A causal relationship model influences innovation in Thai herbal industry

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Abstract - The objective of this research was to present a causal model that influences innovation in the Thai herbal industry. The study process of this research was a mixed method. The quantitative research consisted of 14 observable variables. Data was collected from 280 companies in the herbal industry of Thailand. This qualitative research method was collected by a focus group from seven experts working in corporate innovation or in-house herbal product development and research to confirm the model derived from empirical data. The results of the research were as follows: 1. The causal relationship model affecting innovation in the Thai herbal industry was goodness of fit with empirical data. Index as follows: χ² = 136.72, df = 63, χ² / df = 2.17, CFI = 0.93, GFI = 0.934, SRMR = 0.0457, RMSEA = 0.065. From the model, the factors influencing innovation in the Thai herbal industry were knowledge management, marketing adaptation and business adaptation, respectively.

Keywords — Herb, Herb industry, Innovation

I. INTRODUCTION

At present, the Thai government has a policy to promote Thailand as a hub for herbs in the ASEAN region by 2025. There was a clearer plan for the development of Thai herbs by specifying Thai herbs as the main products for export. Thailand had encouraged research studies and searches for herbs that had outstanding properties and the use of herbs that had been discovered to produce a product that was reliable and accepted both domestically and internationally [1]. The study by the research team found that the important market situation in the herb export was Japan, China and America. The popular herbal consumption of the younger generation plays an important role in increasing the value of herbal products because as a health care alternative, they are viewed as safe and natural. It was estimated that each year the trade of medicinal and spice products to the world market could reach US $ 10 billion. Studies showed that the herbs of Thailand were the main components of the food and beverage industry, cosmetic industry, food supplement industry and the world medicine industry. Thai herbs that are popular in the Product Champion level are turmeric, Zingiber cassumunar Roxb, black finerroot and Centella asiatica. The herbs that are in demand since 2019 are paniculata, ginger and garlic. Therefore, Thailand saw that there was a tendency for herbs to be more demanding on the world market and could generate income and returns for farmers and entrepreneurs in Thailand [2]. The information on domestic and export market for herbs and herbal products in 2016 could be summarized as Figure 1.

In addition, the export value of Thai herbs, the researcher also found that it could raise the level of the Thai herb industry to have higher quality, which was in line with the study of the Kasikorn Research Center [3] on the analysis of market opportunities for herbal products. However, the major challenge for operators was to be reliable in various aspects, especially manufacturing standards, quality, safety, and creating a positive consumer experience.
Figure 1 shows the export value proportion of the herb industry of Thailand [4]

The quality of the herb business has been upgraded as follows:
- Standardized production control
- Ability to keep up with market trends
- Creating a good customer experience
- Communication about the safety of using herbs to the customers

In-depth study from the Information and Technology Center, Office of Small and Medium Enterprises Promotion [3] found that the herbal industry had a total of 1,316 entrepreneurs, comprising 1,305 SMEs (99.16%). As for SMEs employment, the herbal industry employed 24,209 people (82.28%) of the total employment in the pharmaceutical and herbal industries [5]. The study found that most of the herb industry was SMEs industry, so it needed to be developed to upgrade the product to be able to compete with herb exporters from different countries. Therefore, in order to upgrade the industry, SMEs needed to create innovations within the industry to achieve product upgrading and product development. In order for the Thai herbal industry to be innovative, researchers were interested in identifying the factors that influenced innovation in the Thai herbal industry to bring the research results to develop innovative herbal industry in Thailand systematically. It also helped to strengthen the Thai herbal industry and compete with manufacturers from many countries.

II. RESEARCH OBJECTIVES

The objective of this study was to present a model of causal factors influencing innovation in the Thai herbal industry.

III. LITERATURE REVIEW

In this research, the researchers followed the research framework obtained from in-depth interviews with reliable entrepreneurs along with studies from conceptual reviews, theories and related research for the development of the research framework. This research study had 3 main components: 1 knowledge management 2 business adaptation and 3 marketing adaptation. All 3 components affected innovation in the herb industry in Thailand. Figure 2 shows the conceptual framework of the research.
Figure 2 shows the conceptual framework of Causal Relationship Model Affecting Innovation in the Thai herbal industry.

The researchers had created a conceptual framework from the synthesis of theories and related research. It was found that "Causal Relationship Model Affecting Innovation in the Thai herbal industry" was caused by 4 factors as follows.

