

# Designing a model of innovation strategies effective on the development of the cosmetics industry with an emphasis on international entrepreneurship (Case study: Sehat Industrial and Trading Company)

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## Abstract

Today, organizations recognize innovation as a crucial necessity in a constantly changing world. The researcher's objective is to create a model of effective innovation strategies specifically for the cosmetics and health industry, focusing on international entrepreneurship. This research employs both qualitative and quantitative methods and falls under the category of applied research. The qualitative part involves 7 managers and officials from Sehat Industrial and Trading Company, as well as 3 academic experts. The quantitative part includes 75 experts and employees from the same company. To assess the normality of data distribution, we utilized the Kolmogorov-Smirnov test. Hypothesis testing was conducted using structural equations (SEM), and interpretive structural modeling (ISM) was employed to prioritize innovation strategies. Based on the results obtained, there are different types of innovation strategies: aggressive innovative strategies, innovative strategies focused on knowledge absorption capacity, pioneering innovative strategies, and risky innovative strategies. Among these, risky innovative strategies were given the highest priority, while innovative strategies focused on knowledge absorption capacity were given the lowest priority based on their prioritization. The hypotheses tested to examine the impact of aggressive innovative strategies, innovative strategies, pioneer innovative strategies, and risky innovative strategies on the development of the cosmetics industry, specifically in terms of international entrepreneurship, were all confirmed. Therefore, it is recommended that managers and officials in the cosmetics industry contribute to its development by employing innovative strategies that involve taking risks.

Keywords: innovation strategies, industry development, international entrepreneurship, health industrial and commercial company

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## 1 Introduction

Currently, for the enhancement of Iran's business environment, it is crucial to foster entrepreneurship beyond the borders. Innovation holds significant importance in enabling various industries to compete globally. International

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entrepreneurship involves conducting business activities outside national boundaries, and this necessitates a comprehensive understanding of the international landscape. Within entrepreneurship, innovation stands as a central pillar, where entrepreneurs focus on developing and advancing their businesses by emphasizing innovative approaches in product development and service provision. This research aims to identify effective innovation strategies that can contribute to the advancement of international entrepreneurship in the cosmetics industry. Additionally, we aim to develop a model that encapsulates these strategies. The desire to innovate refers to a company's aspiration to support novel and creative ideas, products, or design processes for presentation in foreign markets. Kim and Knight [13] assert that this desire to innovate forms an integral part of the organizational culture, which emphasizes both the quantity and quality of innovation within the company. Exposure to new international opportunities enhances a company's capacity for innovation. Furthermore, innovation in international markets has the potential to increase the company's profitability. Innovation is an intrinsic aspect of entrepreneurship to the point where some scholars use the terms interchangeably. The aspiration for international innovation augments the company's engagement in international entrepreneurship [5]. According to Gil-Pechuan et al. [8], being successful in foreign markets requires creativity, resourcefulness, and careful assessment of risks, as domestic strengths do not always guarantee success abroad. International entrepreneurship is influenced by innovation, risk-taking, and proactive company behaviors. Innovation refers to a company's ability to create new products and successfully introduce them to the market.

Lumpkin and Dess [16] also suggest that innovation reflects a commitment to supporting creativity through the introduction of new products and services, embracing novelty, technological leadership, and investing in research and development for new processes. Companies that consistently exhibit innovative behavior are considered pioneering, meaning they aggressively pursue market opportunities and strive to be industry innovators [8]. At present, there is intense competition among cosmetics and health product manufacturers. One strategy to surpass competitors involves focusing on innovative products and services. Sehat Industrial and Commercial Company is currently dealing with challenges and issues, such as the emergence of new competitors who offer novel products in both domestic and foreign markets. As Sehat Company operates in both local and international markets and exports a significant portion of its products to foreign countries annually, prioritizing innovation becomes essential for penetrating global markets. Furthermore, innovation plays a crucial role in gaining a competitive edge for companies, enabling them to achieve rapid growth and success in both domestic and international markets. Consequently, companies possess a strong inclination toward technological innovation and the provision of new, high-quality products [29].

Hence, the connection between innovation and strategy plays a crucial role in effectively managing innovation. Without a well-defined strategy, it becomes impossible for innovation to enhance performance and achieve organizational success [2]. Cultivating an innovative culture can drive the development of technology-based products and bring numerous benefits, ultimately leading to improved performance for international companies. Additionally, as suggested by Kropp et al. [15], creativity and innovation foster the aspirations and capabilities of companies to establish a presence in global markets; in fact, creativity fuels the desire to expand internationally. Research conducted by Gil-Pechuan and colleagues [8] indicates a positive correlation between proactive behaviors, creativity, innovation, and international entrepreneurship. To capitalize on opportunities in the international market, companies must embrace innovation. In fact, entrepreneurship, innovation, and internationalization are increasingly intersecting in today's complex and dynamic global world. Innovation is crucial for managing business activities in a flexible and forward-thinking manner [3]. Innovation leads to economic growth, increased productivity, and the development of new technology, goods, and services. Nowadays, organizations cannot afford to ignore the need for change and innovation. The current market is highly competitive, and every company strives to attract customers. Managers must employ various innovative methods in their work processes to introduce new products and services. Neglecting innovation will fail. Therefore, the managers and officials of Sehat Industrial and Trading Company should focus on innovation within this fiercely competitive environment. This research aims to identify innovative strategies that can be implemented in the production process of Sehat Industrial and Trading Company's products and services.

## 2 Literature review

In Hatami's study conducted in [11], the researcher examined how innovation affects international entrepreneurship by conducting a case study involving the staff of Parsian Bank in Tehran province. The analysis was carried out using research hypotheses, Pearson's correlation coefficient, and structural modeling. The results of the study revealed a positive and significant relationship between innovation and international entrepreneurship, including both technological and non-technological innovation components. Therefore, innovation is identified as a crucial factor contributing to the advancement of international entrepreneurship.

Similarly, Sardari and Amiri conducted a study in [28] that focused on investigating the influence of innova-

tion strategy on the performance of new product development within private insurance companies. Specifically, the researchers emphasized the role of a shared value-creation strategy. The research findings indicated a substantial and direct association between innovation strategy and the performance of new product development. However, the mediating role of the value co-creation strategy was not confirmed in their study.

Additionally, the relationship between innovation strategy and new product development performance has not been verified with respect to the mediating influence of two variables: design strategy and marketing strategy. In a case study focused on Parsian Bank, Maqsoodi [19] examined the effects of innovation strategy on both innovation performance and organizational performance, considering the moderating roles of entrepreneurial orientation and diversification strategy. The analysis of hypotheses revealed that entrepreneurial orientation and diversification strategy play a moderating role in the impact of innovation strategy on innovation performance and the overall performance of Bank Parsian. The study conducted by Rahim Nia et al. [22] revealed that innovation strategy significantly influences Bank Parsian's innovation performance, entrepreneurial orientation, diversification strategy, and overall performance. Additionally, the research found that the bank's performance and innovation performance are affected by its diversification strategy and entrepreneurial orientation. Given the significance of export businesses in achieving economic and social goals and the competitive nature of international markets, it is crucial to prioritize attention to businesses engaged in export activities.

