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Review

Determining the Most Important Components of the Petroleum Corporate Mission Statement Using Grey Systems Theory

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ABSTRACT

Strategic management contexts usually define a couple of activities, including preparing a mission statement, which is one of the essential parts in developing the strategic plan of an organization. Numerous researches in the strategic management literature have expressed the attributes of an effectively written mission statement for a firm in general. Although the corporate mission statement and its components vary from industry to industry, none of the researchers have specifically studied the components of a corporate mission statement in the petroleum industry. In this study, the general components of the corporate mission statement were extracted and listed based on the literature review of strategic management. Then, the most important components of the corporate mission statement specific to the petroleum industry were selected using the industry experts' opinions. The grey systems theory was utilized to aggregate the expert judgments that are qualitative in nature. Fourteen components of corporate mission statement in the petroleum industry were selected as the research results. Whether developing a new business or reformulating direction for an ongoing company in the petroleum industry, these specific components should be included in the content of the corporate mission statement.

1. Introduction and Research Background

Managing the evolution of mission statements is one of the most important responsibilities of senior management (Fitzroy, 2007). Strategic management contexts include a process of strategic management that incorporates mission as one of the vital tasks in the strategic planning process (Thompson et al., 2014; Hill and Jones, 2001; Wheelen and Hunger, 2000; Penco et al., 2020). Numerous articles point out the value of mission statements and suggest that almost every firm should have one (e.g. see (Bailey, 1996)). Whether developing a new business or reformulating direction for an ongoing company, the basic goals, characteristics, and philosophies that will shape a firm's strategic posture must be determined. The company mission statement will guide future executive action plans. The company mission is defined as the fundamental unique purpose that sets a business apart from other firms of its type and identifies the scope of its operations in product and market terms (Pearce and Robinson, 2005).

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A corporate mission statement must include some components to be effective. The mission statement defines why a firm operates in a particular business environment. For instance, the mission of a firm in the restaurant industry will be different from that of a firm operating in the high-tech industry (Analoui and Karami, 2003). Therefore, the components of an effectively written mission statement for a firm are not expected to be similar across different industries. For example, Rajasekar (2013) evaluated the mission statements of Omani firms to determine whether the components identified in the relevant literature are satisfactorily adopted in their mission statements. In order to conduct such an evaluation, the selected companies were categorized into seven groups based on industry type.

Numerous researches in the strategic management literature (see Section 2.1) have expressed the attributes of a good mission statement in general, but none of them have specifically studied the components of a corporate mission statement in petroleum industry. In this study, the general components of a corporate mission statement were extracted and listed based on the literature review of the strategic management. Then, the most important components of the corporate mission statement specific to petroleum industry were selected using the industry experts' opinions based on the Delphi approach.

Delphi is one of the most frequently used formal consensus techniques (Shawahna, 2020). It was developed in the 1960s by the Rand Corporation. The method is based on an iteration approach, which involves a number of rounds and continues until a level of agreement reaches (Cheng and Lin, 2002).

Since the preference information on the components of the mission statement belongs to the decision-makers' (DMs) subjective judgments and cannot be estimated by an exact numerical value, uncertainty approaches have been adopted in this paper in combination with Delphi technique. Fuzzy theory and grey systems theory are the two most-often applied theories and methods employed in such uncertainties (Sadeghiyeh et al., 2012). The grey systems theory, which was proposed by Deng in 1982 (Deng, 1989), is developed to study problems of "small samples and poor information" and deals flexibly with fuzzy situations (Tseng, 2008). Thus, the grey systems theory was utilized in the process of data collection and ranking the most important components of the corporate mission statement in this paper.

Grey theory is widely applied in the research fields such as systems analysis, data processing and modelling, as well as control and prediction (Chen and Tzeng, 2004; Zhang et al., 2005). Also, many researchers have utilized grey systems theory in the process of decision-making in different strategic management problems recently. Nowak et al. (2020) used grey decision-making models for portfolio analysis. In another work, Dabbaghi and Malek (2010) proposed a mixed methodology approach by using the "grey possibility degree" methodology to evaluate and rank corporate vision statements. Amirghodsi et al. (2020) utilized gray numbers in combination with an integrated Delphi–DEMATEL–ELECTRE method to rank technology providers.

After the introduction, the article is organized as follows. The research methodology is expressed in Section 2. In Section 3, the identified methodology is applied, and the findings are discussed. The results and conclusions are presented in Section 4.

