

# Identifying Marketing Challenges of health-related knowledge-based products of the Technological Units Located in the Growth Centers of Tehran University of Medical Sciences

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## Abstract

**Background:** Marketing is a vital but less addressed capability in knowledge-based companies and is a leading contributor to challenges in this sector.

**Objectives:** This study aimed to identify the marketing challenges of health-related knowledge-based products.

**Methods:** This research is a qualitative study. The participants included 10 experts from technology units located in the growth centers of Tehran University of Medical Sciences, who were selected by purposive sampling and using the theoretical saturation index. Data were collected using semi-structured interviews and analyzed using MAXQDA version 10 and qualitative content analysis with an inductive approach.

**Results:** Data analysis led to the extraction of 4 main categories, including legal/regulatory, financial, infrastructural, and market factors. Each of these main categories consisted of several subcategories that described a specific aspect of the challenges of this field.

**Conclusions:** Legal/regulatory, financial, infrastructural, and market factors are among the marketing challenges experienced by technology units located in the growth centers.

**Keywords:** Marketing Challenges, Knowledge-based Companies, Knowledge-Based Products, Health Field

## 1. Background

Knowledge-based companies have attracted more attention as an important part of today's markets, especially in developing countries (1). These companies are mainly high-tech small- and medium-sized enterprises (SMEs) in the private sector, which are created and managed by professionals to commercialize innovations and inventions and localize technologies (2).

Knowledge-based companies play an important role in the economy by creating employment, contributing to the growth of gross domestic product (GDP), technological innovations, and stimulating other economic activities (3). About 80% of the world's economic growth has been created by these entities (4). The competitive advantage of knowledge-based companies is technology innovation. These companies have a special ability to use technology for rapid growth (5) and introduce their products and services in conditions of high uncertainty and the lack of a stable market by employing qualified human resources and innovative marketing strategies (6).

The activity of technology-based companies faces more risk in terms of product production and marketing at the domestic and foreign levels because, in addition to scientific ability, they must have the ability to produce and commercialize technological products (7). Knowledge-based companies should be careful not to define their mission based on product or technology and instead complement their technological skills with a set of marketing competencies (8). Marketing is crucial for these companies because missing or attracting even 1 customer can determine their survival (9).

According to Huggins, interorganizational and vendor network interactions in new product development are essential for success in technology-based markets (10).

Jasra et al. argued that financial resources, marketing strategy, technological resources, government support, business plan, and entrepreneurial skills are among the factors that are effective in the success of SMEs (11). Amini et al. introduced technology indicators, economic fac-



tors, and laws/regulations as the 3 main factors influencing knowledge-based companies (12).

In addition, Lampadarios classified the factors affecting the success of SMEs into 3 factors: entrepreneurial factors; owner age, gender, education level, experience and management skills, organizational factors; commercial networks, financial resources, customer relationship management, human capital, marketing and strategic planning and business environmental factors; political, economic, socio-cultural, technological, and legal environments (13).

Lekhanya conducted a study in South Africa and found that access to finance, skills and leadership, management skills, value of training, and personnel skills are among the main factors that affect the marketing of SMEs (14).

Marketing is a vital capability in knowledge-based companies (15), but many knowledge-based companies face fundamental challenges in entering the market or developing the market for their products (16). This is because the development of high-tech products is very difficult due to market insecurity, technological uncertainty, and competitive fluctuations (17).

Despite the growing need for knowledge-based marketing approaches, currently, there are only a few companies that have adopted such an approach or are trying to adopt it (18). Although these companies know they can profit through proper marketing, they lack the necessary marketing skills (19). Research has shown that 70% of SMEs fail in the first years of establishment (20), and their failure is often due to a lack of clear understanding of the market, poor cash flow, or limited marketing activity. Therefore, it is important for knowledge-based companies to understand the market, especially in the start-up and development stages, to maintain their survival (21). One of the challenges of the healthcare industry is the need to strategically reduce costs and customer satisfaction (22).