Behnamfar [4] researched creating a model for formulating innovation strategies for Internet businesses. The research followed a design approach and aimed to develop a model using the design research process. This research falls under the category of fundamental-applied research, with the ultimate goal of designing an innovation strategy model for Internet businesses. The research implementation involved four stages: 1. defining the problem and understanding stakeholder expectations, 2. designing and developing artifacts, 3. evaluating the artifacts, and 4. sharing the artifacts. In the first stage, the researcher interviewed business and academic experts to gain insights into the dimensions of the problem and extract stakeholder expectations from the research's outcomes. The researcher then utilized axial coding to identify the specific dimensions of the problem and extract stakeholder expectations based on the March and Smith [20] model. During the second stage, the researcher followed three steps: conducting a literature study, holding brainstorming sessions, and finalizing the ideas. As a result, initial artifacts were created in the form of a bicycle model for innovation strategy development and an operational guidebook for Internet businesses. In the third stage, the artifacts were evaluated through argumentative evaluation, demonstration scenario assessment, and iterative design and development. The final artifacts were then modified and improved, taking the shape of a ship model for innovation strategy development and an operational manual for Internet businesses. In the fourth stage, the approved artifacts were shared through theses, articles, and books.

Kotkova Strytska and Prokop [14] conducted a study on the dynamic innovation strategy model in CEE countries, focusing on innovation leaders and followers. The goal was to establish a foundation for building innovative ecosystems. By utilizing data from Eurostat, specifically the CIS data, and conducting regression models, the study identified the key factors that contribute to the success of both innovation leaders and followers in nine European Union countries. These determining factors, when combined appropriately, mainly include internal research and development activities, collaboration with diverse partners, and effective marketing and design practices. The findings clearly indicate that these determinants have a positive impact on the innovations produced by innovation leaders, whereas, for followers, the same set of factors has a negative effect. In another study by Riyadi and Sumardi [24], they examined how innovation strategy influences the competitiveness of the manufacturing industry in Surabaya, Indonesia.

The findings indicate that implementing an innovation strategy encompassing administrative, technical, process, and product innovation can enhance the competitiveness of organizations in the manufacturing industry. Government innovation positively influences business competition, as does technical innovation, process innovation, and product innovation. Among these strategies, process innovation has a particularly significant impact on improving business competitiveness. Zartha et.al [30] conducted a study on innovation strategies and identified the most crucial variables by analyzing 129 headings. Subsequently, two surveys were conducted, involving experts in innovation strategies to contextualize these variables. The surveys aimed to identify key issues, needs, and opportunities and prioritize the input, transformation process, and output concerning the innovation strategy. With regard to the most significant outcomes derived from the identification of issues, needs, and opportunities, this study emphasizes the insufficient understanding of how to formulate and implement innovation strategies. Additionally, it highlights the lack of awareness regarding the significance of fostering innovative activity as a capability that can be systematically developed within the framework of an innovation strategy, encompassing input, transformation process, and production. All participants expressed a strong consensus, indicating the crucial nature of formulating an innovation strategy and implementing an approach, as well as suggesting topics for further diagnosis.

### 3 Methodology

This research has practical applications and uses both qualitative and quantitative methods. Applied research aims to address specific societal issues and problems by utilizing the obtained results. The design phase of the conceptual model employs a qualitative approach to uncover unmeasurable factors that contribute to the situation, exploring causes and motivations while gaining a deeper understanding of the existing problem. Additionally, the explanation phase uses a quantitative approach to assess measurable factors, often providing an expression of the situation and allowing for generalizations in many instances. Additionally, it is pragmatic as it explores a method to assess the effectiveness of scientific theories within a particular discipline, identifies empirical connections within that discipline, contribute to practical knowledge within that discipline, advances research and methodologies within that discipline, and establish a repository of validated practical knowledge within that discipline. This study aims to introduce a novel framework in the field of entrepreneurship education, which can be applied to the Iranian university education system for implementation and policy development purposes.

### 4 Results

In this chapter, we analyze the findings obtained from collecting and analyzing data and information separately for each research question. The research method used in this study, as explained in Chapter 3, is a mixed exploratory approach that combines qualitative and quantitative methods. In the first stage of analysis in this chapter, we examine qualitative data using theme or content analysis, followed by the analysis of quantitative data. To do this, we first present the qualitative data analysis based on six stages of theme analysis, along with evidence from documents and relevant research literature. After completing the qualitative data analysis, we present an initial model of innovation strategies in the cosmetics industry, focusing on the international entrepreneurship development of Sehat Company. In the quantitative analysis section, we validate the proposed model using confirmatory factor analysis with the PLS software.

The initial inquiry is: Which aggressive strategies that promote innovation have a significant impact on the growth of the cosmetics industry, particularly regarding international entrepreneurship?

#### **The first stage of theme analysis:**

The initial stage of qualitative analysis involves familiarizing oneself with the data by carefully reading and reviewing the transcripts. Specifically, in this study, interviews focusing on innovative strategies that have a significant impact on the advancement of the cosmetic and health industry, particularly in the realm of international entrepreneurship, were conducted and subsequently transcribed. These transcriptions were then reviewed multiple times to gain a comprehensive understanding of the data.

#### **The second stage: generating primary codes (extracting concepts from semantic expressions):**

The second stage begins when the researcher has thoroughly examined the data regarding innovative strategies employed by Pishtaz (pioneer) that have proven effective in advancing international entrepreneurship in industrial and commercial companies. At this point, the researcher becomes familiar with these strategies and proceeds to create initial codes based on the information obtained. The coding process may vary depending on whether the themes are primarily driven by the available data or by existing theories. In the present study, the emphasis has been on theoretical perspectives rather than empirical data. Therefore, during the second stage, data that align with the research's focal points, namely pioneering innovative strategies that contribute to the growth of the cosmetics industry, particularly in terms of international entrepreneurship across different analytical levels, are coded.

#### **4.1 Defining and naming themes**

This stage represents the last step in modifying the themes, to determine and understand the essence of each theme. What message does each theme convey? If there are sub-themes, how do they connect to the main theme and how do they interact with each other? What kind of relationship exists among the themes? Within this analysis, the overarching theme is the impact of risky innovative strategies on the development of the cosmetics industry, particularly in terms of international entrepreneurship. This general theme is deeply connected to other significant themes. Which themes hold considerable influence and power, and in which themes are the main theme deeply embedded? During this phase, the researcher establishes and modifies the themes that are presented for analysis. Subsequently, the data within these themes are examined.

