

Entrepreneurship Development at the National Petroleum Products Refining Company

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Abstract

Petroleum products are very widely used materials, which are processed from crude oil in oil refineries. Refineries can process petroleum products for various purposes according to the composition of crude oil and customer requests. The purpose of this research is to develop entrepreneurship in the National Petroleum Products Refining Company. This research is a developmental applied research according to the research objectives. In this research, using the theme analysis technique, its validation was examined in the development of entrepreneurship in the National Petroleum Products Refining Company. The statistical population of the research in the qualitative section was identified as about 12 people. Considering the dominance of the qualitative approach, the snowball sampling method was used. The statistical population in the quantitative section is 951 people. In the first part (qualitative), the main and sub-themes were determined in order to design an entrepreneurship development model in the national oil refining industry with an approach to preventing environmental damage, using the theme analysis technique with Maxqda2020 software, and then in the second part (quantitative), they were analyzed by surveying statistical samples and using structural equations. According to the results, the main theme of developing green entrepreneurial structures and processes is in the first priority and importance, and the development of green entrepreneurship is in the second and seventh importance.

Keywords: Entrepreneurship, environment, refining of petroleum products, crude oil

INTRODUCTION

Petroleum products are very widely used materials. The most common use of petroleum products is to obtain energy from them: such as fuel oil and gasoline, which are products for using their energy.

Refineries also process other chemicals, some of which use chemical processes to process plastics and other widely used materials. Since oil contains a few percent of sulfur, a large amount of sulfur is also processed as a petroleum product. Hydrogen and carbon in the form of petroleum coke can also be considered petroleum products [1].

Measuring the relative value of crude oil in the market is subject to several factors that sometimes conflict with each other. Each type of oil has its own characteristics and properties, which determine the type and amount of products that are produced after refining the oil. In addition, the way refineries operate and the equipment they use also has an impact on the production of refined products. A particular type of oil may be ideal for a particular refinery, but the same oil may not be desirable for a variety of reasons, including price or the lack of

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Received Date: March 25, 2025

Accepted Date: March 27, 2025

Published Date: April 10, 2025

Citation: Jalal Abdi, Ali Mobaraki, Zahra Arezeh, Ali Abdi Valami, Mohammad Taghipour. Entrepreneurship Development at The National Petroleum Products Refining Company. Journal of Petroleum Engineering & Technology. 2025; 15(2): 44–60p.

sufficient production of key products that the refinery's traditional market requires. A refinery's domestic market demand for petroleum products can fluctuate significantly due to seasonal, economic, or local conditions, which affects the type of oil or blend of oil that a refiner will attempt to source. Research in the petroleum refining industry on eco-entrepreneurship helps to understand how resource-dependent communities, often facing persistent poverty, are harnessing entrepreneurial initiative to create sustainable and profitable businesses. Entrepreneurship is the engine of economic growth. Currently, the usual business models that are associated with high pollution and profit-oriented have been criticized, and the need for a different type of these models that seek sustainability and incorporate environmental concerns into profit and loss considerations has been accepted [2]. On the other hand, the development of organizational entrepreneurship is not only suitable for management, but also for the employee himself, because it is an opportunity to highlight, show off and differentiate his characteristics, using innovation and is motivated to stay in the organization, therefore, we will less likely witness this phenomenon whereby valuable, open-minded and innovative employees are lost. Considering the value of entrepreneurship development as one of the most important concepts raised in the form and nature of environmental discourse, the purpose of this research is the development of entrepreneurship in the National Petroleum Products Refining Company. Therefore, the present study specifically seeks to find an answer to the question: What model can be presented by identifying entrepreneurial development in the National Petroleum Products Refining Company with an approach to preventing environmental damage?

RESEARCH QUESTIONS

To foster entrepreneurship within the National Petroleum Products Refining Company, the current study was carried out. The purpose of this study was to respond to the following queries:

- *Question 1:* What are the themes (themes) and main dimensions of the entrepreneurship development model in the National Petroleum Products Refining Company with the approach of preventing environmental damage?
- *Question 2:* What is the factor loading and the importance of each of the themes and main and sub-dimensions of the entrepreneurship development model in the National Petroleum Products Refining Company with the approach of preventing environmental damage?
- *Question 3:* How does the National Petroleum Products Refining Company's entrepreneurial development model's strategy to reducing environmental damage relate to its key components and dimensions?
- *Question 4:* What is the degree of consistency and fit of the obtained model of entrepreneurship development with the approach of preventing environmental damage in the National Petroleum Products Refining Company?

THEORETICAL LITERATURE

National Industry of Refining Petroleum Products and Classification of Petroleum Products

Petroleum products fall into two major and significant groups, according to a new analysis from the McKinsey Research Center. The first group is petroleum products used as fuel, which includes light naphtha, gasoline, and gasoline used in airplanes, as well as jet fuel. Propane, butane, and LPG are among these goods. Additionally, domestic fuel, industrial gas oil, and diesel fuel fall under this group. However, a significant portion of refinery products, such as asphalt, lubricating or base oils, propylene, and different aromatics, are no longer used as fuel. Asphalt, one of the most used petroleum products, is used to make highways and residential roofs level, and is impermeable. Conversely, lubricating oils are utilized in automobile engines and industrial machinery because of their properties, which stop surface damage and friction [1].

