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Research Article

Presenting the Model of Health Technomarts with the Approach of Marketing Knowledge-Based Products: Grounded Theory

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Abstract

Background: Knowledge-based companies often prioritize the scientific and technical aspects of their products, while marketing considerations receive less attention. However, to achieve a competitive advantage, it is essential to address both technological and marketing dimensions. Fan markets emerge as valuable tools to facilitate technology development activities and strengthen the technology market.

Objectives: The present study aimed to provide a model for the health technomart with the approach of marketing knowledge-based products.

Methods: This research is qualitative and was conducted using the grounded theory method with the Glaser approach. Data were collected through semi-structured interviews with 10 purposefully selected health experts. Data analysis was performed in three stages: Open, selective, and theoretical coding, using MAXQDA version 2020 software.

Results: Data analysis resulted in the extraction of 156 open codes, 21 sub-categories, and 7 main categories. The results indicated that management of technology development and transfer, technology development infrastructures, technology policy, technology market management, technological product development, institutional factors related to technology development, and improving the technological business environment are the main categories of health technomart with the approach of marketing knowledge-based products.

Conclusions: This model can facilitate the effective marketing of knowledge-based health products and provide actionable insights for policymakers and innovation managers aiming to strengthen a dynamic and competitive health technology market.

Keywords: Knowledge-Based Products; Marketing; Health Field; Technomart

1. Background

Knowledge-based products play a crucial role in the economic development of countries, with changes in knowledge and technology increasing the number of these products (1). According to the Deputy Research and Technology of the Iran Ministry of Health and Medical Education, 8,891 knowledge-based enterprises are active in the country, with 1,313 companies operating in the health field (2). Marketing is fundamental to the development of knowledge-based products (3). McIntosh and Bouteri assert that successful marketing efforts depend on employees' ability to quickly adapt to strategic and marketing changes (4). Diehr and Wilhelm emphasize that successful marketing of knowledge-based products requires various resources, including knowledge, experiences, talents, infrastructure, customers, reputation, business relationships, and financial sponsors (5).

Cho and Lee found that for successful product development, managers must be aware of market approaches to closely examine market opportunities and trends by researching customers (6). The health field is not exempt from this rule and has embraced marketing. Anderson et al. identified marketing skills as key tools for success in the health field (7). According to Lim and Ting, marketing plays a vital role in health by linking applicants and service providers and helping providers create, communicate, and deliver value to the target market (8).

Knowledge-based enterprises must recognize that both technological and market conditions are rapidly changing, necessitating attention to both technological and marketing aspects (9). Evidence shows that few knowledge-based enterprises have adopted a marketing approach, as their products are often new and sometimes intangible technologies, with new technology adoption always involving customer uncertainty (10). Arnolds and

Venter noted that many small and medium-sized enterprises face marketing challenges, such as lack of employee motivation and insufficient financial resources, leading to the hiring of incompetent employees for marketing strategies (11). Gilmore and Carson highlighted that many small and medium-sized enterprises fail due to a lack of market understanding, poor cash flow, and limited marketing activity, underscoring the need to monitor the market during start-up and development stages (12).

Although technology development is important, marketing is also needed to turn advanced technology into a competitive advantage (13). Because high-tech companies exploit and change rather than consolidate and defend the status quo, the interdependence between technology and marketing is of critical importance (14). In this regard, one of the tools considered to facilitate technology development activities and strengthen the technology market are technomarts (15). Technomarts create a market for the supply and sale of technology and, as professional intermediaries, establish strong relationships between technology suppliers and applicants (16). In this market, specialized and technical services such as technology consulting, information services, assistance in establishing research and development capabilities, and feasibility studies of technologies and products are provided (17).

The success of technomarts depends on the formulation of intellectual property law, the training of skilled and expert personnel in fields related to technomart operations, cooperation between different organizations, and the creation of a transaction culture (15). According to Aazami, factors such as technology marketing, consulting and technology transfer, legal factors, and financial provision are effective indicators in the commercialization of knowledge-based products within the technology market context (16). Tarhani et al. identified the most important factors affecting the formation of technomarts, including the development of standards and patterns required for sales, focusing on the field of science in technology supply, financial resources allocated to support technology, and facilities for industry modernization and improvement (18).

Chis and Crisan suggested organization, expertise, collaboration, technology, and customer acquisition capacity as key for technology transfer success (19). Jung et al. highlighted the most important success factors of technology commercialization as marketing ability, cooperation with developers, and efforts for technical improvement (20).

2. Objectives

Due to the weakness in knowledge and marketing skills of knowledge-based enterprises and the role of technomarts in introducing and supplying technological products and services, developing a health technomart model with the approach of marketing knowledge-based products was considered.

