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RESEARCH ARTICLE **Open Access**

Identification and Prioritization of Measures to Reduce the Failure of Safety Policies based on the Technique of FMEA

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Abstract

Safety policies are implemented in the organizations to reduce occupational accidents and prevent waste of resources. Numerous measures will reduce the failure to implement occupational safety policies. In this research, these factors are identified and ranked.This research is applied and adopts survey as its strategy. The research population consists of 15 Safety managers in Kerman province who are selected through non-random and purposive sampling. Data collection tools are interviews and questionnaires and FMEA technique and integrated approach of AHP and fuzzy TOPSIS are used to analyze the data. Based on the findings, important and effective measures to reduce the failure of safety policies implementation include reducing the change of managers and requiring new managers to implement safety policies, developing scientific programs in accordance with the organization's capabilities.According to the research findings, it is necessary for organizations to pay more attention to creating and strengthening the structure of safety units by carefully planning and changing the approach of managers.

Keywords: Policy Implementation, Occupational Safety, FMEA, Fuzzy

Introduction

In today's organizations, occupational safety and health policies actually reflect the decisions of an organization regarding occupational safety and health; because policy means decisions(Safian et al., 2019) and Policy is a path for certain actions(Makhmali et al., 2019). Policy-making affects and is influenced by the environment. Therefore, the policy can be studied as an independent variable or dependent variable (Khobro et al., 2019). Policy implementation is the actions taken by public or private sector to achieve the goals of the policy (Memarzadeh Tehran et al., 2013). Numerous experts have mentioned many factors in explaining the factors affecting the implementation of the policy and the problems of policy implementation, and most of them believe that the problems of policy implementation are different from the local conditions of each society (Etebarian et al., 2019). In other words, the policy implementation process takes place in an environment in which different actors are involved and at the same time, these actors interact with each other and these interactions have effects on the policy implementation process due to political, economic, cultural and other differences. Successful implementation of the determined policies requires that the relevant and effective factors and those appropriate to the specific conditions of the policy and its implementation be identified and considered

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(Ahmadian et al., 2019). Therefore, recognizing the factors that reduce the failure to implement policies based on research and also based on local and specific conditions of any organization or community can be effective in their successful implementation.

Today, safety and health policies are among the policies that are always formulated according to the needs of organizations and there is an attempt to ensure their successful implementation. In other words, due to the importance of reducing the harmful factors and risks in the workplace that lead to the imposition of overt and covert life, financial, and social costs and the need to minimize these costs, organizations have adopted policies for the safety and health and tried to achieve their goals by implementing these policies accurately and correctly and reducing work- related accidents and diseases, and in addition to protecting human resources, have achieved greater profitability by increasing efficiency and reducing costs. In other words, what adds to the importance of successful implementation of safety and health policies is the need to pay attention to the position and value of human resources in organizations, which is highly emphasized by scholars and managers. In addition, increasing the variety and intensity of occupational accidents and work-related diseases are among the adverse consequences that have threatened human life, especially employees, with the development of modern industries and technologies (Mohammadfam, 2007). Meanwhile, according to researches, the average cost of occupationalaccidents and diseases is 4% of GDP of countries(Quds et al., 2009) and the mortality rate in mines is six times higher than that in other sectors of industry(Amiri et al., 2012). Aghilinejad et al. (2012) have estimated the number of severe accidents in Iran's mines and mineral industries during 12 years (2001-2013) as 10032(AghiliNejad et al., 2012). In Kerman province, the rate of occupational injuries leading to death in the mining sector has increased from 26% in 2018 to 34% in 2019 (Ministry of Cooperatives, Labor and Social Welfare, 2020).

Despite extensive studies by experts and researchers on the problems and obstacles to implement public policy (including researches conducted by Danaeifard et al., 2013, Aliabadi et al., 2015, Mamivand et al., 2017, Arabi and RezzqiRostami, 2005, Fitzgerald et al., 2019, Holland et al., 2016, Chen Soo, 2006), there is no uniform and generalizable result regarding the factors affecting the reduction of policy implementation failure.

Few researchesare conducted on the factors that reduce the failure of implementing occupational safety and health policies, especially in the country, but what seems to be important regarding the results of these studies is that various factors play a role in reducing failure. Zinivand et al. (2021) considered paying attention to the participation of executives in the policy-making process, holding training courses, foresight and realistic formulation consistent with policy realities, updating policies, avoiding unprofessional and irresponsible behavior of managers among the factors to reduce the failure of implementing the policies(ZeinivandMoghadam et al., 2021).