As petroleum products other than gasoline, a variety of waxes, greases, kerosene, sulfur, and petroleum coke have also been introduced. The pharmaceutical and cosmetics industries both employ kerosene, a colorless and odorless hydrocarbon, in their manufacturing processes. Numerous shampoos and shave creams are made with this substance. When separated from petroleum products in the refinery and marketed separately to different sectors, sulfur, which has frequently been identified as a component

that degrades petroleum products and results in low product quality, is a highly significant and widely utilized petrochemical product. Another byproduct of refineries is petroleum coke, which is utilized as fuel in cement and power plants. Additionally, electrodes and anodes are made with this substance [1].

Job Description of the National Petroleum Refining and Distribution Company

The National Petroleum Refining and Distribution Company of Iran was established in March 1991, based on the principle of separating upstream activities (exploration and production of crude oil and gas) from downstream activities (transportation of crude oil and products, refining, export, import and distribution of petroleum products) in the Ministry of Oil; and its official activities began in 1992. The National Iranian Petroleum Refining and Distribution Company, as one of the four main companies of the Ministry of Oil, is responsible for managing and supervising the activities of subsidiary companies, including the National Iranian Petroleum Distribution Company, the Iranian Oil Pipelines and Telecommunications Company, the Abadan Oil Refining Company, the Imam Khomeini Shazand Arak Oil Refining Company, the National Iranian Oil Engineering and Construction Company, and the Refining Industries Development Company. The missions of the National Iranian Petroleum Refining and Distribution Company are divided into three systems: production, transmission, and distribution (as links in the value chain of downstream activities). In addition to the three systems mentioned, it is responsible for providing engineering and telecommunications services to supply chain companies.

RESEARCH BACKGROUND

Rostami *et al.* stated in a study titled “Presenting a Model for Developing Organizational Entrepreneurship with an Open Innovation Approach in the Ilam Gas Refinery” that the main goal of the present study was to design a model for developing organizational entrepreneurship with an open innovation approach in the Ilam Gas Refinery [1]. Based on the results obtained, realizing the development of organizational entrepreneurship with an open innovation approach requires synergy and fundamental partnerships among key players in the open innovation ecosystem and adjusting or strengthening some structural variables. Organizational decision-makers can take action by considering these issues and adopting favorable policies to improve the necessary conditions for realizing organizational entrepreneurship with an open innovation approach.

Amirkhani and Tajrloo conducted a study entitled “Analysis of the Contractor’s Prior Actions to Reduce Environmental Risks in Upstream Oil Contracts” [3]. This study, in a descriptive-analytical manner, aims to present mechanisms effective in reducing pollution trends by analyzing the contractor’s prior requirements and actions in law and contract and explaining the nature of environmental regulations through reference to national environmental laws and regulations, reference to international practices and international standards, and reference to the method of national law and international practices, as well as legal measures and contractual conditions, including feasibility studies, regulations related to protected areas, appropriate measures in emergency situations, waste management and cleanup, insurance, and implicit contractual conditions, including the regulation and observance of environmental codes.

Ozougwu *et al.* conducted a case study in the Nigerian Oil Delta in a study titled Environmental Identities and Attitude towards Crude Oil Pipeline Vandalism in Niger Delta Oil-Producing Communities. This study showed that young people who scored medium to high on the Environmental Identity Scale were more likely to be pro-environmental. There was also a significant relationship between gender scores and environmental identity [4].

Addo and Willard conducted a complementary approach to improving environmental attitudes and environmental health in Nigerian oil companies in a study titled Community-Based Social Impacts. Their paper argues that a community-based social marketing framework can support an environmental health communication and advocacy campaign in the Niger Delta of Nigeria [5].

Taghipour studied A review of the sustainability indicators' application in vehicle routing problem [6].

Jafarinia and Dabiri conducted a study entitled "Measuring Environmental Attitudes on Environmental Behavior: A Case Study of Oil, Gas, and Petrochemical Industry Employees in Bushehr Province" [7]. The results obtained from simple linear regression indicate that among the three variables in this study, all three variables had a significant relationship with the dependent variable (social environmental behaviors), which means that in the three research hypotheses, the significance level obtained is smaller than 0.05, so the three hypotheses of this study were confirmed and this relationship is significant at the 0.000 level.

Nazarizadeh and Bahmanpour conducted a study entitled A review of environmental pollutants and pollution emission sources in the oil and gas industry [8]. In this article, an attempt is made to compile and introduce a list of environmental pollutants and their emission sources by examining domestic and foreign sources and existing samples. Obviously, the number of these pollutants is very large and they can be combined and synergistic. On the other hand, there is the possibility of phase change, as well as sedimentation and leakage in the ground and the creation of secondary pollution.

Mohammadi *et al.* studied Investigating the role and impact of using Information and Communication Technologies ICT tools on evaluating the performance of service organizations [9].

Taghipour *et al.* studied Evaluating Project Planning and Control System in Multi-project Organizations under Fuzzy Data Approach Considering Resource Constraints (Case Study: Wind Tunnel Construction Project) [10].