2. Methodology

According to the study objective and results, the scientific method of study was applied research. In order to determine the attributes affecting the quality of petroleum corporate mission statement (as the research objective), the grey systems theory in combination with the Delphi approach was adopted in this paper.

Based on the literature review of the strategic management, the general components of the corporate mission statement were listed. Then, due to differences in the nature of the industry, this study employed the Delphi method to construct the key components of the corporate mission statement specific to petroleum industry. A number of petroleum industry experts have been carefully selected to ensure the comprehensiveness of the sample and the generalizability of the results. For this purpose, the judgmental sampling method has been used. Judgmental sampling is a strategy in which the researcher includes cases or participants in the sample because they believe that they warrant inclusion (Taherdoost, 2016). This is often performed when the population of interest is very small, or the desired characteristics of the units are very rare, making probabilistic sampling infeasible (Frey, 2018). In this study, the Delphi participants are those who have the following three characteristics: 1) having experience in the related sectors in petroleum industry; 2) adequate knowledge or education in the field of strategic management; and 3) sufficient time and desire to participate in research. On the one hand, due to the nature of the Delphi method, it requires a considerable time for collecting expert opinions. On the other hand, due to the homogeneity of the selected sample, the participation of

twelve experts with the mentioned characteristics was sufficient and the selection of a larger sample was avoided.

Because of the subjective nature of the experts' judgments, the grey systems theory was utilized in the process of data collection. In fact, geometrical mean for grey numbers was used to calculate the weights of attributes. The grey systems theory can resolve the problem of incomplete information by requiring only a small amount of data to be effective (Pai et al., 2007). Due to the presence of incomplete information and uncertain relations in the evaluation of the current system, it is difficult to analyze it using ordinary methods. The grey systems theory presents a grey relation space and a series of nonfunctional type models to overcome the obstacles of needing a massive number of samples in general statistical methods or the typical distribution and a large amount of calculations. The grey systems theory can be effectively utilized to calculate the attribute weights from incomplete information gathered from subjective judgments of decision-makers. This procedure can be employed instead of pair-wise comparisons (common in analytic hierarchy process) and will decrease the number of questions that should be answered by the decision-makers. Therefore, considering a large number of qualitative attributes, the techniques based on the grey systems theory are more efficient in comparison to the traditional multi-attribute decision-making techniques such as the analytic hierarchy process (AHP).

The research was conducted based on the methodology presented in Figure 1.