Roussouw and Wiseman (2004) considered attention to policy tools (ie, policy documents, regulations, and guidelines) to be important in reducing policy implementation failures.Toukuu et al. (2019) have introduced attention to cultural issues, social issues such as poverty in the formulation and implementation of policies to reduce the failure of health and safety policies in the workplace(Tuokuu et al., 2019). Kwon et al. (2010) also implicitly consider the adoption of appropriate protection laws, the formulation and application of up-to-date management standards and systems, and attention to change management in the areas of health, safety, and the environment as factors effective in reducing policy implementation failure(Kwon et al., 2010). Experience shows that sometimes several issues affect the implementation of a policy; and what is implemented in practice (of course, if it is

possible) is fundamentally different from what isformulated(Danaeifard et al., 2010). In practice, in many cases, policies arenot successfull. Safety and health policies are no exception; because sometimes in diagnosing the problem (due to the occurrence of occupational accidents and their high negative consequences) and in the formulation stage (due to the existence of safety and health policy in many industries) there are no major defects and shortcomings, but the reality is that if safety and health policies were implemented properly, the goals of these policies, which are to improve workplace safety and reduce occupational injuries and accidents, would have been achieved, which has not been the case and different evidenceproves this claim, including a 7% increase in the number of work-related deaths in the first six months of 2020 compared to before. According to the statistics of the Ministry of Cooperatives, Labour, and Social Welfare, the average death rate in the country (compared to one hundred thousand workers) is 5, which is 6 in Kerman province and is higher than the national average. According to what was stated and considering that no special studies are conducted on the factors that reduce failure to implement safety and health policies, especially in the country, conducting a research to identify important factors reducing failure of implementing these policies seems to be necessary. On the other hand, no studies have been conducted to identify the factors that reduce the failure to implement safety and health policies in the country's mines and industries. Therefore, the main question of this research is what are the factors that reduce failure in the implementation of safety policies?

Table 1 lists only some of the success factors in implementing public policies in domestic and foreign research. In addition, the study of the factors that reduce failure in the implementation of safety and health policies in industrial and mining organizations in critical situations such as the Corona-virus epidemic, has not been considered so far. Therefore, the purpose of this study is to identify and prioritize the factors that reduce the failure of health and safety policies in industries and mines (case study of industries and mines in Kerman province).

Table 1.
Success factors in implementing policies based on the results of some researches

Researchers	Factors reducing policy failure
Mamivand et al., (2019)	Symbolic policies, institutional coordination and alignment, thoughtful formulation, prioritization of environmental issues and value alignment, development of environmental knowledge, public support and public participation, green strategies, legal requirements, recognition of cultural background, promotion of environmental culture, environmental value orientation
AliAbadi et al., (2018)	Attention to crises affecting implementation, managerial instability, proper executive structure, performance of individuals and transient policy- making institutions
Abbasi&Beigi (2016)	Performance of individuals and transient policy-making institutions, removal of structural and managerial barriers
MemarzadehTehran et al., (2011)	The appropriate choice of tools, technology
Arabi&RezqiRostami (2005)	Removing barriers related to the expertise and skills of executors, removing barriers related to bureaucracy, removing barriers related to resources and tools
Rajab Beigi (1999)	Relative independence of executive bodies, clarity of duties and responsibilities of executive departments, communications and existence of performance appraisal system
Fitzgerald et al. (2019)	Reducing opposition and supporting the policy, decision makers free of bias
Holland et al. (2016)	Technical skills
Chen Su (2006)	Paying attention to executive capacities, clarity of policy objectives and dynamics of policies
Rousseau and Wiseman (2004)	Existence of implementation and execution hierarchy, monitoring and policy review

Materials and Methods

This research is applied in terms of purpose and is a field research in terms of data collection, and employs a survey as its strategy. Due to the fact that in this study, a combination of interviews and questionnaires are used to identify and rank the failure factors in the implementation of safety and health policies, the present study uses both qualitative and quantitative research approaches simultaneously. Library and field research methods and interviews with experts are used to collect data. The main tool for data collection in the first stage is a semi-structured interview, according to which various risk factors (factors reducing policy implementation failure) were identified. These factors were extracted based on a review of the texts in semi-structured interviews, and based on that, a researcher-made questionnaire with 22 items was developed and the validity and reliability of this questionnaire were confirmed. This questionnaire was distributed among experts to measure the three indices of error priority. These indices are the intensity of failure (the effect of each factor in reducing failure / defect in the implementation of Safety policies), the probability of failure (the rate of exposure to this factor) and the ability to detect failure (the ability to detect any factor reducing failure / defect in implementing Safety policies before they occur). In this study, in order to compare the effective components in reducing safety and health policies failure, a pairwise comparison questionnaire (based on Chang's extended analysis method) was used. The statistical population of this study is managers and experts of safety and health policies implementation in industrial and mining organizations in Kerman province with at least 10 years of activity in the implementation of safety and health policies. They are among the influential and known managers of Safety of Kerman province, whoare selected through non-random sampling technique and purposeful method. Accordingly, the experts of this research include 15 health and safety managers in Kerman province.