Table 1: Interviews of experts on pioneering innovative strategies effective on the development of the cosmetics industry with an emphasis on international entrepreneurship

No	Interviews	Initial codes
First interview	I believe that the key factors that contribute to the growth of entrepreneurship include utilizing technical knowledge, drawing on the experiences of other companies, and fostering creativity and innovation in production. One of the primary strategies that drive entrepreneurial development is implementing technology strategies, cultivating communication networks, and bolstering the financial strength of the company.	Utilizing technical expertise. Leveraging the experiences of other companies. Employing creativity and innovation in production. Implementing a technology strategy. Enhancing the company's communication networks. The strong financial position of the company.
Second interview	Companies are consistently engaged in competition, and they can gain dominance in the market by leveraging effective communication and information networks. These networks should possess competent personnel who understand the consumer demands of society. Additionally, companies should prioritize enhancing their product quality. In my perspective, these aspects can be regarded as key strategies for entrepreneurial development. To ensure survival, organizations must stay abreast of current technology and continuously enhance the quality of their offerings. This approach will lead to the creation of new standards of excellence and knowledge expansion.	1. Dominance in the market 2. Involvement in communication and information networks 3. Highly skilled workforce 4. Understanding the societal consumption demands 5. Keeping up with current technology 6. Consistently improving the quality of services and products 7. Developing new levels of excellence 8. Expanding knowledge and expertise
Third interview	In my view, society is an ever-changing entity, and companies have the opportunity to gain people's trust by adapting to these changes and preferences. They can do this by focusing on providing excellent services, seeking people's opinions, and continuously improving their products. Companies like Sehat must develop new products based on current knowledge to stay competitive. Given the environmental, technological, and demand changes, the speed of product development and innovation is highly significant for Sehat company.	Creating new products utilizing the latest knowledge Sustaining essential competitive edges Shifts in the environment Technological advancements Shifts in demand The rate at which new products are developed
Forth interview	Companies are consistently leading the way in providing unique and unreplicable new products to the market. For instance, a health company must offer products that meet the standards of international markets and stand out with their innovative qualities. Additionally, such a company must continuously keep track of technological advancements, adapt accordingly, acquire new knowledge, and secure suitable funding.	1. Offering unique products to the market 2. Keeping track of technological advancements 3. Progressing by gaining new knowledge and information
Fifth interview	Using new technologies for advertising is a widespread method globally to showcase and sell products. Companies can effectively promote their goods by enhancing quality and lowering costs, enabling them to expand their advertising efforts and gain customer trust. Successful entrepreneurship development relies on companies that possess current knowledge and information.	Utilizing new technologies for advertising Enhancing quality Decreasing costs Elaborate advertising campaigns Customer trust Current knowledge and information
Sixth interview	In today's organizations, the primary factor that gives them an edge over their competitors is their skill in effectively handling knowledge, which goes beyond mere accomplishments. The main valuable asset they possess is the knowledge they can tap into. Additionally, one of the top companies can attract financial resources with reduced risk.	1. Competitive advantage 2. Knowledge management 3. Communication networks 4. Attracting financial resources with less risk-taking
seventh interview	In my view, a crucial aspect of entrepreneurial growth lies in understanding a company's strengths, weaknesses, opportunities, and potential threats resulting from a lack of knowledge on how to address them. One should strive to optimize opportunities, minimize threats, and create innovative products even amidst international competition.	Understanding the weaknesses, strengths, opportunities, and potential threats. Absence of expertise in a specific area. Recognize the potential opportunity.
Eighth interview	In my view, it is important for companies and different business organizations to consistently conduct classes about their industry. This practice helps enhance expertise and knowledge while also leveraging insights and feedback from members.	Organizing a training session for the human resources department. Enhancing expertise and expanding knowledge.
Ninth interview	I believe that the primary goal for any company is to generate profits and minimize production expenses, while also ensuring customer satisfaction. Additionally, the leading organizations are those that dominate the global market.	Generating financial gains Minimizing expenses related to production Keeping up with the latest advancements in specialized knowledge
Tenth interview	Given the competitiveness of various markets and the growing competition among different groups to maximize profits, attract more customers, and ultimately dominate the market, a company needs to utilize its full physical and intellectual capabilities and develop unique innovations that align with societal needs.	Increase financial gains Utilizing both physical and intellectual abilities and knowledge Establishing effective network communications

### 4.2 Qualitative model

Through the process of defining and reviewing, the researcher determines the subject matter addressed by each theme and identifies which aspects of the data are encompassed by them. By incorporating the findings from semi-structured interviews and drawing inspiration from relevant theoretical and empirical literature, this research identifies codes that define innovative risky strategies effective in the development of the cosmetics industry, with a particular focus on international entrepreneurship. These codes consist of three components: 1. Risk control, 2. Risk transfer, and 3. Risk acceptance. The qualitative data analysis yields this definition, which encompasses the aforementioned components.

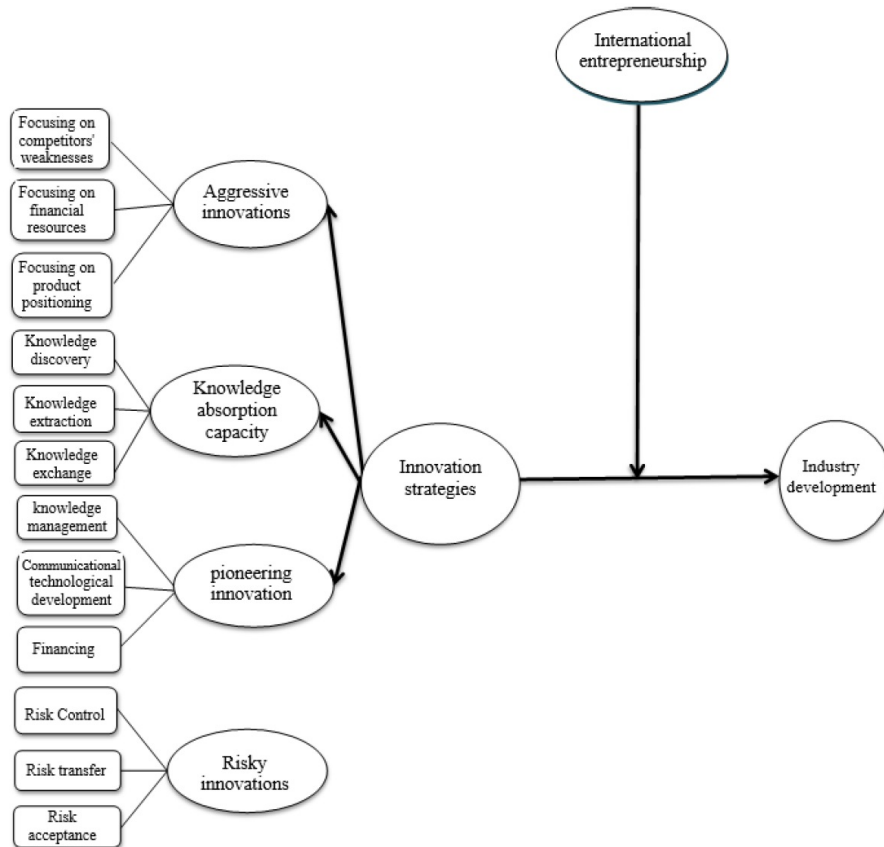


Figure 1: The causal model resulting from the qualitative analysis of the research

### 4.3 Describing research variables

In this section, we have discussed the description of the research participants using the average, standard deviation, minimum, and maximum values, which are listed below.