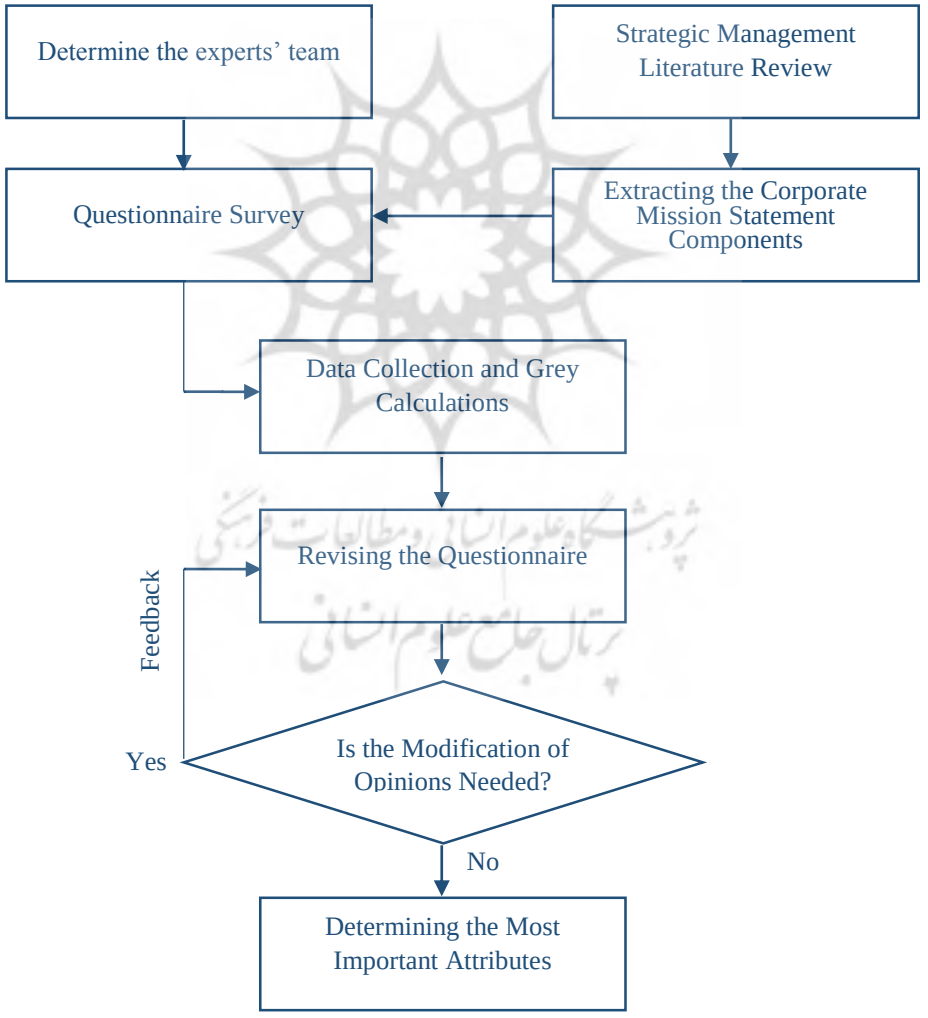

Figure 1. The flow chart of the research methodology.

Different steps of the methodology presented in Figure 1 are described below.

2.1. Extracting Corporate Mission Statement Components Based on Literature Review

Regarding the importance and vitality of mission statement in the strategic management context, there is no need to mention that its definition, benefits, and specifications have been cited in nearly all referenced materials. In this study, the judgment required for the evaluation of mission statement quality is based on determining whether the statement satisfactorily included the given set of components. These components were considered as general attributes affecting the quality of the corporate mission statement. Therefore, the works explicitly cited the general components of the mission statement are chosen and summarized in Table 1.

Table 1. An organized list of corporate mission statement components based on the literature review.

Attribute	Related Literature									
	Pearce and David, 1987	[David, 2003	Fitzroy, 2007	Finlay, 2000	Johnson et al., 2008	Olsen, 2011	Thompson et al., 2014	Pearson, 1990	Bryson, 1988	Dobson and Starkey, 1993
Principle business aims and main activities			*		*		*			*
Philosophy, key believes, and values	*	*		*	*		*		*	*
Stakeholders									*	*
Guiding principles										*
Natural resources			*							
Technology	*	*	*					*		
Product/service	*	*	*					*		
Market/market segment/geographic scope	*	*	*							
Customer needs	*		*			*				
Purpose of the organization/company goals: concern for survival, growth, and profitability	*	*		*	*		*		*	*
Public image	*	*				*				
Self-concept	*	*								
Customers		*						*		
Concern for employees		*						*		
Strategic goals				*						
Standards				*						
Strategic pathway				*						
Quality	*									
Core competencies						*				

2.2. Determine Experts' Team

The team of experts from petroleum industry should consider all possible attributes listed in Table 1 and determine the most important and related components specific to petroleum industry. To this end, 12 experts and managers with more than 10 years of experience in

oil, gas, and petrochemical industry, with knowledge or education in the field of study (strategic management), and with sufficient time and desire to participate in the research have been considered as the team of experts.

2.3. Questionnaire Survey

The main research tool in this study was the questionnaire survey. Based on the literature review presented in Section 2.1, the set of attributes (Q1, Q2, … to Q19,) and their descriptions were considered in the designed questionnaire, as shown in Table 2.

Table 2. The set of attributes and definitions for each of them, as stated in the questionnaire.

Q_j	Description
Q1: Principal business aims and main activities	The principal activities regarding the position it aims to achieve in its chosen business
Q2: Customer needs	Which customer needs are going to be satisfied
Q3: Quality	Managing the quality of products and services
Q4: Guiding principals	Defines the code of conduct that tells employees how to behave
Q5: Core competencies	Distinctive competency of the company in comparison to its competitors
Q6: Product/service	What are the major products or services of the firm
Q7: Purpose of the organization/company goals: concern for survival, growth, and profitability	The reason of the firm for being and its intention to secure its survival through sustained growth and profitability
Q8: Concern for employees	Regarding the employees as a valuable asset of the firm
Q9: Philosophy, key beliefs, and values	Basic beliefs, values, aspirations, and philosophical priorities
Q10: Standards	Organizational policies and norms of behavior
Q11: Market/market segment/geographic scope	The selected markets on which the firm offers its variety of products/services
Q12: Technology	The principal technology which the business focuses on
Q13: Public image	Reflecting the public's expectations
Q14: Stakeholders	Definitions of who are the major stakeholders of the business
Q15: Natural resources	From which natural resources the business values are being created
Q16: Customers	Who are the customers of the firm
Q17: Strategic pathway	The means it will use to achieve its goals
Q18: Self-concept	Describing the corporate and its place in its environment
Q19: Strategic goals	What it wishes to achieve

