging repeat purchases of herbal medicine products.

H3: Entrepreneurship has a direct influence on the Cooperation Network

Kadetz and Baker's (2022) studied on how the People's Republic of China is taking advantage of health issues to increase its power on the world stage. From 1964 to 1979, Mao Zedong used his entrepreneurial leadership and management skills to push a new form of medicine through the integration of Chinese medicine into the application of China's integrated model of primary health care to the world. Building a network of cooperation with the World Health Organization (WHO). The signing of the Declaration of Alma Ata has led to a network of cooperation that has

followed at the international level, such as the China-Africa Health Diplomacy Policy and the Globalization Policy of Traditional Chinese Medicine, which is in line with Roopsing and Pongsiri (2022), who studied the strategy of creating added value for organic agricultural products to increase competitiveness in the digital era. It was discovered that business organizations must seek assistance from the network based on the nature of their activities, whether they are farmer groups, educational institutions, research institutes, professional organizations, or related agencies in both the public and private sectors, to ensure business success.

H4: Market Innovation and Integrated Communication has a direct influence on the Pharmaceutical Industry Process.

Leechayakittikorn (2015) indicated that integrated marketing communication and product diversity, such as the development of various formulations and the production of accessories for product use, are the top two priorities that consumers of herbal products pay the most attention to. Therefore, entrepreneurs must focus on production technology to meet consumers' marketing innovations that consumers want. In line with Thipyarat et al. (2017) explained why marketing innovation and integrated communication, which are rapidly reaching consumers in the modern era, have created a significant marketing ripple. Consequently, the product must be of high quality and manufactured in accordance with a standardized process. Protecting the product's image and branding therefore, a high-pressure butane system with carbon dioxide was developed

H5: Market Innovation and Integrated Communication has a direct influence on the Cooperation Network

Roll (2018) studied the Hallyu 3.0 policy during the presidency. Park Geun Hye from 2013 to 2017, the Korean Cultural Policy (K-Culture) focused on developing creativity on the foundation of traditional culture and declared the vision of "Creative Economy" focusing on building the image of the tourism, medical, and beauty industries. This created a network of cooperation between the public and private sectors across industry groups. This is in line with a study by Kanyapong (2023) on strategies to promote cultural content in the creative content industry in the context of creative economy. The results of the study show that the success of promoting cultural content in the context of the creative economy industry was borne by serious planning and promotion of the content creation industry for more than two decades, focusing on the holistic integration of the work of government agencies and the private sector.

H6: The importance of the elements of the guidelines for the successful management of the herbal medicine industry overall, when classified according to the production value of business organizations, it is different.

Karemka, N. et al. (2024) found that the industry did not profit from the changes made to regulations and certification processes in their study of the situation of Thai herbal product entrepreneurs after the ASEAN Framework Agreement B.E. 2567 went into effect. Most Thai business owners are small to medium-sized, have little money, and have no plans to export herbal products abroad, it was found. On the other hand, the study of Müller et al. (2021), who analyzed 221 industrial organizations in Germany, demonstrate that both large and small businesses can successfully develop innovation strategies with equal success.

RESEARCH METHODS

Procedure Design

This study attempts to generate new knowledge through mixed research (Mixed-Methodology Research), which consists of three parts: two qualitative and one quantitative. The first portion of the qualitative study was conducted using in-depth interview techniques with nine experts who were chosen based on the qualification criteria stated by the report (Cogan & Derricot, 2001). The findings of the expert interviews were utilized to create a questionnaire that was used as a research tool to poll the opinions of entrepreneurs. In the second half, the questionnaire was distributed to 500 Thai entrepreneurs involved in the herbal medicine manufacturing industry. The gathered data were examined using a structural equation model to determine the conceptual framework's goodness of fit. In the last step, a qualitative focus group discussion with eleven management professionals was conducted to determine whether the components obtained from the structural equation model had a true impact on herbal medicine manufacturing.

Population and Sample

The population used in this research was determined from licenses to produce Traditional medicine and herbal products from the Thai Food and Drug Administration during year 2019-2023, with a total of 925 units. The sample size was determined using the criteria of the research type of element analysis or structural equation model, with 500 examples using the probabilistic stochastic method (probability sampling) tool. (Silpjaru, 2024).