3. Methods

The present study aimed to provide a model for the health technomart with an approach focused on marketing knowledge-based products. This qualitative research was conducted using the grounded theory method based on the Glaser classical approach. Grounded theory is a method for generating a theory through a set of interrelated factors (21), involving steps such as continuous data collection and analysis, data comparison and supplementation, data summarization, concept modification, category development, and identifying relationships between categories (22).

Despite an exhaustive search, no comparable or closely related background that could serve as a discussion platform was identified. Additionally, only a limited number of relevant experiences were observed within the statistical population. Consequently, we employed the grounded theory method with the Glaser approach to achieve our research goal. Participants in this research were health experts, selected based on criteria including a history of activity in the knowledge-based ecosystem, familiarity with technomart concepts, experience in organizing or participating in health technomarts, and a history of conducting research activities in the health field.

A purposeful sampling method was used to determine the sample, continuing until theoretical saturation was achieved. Theoretical saturation occurs when no new information emerges that can further develop the theory (23). From the seventh interview onwards, repetition was observed in the information received, but for greater certainty, interviews continued until the tenth participant. Therefore, theoretical adequacy was obtained by examining the opinions of 10 participants.

Data were collected through semi-structured interviews. Interviews began with a question about the concept of the health technomart, followed by sub-questions such as: What is the reason for the formation of the health technomart? How is the health technomart effective in marketing knowledge-based products? What factors attract customers to the health technomart? What are the success factors of the health technomart? What infrastructures are necessary to create a health technomart? What solutions can improve the performance of the health technomart?

Interviews were conducted face-to-face at locations deemed appropriate for the interviewees, usually their workplaces. The questions were sent to the interviewees in advance, and the interview times were determined by the participants. Each interview lasted an average of 45 minutes, with each participant interviewed once. The interviews were recorded with permission and subsequently transcribed and entered into MAXQDA software version 2020.

Data validation was conducted using the four criteria of Lincoln and Guba: Credibility, transferability, dependability, and confirmability (24). For credibility, the findings were shared with participants for their feedback. In terms of transferability, an example of the interview text was included in the research findings section. For dependability, the findings were reviewed by experts familiar with qualitative research and experienced in health research activities. Regarding confirmability, the findings were reviewed and revised multiple times. Data analysis was conducted in three stages: Open, selective, and theoretical coding.

4. Results

The interviews aimed to discern the dimensions and technical components of health technomarts with the approach of marketing knowledge-based products. To achieve this goal, we engaged in discussions with 10 health experts: 5 in pharmaceutical products, 2 in medical equipment, and 3 in health technology. The companies had an average activity history of 11.2 years. Table 1 presents their characteristics.

Table 1. Characteristics of Participants

Field of Activity	Gender	Education	Experience	Position
Pharmaceutical products	Men	PhD	18	CEO
Pharmaceutical products	Men	PhD	12	CEO
Pharmaceutical products	Men	PhD	10	CEO
Pharmaceutical products	Men	PhD	13	CEO
Pharmaceutical products	Men	PhD	15	CEO
Medical equipment	Men	PhD	11	CEO
Medical equipment	Men	PhD	13	CEO
Health technology	Men	PhD	5	CEO
Health technology	Men	PhD	8	CEO
Health technology	Men	PhD	7	CEO

To address the research questions, we analyzed the interview data using open, selective, and theoretical coding techniques, allowing us to identify both main and sub-categories.

(1) Open coding: After transcribing the interviews, transcripts were examined word by word to extract key points from each sentence. In some cases, vivid concepts were directly used as codes, while in others, hidden concepts were assigned titles and considered as codes. Throughout the research process, codes were revised and modified multiple times, resulting in the extraction of 156 open codes. Table 2 provides examples of the open coding process.

Table 2. Some Examples of the Open Coding Process

Highlighted Points in the Interviews	Extracted Codes
Technomart creates an opportunity for technology owners to introduce their technology-based and innovative products to applicants, investors, and industry owners along with images and catalogs.	Platform for product introduction to customers
One of the problems of knowledge-based enterprises is attracting investors. In technomart, it is possible to attract capital for the commercialization of knowledge-based products in the field of health. In the technomart, researchers and investors negotiate by holding various meetings in order to attract capital, and by presenting their capabilities, the development of technology-oriented businesses is provided.	Negotiation of technology owners and investors to attract capital; a suitable platform for technological business development
Before starting the technomart, it is better to inform the customers and the main audience with appropriate information, for example, through social networks, media, etc. Necessary coordination for holding technomart, correct information, conducting appropriate survey to improve the next courses are success factors in technomart.	Strengthening the infrastructures of information and advertising; reviewing the previously held technomarts
Industries are encouraged to invest in these projects by participating in technomart and after getting to know the technological plans of knowledge-based enterprises and startups. This work is effective in the development of knowledge-based economy.	Creating investment opportunities for industry owners; helping to develop the knowledge-based economy
Marketing and sales are one of the important pillars of knowledge-based enterprises. Knowledge-based enterprises should pay attention to the issue of marketing and identify and penetrate domestic and international markets. technomart provides the basis for the entry of knowledge-based health products into domestic and international markets.	Identification and influence in domestic and international markets