1. Innovation in the herb industry was due to the adaptation of entrepreneurs in the herb industry where they need new processes to develop or new things that need to emerge [6]. Moreover, the innovation of the herbal industry required the development of the fundamental stages of creating an organizational strategy for dealing with innovative creativity, being proactive, risk tolerance and making the right decisions [7]. There must be entrepreneurs who were involved in new ideas in development to be able to contribute to the support of products and services or technological processes that meet customer needs [8]. From the research team’s literature review, it was found that the concept of the researcher on the factors affecting innovation in the herbal industry was consistent. In terms of entrepreneurial adaptation, innovation was required to be involved in the development of the organization in order to gain a business advantage [9],[10]. This innovative influence may increase as the competitive environment changes [11], [12], [13]; [14]; [15]. The researchers also found that research by Jeff Y-J Chen, & Boris Urban, 2018[16] demonstrated entrepreneurial adaptation by adopting innovation to achieve sustainable SMEs performance and increase the competitiveness of the organization. The importance of innovation in the organization was vital to the survival of the organization. In research synthesis, it was found that there were four factors affecting innovation in the herb industry: 1 product innovation 2 innovative processes 3 marketing innovations and 4 management innovation

2. Business adaptation was the adaptation of the entrepreneur, which was the guideline for doing business in order to make the organization successful [17]. Entrepreneurial adaptation was an important step forward for SMEs before developing their marketing activities. Entrepreneurial adaptation would focus on developing new products, creating products and finding strategies for dealing with market competitors [18]. Entrepreneurial adaptation required innovative creativity, risk tolerance and a proactive approach from competitors [19]. The company would be more efficient if SMEs entrepreneurs had the ability to innovate and operate the business with new models [20]. The concept of both innovation and creativity was essential if SMEs would like to compete even better. In synthesizing relevant research, the researchers found three factors of entrepreneurial adaptation: 1 innovation 2 working proactive and 3 business risks.

3. Knowledge management was a mechanism for transferring the capability and knowledge of the company to learning and techniques, including new methods for developing knowledge and
increasing competitive advantage. Knowledge management was the primary goal of an organization. Learning was essential to the development of any organization, so every organization supported and encouraged continuous learning [21, 22, 23, 24, 25, 26, 27]. Knowledge management of the herb industry was due to the knowledge transfer process that was deeply embedded in the industry personnel. Therefore, the researchers had synthesized 3 factors affecting the cognitive management: 1 focusing on learning 2 shared vision and 3 Open-mindedness.

4. Marketing adaptation was the cornerstone of marketing theory. It was recognized that the marketing concept was the cornerstone of modern management and marketing strategy [28]. According to the company’s marketing concept, the aim was to make products and services meet customer needs, ensuring that products and services could be responsive and effective than competitors. Market-oriented companies understood customer needs by coordinating and sharing relevant information as well as creating superior value for their customers [29]. Companies should follow a more efficient and effective strategy than competitors in order to achieve defined goals and profitability. Marketing adaptation thus enables companies to take immediate action that enables them to respond to market dynamics by offering innovative new products and services [30]. Marketing adaptation was an entrepreneur’s effort to understand and satisfy the final needs. Essentially, the needs of the customer were clearly accepted so that they could meet the needs of the customer. Organizations must have extensive marketing knowledge and an effective learning model [31]. In matters of customer adaptation, competitor adjustment and coordination, the organization must have integrated marketing knowledge. The company must develop products and services to meet customer needs and satisfy customers, as well as gain more market share and create a sustainable competitive advantage [32]. Responding to consumer needs was done by using information obtained from marketing information, which could increase consumer satisfaction and ensuring that the organization had more opportunities to achieve its performance goals [33]. Market adaptation was a means of creating corporate sustainability because of the advantage in creating better value for customers. In other words, such a marketing strategy would give entrepreneurs the tools to ensure performance that is superior to their competitors. In the herbal industry market adjustment, there were 4 factors that affected the adjustment: 1 competitors’ adaptation 2 customer adaptation 3 coordination and 4 business images for recognition.

From the study of related research, the researchers had synthesized the conceptual framework as shown in Figure 2 and there were five hypotheses from researchers:

1. H1 Knowledge management influenced innovation in the herb industry.
2. H2 Business adaptation influenced innovation in the herb industry.
3. H3 Marketing adaptation influenced innovation in the herb industry.
4. H4 Knowledge management influenced business adaptation.
5. H5 Marketing adaptation influenced business adaptation.