Ansari et al. identified the obstacles facing knowledge-based companies as the market inefficiency, governance-administrative barriers, inefficient union or organization, lack of skills and professionalism, and the internal inefficiency of the company (23).

Petrus claimed that poor business and financial planning, imperfect marketing, poor management, lack of access to funds, regulations, gender, inadequate financing, role of government, globalization, and inability to manage growth and access to markets were among the factors that lead to the failure of SMEs (24). Walt argued that insufficient raw materials, lack of skilled labor, financial constraints, and poor marketing approaches were the major marketing problems that SMEs face (25).

Kazimoto showed that SMEs would face challenges without knowledge of regulations and standards, financial support from the government, understanding of consumer needs and services, poor entrepreneurial skills, and weak network structure to access international marketing (26). Scheers found that factors such as com-

petition, establishing product demand, poor local small businesses, ineffective product marketing, and lack of market knowledge caused business failure in SMEs (20).

## 2. Objectives

Accordingly, it is necessary to pay attention to the production of knowledge-based products/services in the context of knowledge-based companies and growth centers to focus specifically on the market of these products and distinguish these markets from traditional markets. The health field is one of the most important sectors affected by the exponential improvement in health care products developed using modern technology. Meanwhile, health-related knowledge-based products and their related markets are also very important in terms of sensitivities in society. Therefore, examining the marketing challenges of health-related knowledge-based products the main goal of this research.

## 3. Methods

This qualitative study used inductive content analysis to examine the challenges of marketing knowledge-based products in health.

The inductive content analysis includes a process used to extract classes or themes from raw data based on valid inference and interpretation. In the inductive content analysis method, the researcher avoids using predetermined classes and instead allows the classes and their themes to emerge from the data. In this method, instead of starting the data collection by relying on the assumptions that came from the heart of a theory, the starting point is based on the question and purpose of the research (27).

In this study, data collection was performed through semi-structured interviews and note-taking during interviews. Based on the purpose of the study, the participants were selected from the experts and opinion makers of the technology units located in the growth centers of Tehran University of Medical Sciences who met the criteria for entering the study.

Inclusion criteria were having experience in the subject of the research, history of starting a business, history of research activity in the field of health, and interest in participating in research.

A purposive sampling method was used to select the participants. Sample selection continued until no new data appeared during the process of obtaining information. That is, the data collection continued until the theoretical saturation of the data was reached, and the total number of participants reached 10 people. It should be noted that interviews were conducted with all potential participants, who interview time was set with beforehand.

To comply with the ethical principles, the participants were first informed about the objectives and importance

of the research and participated in the study with their own consent. Also, for the purpose of audio recording, they were assured that their details would remain confidential and that they could withdraw from the interview whenever they wished.

Each participant was interviewed once. On average, each interview lasted about 45 minutes.

The face-to-face interviews started with a general question about the challenges of knowledge-based companies in the field of health in the marketing of knowledge-based products, and during the research, more sub-questions were used as follows: Have you developed a written business plan for your product/service? Have you ever felt the need to gain more knowledge in the field of marketing your product/service? If yes, in what areas? Have you had a coherent plan for marketing your product/service? Is the knowledge-based product/service marketing of the health sector different from other fields? What are the factors affecting the success of knowledge-based companies in the field of product/service marketing?

The analysis unit in this research was based on the unique view of the participants and derived from the real data of the text.

To analyze the data collected from the interviews, first, the whole texts were examined, and then there were read line by line by the researcher to understand each sentence. Next, the sentences were converted into smaller analysis units or semantic units (which were summarized in the next step), and primary codes were extracted. The codes were compared and classified based on their differences and similarities, and thus the main categories and subcategories were created. In this way, 4 main categories and 36 subcategories were obtained by the authors from the text of the interviews by using MAXQDA version 10.

To determine the validity of the data, content validity and face validity were used. To check content validity, the codes extracted from the participants' conversations were provided to participants to express their opinions about the codes. Accordingly, codes that did not convey their views were modified. To check face validity, codes and categories were reviewed by 2 experts familiar with qualitative research who had experience in health-related research.