Technomart is a technology transfer platform between suppliers and applicants and facilitates the process of technology transfer from university to industry.	Technology transfer platform between suppliers and applicants
If technomart wants to be successful, it should not be limited to time and place and should be held permanently. The regular holding of technomart can play a role in informing the performance of technomart and identifying the technological needs of industries.	Regular holding of technomart
The government plays an important role in facilitating the connection between the university and the industry and can help to establish and maintain the connection between the university and the industry by implementing appropriate incentive programs. There should be a relationship between the government, university and industry, and until this relationship is established, universities cannot move towards an entrepreneurial institution.	University-industry-government cooperation and communication

(2) Selective coding: In this step, categories were formed by grouping open codes. Open codes were compared, and conceptually related and similar codes were grouped, resulting in sub-categories. These sub-categories were then grouped again at a higher level to form main categories. This stage resulted in 21 sub-categories and 7 main categories. Table 3 illustrates the selective coding process.

Table 3. Selective coding process

Main categories	Sub-categories	Components
Management of technology development and transfer	**Technology development**	identification of technology capacities available in the market
		facilitation of technology development activities
		the possibility of localization of technological products
	Technology transfer	technology transfer platform between suppliers and applicants
		conclusion of partnership agreement between suppliers and applicants
		establishment of technology transfer offices in universities
Technology development infrastructures	**Human resources**	the use of human resources specialized in marketing
		the efficient management for managing the technomart
	Information resources	providing specialized consulting services in various fields of technology
		strengthening the infrastructure of information and advertising
		creating a comprehensive database of companies and products
	Physical resources	the existence of suitable hardware and software
		allocating suitable physical space to applicants
		public access to technomart
		creating an e-commerce platform, especially in the international field
	Financial resources	attracting sponsors for the commercialization of technological products
		attracting venture capitalists to invest in ideas
		creating the opportunity to attract research grants for researchers
		negotiating with technology owners and industry owners to attract capital
		granting long term financial facilities to expand the activities of the companies
		allocating enough funds to hold the technology market
Technology market management	**Market research**	identifying the appropriate target market for suppliers
		creating opportunities for marketing and selling technological products
		identifying and influencing in domestic and international markets
	Customer attraction	identifying potential and actual customers and their needs
		the platform for introducing the product to customers
	Identification of competitors	knowing and analyzing competitors
		the presence of foreign competitors in the market
		creating a competitive environment between companies
	Distribution channel	the role of intermediary between technology applicants and suppliers
		elimination of inefficient intermediaries
		product distribution among applicants by marketing specialists

Technological product development	**Product characteristics**	product quality
		product price comparison
		product design improvement
	Competitive advantage of the product	completing the product value chain
		matching the product with the needs of the industry
		the possibility of providing product samples to applicants
Technology policy	**Planning**	interaction with activists and expert officials
		holding technomart in a targeted manner
		taking a model from similar international markets
		periodically holding technomart
		possibility to participate in the technomart for new companies
		a platform for communication and interaction with famous companies
	measurement and evaluation	the initial evaluation of companies before participating in the technomart
		the evaluation of the technomarts held
		diversity in the type of companies present in the technomart
Improving the technological business environment	**Independence and self-sufficiency**	helping to facilitate the licensing process and removing production barriers
		saving currency
		helping to develop the knowledge-based economy
		producing independence and reducing dependence on other countries
	Promotion of entrepreneurial culture	creating a suitable platform for technological business development
		promoting the culture of using domestic products
	Commercialization of technology	the commercialization platform of technological products
		facilitating the commercialization process of product-oriented research
	Improvement of technological capabilities	holding educational workshops in various fields of technology
		creating a platform for transferring information and technological experiences
		promoting knowledge in the field of technological products
Institutional factors related to technology development	**Universities and research centers**	platform for identifying talents in the field of technology and introducing them to policy makers
		supporting universities for product-oriented dissertations
		creating interaction and developing cooperation between technology owners
		supporting ideas and turning it into a product
		completing the product and entering it into the market
		supporting the intellectual property rights of the technology owners' ideas
	Industry	establishing interaction and direct communication between suppliers and applicants
		creating investment opportunities for industry owners
		training the expert force needed by the industry by the university
	Government	university-industry-government partnership and communication
		support of government and private organizations for domestic technological products
		government presence in the technomart
		examination of the challenges of technology-oriented companies and providing solutions by officials
		preventing the importation of similar domestically produced products by the government

(3) Theoretical coding: In this step, the obtained categories were related to each other to form a conceptual model. For this purpose, Glaser's coding families, titled 6 C, including causes, covariances, contingencies, mediating conditions, consequences, and environmental context, were used (25). Table 4 shows the dimensions of this family. The outcomes of our interview data analysis, visualized in Figure 1, were obtained using MAXQDA software.

