Original Article

Current status and future prospects of research and development operations in traditional and complementary and alternative medicine manufacturing small- and medium-sized enterprises: a 2014 company-based survey

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Background: Small- and medium-sized enterprises (SMEs) have played key roles in the economic growth and technical innovation of traditional and complementary and alternative medicine (T&CM). Research and development (R&D) are critical activities for industrial progress. This study aimed to characterize the current status of SME R&D activities and to explore manufacturers’ perceptions of R&D expansion.

Methods: Records of the distribution of T&CM SMEs and R&D resources detailed in the 2014 Statistics of Korea T&CM Industries survey, a previously conducted survey on the industrial status of the T&CM field, were reviewed. Data on the perceptions of R&D activities were investigated through a company-based survey covering 285 T&CM-manufacturing SMEs.

Results: Greater than 99% of the 13,636 T&CM manufacturers at the time of the study were SMEs employing less than 50 workers. Natural cosmetics manufacturing SMEs (NC SMEs) had the highest R&D expenditures. NC SMEs rely heavily on internal R&D operations, which may contribute to their strong need for R&D collaboration with public research institutions and expanded T&CM-promoted R&D programs. "Digestive system disorders" are the main target diseases for current herbal and dietary supplement manufacturing SMEs and herbal medicine manufacturing SMEs. These SMEs tend to view their own product-related business as a priority for future R&D investment.

Conclusion: This study represents the first attempt to assess SME perceptions of R&D activities. The findings herein can inform the design of sustainable programs that support R&D by reducing the gaps between the perspectives of T&CM product makers and policymakers.

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1. Introduction

Small- and medium-sized enterprises (SMEs) are the backbone of Korean industry. They are a vital source of jobs and comprise the primary driving force of technology development. Countries actively strive to nurture and support SMEs as engines for boosting their national economies. Because of the immense emphasis that has been placed on the health industry worldwide over the past 20 years, a diverse array of manufacturing-based SMEs has been established in South Korea, including businesses based on health foods, medicines, medical devices, and cosmetics. The industry of traditional medicine (TM) and complementary and alternative medicine (CAM) has markedly grown in conjunction with the recent shift toward patient-oriented care in medicine.

Research and development (R&D) is generally thought to be essential for organizational competition, innovation, and improvement. For firms to stay “alive” and remain competitive, they must innovate by implementing multidisciplinary technologies. However, because SMEs may not possess all the multidisciplinary technologies that are required to develop new products and often lack the resources for independent R&D investment, they tend to bolster their limited R&D resources with government-sponsored programs or interfirm R&D partnerships and collaborations. Using these approaches, SMEs must decide on the most efficient way to enhance their technologies, either through internal R&D activities or external R&D partnerships, particularly within the R&D cooperation framework. Internal R&D operations require extensive technical and scientific manpower and R&D infrastructure. In comparison, external R&D uses outside resources; thus, it can be an economical way to exchange knowledge, resources, and organizational learning. However, external R&D also carries potential disadvantages related to intellectual property rights.

Today, industries worldwide are faced with a new era of global competition, and manufacturers are forced to achieve world-class status to compete effectively in the global market. In recent years, Korean firms have tended to engage in high level R&D activity. In particular, small firms have been actively increasing their R&D expenditures. According to data from a survey of Korean SMEs in biotechnology, government R&D support was closely associated with the SMEs’ R&D activities. The scale of the traditional and complementary and alternative medicine (T&CM) industry is much smaller, and its infrastructure is even less developed, than that of the biotechnology industry. Furthermore, government T&CM funding sources are limited.

To gain a better understanding of the current status of R&D and assess the perceptions of SMEs regarding R&D expansion, the present study conducted a survey of 285 T&CM manufacturers in South Korea. We explored differences in the performance and R&D investments of the SMEs and assessed their employees’ perceptions regarding specific factors essential for R&D expansion. The results of the present study help to shape the current understanding of R&D performance among Korean T&CM manufacturers, and offer important implications for policymakers interested in the sustainable growth of the T&CM industry.

2. Methods

2.1. Data sources

The data on the number of employees and the R&D resources of the domestic T&CM enterprises were collected from the 2014 National Statistics of Korea T&CM Industries survey, which was conducted by our institute, the Korea Institute of Oriental Medicine. The statistical data covered all domestic T&CM enterprises. The data quality was approved by Statistics Korea. The data on SME R&D, the diseases targeted by T&CM products, and prospective T&CM businesses were collected from a series of questionnaires administered during our study.

2.2. Questionnaire

A company-based survey was conducted using a semistructured questionnaire with two main sections. The first section of the questionnaire asked the participants to characterize R&D in their firm (e.g., the presence of an internal R&D department, the amount of R&D resources, the target diseases of their products). The second section assessed the respondents’ perceptions about their own T&CM products as well as R&D expansion (e.g., the future growth of the T&CM business and the government support needed for R&D expansion). We consulted an expert panel to establish the content validity of our survey. A draft of the questionnaire was pilot-tested with relevant stakeholders until each domain was completely described via adjustments based on our panel’s recommendations. Prior to conducting the survey, we confirmed that the questions were clear, understandable, and presented in logical order. For example, for the question regarding the potential target diseases of currently manufactured products, the disease-related answer choices were originally cited from the International Classification of Diseases and Related Health Problems, 10th Revision (ICD-10). The disease-related terminology was adjusted to include more understandable terms according to the panel’s recommendations. One example is the use of “infectious disease” rather than “certain infectious and parasitic diseases,” which is used in the ICD-10. In addition, certain symptoms that were difficult for laypersons to classify, or that resulted from multiple lesions (e.g., liver disease, pain, brain/nervous systems disorders), were added to the questionnaire as a result of the pilot test. To collect accurate data, certain questions had multiple answer choices.

2.3. Participants

The questionnaire was administered by the FROMM Research Company (http://www.frr.kr), one of the largest third-party survey research providers in South Korea. We designed the survey to include a target sample of SMEs, which included SMEs with less than 50 workers, by applying proportional quota sampling. Eligibility was limited to company representatives or individuals in equivalent positions. The participants received an email with our questionnaire and a letter of invitation in January 2014. The individuals who were willing to participate in the survey provided informed consent. After the
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