Table 2: Describing the items related to innovation strategies with an emphasis on the development of international entrepreneurship

Dimension	Component	Mean	SD	Min	Max
Aggressive innovations	Focusing on competitors' weaknesses	4.01	0.980	1	5
	Focusing on financial resources	4.13	0.935	1	5
	Focusing on product positioning	4.35	0.951	1	5
Knowledge absorption capacity	Knowledge discovery	4.03	0.838	1	5
	Knowledge extraction	3.96	0.979	1	5

Based on the table above, you can observe the average, standard deviation, smallest, and largest scores of the items related to innovation strategies that focus on international entrepreneurship development. The item "Focusing on Product Positioning in Aggressive Innovations" has the highest score, averaging 4.35, while the financing item has the lowest score, averaging 3.33.

pioneering innovation	Knowledge exchange	3.51	0.742	1	5
	knowledge management	3.57	0.791	1	5
	Communicational technological development	3.47	0.859	1	5
Risky innovations	Financing	3.33	0.777	1	5
	Risk Control	3.93	0.890	1	5
	Risk transfer	3.76	0.898	1	5
International entrepreneurship	Risk acceptance	3.68	1.221	1	5
	Technology transfer	3.66	0.654	1	5
	International opportunity	3.735	0.857	1	5

Table 3: Describing the variables related to innovation strategies with an emphasis on the development of international entrepreneurship

Variable	Mean	SD	Min	Max
Aggressive innovations	4.16	0.865	1.00	5.00
Knowledge absorption capacity	3.83	0.681	1.00	5.00
pioneering innovation	3.46	0.712	1.00	5.00
Risky innovations	3.79	0.831	1.00	5.00
International entrepreneurship	3.652	0.717	1.00	5.00

Based on the table above, which describes the main variables related to innovation strategies with a focus on international entrepreneurship development, the average score for aggressive innovations is 4.16, the score for knowledge absorption capacity is 3.83, the average score for pioneering innovation is 3.46, the average score for risky innovations is 3.79, and the score for international entrepreneurship is 3.652.

#### 4.4 Data distribution

Based on the table above, which presents the results of the normality test for the research variables, it can be concluded that all the variables related to innovation strategies with a focus on international entrepreneurship have a non-normal distribution. This is determined by Kolmogorov-Smirnov's statistic value at a significance level of  $p < 0.05$ . Therefore, non-parametric tests were employed to analyze these variables.

Table 4: The normality test of variables related to innovation strategies with an emphasis on the development of international entrepreneurship

Variable	No	Kolmogorov-Smirnov statistics	Significance
Aggressive innovations	75	0.217	0.000
Knowledge absorption capacity	75	0.178	0.000
pioneering innovation	75	0.164	0.000
Risky innovations	75	0.174	0.000
International entrepreneurship	75	0.145	0.000

Evaluating the measurement model related to innovation strategies with an emphasis on the development of international entrepreneurship:

The researchers state that the measurement model will be considered homogeneous if the factor loading of each observable variable associated with the hidden variable is greater than 0.7. Certain experts recommend excluding observable variables from the model if their factor loading is less than 0.4. Furthermore, if the value is below 0.7 but there are only a few observable variables (two or three) and the Average Variance Extracted (AVE) of the corresponding variable is high (0.5), it is permissible to retain the observable variable in the measurement model according to Esfidani and Mohosenin's study in [6]. In this research, a factor loading value of 0.5 is considered acceptable, provided that the factor loading exceeds 0.4 and the AVE value surpasses 0.5.

All the items associated with the hidden variable of innovation strategies, specifically focusing on the growth of international entrepreneurship, have a factor load greater than 0.5, as evident in the table above. Therefore, none of the items are excluded.

Table 5: Values of factor loadings of observable variables with their corresponding hidden variables (innovation strategies with an emphasis on the development of international entrepreneurship)

Items	Aggressive innovations	Knowledge absorption capacity	Pioneering innovation	Risky innovations	International entrepreneurship
q1	0.792				
q2	0.772				
q3	0.951				
q4		0.702			
q5		0.811			
q6		0.708			
q7			0.882		
q8			0.873		
q9			0.719		
q10				0.700	
q11				0.824	
q12				0.736	
q13					0.739
q14					0.772
q15					0.707
q16					0.711

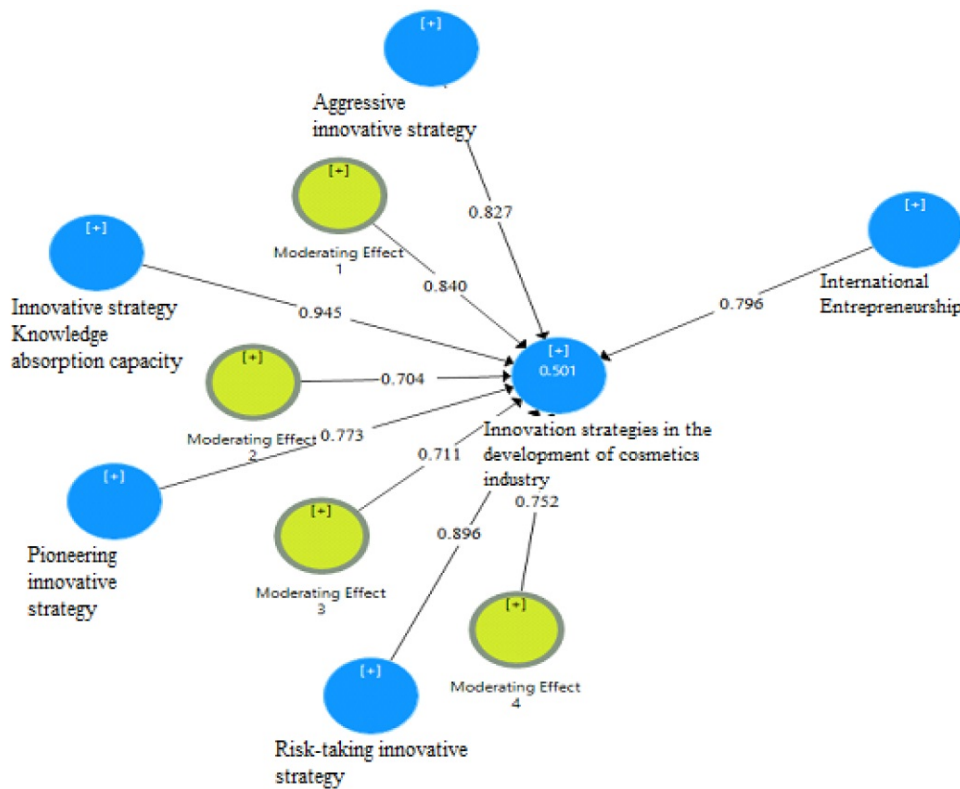


Figure 2: The output of Smart-Pls software regarding the measurement model related to innovation strategies with an emphasis on the development of international entrepreneurship