Murphy *et al.* conducted a study entitled "Steeped in Oil: The Socio-Psychological Factors and Processes That Influence Community Members' Attitudes toward Economic Diversification in an Oil and Gas-Producing Community." This qualitative study included interviews with 37 adults in the community, and a subset of 16 of these participants participated in a transect walk to further explore emerging issues [11].

Ozkan and Ipekoglu conducted a study examining the environmental impacts of tailings dams in China. The findings showed that during the exploitation of valuable metals and industrial minerals from their ores, a large amount of waste or tailings may be produced, and these tailings may be harmful to the environment [12].

The findings showed that new methods are effective in entrepreneurship education and active learning and how to design activities to motivate and increase students' understanding of the most appropriate model of "model teaching" in entrepreneurship is necessary.

Taghipour *et al.* studied the impact of working capital management on the performance of firms listed in Tehran Stock Exchange (TSE) [13].

Wang *et al.* conducted a study entitled "The Impact of Trade and Growth on the Environment: Revisiting the Cross-country Evidence". The findings showed that 15 factors, including natural conditions, environmental issues and human activities, were considered in the Environmental Vulnerability Index [14].

Faham and Parhizkar conducted a study titled The Place of Entrepreneurship Development in National Policies and Programs of the Country. The findings showed that the most reflection of entrepreneurship categories was seen in documents related to the resistance economy [15].

Baghipour *et al.* studied Modeling of nurses' shift work schedules according to ergonomics: a case study in Imam Sajjad(As) Hospital of Ramsar [16].

Taghipour *et al.* studied the impact of Information and Communication Technologies (ICT) on knowledge sharing obstacles in knowledge management process (including case-study) [17].

Taghipour *et al.* studied Analysing the Effects of Physical Conditions of the Workplace on Employee's Productivity (Including Case Study) [18].

STATISTICAL POPULATION

Research Population in the Qualitative Section

The statistical population of the research in the qualitative section includes: (1). Senior managers of the Environmental Organization, (2). Consultants of the National Petroleum Products Refining Company, and (3). Academic experts in the field of entrepreneurship.

According to the initial survey, about 12 people were identified. Given the dominance of the qualitative approach in this section, one of the qualitative sampling methods called the "snowball" sampling method is used.

Research Population in the Quantitative Stage

Since the subject of the present study is the development of entrepreneurship in the National Petroleum Products Refining Company, the statistical population in the quantitative section includes all employees of the National Petroleum Products Refining Company, 951 people, and the sample size was estimated to be 274 people [19].

Data Analysis Method and Explanation of Research Questions

- *Part one: Qualitative part:* determining the main and sub-themes in order to design an entrepreneurship development model in the national oil refining industry with an approach to preventing environmental damage, using the theme analysis technique with Maxqda software,
- *Part two: Quantitative part:* quantifying or testing the obtained model was done by surveying statistical samples and applying structural equations (SEM) with Smart PLS software.

Qualitative Phase of the Research

Demographic Characteristics of Experts (Qualitative Part)

The sample size of the experts in this study was determined to be a total of 12 people. The following Tables 1 and 2 show the frequency distribution of the experts in this study based on gender, service experience and educational degree.

Table 1. Absolute and relative frequency distribution of the study population by gender.

Gender	Frequency	Percentage of frequency
Male	8	67
Female	4	33
Total	12	100

Table 2. Frequency of experts' sample based on length of service.

Length of service	Frequency	Relative frequency percentage
From 10 to 15 years	4	33
Between 15 and 20 years	5	42
Between 20 and 25 years	2	17
Over 25 years	1	8
Total	12	100

Table 2 shows that among the 12 experts in this study, 4 had 10 to 15 years of service, 5 had 15 to 20 years, 2 had 20 to 25 years, and 1 was over 25 years old.

Among the 12 experts in this study, 3 had a master's degree and 9 had a doctorate in terms of education (Table 3).

Analysis and Synthesis of Qualitative Findings

This section analyzes the collected data and research findings. The data collection tool was semi-structured interview files, and the results were analyzed using the Maxqda qualitative analysis software version 2020. Data analysis was carried out with 12 interview files, all of which are detailed in Table 4. Then, based on the three stages of open coding, coding of sub-themes, and coding of main themes, we extracted the main and sub-themes. Finally, for the present study, a model is presented in the form of entrepreneurship development in the National Petroleum Products Refining Company.

Frequency Distribution of Coded Sections of Interviews

One of the useful tools in qualitative software is frequency. In this category of software, frequency is presented based on two groups: coded sections and coded documents. Coded sections are the number of strings or lines of a paragraph that can be coded with n specific codes. In Table 4, the frequency distribution of coded sections of each interview is presented separately in the upstream document group and the interviewee group.

Based on the findings in the Table 4, out of the 12 interview files conducted, 362 sections of the texts were coded. It is worth noting that the highest frequency is related to the second and fourth interview files with 41 coded sections and the lowest is related to the first and eighth interviews with 21 coded sections. In the present study, first, all the factors extracted from the 12 coded interviews are considered as codes. Then, by considering the meaning of each of the codes, they are categorized into a similar concept.