Table 4. Coding Results and Components of 6 C

6 C and Sub-categories	Main Categories
1-Causes	
Technology development, technology transfer	Management of technology development and transfer
2-Covariances	
Human resources, physical resources, information resources, financial resources	Technology development infrastructures
3-Contingencies	
Market research, customer attraction, identification of competitors, distribution channel	Technology market management
Product characteristics, competitive advantage of the product	Technological product development
4-Mediating conditions	
Planning, measurement and evaluation	Technology policy
5-Consequences	
Independence and self-sufficiency, promotion of entrepreneurial culture, commercialization of technology, improvement of technological capabilities	Improving the technological business environment
6-Environmental context	
Universities and research centers, industry, government	Institutional factors related to technology development

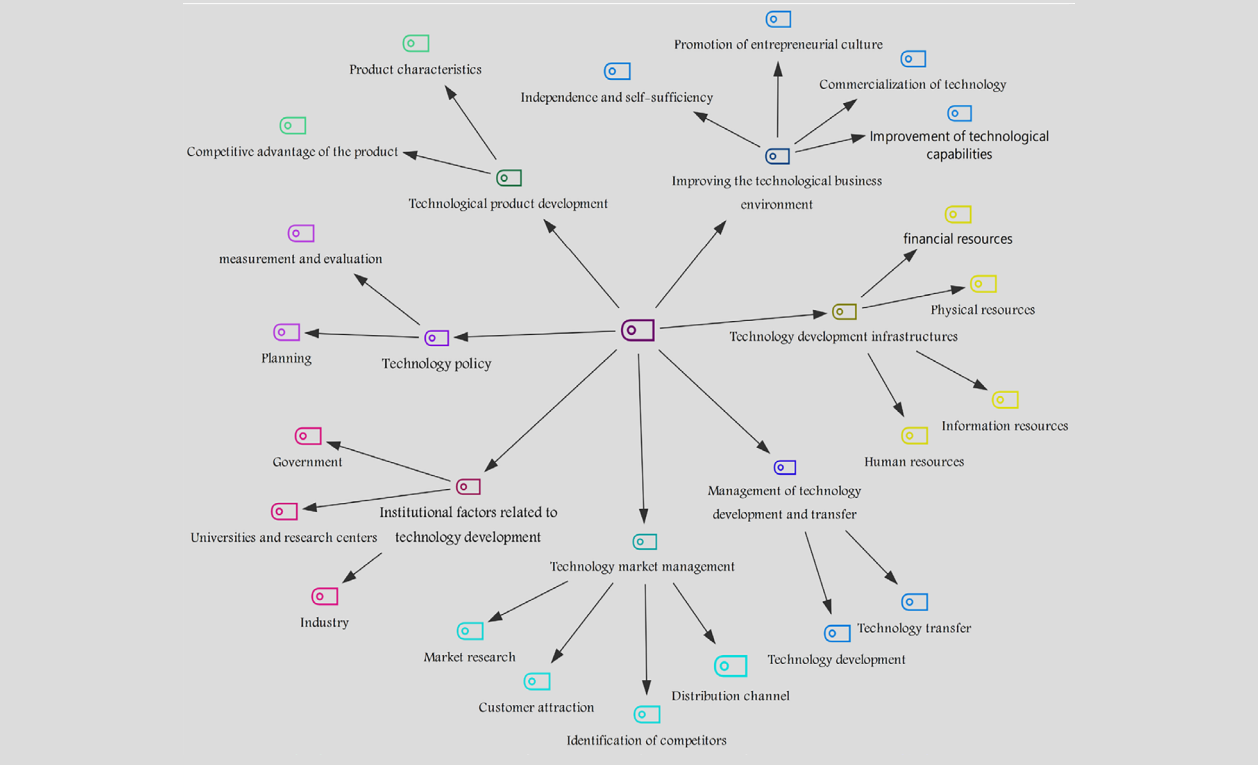

Figure 1. Codes resulting from coding in MAXQDA software

4.1. Description of the Components of the Health Technomart Model

The following section explains each component presented in the technomart model of the health sector.

Health Technomart as a Core Phenomenon

Health technomarts were identified as the core phenomenon of this research. These technomarts serve as venues where suppliers and applicants of technological and knowledge-based health products communicate and

obtain necessary information and advice in health-related technological fields.

4.1.1. Management of Technology Development and Transfer (Causes)

Causes reflect the reasons and explanations for the occurrence of the core phenomenon, including technology development and transfer.

(1) Technology Development: Components related to technology development in this research include facilitating technology development activities, identifying available technology capacities in the market, and enabling the localization of technological products. One interviewee stated, "Technomarts create conditions and the possibility of localizing technological products. With the help of innovation and technology, the health field has been able to localize many of its needs by relying on domestic capabilities and respond to industry needs by producing domestic products".