Questionnaire Development

The questionnaire was primarily created from the previously published works of literature and in-depth interview. The instrument consisted of two sections: closed-ended question (Check list) that comprised five business characteristic information and a 5-point Likert scale (Likert, 1932) of 25 questions per factor total four factors [Entrepreneurship (EnT), Pharmaceutical Industry Process (PhP), Market Innovation and Integrated Communication (MIIC) and Cooperation Network (CoN)]. The statement in the survey asked participants to select on the level of importance that ranged from

1 (strongly unimportant) to 5 (strongly important). Before the questionnaire was distributed to the entrepreneurs, it was evaluated for validity and reliability. Both criteria were accepted by Index of item objective congruence value (IOC) of 0.6 to 1.0 from 5 specialists, and standard deviation value in range of 0.36 - 3.56, and the question with an estimation scale by value analysis. Corrected Item–Total Correlation value between 0.31 and 0.87, while the confidence analysis of the questionnaire by finding the alpha coefficient (Alpha Coefficient) of Cronbach had a value of 0.983 (Silpcharu, 2024).

Data Collection

The finalized questionnaire was distributed to target business organizations by mail, email, telephone and in person between September 2024 and December 2024. The response of answering as shown in Table 1.

Table 1 Percentage of respondents' business characteristics

General business data	Category	Frequency (n=500)	Percentage
Business shareholder	100% Thai	500	100.00
Business size by number of employees	> 200 people	7	1.40
	51-200 people	90	18.00
	5-50 people	377	75.40
	< 5 people	26	5.20
Duration of operation	>57 years	51	10.20
	11-57 years	389	77.80
	5-10 years	51	10.20
	< 5 years	9	1.80
Type of medicine produced	Traditional medicine	199	39.80
	Herbal medicines (medicine developed from herbs)	83	16.60
	Produce both Traditional and herbal medicines	25	5.00
	Produced both and others Healthy herbal products	193	38.60
Production capacity Value (THB)	from 20 million and up	250	50.00
	less than 20 million	250	50.00

Data Analysis

Qualitative research: Frequency statistics and content analysis were used to analyze the data. Quantitative research: Using SPSS (Statistical Package for Social Science) and AMOS (Analysis of Moment Structure) v.20, statistical analysis developed SEM using inference statistics and multivariate statistics, while descriptive statistics such as frequency distribution, mean, standard deviation (S.D.), and percentage were employed. The researcher employed Arbuckle's (2016) model fit criteria, which comprised the following four criteria, to evaluate the structural equation model's fit: 1) Chi-square probability value (CMIN-p) greater than 0.05. 2) Chi-square correlation value (CMIN/DF) less than 2.00, 3) Goodness of fit index (GFI) greater than 0.90, and 4) Root means square error of approximation (RMSEA) less than 0.08.

RESULTS

The Importance of Component Guidelines for Successful Management of Herbal Medicine Manufacturing Industry

The result of the analysis of the level of importance of the component of Guidelines for Successful Management of Herbal Medicine Manufacturing Industry revealed that the overall importance was very high. The average value was 4.12, sorted by priority level as follows: 1) the Entrepreneurship component's very important, with an average value of 4.22; 2) the Pharmaceutical Industry Process component's very important, with an average value of 4.14; 3) the Cooperation Network component's very important, with an average value of 4.07 and 4) the Market Innovation and Integrated Communication component is very important, with an average value of 4.06. When classified individually in each area with the highest priority of the top 3, it was found that:

Entrepreneurship component includes arranging for the preparation of control documents with production data recorded at every step. There is a date, time, and lot of raw materials, packaging materials, and products for verification. It is the most important level. The average value is equal to 4.53 (S.D. = 0.57). Secondly, control the

production of products to ensure that they are of high quality, safe according to industrial pharmaceutical principles and in accordance with the registration of the Food and Drug Administration. The average value is equal to 4.37 (S.D. = 0.62) and select each type of herbal raw material with the required quality and standards to feed the production process. 4.34 (S.D. = 0.62) respectively.

Pharmaceutical Industry Process components include the use of scientific tools in the quality control process, such as concentration checks, stability tests, humidity tests, etc. The average value is 4.48 (S.D. = 0.75), followed by the application of clean room technology in pharmaceutical manufacturing facilities to control the amount of dust and microorganisms, with an average value of 4.29 (S.D. = 0.83), and the development of equipment that connects traditional medicinal preparation knowledge with modern technology to increase production efficiency and control standards. The average value is 4.26 (S.D. = 0.69), respectively.