2.4. Data Collection and Grey Calculations

The linguistic variables are used to represent the imprecision of the data and the preference of the experts/decision-makers over the attributes in the evaluation process. In this paper, the weight of the attributes is considered as the linguistic variables. These linguistic variables were expressed in grey numbers on a 1–7 scale, as listed in Table 3 (Li et al., 2007).

Table 3. The scale of the weight of the attributes.

Scale	VL	L	ML	M	MH	H	VH
⊗W	[0.01,0.1]	[0.1,0.3]	[0.3,0.4]	[0.4,0.6]	[0.6,0.7]	[0.7,0.9]	[0.9,1.0]

In this study, a grey number indicated by $\otimes G \epsilon [\underline{a},\overline{a}]$, is such a number the exact value of which is unknown, but the range within which the value lies is known. $\underline{a}$ and $\overline{a}$ are the lower and upper bounds of the grey number respectively, where $[a \in G \,|\underline{a} \leq a \leq \overline{a}]$ (Stanujkic et al., 2012).

We assume that $Q = \{Q_1, Q_2, \ldots, Q_{19}\}$ is the set of 19 attributes of mission statement expressed in Section 2.3, and $\otimes W = \{\otimes w_1, \otimes w_2, \ldots, \otimes w_{19}\}$ is the related vector of attribute weights. According to the geometric mean of grey numbers, the weight of the *j*th attribute can be calculated as follows (Chen and Tzeng, 2004):

$$\otimes w_j = \sqrt[k]{\otimes w_j^1 \times \otimes w_j^2 \times \ldots \times \otimes w_j^k} \quad (1)$$

where $\otimes w_j^k$ $(j = 1,2,\ldots,19)$ is the subjective judgment of the k_{th} expert (k = 12, as expressed in Section 2.2) over the *j*th attribute described by grey number $\otimes w_j^k \in [\underline{w}_j^k, \overline{w}_j^k]$ as expressed in Table 3. Let $\otimes W_1 = [\underline{w}_1, \overline{w}_1]$ and $\otimes W_2 = [\underline{w}_2, \overline{w}_2]$ be two grey numbers, for instance. The basic operations were done based on the following equations (Stanujkic et al., 2012; Dabbaghi et al., 2011):

$$\otimes w_1 + \otimes w_2 = [\underline{w}_1 + \underline{w}_2, \overline{w}_1 + \overline{w}_2] \quad (2)$$

$$\otimes w_1 - \otimes w_2 = [\underline{w}_1 - \overline{w}_2, \overline{w}_1 - \underline{w}_2] \quad (3)$$

$$\otimes w_1 \times \otimes w_2 = [\min(\underline{w}_1\underline{w}_2, \underline{w}_1\overline{w}_2, \overline{w}_1\underline{w}_2, \overline{w}_1\overline{w}_2), \max(\underline{w}_1\underline{w}_2, \underline{w}_1\overline{w}_2, \overline{w}_1\underline{w}_2, \overline{w}_1\overline{w}_2)] \quad (4)$$

$$\otimes w_1 \div \otimes w_2 = [\underline{w}_1, \overline{w}_1] \times \left[\frac{1}{\underline{w}_2}, \frac{1}{\overline{w}_2}\right] \quad (5)$$

$$\otimes w_1 \preccurlyeq \otimes w_2 \quad if \begin{cases} w_{1c} < w_{2c} \text{ whenever } w_{1c} \neq w_{2c} \\ w_{1D} \geq w_{2D} \text{ whenever } w_{1c} = w_{2c} \end{cases} \quad (6)$$

where

$w_{1c} = \frac{1}{2}(\overline{w}_1 + \underline{w}_1)$ and

$w_{1D} = \frac{1}{2}(\overline{w}_1 - \underline{w}_1)$

(Hu and Wang, 2006)