### 4.5 First-order confirmatory factor analysis

In the confirmatory factor analysis method, the first step is to assess the validity of the construct. This involves determining if the chosen indicators are accurate enough to measure the desired constructs. To do this, we look at the factor load of each indicator in relation to its structure. A factor load with a t value higher than 1.96 at the 0.5 level and 2.58 at the 0.1 level, and a positive value, indicates that the indicator is sufficiently accurate to measure that



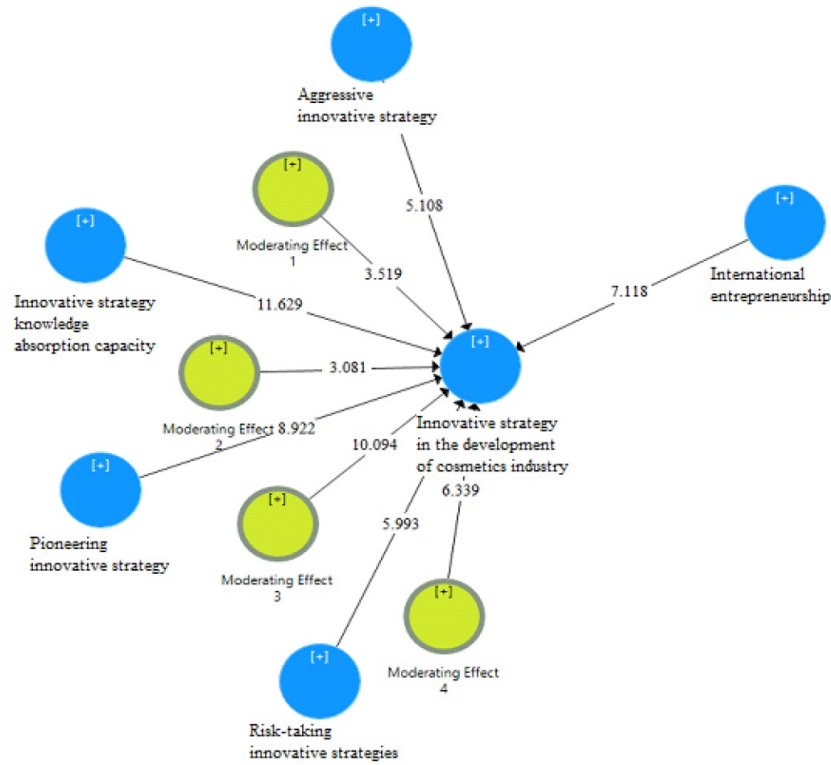


Figure 3: T-scores related to the factor loadings of the measurement model of innovation strategies with an emphasis on the development of international entrepreneurship

specific hidden structure or attribute [6].

As you can see, the null hypothesis implies the homogeneity and homogeneity of all societies in terms of variance, while the opposite hypothesis rejects this hypothesis. In this way, if out of K population samples of size  $n_i$  and  $S_i^2$  indicates the variance of the ith community, then Bartlett’s statistic is written as follows:

$$\chi^2 = \frac{(N - k) \ln(S_p^2) - \sum_{i=1}^k (n_i - 1) \ln(S_i^2)}{1 + \frac{1}{3(k-1)} \left( \sum_{i=1}^k \left( \frac{1}{n_i - 1} \right) - \frac{1}{N - k} \right)} \tag{4.1}$$

Note that the following limitation should be considered in this regard:

$$N = \sum_{i=1}^k n_i \tag{4.2}$$

It is clear that the mixed variance is also calculated as follows:

$$S_p^2 = \frac{1}{N - k} \sum_i (n_i - 1) S_i^2 \tag{4.3}$$

According to this form of Bartlett’s test statistic, which is defined as the square ratio of two standard normal distributions, asymptotically, the distribution of  $\chi^2$  or  $\chi^2$  with  $k - 1$  degrees of freedom will be zero. In this way, if the value of the statistic is greater than the  $\alpha$ th percentile of such a distribution, we assume zero:

$$\chi^2 > \chi_{k-1, \alpha}^2 \tag{4.4}$$

Based on the table provided, all the items show a strong correlation with the relevant variable, and these correlations are statistically significant at the 0.05 level based on the t score. In simpler terms, the t-value for each correlation is higher than the critical value of 1.96 at the 0.05 level. Therefore, we can conclude that these indicators are accurate in measuring their respective structures, and that’s why they were included in the final analysis.

Table 6: Factor loading values and t value for indicators of innovation strategies with an emphasis on international entrepreneurship development

Structure	Item	Load factor	t-value	Significance level	Result
Aggressive innovations	Question 1	0.792	3.164	0.002	Indicator verification
	Question 2	0.772	5.011	0.000	Indicator verification
	Question 3	0.951	10.308	0.000	Indicator verification
Knowledge absorption capacity	Question 4	0.702	6.202	0.000	Indicator verification
	Question 5	0.811	6.970	0.000	Indicator verification
	Question 6	0.708	7.152	0.000	Indicator verification
pioneering innovation	Question 7	0.882	4.125	0.000	Indicator verification
	Question 8	0.873	9.390	0.001	Indicator verification
	Question 9	0.719	4.526	0.000	Indicator verification
Risky innovations	Question 10	0.700	13.022	0.000	Indicator verification
	Question 11	0.824	8.704	0.000	Indicator verification
	Question 12	0.736	5.706	0.000	Indicator verification
International entrepreneurship	Question 13	0.739	6.804	0.000	Indicator verification
	Question 14	0.772	3.011	0.000	Indicator verification
	Question 15	0.707	5.748	0.000	Indicator verification
	Question 16	0.756	6.860	0.000	Indicator verification

Table 7: Factor loading values and t value for indicators of innovation strategies with an emphasis on international entrepreneurship development

Items	Factor load	t-value	Significance level	Result
Aggressive innovations	0.827	5.108	0.000	Indicator verification
Knowledge absorption capacity	0.945	11.629	0.000	Indicator verification
pioneering innovation	0.773	8.922	0.000	Indicator verification
Risky innovations	0.896	5.993	0.000	Indicator verification
International entrepreneurship	0.796	7.118	0.000	Indicator verification

Based on the table provided, all the dimensions show appropriate factor loadings on the corresponding variable. These factor loadings are statistically significant at the 0.05 level based on the t-scores. In simpler terms, the t-values for each factor loading exceed the critical value of 1.96 at the 0.05 level. Therefore, we can conclude that these indicators accurately measure their respective structures and have been included in the final analysis.