Cooperation Network component is to promote the concept of participatory public administration to create cooperation in planning, exchange, implementation, and evaluation with government agencies and related agencies through the Herbal Medicine Manufacturers Association. The average value is equal to 4.25 (S.D. = 0.84). Secondly, cooperate with the Food and Drug Administration to participate in training activities to understand the regulations and applications for permits, such as product registration, production site licenses, advertising permits, etc. The average value is equal to 4.23 (S.D. = 0.64) and building a network of cooperation with farmers who grow medicinal plants from various areas to obtain sufficient raw materials and reduce the risk of unstable important substances, the average value is equal to 4.17 (S.D. = 0.78), respectively.

Market Innovation and Integrated Communication includes the use of various standard certification symbols such as: GMP, PIC/S, Halal, Premium Herbal Awards communicate on the packaging, the average value is 4.27, followed by creating a good customer experience by providing information about product knowledge, properties, and how to use it before and after sales and building long-term relationships with customers through the organization's main platform by communicating the same message through all channels to create a ripple force (impact) with an average value of 4.18 (S.D. = 0.76) and developing new packaging for the market, such as packaging that increases ease of use, such as herbal massagers in spray bottles, herbal inhaler bottles with herbal residue blockers, etc. The average value is 4.18 (S.D. = 0.79), respectively.

Comparing the differences of components of guidelines for the successful management of the herbal medicine manufacturing industry classified by production value

The difference in means between two independent population groups was determined using a t-test. When categorized based on business organizations' production value, the components of the guidelines were found to be generally important for the effective management of the herbal medicine industry. There are variations. Businesses with an annual production value of at least 20 million baht are given more priority than those with lower annual production values when it comes to ensuring the successful operation of the herbal medicine manufacturing sector. Twenty million baht annually. Table 2 indicates that they are statistically significant at the 0.05 level.

Table 2 Statistical values were used in comparing the differences in the importance levels of components of guidelines for the successful management of the herbal medicine manufacturing industry

Components of guidelines for the successful management of the herbal medicine manufacturing industry	t-Value	P-Value
The overall importance of the components	2.38	0.02*
1. Entrepreneurship	0.18	0.86
2. Pharmaceutical Industry Process	3.32	0.00*
3. Cooperation Network	2.24	0.03*
4. Market Innovation and Integrated Communication	2.43	0.02*

Structural equation model (SEM) of guidelines for successful management of herbal medicine manufacturing industry.

The statistical values used to assess the fit of the structural equation model of guidelines for successful management in the herbal medicine manufacturing industry before improvement revealed a root mean square error of approximation (RMSEA) of 0.062, which met the fit assessment criteria with empirical data. However, the chi-square probability value (CMIN-p) was 0.000, the chi-square correlation value (CMIN/DF) was 2.908, and the goodness-of-fit index (GFI) was 0.593, indicating that the empirical data failed to meet the fit criteria for assessment.

As a result, the researcher improves the model by considering the modification index values, as indicated by Arbuckle (2016), while also applying theoretical concepts and software program results. Inappropriate observational variables

were deleted one at a time, and the new model was run until it met all four statistical criteria. As a result, the structural quation model was deemed comprehensive and aligned with empirical evidence. After the model improvement and the structural equation model is fit. The empirical results were consistent (p-value = 0.079, CMIN/DF = 1.159, GFI = 0.963, RMSEA = 0.018). There is a statistically significant difference of 0.001, which is consistent with the literature and empirical data and meets the criteria of Arbuckle (2016). The guidelines for successful management in the herbal medicine manufacturing industry after model improvement, as shown in Figure 4 and Table 3.