Table 3. Relative and absolute frequency distribution of sample individuals by education.

Education	Frequency	Relative frequency percentage
Master's Degree	3	25
Specialized Doctorate	9	75
Total	12	100

Table 4. Frequency distribution of coded sections of interviews.

Interviewee	Frequency of coded segments
Respon01	21
Respon02	41
Respon03	40
Respon04	41
Respon05	27
Respon06	36
Respon07	28
Respon08	21
Respon09	27
Respon10	31
Respon11	27
Respon12	22
Total coded sections	362

Coding Steps

- *Open coding*: In this stage, the interview files are collected and categorized by the researcher. It is worth noting that 12 interview files were collected and coded in the present study.
- *Sub-themes (secondary pre-organizing themes (components))*: Coding of sub-themes is done when the researcher assigns a code to each part of the text by studying it. At this point, a paragraph or section of text may have many codes assigned to it.
- *Principal pre-organizing themes (dimensions) or main topics*: We may now classify and combine the retrieved codes since they are shown in the Code system area. This window is the same as the selected coding (main themes) that we can use to categorize, classify, and classify and arrange the codes to draw a figure. The extracted themes are: (1) Green entrepreneurship culture and atmosphere, (2) Development of green entrepreneurial structure and processes, (3) Management factors, (4) Environmental factors, (5) Development of green entrepreneurial opportunities, (6) Entrepreneurial human resources, and (7) Development of green entrepreneurship.

Reliability and Validity of the Model and Theoretical Saturation of Findings (Codes)

In qualitative research, validity refers to concepts such as defensibility, believability, verifiability, and even reflectability of the research results, which if another person had conducted this research, would have reached the results extracted in the present study. The assessment of two or more documents in relation to a particular indicator is one of the reliability indicators of qualitative research. Such a capacity is present in Maxqda software. To evaluate the reliability of the meta-combination stage between the groups of student and expert interviews, the Maxqda software was compared in terms of the extracted codes based on the Inter-code agreement option. Its output was the kappa coefficient (0.483), which was more than an acceptable value.

Table 5 shows the level of agreement of individuals based on two files Respon02 and Respon04 from the interview files. The reason for this choice is the high number of codes extracted in each of the aforementioned documents. The value obtained for the Kappa index is equal to 0.483, which has assigned itself a standard deviation value of 0.312. For the significance of this coefficient, we can conclude based on the two criteria T-VALUE and P-VALUE, in such a way that for the first index the number should be above 1.96 and for the second index it should be less than 0.05. Since the two values 4.514 are higher than 1.96 and the resulting P-value is equal to 0.000 and is much smaller than the 5% percent error level, we can claim that the agreement test based on the Kappa coefficient is at a very acceptable level.

Open Coding (Free Coding), Sub-themes and Main Themes (Interview Files)

This section examines open coding (free coding), themes in MaxQuda software.

Main Theme of Developing Green Entrepreneurial Structure and Processes

In the present study, the main theme (primary pre-organizing themes (dimensions)) of developing green entrepreneurial structure and processes along with sub-themes (secondary pre-organizing themes (components) and indicators (open coding) are presented as follows.

Table 5. Coding agreement test between student and expert interview groups.

		Amount	Estimated standard deviation (a)	Estimate (Tb)	Estimated significance (sig)
Measure of agreement	Kappa	0.483	0.312	4.514	0.000
N of Valid Cases		2	-	-	-
a. Not assuming the null hypothesis					
b. Using the asymptotic standard error assuming the null hypothesis					

Based on the findings in Table 6, three themes have been identified and reported for developing green entrepreneurial structures and processes. The sub-themes are: integrating entrepreneurial structures and processes, decentralization, and process improvement and development.

Main Theme of Management Factors

In the present study, the main theme (primary pre-organizing themes (dimensions)) of management factors along with sub-themes (secondary pre-organizing themes (components)) and indicators (open coding) are presented as follows:

Based on the findings in Table 7, four sub-themes for the third main theme (management factors) have been identified and reported. Information technology management, human resource management, financial resource management, and entrepreneurial leadership are the sub-themes.

Main Theme of Environmental Factors

In the present study, the main theme (primary pre-organizing themes (dimensions)) of environmental factors along with sub-themes (secondary pre-organizing themes (components)) and indicators (open coding) are presented as follows:

Based on the findings in Table 8, four sub-themes for the main theme (environmental factors) have been identified and reported. The sub-themes are: economic environment, cultural environment, government environment and legal institutions, and political environment.

Main Theme of Developing Green Entrepreneurial Opportunities

In the present study, the main theme (primary pre-organizing themes (dimensions)) of developing green entrepreneurial opportunities along with sub-themes (secondary pre-organizing themes (components)) and indicators (open coding) are presented as follows:

Table 6. Categories and classes related to the main theme (Development of green entrepreneurial structure and processes).