Based on FMEA model these factors" occurrence, intensity and indication" (Teimoorirad & Azizi,2015) .The main purpose of FMEA analysis is to discover and prioritize potential failure situations by calculating the risk priority index, which is the product of three concepts of failure probability, failure intensity, and failure detection capability. These three factors are estimated by experts on a specific scale. Since the risk priority index is a measure of failure risk, it can be used to rank failures and prioritize actions. To remove the defects of failure analysis technique and its effects for ranking failure items, a fuzzy logic approach is used to prioritize failures in a failure analysis system and its effects (Abadian et al., 2012). This approach is integrated with AHP and TOPSIS in fuzzy environment and fuzzy AHP method is used to calculate the weight of the three FMEA factors (probability, severity, and detection coefficient) and fuzzy TOPSIS method is used to rank the failure factors. The steps of doing ranking with Topsis are as in the follow: Initially matrix consist of choices and criteria designed at the first. In the next step, Unscaling should be done. in the next step, the weighted unscalled matrix is formed, In the next step, the distance from positive and negative ideal should be calculated.After that, the distance from positive and negative ideal calculated(Dalvand et al., 2019). In this research, first, a hierarchical decision tree was drawn using the target and standard levels, and in the next stage, fuzzy numbers were defined in order to perform pairwise comparisons. To do this, the effect size scale of Table 2 was used.

Table 2.
Fuzzy spectrum and the corresponding verbal expressions for pairwise comparison (BoalHassani et al., 2017).

Type of priority	Priority-equal importance	Equal-low	Priority-low importance	Average-strong	Priority-very important	Strong-so strong	Priority-very important	Very strong-too much strong	Priority-and complete, absolute importance
Score	(1,1,1)	(1,1,5,1,5)	(1,2,2)	(3,3,5,4)	(3,4,4,5)	(3,4,5,5)	(5,5,5,6)	(5,6,7)	(5,7,9)

In order to form a pairwise comparison matrix, using the opinion of the decision maker and using triangular fuzzy numbers and according to the priority of two triangular fuzzy numbers shown in Figure 1, the comparison matrix is formed based on the opinions of several decision makers and P_{ij}shows the number of commenters about the priority of entryi over j. Then, in order to calculate the arithmetic mean of the experts' opinions, the relevant matrix was formed and after calculating the sum of the elements of the rows, the sum of the rows was normalized and in the next step, the probability degree of being larger was calculatedand by normalizing the weight vector, normalized weights were obtained. Gogus and Boucher (1998) method was used to calculate the incompatibility rate or to study the compatibility of two matrices (median and fuzzy number limits).

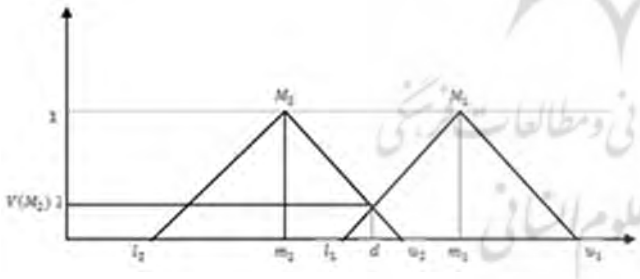

Figure 1. *Priority of two triangular fuzzy numbers*

In order to rank the failure factors using fuzzy TOPSIS, havingformed the decision matrix, the options (including a set of criteria in the column and the options in the row) were evaluated and completed with expert opinions on a 5-point Likert scale, relative to unscaling the decision matrix (normalization of decision matrix). After that, the weighted unscaled matrix was determined $(\widetilde{V})$and then by determining the positive or negative aspects of the criteria, the ideal solution (FPIS, A^+) and the counter-ideal solution (FPIS, A^-) were determined and by calculating the total distance of the options from the fuzzy positive and negative ideal solution,the relative proximity of option i of the ideal solution was calculated and finally the options were ranked.

Results

In the first step, the texts obtained from interviews with experts were reviewed to extract the factors that reduce safety and health policies failure in industries and mines of Kerman province. The research experts consisted of 1 general manager with a doctoral degree, 2 heads of departments and 8 Safety managers with a master's degree and 4 Safety experts and consultants, all with 10 years of experience in the implementation of safety and health policies. After reviewing the research literature and obtaining expert opinions, the factors reducing the safety and health policies failure were identified, screened, and categorized. According to experts, the factors reducing the policies failure are provided in Table 3.