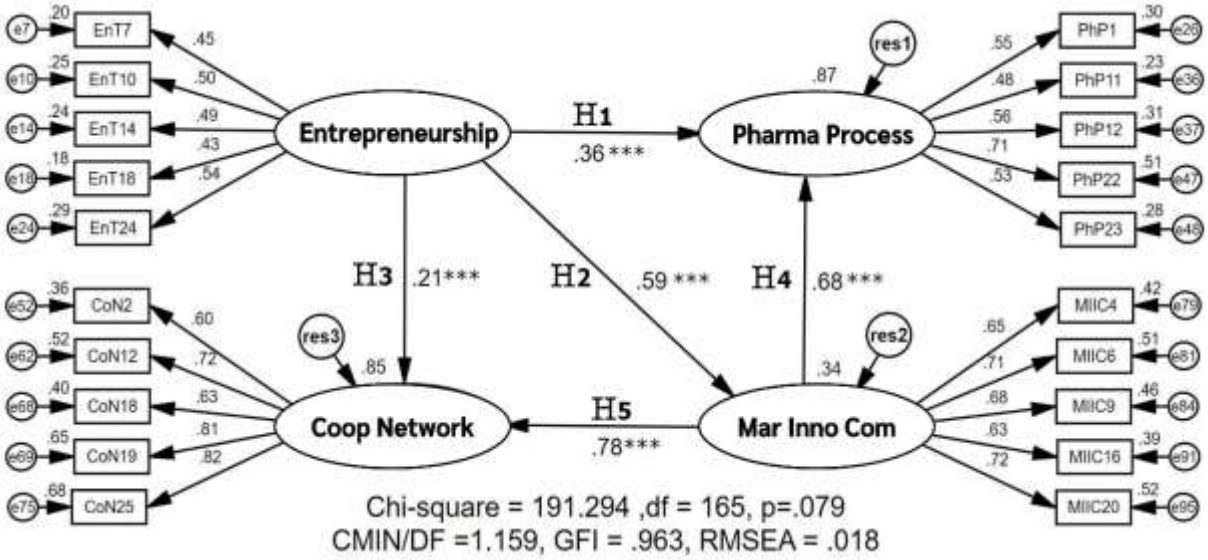

Figure 4 Structural Equation Model for Guidelines for successful management of the herbal medicine manufacturing industry after model improvement

Figure 4 shows the results of the hypothesis tests used to investigate the causal relationships between the latent variables in the model. Structural equation for the successful management of the herbal medicine industry. Five hypotheses were found in accordance with these assumptions.

H1: Entrepreneurship has a direct impact on the Pharmaceutical Industry Process; the value is statistically significant at the 0.001 level. The standardized regression weight was 0.36.

H2: Entrepreneurship has a direct impact on Market Innovation and Integrated Communication, which is statistically significant at the 0.001 level. The standard regression weight was 0.59.

H3: Entrepreneurship has a direct effect on the component of the Cooperation Network, which is statistically significant at the 0.001 level. The standard regression weight was 0.21.

H4: Market Innovation and Integrated Communication have a direct influence on the Pharmaceutical Industry Process. Statistical significance was set at 0.001 level. The standard regression weight was 0.68.

H5: Market Innovation and Integrated Communication has a direct influence on the Cooperation Network, which is statistically significant at the 0.001 level. The standard regression weight was 0.78

Table 3 Data values obtained from Structural Equation Model after model improvement

Latent Variables	Variable Items	Factor Loading	R^2	Variance	C.R.	P-Value
Entrepreneurship	EnT7	0.45	0.20	0.26		
	EnT10	0.50	0.25	0.31	6.835	***
	EnT14	0.49	0.24	0.34	6.780	***
	EnT18	0.43	0.18	0.40	6.262	***
	EnT24	0.54	0.29	0.32	7.097	***
Pharmaceutical Industry Process	PhP1	0.55	0.30	0.40		
	PhP11	0.48	0.23	0.48	8.653	***
	PhP12	0.56	0.31	0.33	9.620	***
	PhP22	0.71	0.51	0.28	11.163	***

	PhP23	0.53	0.28	0.30	9.276	***
Market Innovation and Integrated Communication	MIIC04	0.65	0.42	0.31	13.661	***
	MIIC06	0.71	0.51	0.31	15.001	***
	MIIC09	0.68	0.46	0.33	14.223	***
	MIIC16	0.63	0.39	0.41	13.199	***
	MIIC20	0.72	0.52	0.31		
Cooperation Network	CoN02	0.60	0.36	0.37		
	CoN12	0.72	0.52	0.34	12.865	***
	CoN18	0.63	0.40	0.41	11.612	***
	CoN19	0.81	0.65	0.24	13.857	***
	CoN25	0.82	0.68	0.27	14.013	***

*** Statistically significant at the level 0.001

Definition of variable item of each latent variable in Structural Equation Model after model improvement

Entrepreneurship

EnT7 Arrange for control documents to be made with production data recorded at every step for erification.