2.5. Revising Questionnaire

The first-round questionnaire usually uses an open-ended format to elicit individual judgments or opinions from each member of the panel about the particular issue or problem under study. After all the first-round questionnaires are returned, the researcher reviews, edits, and compiles the panel's responses; then, the second-round questionnaires are prepared (Chu and Hwang, 2008). In this study, a semi-structured questionnaire was designed in the first round of the Delphi process. The questionnaire consisted of two parts. The first part contained 19 questions, each of which measured the importance of each attribute as explained in Section 2.3. Each expert expressed his or her opinion on the importance of each of the attributes using the linguistic variables in Table 2. In the second part of the questionnaire, an open-ended question was considered, which asked the experts' opinions about the attributes listed in the previous section. In essence, in this question, they were asked to remove or add any criteria that may have been neglected in the first section. Revising the questionnaire will be done according to the gathered opinions of the experts in the first round, if necessary.

2.6. Modifying Opinions

Once the group judgments have been elicited, the information needs to be combined in order to answer the study question(s) of interest (Normand et al., 1998). When the intent is to achieve convergence, the ultimate measure of the effectiveness of a Delphi method is whether there is a central tendency demonstrated by the group. This can be quantified by the mean, median, and mode (Valerdi, 2011). In this study, geometric mean of experts' opinions over each attribute in each round was calculated. In addition to looking at the geometric mean of each attribute, it is also useful to consider the deviation

from the mean because this shows the diversity of opinion within the group on any particular attribute. In this study, the deviation from the mean using grey systems theory was calculated based on the following equation (Stanujkic et al., 2012).

$$d\left(\otimes w_j^k, \otimes w_j\right) = \frac{1}{2}\left|\left(\underline{w}_j^k - \underline{w}_j\right) + \left(\overline{w}_j^k - \overline{w}_j\right)\right|, j = 1,2,3,\ldots 19 \text{ and } k=1,2,3,..12 \quad (7)$$

Different approaches to measuring the level of agreement between the panelists have been developed (Holey et al., 2007), and these vary from study to study. In this study, the threshold value of 0.3 for the calculated deviations was considered as the measure of achieving consensus (Cheng and Lin, 2002; Yazdimoghaddam, 2019).

Based on the collected data and the abovementioned calculations in each round, each expert was asked to modify his opinion as a result of considering the views of their peers in the panel. The Delphi rounds continue until the expected level of agreement is reached.

2.7. Determining Most Important Attributes

Given that brevity is the key to a good mission statement, it is certainly not expected to consider all of the mentioned components for creating a petroleum corporate mission statement. Therefore, in order to focus on the most important attributes, it appears necessary to eliminate attributes that are not significantly important (as adopted by Yazdimoghaddam, 2019). In this study, the attributes with the upper bounds of more than 0.6 (MH upper bound) were selected.

3. Research Findings and Discussion

Based on the judgmental sampling described in Section 2 and considering the mentioned characteristics of the experts, 12 experts were determined as the experts' team in this study. The experts were contacted and informed in advance of the intention of the survey. After conducting the necessary coordination, the designed questionnaires (see Section 2.3) were distributed. They were also provided by troubleshooting assistance via the phone in order to increase the accuracy of the results. The findings from the implementation of the Delphi rounds based on the research methodology are discussed in this section.

3.1. Round 1

The research questionnaire in the first round was a semi-structured questionnaire consisted of two parts based on the explanations described in Section 2.5. After all the first-round questionnaires were returned, the experts' responses were reviewed. Since none of the experts added no extra attribute, summarizing the data collected from the second part of the questionnaire in the first round showed that the 19 determined attributes were sufficient. Hence, from the second round onwards, the second part of the questionnaire was removed and the questionnaire became a structured questionnaire consisting of the first section.

The experts' judgments about the importance of each attribute using the linguistic variables (Table 2) were collected through 19 questions in the first part of the research questionnaire. The collected data and the related calculations based on Equations (1) and (6) are shown in Table 4. The calculated values for $\otimes w_j$ and $d\left(\otimes w_j^k, \otimes w_j\right)$ demonstrate the average importance and the diversity of opinion within the group on any particular attribute respectively. Given that some of the calculated values for $d\left(\otimes w_j^k, \otimes w_j\right)$, which indicate the level of agreement between the experts' panel (highlighted in Table 4), are higher than the threshold (explained in Section 2.6), we conclude that continuing the Delphi process for reaching the consensus is necessary.