(2) Technology Transfer: Components related to technology transfer include providing a technology transfer platform between suppliers and applicants, concluding partnership agreements, and establishing technology transfer offices in universities. One participant noted, "Technomarts provide a platform for technology transfer between suppliers and applicants and facilitate the process of transferring technology and research findings from universities to industry". Another participant added, "In technomarts, an opportunity is provided for knowledge-based companies, investors, and industry owners to negotiate directly and, if desired, sign cooperation contracts for business development".

4.1.2. Technology Development Infrastructures (Covariances)

Some causes act as driving and supporting forces for the main causes. In this research, they include human resources, physical resources, information resources, and financial resources.

(1) Human resources: Components of human resources include utilizing specialized marketing personnel and efficient management for technomart operations. One participant believed, "The presence of expert and capable staff with the ability to properly present products in booths can attract the attention of technomart customers".

(2) Physical resources: Components of physical resources include suitable hardware and software infrastructures, allocating appropriate physical space to applicants, public access to technomarts, and creating an e-commerce platform, especially internationally. A contributor stated, "To realize a knowledge-based economy, we need appropriate information technology infrastructure to enable data and knowledge-based product transfer". Another participant mentioned, "Allocating appropriate booths to knowledge-based companies and applicant universities can attract the attention of technomart customers".

(3) Information sources: Components of information sources include providing specialized consulting services in various technology fields, strengthening information and advertising infrastructure, and creating a comprehensive database of companies and products. One participant noted, "Before starting the technomart, it is better to inform customers and the main audience by notifying and advertising in appropriate spaces such as universities, industry, social media, and government institutions to achieve the main goals faster". Another participant believed, "Technomarts can play a role in creating a database of knowledge-based products in the health field to facilitate needs assessment".

(4) Financial resources: Components of financial resources include attracting sponsors for the commercialization of technological products, attracting venture capitalists to invest in ideas, creating opportunities to attract research grants for researchers, negotiating with technology and industry owners to attract capital, granting long-term financial facilities to expand company activities, and allocating sufficient funds to hold the technology market. One contributor stated, "Technomarts play a role in attracting venture capitalists to invest in technological ideas and projects, and technology owners must seek investors and attract capital to achieve success". Another participant added, "Technomarts provide an opportunity for researchers and investors to negotiate by holding various meetings to attract capital, thus facilitating the development of knowledge-based businesses and the commercialization of their products".

4.1.3. Technology Market Management and Technological Product Development (Contingencies)

In the present study, contingencies are factors that affect and moderate the relationship between the causes and the core phenomenon, as well as the relationship between the core phenomenon and the results. Moderator categories in this research include market research, customer attraction, identification of competitors, distribution channels, product characteristics, and competitive advantage.

(1) Market research: This emphasizes understanding the target market and assessing their needs. Components include identifying the appropriate target market for suppliers, creating opportunities for marketing and selling technological products, and identifying and influencing domestic and international markets. One participant stated, "Knowledge-based companies should identify domestic and international markets and collect necessary information about market needs and customer demand". Another participant noted, "Weakness in marketing and sales and the lack of familiarity with marketing issues are basic challenges for knowledge-based companies".

(2) Customer attraction: This moderating factor includes components such as platforms for introducing products to customers and identifying potential and actual customers and their needs. One contributor asserted, "Technomarts create an opportunity for technology owners to introduce their technological and innovative products to investors and industrial owners with images and catalogs, finding new customers for their products".

(3) Identification of competitors: This factor involves knowing and analyzing competitors, the presence of foreign competitors in the market, and creating a competitive environment between companies. One participant said, "Knowledge-based companies can learn about the latest technological changes in their field, identify competitors, gather effective information about their performance, and improve the quality of their goods and services".

(4) Distribution channel: This is another moderating factor effective in the health technomart field. It includes components such as acting as an intermediary between technology applicants and suppliers, eliminating inefficient intermediaries, and distributing products among applicants by marketing specialists. One participant believed, "The supply of technological products to the market requires communication between technology owners and capital owners, and technomarts can help realize this connection". Another participant added, "One way knowledge-based companies can introduce products is by distributing them to customers through marketers. Technomarts provide conditions for products to be distributed among customers by marketing specialists".

(5) product characteristics: This factor includes product quality, price comparison, and design improvement. One participant said, "The realization of commercialization and marketing of knowledge-based products depends on the quality, final price, and suitability of the product to industry needs, so knowledge-based companies should focus on products with commercialization capacity".

(6) Competitive advantage of the product: This factor is effective in health technomarts and includes completing the product value chain, matching the product with industry needs, and providing product samples to applicants. One participant stated, "Providing a product sample to a customer is a way to introduce a business and significantly impacts increasing product sales. This allows customers to closely assess product quality and make purchasing decisions".