EnT10 Develop personnel capacity by making a training plan to have knowledge in the fields of Thai traditional medicine.

EnT14 Manage warehouse and transportation systems to maintain product quality.

EnT18 Control the expenditure in accordance with the budget set in the short, medium, and long-term plans.

EnT24 Regularly monitors government regulatory information to be used to benefit domestic business operations.

Pharmaceutical Industry Process

PhP1 Choose a temperature and humidity-controlled transportation management system to maintain quality.

PhP11 Use an automatic cube powder mixer to make medicine mix evenly.

PhP12 Develop equipment that connects traditional medicinal knowledge with modern technology.

PhP22 Scientific tools to be used in the quality control process.

PhP23 Develop a system for cleaning, drying, and storing tools and equipment.

Cooperation Network

CoN2 Consider and select various aspects of the supply chain network.

CoN12 Become a member of the Industry Council of the Herbal Products Industry Group.

CoN18 Support the activities of pharmacies by conducting promotional programs for pharmacies to increase sales opportunities and build brand awareness.

CoN19 Collaboration with the National Science and Technology Development Agency to develop innovative products.

CoN25 Seek investment promotion from the Board of Investment.

Market Innovation and Integrated Communication

MIIC4 Create marketing content that needs to be communicated for individual herbal medicinal products.

MIIC6 Create new products to the market from research that has been scientifically certified.

MIIC9 Digital marketing through search engine marketing and online shopping systems such as Shopee, Lazada, TikTok, Facebook.

MIIC16 Create valuable content and provide useful information about the product such as infographic.

MIIC20 Conduct marketing activities via drug stores.

DISCUSSIONS

The results revealed that Entrepreneurship Component had the highest average value.

The results revealed that the Entrepreneurship Component had the highest average value, with a value of 4.22. The empirical data demonstrates that entrepreneurship is critical to running the herbal medicine industry as efficiently as possible. Family-to-small entrepreneurs dominate Thailand's herbal medicine manufacturing industry. As a result, entrepreneurship is the primary link connecting other components to the success of herbal medicine management. In accordance with Gruber et al. (2024), who investigated firm founders in Greece during the crisis, a company's

performance is decided by its founder's human capital if they exhibit entrepreneurial traits. In line with Babak and Hosseini (2020), a study of 103 Iranian financial technology companies discovered that corporate and strategic entrepreneurship are likely to help organizations achieve consistent success. The findings of Hanandeh et al. (2024), who researched the entrepreneurial mindset of Jordanian founders, self-motivation and risk tolerance influence operational success and total firm performance. Same as stated by Namwong et al. (2021), successful businesses require CEOs with entrepreneurial qualities. This can be related to the implementation of established and used strategies in each situation.

The most important aspect of successful herbal medicine management is the provision of control documents.

The study found that the most important aspect of successful herbal medicine industry management is the provision of control documents that include production data at all stages. There were dates, times, and lot numbers for raw materials, packaging materials, and products for verification, with an average value of 4.53. This is in line with Rezaei and Trott (2018) who stated that entrepreneurial attributes should reflect the organization's operational procedures, methods of operation, and managerial style. They compare entrepreneurship attributes as a reflection of the organization's operational operations, which has a direct impact on the increasing trend of business success. Sames as Kerr et al. (2017) who proposed the Big Five paradigm of Entrepreneurs' Personality Traits. One from the Big Five is to promote mindfulness, meaning successful entrepreneurs must be meticulous in their planning, organization, and record-keeping, as well as successful resource management and adherence to work ethics.

Market Innovation and Integrated Communication is the highest direct influence on the Cooperation Network.

The results of the hypothesis test show that Market Innovation and Integrated Communication directly influence the components of the Cooperation Network. This is the highest direct influence on the weight value (standardized regression weight) 0.78 shows empirical data that when sales through various types of tools using digital marketing, it is more possible with great convenience and speed, along with the challenge of adapting to the sales cooperation network. Pharmacies, hospitals, and government agencies either promote and support, or control must adapt to the new way of working. Online sales may increase the number of buyers who can easily access herbal medicines; however, it is important to be careful about the safety and quality of the product, as well as compliance with relevant laws, to ensure that the herbal medicines sold are of high quality and safety.