#### 4.6 Reliability test

To assess the dependability of the model, two measures were employed: composite reliability and Cronbach's alpha. Both of these measures should exceed 70.0.

Table 8: Composite reliability values and Cronbach's alpha for the measurement model of innovation strategies with an emphasis on international entrepreneurship development

Innovation strategies with an emphasis on the development of international entrepreneurship	Composite reliability	Cronbach's alpha
Aggressive innovations	0.749	0.719
Knowledge absorption capacity	0.849	0.703
pioneering innovation	0.917	0.811
Risky innovations	0.886	0.706
International entrepreneurship	0.892	0.785

The measurement model confirms the combined reliability (pDelvin-Goldstein) and Cronbach's alpha of all variables associated with innovation strategies, particularly those focused on international entrepreneurship, as evident in the table above.

#### 4.7 Validity test

Convergent validity and divergent validity were employed to assess the accuracy of the measurement model.

#### 4.8 Convergent validity

The Average Variance Extracted Index (AVE) was utilized to assess convergent validity, and it is expected that the value of this index exceeds 0.05.

Average Variance Extracted (AVE), composite reliability (cp), and alpha indicators were used to test the measurement model as presented in Table 3. The results indicate that all the variables have the criterion limit:

$$AVE = \frac{\sum \lambda_i^2}{n} \quad (4.5)$$

Table 9: AVE values the measurement model of innovation strategies with an emphasis on the development of international entrepreneurship

<b>Innovation strategies with an emphasis on the development of international entrepreneurship</b>	<b>AVE</b>
Aggressive innovations	0.819
Knowledge absorption capacity	0.750
pioneering innovation	0.875
Risky innovations	0.739
International entrepreneurship	0.791

Based on the table provided, all variables have an AVE index higher than 0.5, which serves as evidence that the measurement model of innovation strategies, with a focus on international entrepreneurship development, demonstrates appropriate convergent validity.

#### 4.9 Divergent or diagnostic validity

To assess the diagnostic validity or variance of the measurement model, the Fornier-Larker test is employed in smart-PLS software. The explanation of this test follows.

##### **Fornier-Larker index**

Based on this index, the square root of the average extracted variance ( $\sqrt{AVE}$ ) for each hidden variable should be higher than the highest correlation between that hidden variable and other hidden variables.

Table 10: The results of the Fornier Larker index for the diagnostic validity test of the measurement model of innovation strategies with an emphasis on the development of international entrepreneurship

<b>Variables</b>	<b>Aggressive innovations</b>	<b>Knowledge absorption capacity</b>	<b>Pioneering innovation</b>	<b>Risky innovations</b>	<b>International entrepreneurship</b>
Aggressive innovations	0.862				
Knowledge absorption capacity	0.798	0.873			
pioneering innovation	0.396	0.580	0.829		
Risky innovations	0.493	0.439	0.740	0.776	
International entrepreneurship	0.167	0.302	57.76	6.780	7.674

The table above clearly demonstrates that the average square root of the extracted variance for each hidden variable is greater than the maximum correlation between that hidden variable and other hidden variables. This indicates that the measurement model being studied has appropriate diagnostic validity.

##### **Examining research hypotheses**

The first hypothesis of the study suggests that implementing aggressive innovative strategies in the cosmetics industry, particularly in the context of international entrepreneurship, has a notable and beneficial impact on its development.

Based on the values in Table 11, the first hypothesis is confirmed with 95% confidence. This is because the P-value (0.000) is less than 0.05, indicating a significant result, and the T-value (5.108) is greater than 1.96, also indicating significance. These findings suggest that aggressive innovative strategies have a positive and significant impact on the development of the cosmetics industry, particularly in terms of international entrepreneurship. Additionally, the Beta value ( $\beta = 0.152$ ) in Table 11 represents the intensity of the influence of the variable coefficients.

A t-test is a type of statistical analysis used to compare the averages of two groups and determine if the differences between them are more likely to arise from random chance. It is any statistical hypothesis test in which the test

statistic follows a student’s t-distribution under the null hypothesis. It is most commonly applied when the test statistic would follow a normal distribution if the value of a scaling term in the test statistic were known (typically, the scaling term is unknown and therefore a nuisance parameter).

As an example, in the one-sample t-test:

$$t = \frac{Z}{s} = \frac{\bar{X} - \mu}{\hat{\sigma}/\sqrt{n}} \tag{4.6}$$

where  $\bar{X}$  is the sample mean from a sample  $X_1, X_2, \dots, X_n$ , of size  $n$ ,  $s$  is the standard error of the mean,  $\hat{\sigma}$  is the estimate of the standard deviation of the population, and  $\mu$  is the population mean.

Table 11: Significance test and intensity of coefficients of the first hypothesis

	<b>T.value</b>	<b>P value</b>	$\beta$	<b>Result</b>
Innovative offensive strategies	5.108	0.000	0.152	Hypothesis confirmed
International entrepreneurship	7.118	0.000		

The second hypothesis of the study suggests that adopting innovative strategies to enhance knowledge absorption capacity has a notable and beneficial impact on the growth of the cosmetics industry, particularly in terms of international entrepreneurship.

Based on the values in Table 12, the second hypothesis is confirmed with 95% confidence. This is because the P-value (0.000) is less than 0.05, indicating a significant result, and the T-value (11.629) is greater than 1.96, also indicating significance. Specifically, the innovative strategies of knowledge absorption capacity have a positive and significant impact on the development of the cosmetics and health industry, particularly in international entrepreneurship. The beta value ( $\beta = 0.279$ ) in Table 12 represents the intensity of the influence of the variable coefficients.

Table 12: Significance test and intensity of coefficients of the second hypothesis

	<b>T.value</b>	<b>P value</b>	$\beta$	<b>Result</b>
Innovative strategies of knowledge absorption capacity	11.629	0.000	0.279	Hypothesis confirmed
International entrepreneurship	7.118	0.000		

The third hypothesis of the study suggests that implementing groundbreaking strategies in the cosmetics industry, particularly those focused on international entrepreneurship, can have a notable and beneficial effect on its development.

Based on the statistical analysis presented in Table 13, the third hypothesis is validated with a 95% confidence level. This is supported by the significance level value (P-value = 0.000) being less than 0.05 and the significance coefficient value (T-value = 8.922) being greater than 1.96. These findings indicate that implementing pioneering innovative strategies in the cosmetics and health industry, with a focus on international entrepreneurship, has a positive impact. Additionally, the Beta value ( $\beta = 0.215$ ) in Table 13 represents the strength of the variable coefficients and further supports the hypothesis.