IV. RESEARCH METHODS

This research was a mixed method. The quantitative research was collected from 280 samples from 1,316 companies in the Thai herbal industry [5]. There were 14 observable variables [34, 35, 36, 37] from the herbal industry group of Thailand using convenience sampling method. The tool was used as a closed-ended questionnaire with a Likert 5-grade scale scoring with IOC of 0.8-1.00 and Cronbach’s alpha of 0.85. The questionnaires were distributed manually and electronically. Qualitative research was a focus group by interviewing seven experts working in the field of innovation of the organization or in the development and research of herbal products in the organization. This was a selection of experts in the form of judgment sampling. There were
selection criteria: the sample group must be at the supervisor level or above and work experience in organizational innovation management or in the part of the development and research of herbal products for at least 10 years in order to confirm the model obtained from quantitative research

V. RESEARCH RESULTS

The results of the research team study using the Structural Equation Analysis (SEM) method showed that there were three latent variables and 13 observable variables. The interpretation of the results by Lisrel was confirming the consistency of empirical data by considering the Goodness of Fit. The results showed that $\chi^2 = 136.72$, df = 63, $\chi^2 / df = 2.17$, CFI = 0.93, GFI = 0.934, SRMR = 0.0457, RMSEA = 0.065, which were considered to pass the criteria of [32], [33] and the prediction coefficient of $R^2$ was 91.6%, shown in Figure 3.

Figure 3 shows Causal model for innovation in the herbal industry in Thailand

From Figure 3, it was found that Causal Relationship model Affecting innovation in the herbal industry in Thailand had Goodness of Fit with empirical data according to the criteria of [38] and total effect as shown in Table 1.

Table 1 shows the total effect of each relationship influence.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Direct Effect</th>
<th>Indirect Effect</th>
<th>Total Effect</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H_1$ Knowledge management influenced Innovation in the herb industry</td>
<td>0.38</td>
<td>0.12</td>
<td>0.50</td>
<td>Accepted</td>
</tr>
<tr>
<td>$H_2$ Business adaptation influenced Innovation in the herb industry</td>
<td>0.25</td>
<td>-</td>
<td>0.25</td>
<td>Accepted</td>
</tr>
</tbody>
</table>
From Table 1, we found that there were five hypotheses and all five hypotheses were accepted. There were effect sizes that could be sorted from descending as follows: 1) $H_1$ Knowledge management influenced Innovation in the herb industry. The effect size was 0.50 which was direct effect of 0.38 and indirect effect of 0.12. 2) $H_4$ Knowledge management influenced Business adaptation. The effect size was 0.48 which was direct effect of 0.48 and no indirect effect. 3) $H_3$ Marketing adaptation influenced Innovation in the herb industry. The effect size was 0.445 which was direct effect of 0.36 and indirect effect of 0.085. 4) $H_5$ Marketing adaptation influenced Business adaptation. The effect size was 0.34 which was direct effect of 0.34 and no indirect effect. 5) $H_2$ Business adaptation influenced Innovation in the herb industry. The effect size was 0.25 which was direct effect of 0.25 and no indirect effect.

Results of qualitative research

The results of a focus group interview of seven experts working on corporate innovation or in the field of herbal product development and research in the organization to confirm the model derived from empirical data, the results were the same, the model was accepted. Innovation in the Thai herbal industry must start from a good origin, that is, specialized knowledge in the field of Thai herbs, which consists of Thai traditional medicine recipes of the personnel within the organization. In Thai traditional medicine, it consisted of knowledge ranging from types of herbs, specific properties of herbs, how to optimize the properties of the herbs, the extraction of substances in the herbs, including the cultivation methods and methods of seeking herbs. Since ancient times to the present, a lot of knowledge had been created, but there were very few people who were knowledgeable and expert in herbs in Thailand. Therefore, in the herbal industry of Thailand, it was the first priority in knowledge management, especially the transfer of knowledge from generation to generation in order to maintain the knowledge of herbs in Thailand and to be able to further develop the application of Thai herbs to modern treatment. Therefore, it was consistent with the research results in the sense that knowledge management had the highest influence and the second rank of all influencing factors. In the center of innovation in the Thai herbal industry, it was found that the factors that influenced the innovation were marketing adaptation and business adaptation. From the opinion of the experts commented that the innovation of the herb industry in Thailand, apart from the upstream factor, that is good knowledge.
management, the factors that had direct effect on herbal industry innovation were market adaptation and business adaptation. This was because nowadays, the direction of consumer needs, both domestic and international, especially Asian countries, were paying attention to the issue of physical health as a priority. Most consumers value natural herbs and refuse to get the chemicals into their bodies. When considering the growth rate from the export value of Thai herbs, which was in line with the data of the Department of International Trade Promotion, Ministry of Commerce (36), indicating that in 2020, the export value of Thai herbs was in the hundreds of thousands of million baht. Thai herbs in the food supplement group had total utilization and export value of more than 80 billion baht. The spa group and its products were worth approximately 10,000 million Baht. Traditional medicine group based on Thai traditional medicine wisdom had a value of approximately 10,000 million Baht. Hence, experts pay more attention to the adaptation of the market in terms of being able to keep up with the upcoming opportunities. In addition, the business adaptation factor of the domestic herb industry was highly emphasized as most of the companies in Thailand were still SMEs, resulting in a delay in the business adaptation and did not keep up with consumer demand. This was in contrast to medium to large companies that can adapt more quickly. The herb market was still in high demand. To achieve innovation in the herbal industry in Thailand, industry companies need to make adjustments in both marketing and business adaptation. If the herbal industry in Thailand had no innovation, the Thai herbal industry would not be able to compete with many innovative competitors in many countries.