Therefore, cooperation between public and private sectors throughout the supply chain is important. This is in line with Tolstoy et al. (2022) who conducted a study on the indirect impact of online marketing capabilities on the international performance of e-commerce enterprises in Sweden. International e-commerce is an integrated marketing and communication innovation that is a strong global trend driven by customer behavior. Better transportation and technology results show that online marketing capabilities are essential for marketing optimization. Reflected in both the market-driven and market access of the upgraded network, capabilities have increased. The same is true for Khonkhlong's (2020) research on Chiang Rai's opportunities and challenges as an herbal city, as well as its relationship with the Chinese market. He mentioned that Thai dramas and movies broadcast in China have stimulated a significant increase in exports. The Chinese government responded to this market event by restructuring and upgrading the health industry, including health products, rather than focusing solely on advertising. However, there is also a comprehensive policy to push the entire network through the "China Population Health Development Plan" (Healthy China). At the provincial level, the Yunnan government, which shares a border with Thailand, invested 3,140 million yuan. The establishment of the Yunnan Province Herbal Medicine Science and Technology Industrial Zone demonstrates that integrated marketing and communication innovation, once established, will force the cooperation network to adapt and respond.

The highest overall analysis result was in the Entrepreneurship influence of the overall Pharmaceutical Industry Process

Based on the results of the hypothesis test, it was found that the highest overall influence analysis result was in the entrepreneurship influence the overall Pharmaceutical Industry Process statistically significant at the level of 0.001 with a standardized regression weight equal to 0.76, showing empirical data that an organization with entrepreneurial management will be able to drive the change and development and creation of herbal pharmaceutical products and production processes according to the pharmaceutical industry guidelines that are accepted by the global market until they succeed. Both by pushing directly from the entrepreneurship of the organization's own executives and through market innovation and integrated communication, are in line with the statement that successful business organizations manage and develop cost-effective products for customers, most are business organizations that drive technological innovation. This is in line with the findings of Ilenwabor et al. (2024), who found that the development of new pharmaceutical products can be accelerated, and the quality of pharmaceuticals is also guaranteed. It is an improvement on the original important medicine by making it a new form of pharmaceutical product. New dosing

regimens, indications by using nanotechnology, as was the case with Thipyarat et al. (2017), when integrated marketing innovation and integrated communication cause strong marketing ripples and quickly reach consumers on a large scale. Protecting the image and brand of the organization, the product must be of high quality and come from a standardized manufacturing process. As a result, an extractor was developed to produce herbal products, and an innovation in the extraction of medicinal plants with a butane system under high pressure with supercritical carbon dioxide. This extract has a continuous medicinal effect.

The importance of the components of guidelines for the successful management of the herbal medicine manufacturing industry classified by production value is different.

The hypothesis testing results, when classified by the business's annual output value, revealed a significant difference at the 0.05 level. Companies with an annual output value of more than or equal to 20 million baht gave more importance to the components than organizations with an annual output value of less than 20 million baht. For the analysis of the difference in importance of the components of the successful management guidelines for the herbal medicine production industry by component basis, it was found that the pharmaceutical industry process, market innovation and integrated communication, and the cooperation network have a statistically significant difference at 0.05 level. Businesses with an annual production value of more than or equal to 20 million baht prioritize successful management of the herbal medicine manufacturing industry above businesses with a lower annual production value of 20 million baht. This could be because businesses with an annual production value of less than 20 million baht have a limited amount of budget, people, and time to allocate. According to Thongsamoot, S. (2023) study, which discovered major problems and obstacles in the law regarding safety control standards, such as the legal problem of obtaining product registration permits for operations under the guidelines for compliance with good production standards (Good Manufacturing Practice: GMP), this has affected a number of entrepreneurs, with even higher investment costs and overly stringent requirements compared to foreign laws. Small and medium-sized plant operators will have difficulty meeting the standards. This is congruent with the findings of Karemka, N. et al. (2024) on the status and problems faced by entrepreneurs in Thailand's herbal products industry as they prepare to implement the ASEAN Framework Agreement. In 2024, it was found that modifying rules and certification systems for herbal goods to meet ASEAN Framework of Agreement criteria was damaging to the industry. Most Thai entrepreneurs are modest to medium-sized, have minimal resources, and do not want to export herbal products overseas.