Main themes (primary pre-organizing themes (dimensions))	Sub-themes (secondary pre-organizing themes (components))	Row	Indicators (open coding)
Developing green entrepreneurial structures and processes	Integration of entrepreneurial structure and processes	16	Proportion of authority and responsibility
		17	Organizational coherence in the entrepreneurial process
		18	Development and approval of laws and regulations supporting green entrepreneurship
		19	De-bureaucratization
	Decentralization	20	Reducing organizational centralization
		21	Delegating entrepreneurial authority to lower levels
		22	Employee participation in entrepreneurial decision-making
	Process improvement and development	23	Resolving process complexities of entrepreneurial decision-making
		24	Improving and updating existing processes related to sustainable entrepreneurship
		25	Re-engineering green entrepreneurship processes

Table 7. Categories and classes related to the main theme (management factors).

Main themes (primary pre-organizing themes (dimensions))	Sub-themes (secondary pre-organizing themes (components))	Row	Indicators (open coding)
Management factors	Entrepreneurial leadership	26	Developing entrepreneurial capabilities
		27	Inspiring employees
		28	Seeking employee participation
	Financial resources management	29	Appropriate budget allocation
		30	Providing financial facilities
		31	Appropriate financial audit
	Human Resources Management	32	Entrepreneurial competency-based selection
		33	Entrepreneurial competency-based leadership
		34	Entrepreneurship training for human resources
		35	Job enrichment for human resources
	Information Technology Management	36	Creating appropriate IT infrastructure
		37	Developing communication networks
		38	Appropriate information systems
39		Electronic technology and equipment	
40		Digital entrepreneurship	

Table 8. Categories and classes related to the main theme (environmental factors).

Main themes (primary pre-organizing themes (dimensions))	Sub-themes (secondary pre-organizing themes (components))	Row	Indicators (open coding)
Environmental factors	Economic environment	41	The level of attention of companies to profitability from entrepreneurship
		42	Government economic policies towards the environment
		43	Economic indicators of entrepreneurship in society
	Cultural environment	44	Promoting an entrepreneurial culture among members of society
		45	A culture of attention to the environment in society
		46	People's and employees' attention to environmental damage
	Government environment and legal institutions	47	Government laws on environmental damage
		48	Government instructions on the environment
		49	Government supervision on environmental damage
		50	Periodic reports on environmental damage
	Political environment	51	Recognizing and gaining trust in public support for environmental programs
		52	Preparing a charter of ethics, vision and mission of an environmental organization
		53	Advertising environmental programs in the media

Based on the findings of Table 9, three sub-themes for the main theme (Developing Green Entrepreneurial Opportunities) have been identified and reported. The sub-themes are: Environmental Impacts, Project Evaluation, and Opportunity Feasibility.

Main Theme of Entrepreneurial Human Resources

In the present study, the sixth main theme (Primary Pre-Organizing Themes (Dimensions)) of Entrepreneurial Human Resources along with the sub-themes (Secondary Pre-Organizing Themes (Components)) and indicators (Open Coding) have been presented as follows:

Table 9. Categories and classes related to the main theme (Development of green entrepreneurial opportunities).

Main themes (primary pre-organizing themes (dimensions))	Sub-themes (secondary pre-organizing themes (components))	Row	Indicators (open coding)
Developing green entrepreneurial opportunities	Environmental impacts	54	Environmental Impact Assessment
		55	Environmental Damage Assessment
	Project evaluation	56	Technical Project Evaluation
		57	Financial Project Evaluation
		58	Economic Project Evaluation
	Feasibility study of opportunities	59	Determining Financing Model
		60	Investment Estimate
		61	Estimation of Costs and Implementation Time

Table 10. Categories and classes related to the main theme (Entrepreneurial Human Resources).

Main themes (primary pre-organizing themes (dimensions))	Sub-themes (secondary pre-organizing themes (components))	Row	Indicators (open coding)
Human Resources Entrepreneur	Specialized features	62	Entrepreneurial action
		63	Entrepreneurial spirit of human resources
		64	Entrepreneurial knowledge
		65	Environmental awareness
	General features	66	General personality trait
		67	General entrepreneurial trait
		68	General environmental trait
	Moral characteristics	69	Personal ethical traits
		70	Entrepreneurial ethical traits
		71	Social ethical traits

Based on the findings of Table 10, three sub-themes for the main theme (entrepreneurial human resources) have been identified and reported. The sub-themes are: specialized characteristics, general characteristics, and ethical characteristics.

Main Theme of Green Entrepreneurship Development

In the present study, the main theme (primary pre-organizing themes (dimensions)) of green entrepreneurship development along with sub-themes (secondary pre-organizing themes (components)) and indicators (open coding) are presented as follows:

Based on the findings in Table 11, three sub-themes have been identified and reported for the main theme (green entrepreneurship development). The sub-themes are: green enterprise development, green entrepreneurship creativity and innovation development, and regulatory review.

DISCUSSION AND ANSWERS TO QUESTIONS

Answer to the First Research Question

Question 1: What are the main themes and dimensions of the entrepreneurship development model in the National Petroleum Products Refining Company with an approach to preventing environmental damage?

Table 12 shows the Green entrepreneurship culture and atmosphere, development of green entrepreneurial structure and processes, managerial factors, environmental factors, development of

green entrepreneurial opportunities, entrepreneurial human resources, and development of green entrepreneurship are the main themes, as indicated by the results in Table 5.