Table 4. Experts' preferences, the calculated weights, and deviations in Round 1.

Attributes	Experts linguistic preferences												Äwj	d(wj^k,wj)										
Q_j	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}		D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}
Q_1	VH	VH	H	VH	H	H	H	H	VH	H	VH	H	[0.777 , 0.940]	0.09	0.09	0.06	0.09	0.06	0.06	0.06	0.06	0.09	0.06	0.09	0.06
Q_2	MH	VH	M	MH	VH	MH	M	ML	H	MH	H	MH	[0.581 , 0.721]	0.00	**0.30**	0.15	0.00	**0.30**	0.00	0.15	**0.30**	0.15	0.00	0.15	0.00
Q_3	M	VL	L	MH	H	M	ML	L	H	H	H	M	[0.284 , 0.516]	0.10	**0.35**	0.20	0.25	**0.40**	0.10	0.05	0.20	**0.40**	**0.40**	**0.40**	0.10
Q_4	L	L	VL	MH	H	ML	VL	L	H	M	M	M	[0.170 , 0.392]	0.08	0.08	0.23	**0.37**	**0.52**	0.07	0.23	0.08	**0.52**	0.22	0.22	0.22

Attributes	Experts linguistic preferences												Äw$_j$		d(w$_j^k$,w$_j$)										
Q_j	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}			D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}
Q_5	M	L	MH	VH	VH	ML	MH	H	H	M	H	H	[0.513 , 0.700]		0.11	**0.41**	0.04	**0.34**	**0.34**	0.26	0.04	0.19	0.19	0.11	0.19	0.19
Q_6	VH	H	VH	H	H	H	VH	VH	H	MH	VH	VH	[0.784 , 0.929]		0.09	0.06	0.09	0.06	0.06	0.06	0.09	0.09	0.06	-0.21	0.09	0.09
Q_7	VH	M	VH	VH	VH	MH	H	MH	H	H	VH	VH	[0.738 , 0.880]		0.14	**0.31**	0.14	0.14	0.14	0.16	0.01	0.16	0.01	0.01	0.14	0.14
Q_8	VH	VL	H	VH	VH	M	ML	M	MH	H	H	VH	[0.448 , 0.664]		**0.39**	**0.50**	0.24	**0.39**	**0.39**	0.06	0.21	0.06	0.09	0.24	0.24	**0.39**
Q_9	H	VH	VH	H	VH	MH	VH	VH	H	MH	H	H	[0.758 , 0.902]		0.03	0.12	0.12	0.03	0.12	0.18	0.12	0.12	0.03	0.18	0.03	0.03
Q_{10}	MH	VL	VH	VH	VH	ML	MH	VH	H	MH	H	H	[0.479 , 0.681]		0.07	**0.53**	**0.37**	**0.37**	**0.37**	0.23	0.07	**0.37**	0.22	0.07	0.22	0.22
Q_{11}	VH	VH	H	H	VH	M	VH	VH	VH	H	MH	VH	[0.764 , 0.906]		0.12	0.12	0.03	0.03	0.12	**0.33**	0.12	0.12	0.12	0.03	0.18	0.12
Q_{12}	VH	H	H	H	H	ML	MH	VH	H	M	MH	MH	[0.625 , 0.777]		0.25	0.10	0.10	0.10	0.10	**0.35**	0.05	0.25	0.10	0.20	0.05	0.05
Q_{13}	MH	VH	H	H	H	M	H	VL	MH	ML	M	H	[0.415 , 0.633]		0.13	**0.43**	0.28	0.28	0.28	0.02	0.28	**0.47**	0.13	0.17	0.02	0.28
Q_{14}	H	VL	M	H	MH	MH	H	VH	MH	ML	M	MH	[0.405 , 0.607]		0.29	**0.45**	0.01	0.29	0.14	0.14	0.29	**0.44**	0.14	0.16	0.01	0.14
Q_{15}	H	L	MH	H	H	H	M	MH	VH	H	MH	H	[0.558 , 0.752]		0.14	**0.46**	0.01	0.14	0.14	0.14	0.16	0.01	0.29	0.14	0.01	0.14
Q_{16}	M	VL	L	MH	VH	MH	L	VL	MH	M	ML	M	[0.198 , 0.416]		0.19	0.25	0.11	**0.34**	**0.64**	**0.34**	0.11	0.25	**0.34**	0.19	0.04	0.19
Q_{17}	MH	L	L	H	VH	MH	L	VL	M	ML	ML	M	[0.238 , 0.450]		**0.31**	0.14	0.14	**0.46**	**0.61**	**0.31**	0.14	0.29	0.16	0.01	0.01	0.16
Q_{18}	H	L	L	VH	H	M	H	VL	MH	MH	L	M	[0.274 , 0.515]		**0.41**	0.19	0.19	**0.56**	**0.41**	0.11	**0.41**	**0.34**	0.26	0.26	0.19	0.11
Q_{19}	M	L	MH	VH	H	L	MH	H	H	M	H	H	[0.459 , 0.678]		0.07	**0.37**	0.08	**0.38**	0.23	**0.37**	0.08	0.23	0.23	0.07	0.23	0.23