When integrated marketing and communication innovations create a strong marketing trend and reach a wide range of consumers quickly, it is a business opportunity on one hand, but on the other hand, it may seriously affect consumer confidence. Protecting the image and gaining back consumer confidence in herbal medicines, products must be of high quality and come from standardized production processes. Government agencies, through collaborative networks, must promote the education on entrepreneurial skills to herbal medicine manufacturers and develop financial plans to support the investment on pharmaceutical industry processes. In addition, Government regulations should be reviewed to be in line with target market countries to support the growth of the herbal medicine industry.

PRACTICAL IMPLICATION FOR ASIAN BUSINESS

The findings of this study offer valuable insights that can be practically applied to enhance the development and competitiveness of herbal medicine enterprises across Asian. By aligning with the diverse regulatory frameworks and strategic priorities of each ASEAN member state, these implications serve as a foundation for regional integration and sustainable industry growth. In summary:

Policy level

Policy Alignment and Compliance, the study provides a framework for herbal medicine businesses to navigate and comply with varying national policies, including product registration, safety standards, and intellectual property protection. This supports smoother cross-border trade and regulatory harmonization within ASEAN.

Strategic Business Development, Insights from the research can guide entrepreneurs and industry stakeholders in refining their production, marketing, and distribution strategies. Emphasis on quality assurance, eco-friendly packaging, and cultural branding can enhance consumer trust and brand positioning in both domestic and international markets.

Regional Collaboration and Innovation, the findings encourage multi-stakeholder collaboration among governments, academia, and private sectors to foster innovation, share best practices, and co-develop herbal products that reflect regional biodiversity and traditional knowledge.

Market Expansion and Cultural Diplomacy, by leveraging soft power and cultural identity, herbal medicine businesses can create compelling narratives that resonate with global consumers. This not only promotes commercial success but also strengthens Asian’s presence in the global wellness and natural health sectors.

Operational level

Herbal medicine entrepreneurs should promote entrepreneurship as follows: 1) Arrange for the preparation of control documents, with production data recorded at every stage, including dates, times, and lot numbers for raw materials, packaging materials, and products for verification. 2) Control production to ensure that products are of quality and safe according to industrial pharmaceutical principles and in accordance with the Food and Drug Administration. 3) Select each type of herbal raw materials that are of quality and meet the specified standards to enter the production process. 4) Forecast and plan finances 5) Decide to invest in production locations and machinery to meet GMP standards.

Herbal medicine entrepreneurs should promote the pharmaceutical industry process as follows: 1) Use scientific tools in the quality control process, such as checking concentration, testing stability, and moisture content. 2) Apply clean room and sterile room technology to pharmaceutical production sites to control the amount of dust and microorganisms. 3) Develop equipment that connects traditional medicine preparation knowledge with modern technology.

Herbal medicine entrepreneurs should promote cooperation networks as follows: 1) Promote the concept of participatory government administration to create cooperation with government agencies and related agencies through the Herbal Medicine Manufacturers Association. 2) Cooperate with the Food and Drug Administration in participating in training activities to gain understanding of regulations, rules and various permission requests, such as product registration requests, production site permit requests, and advertising permit requests. 3) Create a network of cooperation with herbal plant farmers from various areas without restrictions to obtain sufficient raw materials and reduce the risk of inconsistent essential ingredients.

Herbal medicine entrepreneurs should promote marketing innovation and integrated communication as follows: 1) Use certification symbols such as GMP, PIC/S, Halal, Premium Herbal Awards on the packaging. 2) Create a good experience for customers by providing product knowledge, properties, and how to use before and after sales. 3) Develop new packaging to be launched in the market, such as packaging that increases convenience of use, environmentally friendly packaging, etc. 4) Creative and legal advertising of herbal medicines, such as using social media influencers to have social media influencers talk about the product in a context related to health care or daily life. 5) Distribution channels should be promoted, similar as China, Japan, and South Korea, by increasing distribution channels so that herbal medicine products can be easily purchased at convenience stores.

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