4.1.4. Technology Policy (Mediating Conditions)

Mediating conditions affect the relationship between the core phenomenon and its consequences. In our research, these include planning and measurement and evaluation.

(1) Planning: Components of planning include interaction with activists and expert officials, targeted technomart organization, modeling after similar international markets, periodic technomart events, opportunities for new companies to participate, and platforms for communication and interaction with renowned companies. One participant stated, "Modeling after similar international markets in terms of planning, implementation, and development is an effective way to improve market performance". Another participant emphasized, "Regular technomart events can inform about technomart performance and identify technological needs of industries".

(2) Measurement and evaluation: Components of measurement and evaluation include initial company evaluations before technomart participation and evaluating technomarts to measure performance improvement and diversity in participating companies. Measurement and evaluation provide essential information for decision-making before, during, and after technomart events. One contributor noted, "Surveys are an effective way to gather information that helps businesses collect and analyze customer feedback".

4.1.5. Improving the Technological Business Environment (Consequences)

Consequences refer to the long-term effects resulting from the occurrence of the core phenomenon. In this research, they include independence and self-sufficiency, promotion of entrepreneurial culture, commercialization of technology, and improvement of technological capabilities.

(1) Independence and self-sufficiency: One consequence of technomarts in the health field is independence and self-sufficiency. Components include facilitating the licensing process, removing production barriers, saving currency, developing the knowledge-based economy, achieving production independence, and reducing dependence on other countries. One participant stated, "By participating in technomarts and learning about the technological plans of knowledge-based enterprises and startups, industries are encouraged to invest in these plans, which is effective in developing the knowledge-based economy". Another participant noted, "Attention to technology prevents currency outflow and reduces dependence on foreign countries by acquiring high-tech industries".

(2) Promotion of entrepreneurial culture: Another consequence of health technomarts is the promotion of entrepreneurial culture. Sub-categories include creating a suitable platform for technological business development and promoting the culture of using domestic products. One participant mentioned, "Technomarts create a space for presenting specialized topics related to technological businesses and help identify entrepreneurial job opportunities". Another participant added, "One problem for knowledge-based companies is the lack of support and purchase of their products by customers. In addition to creating a culture for buying domestic products, it is necessary to market the products through the company's marketers".

(3) Commercialization of technology: Another consequence of health technomarts is the commercialization

of technology. Sub-categories include the commercialization platform for technological products and facilitating the commercialization process of product-oriented research. One participant stated, "Technomarts are places for the commercialization of knowledge-based products, with technology owners and suppliers on one side and technology applicants, industry owners, and investors on the other". Another participant believes, "By holding technomarts, researchers can present their research results as technological products, and industrial owners can use domestic producers to meet their technological needs".

(4) Improvement of technological capabilities: Another consequence of health technomarts is the improvement of technological capabilities. Sub-categories include holding educational workshops in various technology fields, creating a platform for transferring information and technological experiences, and promoting knowledge in technological products. One participant asserted, "Holding educational workshops related to technology to train and empower researchers and technology owners is emphasized in technomarts. These workshops provide specialized information to improve the knowledge, skills, and abilities of technology owners".

4.1.6. Institutional Factors Related to Technology Development (Environmental Context)

The environmental context refers to the setting in which the studied society operates. Categories of the environment include universities and research centers, industry, and government.

(1) Universities and research centers: Components include platforms for identifying talents in technology and introducing them to policymakers, supporting universities for product-oriented dissertations, fostering interaction and cooperation between technology owners, supporting ideas and turning them into products, completing products and entering them into the market, and supporting the intellectual property rights of technology owners' ideas. One participant noted, "Intellectual property is a significant issue for technology owners. They lack sufficient information about intellectual property and are unaware of their shares in technologies". Another participant stated, "Motivating researchers and supporting elites due to their intellectual ability and superior ideas can greatly aid the development of product-oriented and applied research".

(2) Industry: Components include training the expert workforce needed by the industry through universities, establishing interaction and direct communication between suppliers and applicants, and creating investment opportunities for industry owners. One participant remarked, "Universities should support the industry by producing products needed by the industry and cultivating the human resources required by the industry". Another participant maintained that industry and capital owners can participate in technomarts to learn about technological and innovative products, as well as the latest technologies in their field, and explore investment opportunities.

(3) Government: Components include university-industry-government partnerships and communication, support from government and private organizations for domestic technological products, government presence in technomarts, examination of challenges faced by technology-oriented companies, providing solutions by officials, and preventing the importation of similar domestically produced products by the government. One contributor stated, "There should be a relationship between the government, university, and industry, and until this connection is established, universities cannot move towards becoming entrepreneurial universities". According to another contributor, "When domestic knowledge-based companies produce a product, the government should set regulations to prevent similar products from entering the country".