#### 4. Results

Ten experts (6 males and 4 females) with work experience of 5 to 13 years participated in this study. Eight of them had PhD and above, and 2 had a master's degree.

Participants' areas of interest were stem cells, cell therapy, tissue engineering, biotechnology, biological materials, medicinal plants, information technology, medical education, medical informatics, diabetes education, biological products, preparation of reference standards for pharmaceutical impurity, production and research in the field of medical equipment, and service-educational

research.

About 50% of the participants in the research did not have a written business plan, and 90% of the participants felt the need to acquire more knowledge in the field of marketing, including customer identification, product introduction, product sales, marketing consulting, and product export. They believed that the manager of a knowledge-based company, based on his field of activity, must have sufficient ability and skill in the field of design, implementation, sales, after-sales service, distribution, and product/service packaging and should use the opinions of expert and knowledgeable consultants in this context.

30% of the participants emphasize coherent planning for product/service marketing, including attending domestic and foreign trade exhibitions, participating in related congresses and seminars, holding technical markets and conferences, conducting marketing research and establishing communication with activists in this field, and using their experiences for marketing their product/service.

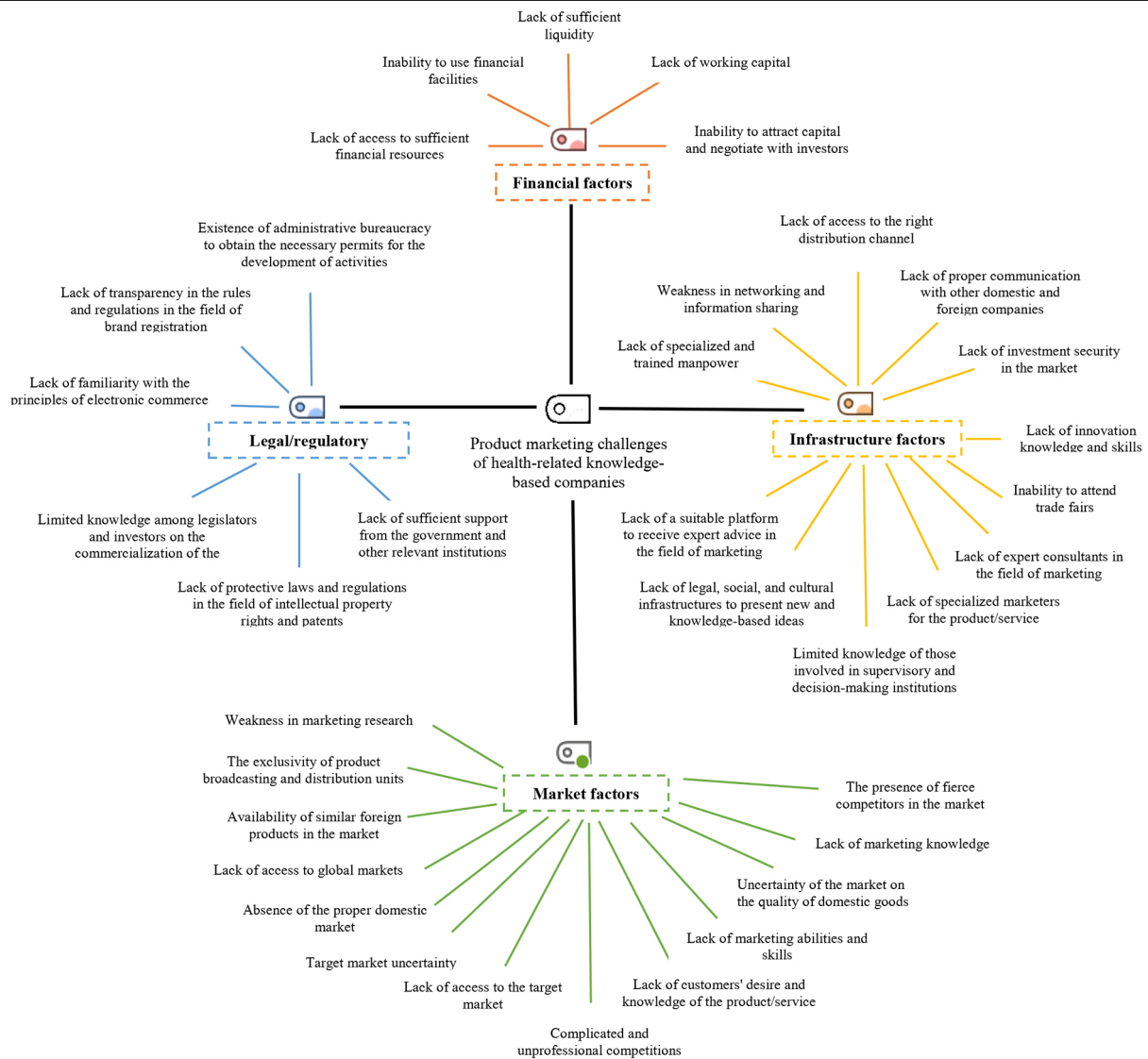
The participants stated the difference between the marketing of health knowledge-based products/services and the marketing of other products in terms of product/service quality, registration process, target groups, and customer decision-making process.