Answer to the Second Research Question

Question 2: What are the themes (topics) and sub-dimensions of the entrepreneurship development model in the National Petroleum Products Refining Company with the approach of preventing environmental damage?

According to the results obtained, the main theme of green entrepreneurial culture and atmosphere; the sub-themes of organizational infrastructure, entrepreneurial values, motivational methods, and the sub-theme of sublime organizational atmosphere are located. The main theme of developing green entrepreneurial structure and processes; the sub-themes of decentralization, integration of the structure of entrepreneurial processes, and the sub-theme of process improvement and development are located. The main theme of management factors; the sub-themes of entrepreneurial leadership, financial resource management, human resource management, and the sub-theme of information technology management are located. The main theme of environmental factors; the sub-themes of political environment, cultural environment, government environment and legal institutions, and the sub-theme of economic environment are located.

Table 11. Categories and classes related to the main theme (Green Entrepreneurship Development).

Main themes (primary pre-organizing themes (dimensions))	Sub-themes (secondary pre-organizing themes (components))	Row	Indicators (open coding)
Green Entrepreneurship Development	Green enterprise development	72	Rewards for green enterprise development
		73	Tax incentives, i.e. rewards for green enterprise development
		74	Punishment for irrational use of natural resources
	Developing creativity and innovation in green entrepreneurship	75	Development of green entrepreneurship creativity
		76	Establishment of environmental management system
		77	Pay attention to social capital, use of environmental entrepreneurship
	Review of the rules	78	Commitment of enterprises to the results of unsustainable economic enterprises
		79	Enforcement of environmental inspection
		80	Communication of instructions related to environmental activity
		81	Enforcement of environmental standard label

Table 12. Main themes and dimensions of the entrepreneurship development model with an environmental damage prevention approach.

The theme is comprehensive.	Main themes (Primary pre-organizing factors (dimensions))
Entrepreneurship development with an approach to preventing environmental damage	Green Entrepreneurship Culture and Climate
	Developing Green Entrepreneurship Structure and Processes
	Management Factors
	Environmental Factors
	Developing Green Entrepreneurship Opportunities
	Entrepreneurial Human Resources
	Developing Green Entrepreneurship

The main theme of developing green entrepreneurial opportunities; the sub-themes of environmental impacts, project evaluation, and opportunity feasibility are located. In the main theme of human resources of entrepreneurs; the sub-themes of specialized characteristics, ethical characteristics and the sub-theme of general characteristics are located. In the main theme of green entrepreneurship development; the sub-themes of green enterprise development, review of laws and the sub-theme of developing green entrepreneurship creativity and innovation are located.

Answer to the Third Research Question

Question 3: What is the factor load and importance of each of the main and sub-themes and dimensions of the entrepreneurship development model in the National Petroleum Products Refining Company with the approach of preventing environmental damage?

The development of green entrepreneurial opportunities, management factors, environmental factors, entrepreneurial human resources, green entrepreneurship culture and atmosphere, and green entrepreneurship structure and processes are among the primary themes. Developing green entrepreneurial structure and processes is the primary theme among them, ranking first in terms of priority and importance with a coefficient of 0.276; developing green entrepreneurial opportunities comes in second with a coefficient of 0.258; and environmental factors comes in third with a coefficient of 0.250. The main theme of green entrepreneurial culture and atmosphere with a coefficient of 0.240 is in the fourth priority and importance, the development of green entrepreneurship, with a coefficient of 0.119, is the seventh priority and importance, followed by the main theme of managerial factors, with a coefficient of 0.215, is in the fifth priority and importance, and the main theme of entrepreneurial human resources, with a coefficient of 0.125, is in the sixth priority and importance.

In the main theme of green entrepreneurial culture and atmosphere; The sub-theme of organizational infrastructure with a factor loading of 0.896 is in the first priority, the sub-theme of entrepreneurial values with a factor loading of 0.869 is in the second priority, the sub-theme of motivational methods with a factor loading of 0.848 is in the third priority, and the sub-theme of transcendent organizational climate with a factor loading of 0.544 is in the fourth priority.

In the main theme of developing green entrepreneurial structure and processes; the sub-theme of decentralization with a factor loading of 0.936 is in the first priority, the sub-theme of the integration of the structure of entrepreneurial processes with a factor loading of 0.904 is in the second priority, and the sub-theme of reforming and developing processes with a factor loading of 0.831 is in the third priority.

In the main theme of managerial factors: The entrepreneurial leadership sub-theme with a weight of 0.886 is in the first priority, the financial resources management sub-theme with a factor load of 0.885 is in the second priority, the human resources management sub-theme with a factor load of 0.645 is in the third priority, and the information technology management sub-theme with a factor load of 0.585 is in the fourth priority.

In the main theme of environmental factors; the political environment sub-theme with a factor load of 0.917 is in the first priority, the cultural environment sub-theme with a factor load of 0.908 is in the second priority, the government and legal institutions sub-theme with a factor load of 0.895 is in the third priority, and the economic environment sub-theme with a factor load of 0.853 is in the fourth priority.