Figure 2 illustrates the model of the health technomart with the approach of marketing knowledge-based products, showing each component of the "C".

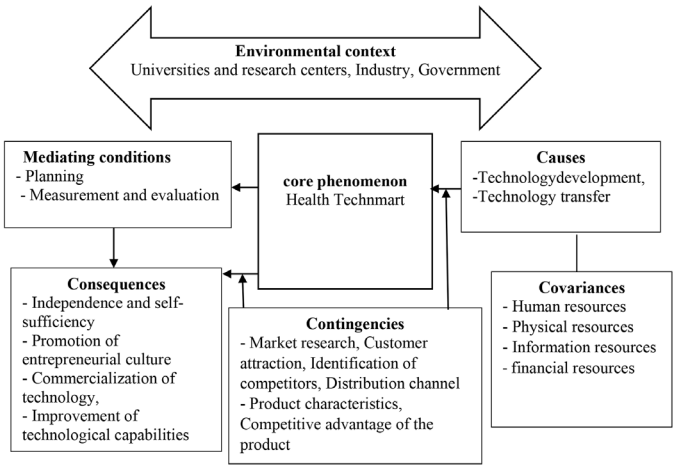

Figure 2. Health technomart model with the approach of marketing knowledge-based products

5. Discussion

In the present study, an attempt was made to formulate the health technomart model with a marketing approach for knowledge-based products using the grounded theory method based on the classical approach (Glaser). The research findings suggest that to succeed in the health sector technology market, policymakers and health sector managers should carefully consider components such as management of technology development and transfer, technology development infrastructures, technology policy, technology market management, technological product development, institutional factors related to technology development, and improving the technological business environment.

The analysis of the findings showed that development management and technology transfer are drivers for the formation of the health technology market. Technomarts facilitate technology development activities, enable the localization of technological products, and help identify technological capacities available in the market. Additionally, technomarts create a platform for technology transfer between suppliers and applicants, facilitating the process of technology transfer from universities to industry. Furthermore, technomarts provide opportunities for technology owners and investors to negotiate and sign cooperation agreements for technological business development. These findings align with those of Al-Ansari et al. (26), who concluded that management orientation, technology orientation, market orientation, and joint agreements with business groups and industries are important characteristics of small and medium enterprises. Similarly, the research results of Ravi and Janodia (27) indicated that despite relevant support systems to strengthen university-industry cooperation, such as the establishment of technology transfer offices in universities, resources are rarely directed towards socially useful innovation.

Technology market management was identified as a modulating factor in health tech markets. Technomarts play a significant role in identifying technology applicants, attracting suppliers, and helping suppliers identify the right target market. They provide a platform for marketing and selling technological products, strengthening the market for knowledge-based products. Moreover, these markets offer knowledge-based companies opportunities to sell their technological products in national and international markets. Technomarts also help identify customers and their needs, providing a platform to introduce products using new marketing methods. Additionally, technomarts play a role in identifying competitors, obtaining information about them, and creating a competitive environment among knowledge-based companies. They act as intermediaries, connecting technology applicants with suppliers and eliminating inefficient intermediaries. They also facilitate product distribution to customers by marketing specialists. These findings are consistent with the study by Mamun et al. (28), which identified strategic market factors such as access to multiple technology resources, development of technological resources, market differentiation, managing marketing efforts, developing appropriate distribution channels, connecting with major customers, and speed of market entry. The results of Lee et al. (29) showed that successful implementation of buyer-seller technology requires attention to relationships between channel stakeholders, as well as the internal needs of each channel stakeholder and their ability to accept the technology.

The results also indicated that technological product development is another moderating factor. Technomarts play a role in determining the quality, price, and improvement of technological product design, completing the product value chain, and providing product samples to customers. The findings of Mu et al. (30) showed that marketing, technical, commercial, and managerial factors are important in all stages of new product development. Additionally, Eng and Quaia (31) concluded that customer orientation, competition, technical excellence, product technology, and technical/production synergy are effective in improving new product acceptance.

Technology development infrastructures were identified as supporting and promoting factors in health technomarts. The use of skilled human resources, marketing experts, and strong, efficient management can enhance the proper operation of technomarts. Possessing hardware and software infrastructures, allocating suitable physical space to applicants, and ensuring public access to technomarts improve their performance. Furthermore, technomarts can effectively market knowledge-based products by creating platforms for knowledge-based companies to familiarize themselves with international markets and engage in online sales. Technomarts provide specialized consulting services in various technology fields. Informing audiences and customers and advertising in appropriate spaces can also enhance technomart performance.