According to the participants, factors that affect the success of knowledge-based companies in the field of product/service marketing are the analysis of target market needs, clear definition of the product/service, quick recognition market changes, examining the intensity of market competition, producing products/services based on market needs, receiving necessary training by employees, supporting the government and other relevant institutions for domestic production, continuous communication with the research and development unit, using new technologies in product/service production, the ability to match market needs with existing technology, innovation in product and processes, the quality of the product/service, introducing the product to the customer in the right and suitable position, convince customers to use internal product/service, and employing a team of trained, creative technical experts with diverse expertise.

Based on the findings, the existing challenges of knowledge-based companies in the field of product/service marketing can be divided into 4 main categories: legal/regulatory factors, financial factors, infrastructural factors, and market factors; each of these main categories also includes subcategories (see Table 1). According to the participants, the most important challenges of knowledge-based companies in the field of marketing are the lack of familiarity with principles of electronic commerce, inability to use financial facilities, lack of access to the right distribution channel, and weakness in marketing research (Figure 1).

**Table 1.** Product Marketing Challenges of Health-Related Knowledge-Based Companies

Main Categories	No.	Subcategories	Frequency (%)
<b>Legal/regulatory factors</b>	1	Lack of familiarity with the principles of electronic-commerce	6 (60)
	2	Lack of sufficient support from the government and other relevant institutions	4 (40)
	3	Lack of protective laws and regulations in the field of intellectual property rights and patents	3 (30)
	4	Existence of administrative bureaucracy to obtain the necessary permits for the development of activities	3 (30)
	5	Lack of transparency in the rules and regulations in the field of brand registration	1 (10)
	6	Limited knowledge among legislators and investors on the commercialization of the product/service	1 (10)
<b>Financial factors</b>	7	Inability to use financial facilities	8 (80)
	8	Lack of sufficient liquidity	5 (50)
	9	Lack of access to sufficient financial resources	4 (40)
	10	Lack of working capital	3 (30)
	11	Inability to attract capital and negotiate with investors	2 (20)
<b>Infrastructure factors</b>	12	Lack of access to the right distribution channel	7 (70)
	13	Weakness in networking and information sharing	6 (60)
	14	Lack of specialized and trained manpower	5 (50)
	15	Lack of a suitable platform to receive expert advice in the field of marketing	5 (50)
	16	Inability to attend trade fairs	4 (40)
	17	Lack of proper communication with other domestic and foreign companies	4 (40)
	18	Lack of investment security in the market	4 (40)
	19	Lack of innovation, knowledge, and skills	3 (30)
	20	Limited knowledge of those involved in supervisory and decision-making institutions	2 (20)
	21	Lack of expert consultants in the field of marketing	2 (20)
	22	Lack of specialized marketers for the product/service	1 (10)
	23	Lack of legal, social, and cultural infrastructures to present new and knowledge-based ideas	1 (10)
<b>Market factors</b>	24	Weakness in marketing research	7 (70)
	25	Uncertainty of the market on the quality of domestic goods	6 (60)
	26	The exclusivity of product broadcasting and distribution units	6 (60)
	27	Availability of similar foreign products in the market	5 (50)
	28	Lack of access to global markets	5 (50)
	29	Absence of the proper domestic market	5 (50)
	30	Target market uncertainty	4 (40)
	31	Lack of access to the target market	4 (40)
	32	Lack of marketing knowledge	3 (30)
	33	Lack of marketing abilities and skills	3 (30)
	34	Complicated and unprofessional competitions	2 (20)
	35	The presence of fierce competitors in the market	1 (10)
	36	Lack of customers' desire and knowledge of the product/service	1 (10)