Table 13: Significance test and intensity of coefficients of the third hypothesis

	<b>T.value</b>	<b>P value</b>	$\beta$	<b>Result</b>
Pioneering innovative strategies	8.922	0.000	0.215	Hypothesis confirmed
International entrepreneurship	7.118	0.000		

The fourth hypothesis of the study suggests that implementing innovative and daring strategies in the cosmetics industry, particularly in international entrepreneurship, has a notable and beneficial impact on its growth.

Based on the values in Table 14, specifically the significance level (P-value = 0.000) and the significance coefficient (T-value = 5.993), the fourth hypothesis is confirmed with 95% confidence. This confirmation is based on the fact that the P-value is less than 0.05, indicating a significant result, and the T-value is greater than 1.96, indicating a positive impact. The impact of risky innovative strategies on the development of the cosmetics and health industry, particularly international entrepreneurship, is emphasized. The intensity of this influence is represented by the variable coefficient  $\beta$ , which has a value of 0.188 in Table 14.

Table 14: Significance test and intensity of coefficients of the fourth hypothesis

	<b>T-value</b>	<b>P value</b>	$\beta$	<b>Result</b>
Innovative risky strategies	5.993	0.000	0.188	Hypothesis confirmed
International entrepreneurship	7.118	0.000		

## 5 Discussion and conclusion

The qualitative part of the current research has identified five categories through theme analysis or content analysis. The first category is aggressive innovations, which consists of three components: focusing on competitors' weaknesses, focusing on financial resources, and focusing on product positioning. The second category is knowledge absorption capacity, which includes the components of knowledge discovery, knowledge extraction, and knowledge exchange. The third category is pioneering innovation, which includes the components of knowledge management, technological communication development, and financing. Lastly, the fourth category, which comes after risky innovations, includes the components of risk control, risk transfer, and risk acceptance.

The first hypothesis of the research states that implementing aggressive innovative strategies in the cosmetics industry, particularly in the context of international entrepreneurship, has a notable and beneficial effect on its development.

Based on the significance level (P-value = 0.000) and the significance coefficient (T-value = 5.108) at a 95% confidence level, we can confirm the first hypothesis. This is because the P-value is less than 0.05, indicating a significant impact, and the T-value is greater than 1.96, suggesting a positive effect. Specifically, aggressive innovative strategies have a significant and positive influence on the development of the cosmetics industry, particularly in terms of international entrepreneurship. The findings of the first hypothesis in the present research align with the findings from Faiz and Shaabani [7] studies titled "Investigation of the Effect of entrepreneurial orientation on the export potential of Small and Medium-sized Companies with the Mediation of organizational learning ability and innovation performance." Similarly, Akbari et al.'s [1] study on the automobile industry and Maqsoodi's [19] study titled "Investigation of the Impact of innovation strategy on innovation performance and organizational performance with the role moderator of entrepreneurial orientation and diversification strategy (case study: Parsian Bank)" yield comparable results.

The second hypothesis of the research states that the ability to absorb knowledge through innovative strategies has a positive and significant impact on the growth of the cosmetics industry, particularly in terms of international entrepreneurship.

Based on the statistical analysis, the second hypothesis is confirmed with 95% confidence. This is because the P-value (0.000) is less than 0.05, indicating a significant result, and the T-value (11.629) is greater than 1.96, also indicating significance. Therefore, it can be concluded that innovative strategies of knowledge absorption capacity have a positive and significant impact on the development of the cosmetics industry, particularly in terms of international entrepreneurship.

The findings of the second hypothesis in this current research align with the results of Momeni's [21] study titled "Investigation of the impact of knowledge absorption capacity on innovation capacity (case study: SAIPA Automotive Industries Research and Innovation Center)" conducted by Moradi et al. The mediating role of knowledge absorption capacity supports the findings of the second research hypothesis.

The third hypothesis of the study suggests that implementing innovative strategies with a focus on international entrepreneurship has a favorable and substantial influence on the growth of the cosmetics industry. Based on the statistical analysis at a 95% confidence level, the third hypothesis is supported. This is because the P-value (0.000) is less than 0.05, indicating a significant result, and the T-value (8.) is greater than 1.96, suggesting a positive and significant impact of pioneering innovative strategies on the development of the cosmetics industry, particularly in terms of international entrepreneurship.

The findings of the third hypothesis in this study align with those of Hadadian et al.'s research conducted in [10], which explored the role of readiness to serve as a mediator in the impact of innovation, risk-taking, and pioneering on performance in state-owned banks. Similarly, Gholipor et al.'s studies in [9], titled "Investigating the Interrelationship between organizational innovation, organizational entrepreneurship, and their influence on enhancing organizational learning," as well as Akbari et al.'s article in [1], titled "The Impact of organizational readiness for organizational entrepreneurship on financial performance and innovation performance of organizations: the mediating role of entrepreneurial orientation," yielded similar results.

The fourth hypothesis of the research states that implementing innovative and daring strategies in the cosmetics industry, particularly in international entrepreneurship, has a noteworthy and beneficial effect on its development.

Based on the statistical analysis with a 95% confidence level, the fourth hypothesis is supported. This is indicated by the significance level value (P-value=0.000) being less than 0.05 and the significance coefficient value (T-value=5.993) being greater than 1.96. Therefore, it can be concluded that implementing innovative risky strategies in the cosmetics industry, particularly in international entrepreneurship, has a positive and significant impact on its development. The findings of the fourth hypothesis in this study align with the results of several other articles. These include Manshari's [18] article on the role of risk tolerance in the relationship between innovation and competitive advantage in the insurance industry, Sadri and Delavi's [27] article on the effect of innovation strategy on performance using a balanced scorecard approach in the case of Isfahan Electricity Distribution Company, Rajabzadeh Davasri's [23] thesis investigating the impact of innovation strategies on company performance using Tidewater Company as a case study, and Malik Akhlaq et al.'s [17] study on innovation strategies, performance diversity, and development. Additionally, Katz et al.'s [12] study on practical innovation strategy, and Akman and Yilmaz's [2] research on innovation capability, innovation strategy, and market orientation in the Turkish software industry also support these findings.

Further research is warranted to gain a deeper understanding of the unique demands for innovation within the cosmetic industry, particularly in the context of Iran. This study primarily concentrated on examining companies' internal policies. However, in the current era of social media [25] and the prevalence of fake news [26], where the success of any innovation can hinge on the responses of online communities, it is imperative to closely investigate the correlation between a company's internal policies and its media and society-related strategies. Such an investigation will provide valuable insights into the dynamic interplay between organizational policies and public perception, enabling more informed decision-making for cosmetic companies operating in Iran's digitally connected landscape.