Technomarts play a role in attracting capital and providing financial facilities to invest in technological ideas and projects, expanding the activities of knowledge-based companies. They offer opportunities for technology owners to use technological grants for business development. Allocating sufficient funds can advance the goals of technology markets. These results align with the findings of Kirchberger and Pohl (32), who investigated success factors in technology commercialization and concluded that access to financial resources, growth centers, university funding, internal production and technology-based resources, and venture capital availability are effective in technology commercialization. The studies by Panmaung et al. (33) showed that human resources, including the skills and experience of related employees, are effective in the technology transfer process in innovative small and medium-sized companies. Aramesh and Dehghani (34) concluded that marketing and sales

capabilities, expert forces, and information technology infrastructures (software, hardware, and network) are effective in the success of knowledge-based enterprises.

Planning, as well as measurement and evaluation, were identified as mediating factors in health technomarts. Formulating the correct strategy, precise targeting in organizing technomarts, adopting practices from similar international markets in terms of planning, and periodically and continuously holding technomarts are effective for the success of technology markets. Additionally, the initial evaluation of knowledge-based enterprises before participating in technomarts and the evaluation of technomarts held to measure performance improvement and diversity in company types are crucial. In this context, Alaei Tabatabaei and Movahedi (35) investigated the obstacles and challenges of technomart formation and showed that, in addition to better and more accurate planning for national technomarts, custodian centers should focus on creating a centralized and efficient structure to serve the country's technology development.

Institutional factors related to technology development were identified as the environmental base of technomarts in the health field. Technomarts provide a platform to identify talents in technology, introduce them to policymakers, and create opportunities for technology owners to communicate, interact, and share experiences. Technomarts can also offer services in protecting the intellectual property rights of technology owners' ideas and significantly aid in the development of product-oriented and applied research. Furthermore, technomarts provide a space for industry and capital owners to familiarize themselves with technological products and play a role in developing the specialized human resources needed by the industry through universities. Technomarts also facilitate communication between universities, industry, and government. The government plays an effective role in promoting market goals by being present in the market, supporting suppliers and applicants, and preventing the entry of similar domestically produced products into the country.

The research results of Chiș and Crișan (19) and Min et al. (36) are consistent with these findings. Additionally, González et al. (37) identified intellectual property rights, government policies, university-industry relationships, and understanding technological needs as critical success factors in technology commercialization. The studies by Govindaraju et al. (38) also showed that awareness of market needs, intellectual property rights, and university-industry cooperation play important roles in determining the success of university technology commercialization.

The improvement of the technological business environment was identified as a consequence of forming health technomarts. The formation of technomarts strengthens and develops the knowledge-based economy in health technologies, aiming to reduce the country's dependence on foreign products and currency and promote domestic producer independence. Additionally, technomarts can facilitate the licensing process and review and improve the licensing process for knowledge-based companies. Providing suitable conditions for technological business development and promoting the culture of using domestic knowledge-based products for national progress and development is another consequence of market formation. Technomarts also create a platform for the commercialization of technological products in the health field and facilitate the commercialization process of product-oriented research. Furthermore, technomarts offer knowledge-based companies opportunities to showcase their technological capabilities and market their products. The findings of this research align with the results of Eze et al. (39). Notably, the absence of prior context related to the subject matter at all stages serves as compelling evidence of the novelty inherent in the components and developed model.

5.1. Conclusions

According to the results of the study, the presented model can facilitate the effective marketing of knowledge-based health products and provide actionable insights for policymakers and innovation managers aiming to strengthen a dynamic and competitive health technology market. Based on the findings, the following suggestions are made: (1) Provide the necessary infrastructure to foster effective interaction between technology suppliers (universities) and technology applicants (industry) by establishing industry relations offices within universities; (2) support intellectual property and novel technologies by setting up technology transfer offices in universities; (3) support technological and innovative achievements of technology owners by providing financial resources and attracting investors; (4) empower faculty members and researchers to launch innovative and knowledge-based businesses by organizing workshops, training courses, and entrepreneurial events; (5) support product-oriented theses and strengthen the knowledge-based economy by granting research funds to technological and innovative projects; (6) promote the culture of commercialization by encouraging researchers and faculty members to present their achievements and research results; (7) develop an entrepreneurial culture and create sustainable job opportunities by investing in graduates and specialized human resources from universities.

This study, like others, has limitations. Using grounded theory relies on researchers' ability to extract concepts from data. The authors endeavored to increase the theory's acceptability by adapting almost all presented concepts to reflect participants' viewpoints. Furthermore, this study is tailored to the current pool of participants based on collected data and may be limited in applicability and modifiability if new or different data are collected. However, efforts were made to limit these issues by performing continuous data comparisons throughout the

data collection and analysis process.

Considering that the current research was conducted in the health field, it is suggested to verify the findings in other organizations and industries to identify operational challenges and obstacles, enhancing the reliability and validity of its findings. It is also recommended to implement the presented model through a pilot study at universities of medical sciences and research centers. Additionally, investigating the impact of each obtained dimension and component individually on the performance of the health market is advisable.

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