**Figure 1.** Challenges of health-related knowledge-based companies in the field of product marketing using MAXQDA version 10

Figure 1 shows the output of MAXQDA version 10, representing the challenges of health-related knowledge-based companies in the field of product marketing.

## 5. Discussion

This research aimed to investigate the marketing challenges of health-related knowledge-based products located in the growth centers of Tehran University of Medical Sciences. The obtained results showed that legal/regulatory, financial, infrastructural, and market factors are among the marketing challenges experienced by technology units located in the growth centers.

Our findings showed that despite the importance of the business plan for starting a business, the participants had many uncertainties and questions in the preparation of the business plan, and they acknowledged the need to

obtain detailed information in this regard. The business plan is an important and key element for any company that seeks success in its operations, and SMEs are no exception to this rule (28). It will produce a product; on the other hand, it facilitates the acquisition of detailed information from customers (29). Therefore, it is necessary for knowledge-based companies to prepare a written business plan for success.

Most of the participants emphasized gaining more knowledge in the field of product/service marketing. Marketing knowledge management helps to meet the needs of customers, collect information from competitors, create satisfaction and loyalty in customers, and the best efficiency and optimal performance in the organization (30). Therefore, it is necessary for knowledge-based companies to develop their marketing capabilities through marketing knowledge management to achieve a



sustainable competitive advantage.

In addition, our findings showed that a small percentage of the participants had a coherent plan for marketing their product/service. Marketing planning is an important capability that helps companies to purposefully organize the processes necessary to develop a marketing strategy and direct marketing activities (31). Therefore, it is necessary for knowledge-based companies to pay more attention to correct and timely planning to achieve sustainable success in their operations.

In examining the marketing challenges of knowledge-based products in technology units located in growth centers, one of the challenges was legal/regulatory factors. Its subcategories were the lack of familiarity with the principles of electronic commerce, lack of sufficient support from the government and other relevant institutions, lack of protective laws and regulations in the field of intellectual property rights and patents, existence of administrative bureaucracy to obtain the necessary permits for the development of activities, lack of transparency in the rules and regulations in the field of brand registration, and limited knowledge among legislators and investors on the commercialization of the product/service. Among the subcategories, the lack of familiarity with the principles of electronic commerce was the concern of the participants. This is consistent with the findings of Abed et al. (32), Kadam (33), and Gunawardana (34). Since electronic commerce affects the main dimensions of marketing activities of companies (35), it is necessary for knowledge-based companies to reduce marketing costs, improve the growth of sales markets, develop and implement a written program for their products to enter the virtual space, and use its capacities for marketing and selling their products and services.

Financial factors were among the other challenges emphasized by the participants. The inability to use financial facilities, lack of sufficient liquidity, lack of access to sufficient financial resources, lack of working capital, and inability to attract capital and negotiate with investors were among the subcategories obtained. According to the participants, the inability to use financial facilities was of great importance. This issue has also been raised in studies conducted by Karadag (36), Kudlyak and Sánchez (37), and Eggers (38). The existence of a comprehensive and efficient financing system and the easy access of knowledge-based companies to financial resources, especially in the initial stages of establishment, can improve efficiency, increase the quality of products and services, and achieve success in competitive or new markets. Therefore, it is necessary for the government and relevant institutions to provide the necessary platform for the creation and development of knowledge-based companies by providing financial facilities, facilitating the financing process, and ensuring their access to financial resources (39).