CONCLUSION AND DISCUSSIONS

This research was a research study to determine the causal relationship models that influence innovation in the Thai herbal industry. This research was a mixed method. In the study of knowledge management, marketing adaptation and business adaptation factors influencing Innovation in the herb industry, it could be summarized and discussed according to the following hypothesis:

H1 Knowledge management influenced Innovation in the herb industry. From the study of causal models that influence innovation in the Thai herbal industry, it was found that, the fundamental factor that directly influences innovation was knowledge management. This was because the herb industry in Thailand was different from other industries. An indispensable key factor in this industry was knowledge management, because innovation required knowledge that was passed down from generation to generation. In the herb industry, knowledge had been accumulated and had been passed down for more than 500 years. In each era, there would be additional knowledge, or innovation, which could be said all the time, as could be seen from the application of herbs to the treatment. Therefore, innovation in the Thai herbal industry required knowledge management factors. The study was consistent with M. Amin [21] I.Murtala and M. Shariff [22] and S. Suratna [23].

H2 Business adaptation influenced Innovation in the herb industry. According to the results of the study, it was found that the business adaptation of the companies in the herbal industry of Thailand was mostly SMEs. In most cases, adaptation could be slow, which directly affected industry innovation. In our study, it was found that the business adaptation of each company was different from that of the large companies. This was because large companies were involved in research and development that could continuously innovate. On the other hand, smaller companies adapted by embracing external innovation and making business adjustments to achieve internal innovation of the company. Therefore, the innovation of SMEs companies was slow and required
market changes and the knowledge of the personnel in the company to directly affected the innovation in the Thai herbal industry. According to studies, our research was consistent with that of Susanto and Wasito [20].

H3 Market adaptation influenced Innovation in the herb industry. In our study, it was found that, in addition to knowledge management, the market dynamics factors directly affected the innovation of the Thai herbal industry. The qualitative and quantitative results suggest that SMEs in the Thai herbal industry need market dynamics before innovation in their companies. As approximately 80% of companies were SMEs, innovation required market dynamics before innovation could occur within the company. This was because SMEs companies in Thailand still lack research and development but relied only on conveying the body from generation to generation and would adjust innovation only when the marketing changes. This research was consistent with Zafar et al. [32].

H4 Knowledge management influenced Business adaptation. The results were found that in the Thai herbal industry, the influencing factor on the Thai herbal industry was knowledge management. From the study, it was found that knowledge management factors influence industry innovation and directly affected business transformation since the herbal industry in Thailand relied on knowledge as a key factor for change. In addition, it was found that the business change of the industry was due to increased knowledge, which resulted in Thai herbs being able to be used as a treatment in place of chemical medicine. Therefore, business transformation required knowledge management to bring about change. The business change would affect the overview of the Thai industry in a better direction and increased the export of Thai herbs as well. This was consistent with the research of Muhammad et al. [25] Aris Tri Haryanto et al. [26] Zany and Elsina [27].

H5 Marketing adaptation influenced Business adaptation. The results of the study found that market changes directly affected business changes as the herb industry in Thailand still needs to change according to market trends. This was because most companies in the SMEs industry. Most industry companies were not market leaders, so the direction of market transition must be considered as a key factor in business transformation. However, the results showed that during the COVID-19 crisis, many SMEs had made adjustments based on the situation, herbal knowledge, consumer adaptation and market adaptation. The business was then analyzed and adjusted in order to respond to current events and to meet the needs of both domestic and international consumers. The study was consistent with Zafar et al. [32] and Yan et al. [33].

REFERENCES