3.2. Rounds 2 and 3

In these rounds, in order to reach the consensus of experts' opinions, the revised questionnaire (as explained in Round 1) was sent to the members of the panel with the calculated deviation from the mean based on the other experts' opinions in the previous round. Each expert was asked to review his/her expressed judgments based on the presented feedback. Since all of the deviations calculated based on the collected data in the third round was less than the threshold value, the desired level of agreement between the panelists was achieved. The final results of Round 3 are tabulated in Table 5.

Table 5. Experts' preferences, the calculated weights, and deviations in Round 3.

Attributes	Experts linguistic preferences												Mean		d(w$_j^k$,w$_j$)										
Q_j	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}	Äw$_j$		D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}
Q_1	VH	VH	H	VH	H	H	H	H	VH	H	VH	H	[0.777 , 0.940]		0.09	0.09	0.06	0.09	0.06	0.06	0.06	0.06	0.09	0.06	0.09	0.06
Q_2	MH	VH	M	MH	MH	MH	M	H	H	MH	H	MH	[0.581 , 0.721]		0.03	0.27	0.18	0.03	0.03	0.03	0.18	0.12	0.12	0.03	0.12	0.03
Q_3	M	VL	L	ML	M	M	ML	L	M	M	M	M	[0.284 , 0.516]		0.17	0.27	0.13	0.02	0.17	0.17	0.02	0.13	0.17	0.17	0.17	0.17
Q_4	L	L	VL	ML	ML	ML	VL	L	ML	M	M	M	[0.170 , 0.392]		0.03	0.03	0.18	0.12	0.12	0.12	0.18	0.03	0.12	0.27	0.27	0.27
Q_5	MH	M	MH	VH	VH	M	MH	H	H	M	H	H	[0.513 , 0.700]		0.04	0.19	0.04	0.26	0.26	0.19	0.04	0.11	0.11	0.19	0.11	0.11
Q_6	VH	H	VH	H	H	H	VH	VH	H	MH	VH	VH	[0.784 , 0.929]		0.09	0.06	0.09	0.06	0.06	0.06	0.09	0.09	0.06	0.21	0.09	0.09
Q_7	VH	VH	VH	VH	VH	MH	H	MH	H	H	VH	VH	[0.738 , 0.880]		0.10	0.10	0.10	0.10	0.10	0.20	0.05	0.20	0.05	0.05	0.10	0.10
Q_8	MH	ML	H	MH	MH	M	ML	M	MH	H	H	MH	[0.448 , 0.664]		0.06	0.24	0.21	0.06	0.06	0.09	0.24	0.09	0.06	0.21	0.21	0.06
Q_9	H	VH	VH	H	VH	MH	VH	VH	H	MH	H	H	[0.758 , 0.902]		0.03	0.12	0.12	0.03	0.12	0.18	0.12	0.12	0.03	0.18	0.03	0.03
Q_{10}	MH	ML	H	MH	MH	ML	MH	MH	H	MH	H	H	[0.479 , 0.681]		0.02	0.28	0.17	0.02	0.02	0.28	0.02	0.02	0.17	0.02	0.17	0.17
Q_{11}	VH	VH	H	H	VH	VH	VH	VH	VH	H	MH	VH	[0.764 , 0.906]		0.07	0.07	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.08	0.23	0.07
Q_{12}	VH	H	H	H	H	MH	MH	VH	H	M	MH	MH	[0.625 , 0.777]		0.21	0.06	0.06	0.06	0.06	0.09	0.09	0.21	0.06	0.24	0.09	0.09
Q_{13}	MH	M	H	H	H	M	H	M	MH	ML	M	H	[0.415 , 0.633]		0.03	0.12	0.18	0.18	0.18	0.12	0.18	0.12	0.03	0.27	0.12	0.18