Infrastructural factors are another challenge that was noticed by the participants. Its subcategories were lack of access to the right distribution channel, weakness in

networking and information sharing, lack of specialized and trained manpower, lack of a suitable platform to receive expert advice in the field of marketing, inability to attend trade fairs, lack of proper communication with other domestic and foreign companies, lack of investment security in the market, lack of innovation knowledge and skills, limited knowledge of those involved in supervisory and decision-making institutions, lack of expert consultants in the field of marketing, lack of specialized marketers for the product/service, and lack of legal, social, and cultural infrastructures to present new and knowledge-based ideas. According to the participants, lack of access to the proper distribution channel was one of the most important subclasses. The findings are consistent with the studies conducted by Fayaz and Azizinia (40) and Naghavi Alhosseini et al. (41). The distribution channel is a key issue for any type of business enterprise because it is an important part of the value chain, and the effectiveness of the value chain practically depends on it (3). Considering the role and importance of the distribution channel in the success of the marketing strategy, it is necessary for knowledge-based companies to scrutinize this regard.

Another challenge was market factors, which was raised as an important and effective challenge in the marketing of knowledge-based products. Its subcategories were weakness in marketing research, uncertainty of the market on the quality of domestic goods, the exclusivity of product broadcasting and distribution units, availability of similar foreign products in the market, lack of access to global markets, absence of the proper domestic market, target market uncertainty, lack of access to the target market, lack of marketing knowledge, lack of marketing abilities and skills, complicated and unprofessional competitions, the presence of fierce competitors in the market, and lack of customers' desire and knowledge of the product/service. Among the subclasses, weakness in marketing research was among the factors underlined by the participants. The results are consistent with the findings of Greenland and Kwansah-Aidoo (42), Malhotra (43), and Karimjanova and Soliyeva (44). Marketing research is the process of collecting, analyzing, and interpreting market and product information that provides details about existing customers and helps target new customers. Shatanawi et al. also discussed the role of research in creating and implementing successful marketing programs and provided a deep understanding of market research and the process involved in achieving the required objectives, which is consistent with the findings of the present study (45). Therefore, knowledge of the market situation will help knowledge-based companies to better adapt themselves to market conditions and finally choose the right path according to their goals.

## 5.1. Conclusions

The technology ecosystem based in universities and

academic growth centers, as the most important component of the knowledge-based economy, needs more focus on marketing and market management. Despite the fact that due to the establishment of protective laws for the production of knowledge-based products in Iran, the movement toward the creation of knowledge-based wealth has begun, but there is still a considerable way to go until the completion of this cycle from the stage of ideation to gaining market share.

In recent years, more efforts have been made to acquire and develop technical knowledge related to organized knowledge-based products, and the market and marketing of knowledge-based products have been less systematically considered. Therefore, it is suggested to define a special and localized model for the marketing of knowledge-based products based on the concluded needs, which should be taken into consideration by various stakeholders. In this case, in addition to acquiring and developing the share of domestic markets with a clear model, the activists of the technology and knowledge-based ecosystem of the country can think of acquiring the share of global markets of knowledge-based products.

This study has some limitations. One of them is the difficulty in accessing actors from other knowledge-based fields other than the health field, which will make it difficult to generalize the results to those fields. However, the basic needs of the actors of this ecosystem largely overlap with each other. Among the other limitations of this study is the inclusion of only 1 university as the study field, which was mainly due to the unique structure of knowledge-based productions in this university, unlike other universities in the country.

For future research, it is suggested that researchers investigate these factors in other businesses and industries.

The authors are designing and implementing additional studies to develop a localized marketing model for knowledge-based products, the results of which will be published soon.

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#### Conflicts of Interest

The authors declare that they have no competing interests.

#### Authors contribution

N. Z. designed the study. S. N. contributed to collecting data and drafting the manuscript. N. Z., CH. V. and A. N. supervised the development of the work. All authors read and approved the final manuscript.

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