## References

- [1] M. Akbari, M. Danesh, K. Sakhdari. and P. Dolatshah, *The effect of organizational readiness for organizational entrepreneurship on financial performance and innovation performance of organizations: the mediating role of entrepreneurial orientation*, Technol. Dev. Manag. **5** (2016), no. 1.
- [2] G. Akman and C. Yilmaz, *Innovative capability, innovation strategy and market orientation: an empirical analysis in Turkish software industry*, Int. J. Innov. Manage. **12** (2008), no. 01, 69–111.
- [3] B. Bagherian Kasgari and M. Bavafa Semiromi, *How do the features of international entrepreneurship affect the capabilities of the Internet for the company's international business processes?*, First Future Res. Conf. Manag. Dev., 2013.
- [4] A. Behnamfar, *Designing the innovation strategy formulation model for internet businesses with a research design approach*, Master's thesis in the field of entrepreneurship management, Kashan University, 2017.
- [5] P. Dimitratos, I. Voudouris, E. Plakoyiannaki and G. Nakos, *International entrepreneurial culture—Toward a comprehensive opportunity-based operationalization of international entrepreneurship*, Int. Bus. Rev. **21** (2012), no. 4, 708–721.
- [6] M.R. Esfidani and S. Mohosenin, *Structural Equations Based on Partial Least Squares Approach Using Smart-PLS Software: Educational and Practical*, Kitab Mehraban Publishing House, 2013. [In Persian]
- [7] D. Feiz and A. Shaabani, *Investigating the Impact of entrepreneurial orientation on the export power of small and medium enterprises with emphasis on mediating role of organizational learning capability and innovation performance*, Commer. Strat. **25** (2019), no. 12.
- [8] I. Gil-Pechuan, M. Exposito-Langa, and J.V. Tomas-Miquel, *International entrepreneurship in SMEs: A study of influencing factors in the textile industry*, Int. Entrepr. Manage. J. **9** (2013), 45–57.
- [9] V. Gholipor, M. Farashad and S. Zare, *Investigating the relationship between organizational innovation and organizational entrepreneurship and its impact on improving organizational learning*, J. Account. Manage. Vis. **3** (2020), no. 32.
- [10] A.R. Hadadian, F. Sadeghi and N. Salar Babakani, *Investigating the moderating role of readiness to serve in the efficacy of innovativeness, risk taking and proactiveness on the performance in Governmental banks in Mashhad*, J. Bus. Admin. Res. **10** (2018), no. 19.

- [11] S. Hatami, *The effect of innovation power on international entrepreneurship (case study of employees of Parsian bank headquarters in Tehran province)*, Master's thesis, Islamic Azad University, Central Tehran branch, 2019.
- [12] B.R. Katz, N.D. Du Preez and C.S.L. Schutte, *Definition and role of an innovation strategy*, SAIIE Conf. Proc., 2010, pp. 60–74.
- [13] S.H. Kim and K.H. Huarng, *Winning strategies for innovation and high-technology products management*, J. Bus. Res. **64** (2009), no. 11, 1147–1150.
- [14] M. Kotkova Striteska and V. Prokop, *Dynamic innovation strategy model in practice of innovation leaders and followers in CEE countries—a prerequisite for building innovative ecosystems*, Sustainability **12** (2020), no. 9, 3918.
- [15] F. Kropp, N.J. Lindsay and A. Shoham, *Entrepreneurial, market, and learning orientations and international entrepreneurial business venture performance in South African firms*, Int. Market. Rev. **23** (2006), no. 5, 504–523.
- [16] G.T. Lumpkin and G.G. Dess, *Clarifying the entrepreneurial orientation construct and linking it to performance*, Acad. Manage. Rev. **21** (1996), no. 1, 135–172.
- [17] A. Malek Akhlaq, M. Moradi, M. Mehdizadeh and N. Darsthkar Ahmadi, *Selection of innovation strategies*, Bus. Manag. **5** (2016), no. 3, 172–145.
- [18] S. Manshari, *The role of risk taking on the relationship between innovation and competitive advantage in the insurance industry*, the 27th Nat. Insurance Dev. Conf., Tehran, (2019).
- [19] M.F. Maqsoodi, *Investigating the impact of innovation strategy on innovation performance and organization performance with the moderating role of entrepreneurial orientation and diversification strategy (case study: Parsian bank)*, Master's Thesis, Mehr Alborz Institute of Higher Education, 2018.
- [20] S.T. March and G.F. Smith, *Design and natural science research on information technology*, Decision Support Syst. **15** (1995), no. 4, 251–266.
- [21] M. Momeni, *Investigating the effect of knowledge absorption capacity on innovation capacity (study case: SAIPA automotive industries research and innovation center)*, 6th Nat. Conf. Mod. Res. Human. Soc. Stud. Iran, Tehran, 2019.
- [22] F. Rahim Nia, A. Dohaviyan and F. Qadri, *Examining the impact of innovation strategies on the performance of export businesses*, Int. Bus. Manag. **1** (2017), no. 3, 1–22.
- [23] H. Rajabzadeh Davasri, *Investigating the impact of innovation strategies on company performance. (case study: Tidewater company)*, Master's thesis, Bandar Abbas Islamic Azad University, 2016.
- [24] S. Riyadi and S. Sumardi, *The impact of innovation strategy toward business competitiveness of manufacturing industry in Surabaya, Indonesia*, Hasanuddin Econ. Bus. Rev. **1** (2017), no. 1, 83–89.
- [25] S. Sabbar and D. Hyun, *What do we trust? a study on credibility of new and old media and relations with medium, content and audience characteristics*, New Media Stud. **1** (2016), no. 4, 205–245.
- [26] M. Sabzali, M. Sarfi, M. Zohouri, T. Sarfi and M. Darvishi, *Fake news and freedom of expression: an Iranian perspective*, J. Cyberspace Stud. **6** (2022), no. 2, 205–218.
- [27] H. Sadri and M. Delavi, *The effect of innovation strategy on performance based on balanced scorecard (case study of Isfahan electricity distribution company)*, Public Policy-Mak, Manag. **8** (2016), no. 3, 37–50.
- [28] A. Sardari and F. Amiri, *Investigating the impact of innovation strategy on new product development performance with emphasis on the value co-creation strategy (case study: private insurance companies)*, Sci. J. Bus. Strat. **26** (2018), no. 14, 154–180.
- [29] M. Tajuddin, K. Talebi, A.A. Rostgar and M. Samizadeh, *The relationship between the type of business strategies used in small and medium companies and their internationalization*, Bus. Manag. **4** (2012), no. 11, 19–38.
- [30] J.W. Zartha, E.E. Martínez, E.V. Escobar and J.M. Hincapié, *Innovation strategy*, Espacios **37** (2016), no. 24, 7.