Attributes	Experts linguistic preferences												Mean	d(w_j^k,w_j)										
Q_j	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}	Äw$_j$	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}
Q_{14}	MH	ML	M	MH	MH	MH	M	MH	MH	ML	M	MH	[0.405 , 0.607]	0.10	0.20	0.05	0.10	0.10	0.10	0.05	0.10	0.10	0.20	0.05	0.10
Q_{15}	H	MH	MH	H	H	H	M	MH	VH	H	MH	H	[0.558 , 0.752]	0.07	0.08	0.08	0.07	0.07	0.07	0.23	0.08	0.22	0.07	0.08	0.07
Q_{16}	M	VL	L	M	M	ML	L	VL	ML	M	ML	M	[0.198 , 0.416]	0.24	0.20	0.06	0.24	0.24	0.09	0.06	0.20	0.09	0.24	0.09	0.24
Q_{17}	M	L	L	ML	M	ML	L	VL	M	ML	ML	M	[0.238 , 0.450]	0.22	0.08	0.08	0.07	0.22	0.07	0.08	0.23	0.22	0.07	0.07	0.22
Q_{18}	M	L	L	M	ML	M	L	VL	ML	ML	L	M	[0.274 , 0.515]	0.23	0.07	0.07	0.23	0.08	0.23	0.07	0.22	0.08	0.08	0.07	0.23
Q_{19}	M	ML	MH	MH	H	ML	MH	H	H	M	H	H	[0.459 , 0.678]	0.11	0.26	0.04	0.04	0.19	0.26	0.04	0.19	0.19	0.11	0.19	0.19

After completing the Delphi process at the end of Round 3 and reaching consensus among experts' panel, the attributes must be listed in the order of importance. Different grey ranking approaches have been developed in the literature (Darvishi et al., 2019). Based on the approach of Hu and Wang (2006) (presented in Equation (6) in Section 2.4), the attributes were listed in the order of importance, as presented in Table 6. Based on the explanations presented in Section 2.7, Table 6 lists the most important attributes affecting the quality of petroleum corporate mission statement.

Table 6. List of the most important attributes.

attributes	w_j			
Q_1	[	0.777 ,	0.940	]
Q_6	[	0.784 ,	0.929	]
Q_{11}	[	0.764 ,	0.906	]
Q_9	[	0.758 ,	0.902	]
Q_7	[	0.738 ,	0.880	]
Q_{12}	[	0.625 ,	0.777	]
Q_{15}	[	0.558 ,	0.752	]
Q_2	[	0.581 ,	0.721	]
Q_5	[	0.513 ,	0.700	]
Q_{10}	[	0.479 ,	0.681	]
Q_{19}	[	0.459 ,	0.678	]
Q_8	[	0.448 ,	0.664	]
Q_{13}	[	0.415 ,	0.633	]
Q_{14}	[	0.405 ,	0.607	]
Q_3	[	0.284 ,	0.516	]
Q_{18}	[	0.274 ,	0.515	]
Q_{17}	[	0.238 ,	0.450	]
Q_{16}	[	0.198 ,	0.416	]
Q_4	[	0.170 ,	0.392	]

Most Important

Least Important

4. Conclusions and Results

Based on the aggregated opinions of the experts, 14 attributes of the petroleum industry corporate mission statement were selected as the research result. These components (attributes) are presented and ranked in the order of importance in Table 7.

Table 7. The most important components of petroleum industry corporate mission statement.

Attributes	Ranking
Principal business aims and main activities	1
Product/service	2
Market/market segment/geographic scope	3
Philosophy, key beliefs, and values	4
Purpose of the organization/company goals: concern for survival, growth, and profitability	5
Technology	6
Natural resources	7
Customer needs	8
Core competencies	9
Standards	10
Strategic goals	11
Concern for employees	12
Public image	13
Stakeholders	14

These attributes can be considered as a checklist for creating an effective corporate mission statement in petroleum industry. In fact, these specific components should be included in the content of mission statements developed for a company in petroleum industry. Moreover, as a suggestion for future research, these attributes can be used as a framework in an evaluation method in order to compare the quality of the mission statement of several petroleum companies.

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