In the main theme of developing green entrepreneurial opportunities; the sub-theme of environmental impacts with a factor loading of 0.883 is in the first priority, the sub-theme of project evaluation with a factor loading of 0.825 is in the second priority, and the feasibility of opportunities with a factor loading of 0.653 is in the third priority.

In the main theme of human resources of the entrepreneur; the sub-theme of specialized characteristics with a factor loading of 0.927 is in the first priority, the sub-theme of ethical characteristics with a factor loading of 0.817 is in the second priority, and the sub-theme of general characteristics with a factor loading of 0.778 is in the third priority.

In the main theme of green entrepreneurship development; the sub-theme of green enterprise development with a factor loading of 0.849 is in the first priority, the sub-theme of reviewing laws with a factor loading of 0.783 is in the second priority, and the sub-theme of developing green entrepreneurship creativity and innovation with a factor loading of 0.771 is in the third priority.

Answer to Question Four

Question 4: What are the relationships between the main factors and dimensions of the entrepreneurship development model in the National Petroleum Refining Company with the approach to preventing environmental damage?

In this section, the structural model and relationships between the main and secondary factors and dimensions of the entrepreneurship development model in the National Petroleum Refining Company with the approach to preventing environmental damage were examined using PLS software.

The PLS4 software tests relationships at a 95% confidence level by default, and since the t value of this confidence level is equal to 1.96, then any relationship for which the t value is outside the range of -1.96 to +1.96 is statistically confirmed at a 95% confidence level. The significance of the variables' effects on one another is demonstrated by the T statistic, which is noteworthy. When T is larger than 1.96, it indicates that there is a substantial positive effect; if it is between -1.96 and +1.96, there is no significant effect; and if it is less than -1.96, it indicates that there is a significant negative effect. The path coefficients also indicate a strong association between the two variables if they are over 0.6, a moderate relationship if they are between 0.3 and 0.6, and a weak relationship if they are below 0.4.

The study's findings indicate that all of the model's routes are appropriate and that, at a 95% confidence level, their t values fall outside of the designated range, demonstrating the relevance of all of the paths and the relationships between the variables.

Answer to the Fifth Research Question

Question 5: How is the degree of consistency and fit of the obtained model of entrepreneurship development with the approach of preventing environmental damage in the National Petroleum Products Refining Company?

Table 13 shows that the CVR value is 0.404 and the GoF value is 0.64. Considering that the CVR value is compared with three values of 0.02 (poor model quality), 0.15 (moderate) and 0.35 (strong), since this value was calculated above 0.15, it means that the structural model has a good fit. Also, GoF is compared with three values of 0.01 (poor), 0.15 (moderate) and 0.35 (strong), therefore, considering that this value was calculated above 0.15, it means that the model has a good fit. The standardized root mean square residual was introduced as a suitable criterion for evaluating the overall model fit for PLS-SEM. A value less than 0.1 is appropriate, which means that in this model the overall model fit is evaluated as good.

Table 13. Results of overall structural model tests and PLS overall model test.

Test result	Calculated value	Desired amount	Index
Confirmation	0.404	>0/15	CV Redundancy
Strong confirmation	0.64	>0/15	GoF
Confirmation	0.089	<0/1	SRMR

Therefore, in response to the fifth research question, based on the consistency and fit of the obtained model of entrepreneurship development with the approach of preventing environmental damage in the National Petroleum Products Refining Company, it has been assessed as appropriate.

CONCLUSION

In the present study, seven factors were identified in the framework of entrepreneurship development in the National Petroleum Products Refining Company, which are reported as follows:

Findings from the First Research Question

Question 1: What are the main themes and dimensions of the entrepreneurship development model in the National Petroleum Products Refining Company with an approach to preventing environmental damage?

According to the results, the main themes include green entrepreneurship culture and atmosphere, development of green entrepreneurial structure and processes, managerial factors, environmental factors, development of green entrepreneurial opportunities, entrepreneurial human resources, and development of green entrepreneurship.

Findings from the Second Research Question

Question 2: What are the themes (topics) and sub-dimensions of the entrepreneurship development model in the National Petroleum Products Refining Company with the approach of preventing environmental damage?

According to the results obtained, the main theme of green entrepreneurial culture and atmosphere, the sub-themes of organizational infrastructure, entrepreneurial values, motivational methods, and the sub-theme of sublime organizational atmosphere are located. The main theme of developing green entrepreneurial structure and processes, the sub-themes of decentralization, integration of the structure of entrepreneurial processes, and the sub-theme of process improvement and development are located. The main theme of management factors, the sub-themes of entrepreneurial leadership, financial resource management, human resource management, and the sub-theme of information technology management are located. The main theme of environmental factors; the sub-themes of political environment, cultural environment, government environment and legal institutions, and the sub-theme of economic environment are located. The main theme of developing green entrepreneurial opportunities, the sub-themes of environmental impacts, project evaluation, and opportunity feasibility are located. In the main theme of human resources of the entrepreneur, there are sub-themes of specialized characteristics, ethical characteristics and sub-theme of general characteristics. In the main theme of green entrepreneurship development, there are sub-themes of green enterprise development, review of laws and sub-theme of developing green entrepreneurship creativity and innovation.

Findings from the Third Research Question

Question 3: What is the factor loading and importance of each of the main and secondary themes and dimensions of the entrepreneurship development model in the National Petroleum Products Refining Company with an approach to preventing environmental damage?

The findings indicate that green entrepreneurial culture and atmosphere, green entrepreneurial structure and processes, managerial and environmental factors, green entrepreneurial opportunities, entrepreneurial human resources, and green entrepreneurial development are the main themes.

Among them, the main theme of developing green entrepreneurial structure and processes with a coefficient of 0.276 is in the first priority and importance, and the main theme of developing green entrepreneurial opportunities with a coefficient of 0.258 is in the second priority and importance, the main theme of environmental factors with a coefficient of 0.250 is in the third priority and importance,

the main theme of green entrepreneurial culture and atmosphere with a coefficient of 0.240 is in the fourth priority and importance, the main theme of managerial factors with a coefficient of 0.215 is in the fifth priority and importance, the main theme of entrepreneurial human resources with a coefficient of 0.125 is in the sixth priority and importance, and finally, the development of green entrepreneurship with a coefficient of 0.119 is in the seventh priority and importance.

In the main theme of green entrepreneurial culture and atmosphere: The sub-theme of organizational infrastructure with a factor loading of 0.896 is in the first priority, the sub-theme of entrepreneurial values with a factor loading of 0.869 is in the second priority, the sub-theme of motivational methods with a factor loading of 0.848 is in the third priority, and the sub-theme of transcendent organizational climate with a factor loading of 0.544 is in the fourth priority.

In the main theme of developing green entrepreneurial structure and processes: the sub-theme of decentralization with a factor loading of 0.936 is in the first priority, the sub-theme of the integration of the structure of entrepreneurial processes with a factor loading of 0.904 is in the second priority, and the sub-theme of reforming and developing processes with a factor loading of 0.831 is in the third priority.

In the main theme of managerial factors: The entrepreneurial leadership sub-theme with a weight of 0.886 is in the first priority, the financial resources management sub-theme with a factor load of 0.885 is in the second priority, the human resources management sub-theme with a factor load of 0.645 is in the third priority, and the information technology management sub-theme with a factor load of 0.585 is in the fourth priority.

In the main theme of environmental factors; the political environment sub-theme with a factor load of 0.917 is in the first priority, the cultural environment sub-theme with a factor load of 0.908 is in the second priority, the government and legal institutions sub-theme with a factor load of 0.895 is in the third priority, and the economic environment sub-theme with a factor load of 0.853 is in the fourth priority.

In the main theme of developing green entrepreneurial opportunities: The sub-theme of environmental impacts with a factor loading of 0.883 is in the first priority, the sub-theme of project evaluation with a factor loading of 0.825 is in the second priority, and the feasibility of opportunities with a factor loading of 0.653 is in the third priority.

In the main theme of human resources of the entrepreneur: the sub-theme of specialized characteristics with a factor loading of 0.927 is in the first priority, the sub-theme of ethical characteristics with a factor loading of 0.817 is in the second priority, and the sub-theme of general characteristics with a factor loading of 0.778 is in the third priority.

In the main theme of green entrepreneurship development: the sub-theme of green enterprise development with a factor loading of 0.849 is in the first priority, the sub-theme of reviewing laws with a factor loading of 0.783 is in the second priority, and the sub-theme of developing green entrepreneurship creativity and innovation with a factor loading of 0.771 is in the third priority.

Findings from the Fourth Question

Question 4: What are the relationships between the main factors and dimensions of the entrepreneurial development model in the National Petroleum Refining Company with the approach to preventing environmental damage?

To answer this question, the structural model and the relationships between the main and secondary factors and dimensions of the entrepreneurial development model in the National Petroleum Refining Company with the approach to preventing environmental damage were examined using PLS software and it was determined that all paths of the model are acceptable and their t value is outside the specified

range, which indicates the significance of all paths and relationships between variables at a 95% confidence level.

Findings from the Fifth Research Question

Question 5: What is the degree of consistency and fit of the obtained model of entrepreneurial development with the approach to preventing environmental damage in the National Petroleum Refining Company?

The three values of 0.01, 0.15, 0.35 as weak, medium and strong values for GOF. Considering the value obtained for GOF of 0.571, the strong fit of the overall model is confirmed. The results show that; the CVR value is 0.404 and the GoF value is 0.64. Considering that the CVR value is compared with three values of 0.02 (weak model quality), 0.15 (medium) and 0.35 (strong), since this value was calculated above 0.15, it means that the structural model has a good fit. Also, GoF is compared with three values of 0.01 (weak), 0.15 (moderate) and 0.35 (strong), so considering that this value was calculated above 0.15, the model has a good fit. The standardized root mean square residual was introduced as a suitable criterion for evaluating the overall fit of the model for PLS-SEM. A value less than 0.1 is appropriate, which in this model the overall fit of the model is assessed as appropriate.

Therefore, in response to the fifth research question, based on the consistency and fit of the obtained model, entrepreneurship development with the approach of preventing environmental damage in the National Petroleum Products Refining Company is assessed as appropriate.

Conflict of Interest

The authors declare no conflict of interest.

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