Table 3.
Reducing components of policy failure

Row	Failure reducing factors
1	Creating an organizational structure in the field of Safety relevant to the goals and strategies of the organization and Safety management activities under the direct supervision of senior management
2	Paying attention to the implementation of laws and the implementation of up-to-date standards and the establishment of management systems in the field of Safety
3	Promoting the organization's Safety culture through cultural planning, training and modifying employee behavior and use through cyberspace and print and video media
4	Supervision of competent persons inside and outside the organization on the correct implementation of Safety policies
5	Developing a policy based on the desired organizational Safety culture
6	Increasing employee participation in the implementation of Safety policies
7	Paying attention to the fit between Safety policies and the organization's wealth
8	Allocating the necessary funds to implement Safety policies
9	Removing internal and external restrictions on the supply and use of new equipment and technologies in the field of Safety
10	Practical and effective training of all employees regarding the implementation of Safety policies
11	Employing efficient executives to implement Safety policies
12	Implementing internal researches and development programs on new Safety technologies
13	Paying attention to the implementation indicators of Safety policies in evaluating the performance of employees
14	Motivating Safety policy executives
15	Developing scientific programs relevant to the organization's ability to implement Safety policies
16	Establishing cross-sectoral coordination in the organization to implement Safety policies
17	Establishment and support of trade unions specializing in Safety
18	Managing managers and supporting managers with Safety approach
19	Reducing change of managers and requiring new managers to implement Safety policies
20	Paying attention to incentives for successful organizations to implement Safety policies
21	Appointment of expert managers and use of specialized consulting nuclei in the field of Safety policies
22	Participation of executives (managers and staff in the implementation of Safety policy) in policy development

The hierarchical decision tree (research hierarchical structure) is as follows:

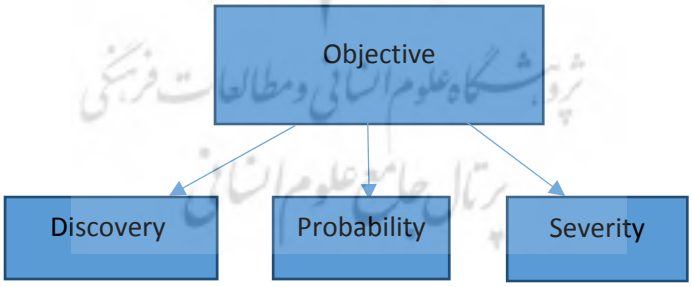

Figure 2. *Hierarchical structure of research*

Calculating the Relative Weight of Main Research Criteria

To calculate the weight of the research criteria in relation to the objective, a questionnaire of pairwise comparisons of the criteria in relation to the objective was developed first and provided to the research experts and the experts' opinions were converted to fuzzy numbers using Table 1.

After using the fuzzy FMEA approach to identify the importance of failure reduction components based on the indicators of Severity, failure probability and detectability according to experts, the incompatibility rate was calculated using Gogus

and Boucher method and the incompatibility was confirmed. After calculating the fuzzy geometric mean of experts' opinions according to Table 4, the weight of the main criteria of the research was calculated using Chang's hierarchical analysis process method. Calculations related to Chang's fuzzy hierarchical analysis process for the fuzzy pairwise comparison questionnaire of the main criteria are given in Tables 5 to 7.

Table 4.
Fuzzy geometric mean pairwise comparison matrix of main criteria

Integrated fuzzy pairwise comparison matrix (geometric mean of expert opinions)									
Factors	Failure Severity			Probability of failure			The potential of failure detection		
Failure Severity	1	1	1	3.06719	2.89332	1.97973	4.82958	4.26134	3.17866
Probability of failure	0.50512	0.34562	0.32603	1	1	1	4.26847	3.81641	2.85527
The potential of failure detection	0.3146	0.23467	0.20706	0.35023	0.26203	0.23428	1	1	1

Table 5.
Fuzzy addition and fuzzy compound expansion of the main criteria

Factors	Fuzzy addition of each row			Fuzzy compound expansion (Sj)		
	L	M	U	L	M	U
Failure Severity	8.89677	8.15466	6.15839	0.75518	0.55049	0.377
Probability of failure	5.77359	5.16204	4.1813	0.49008	0.34847	0.25597
The potential of failure detection	1.66483	1.49669	1.44133	0.14131	0.10104	0.08823

Table 6.
Degree of magnitude and degree of priority

	Degree of magnitude			Priority degree	Priority normalization
	Failure Severity	Probability of failure	The potential of failure detection		
Failure Severity	1	1	1	1	0.33333
Probability of failure	1.67978	1	1	1	0.33333
The potential of failure detection	3.06659	2.6025	1	1	0.33333

Table 7.
The weight of main criteria

Weight of criteria	
Failure Severity	0.33333
Probability of failure	0.33333
The potential of failure detection	0.33333

Based on the results of Table 6, the prioritization of the criteria of all three levels towards the goal is the same, which are the severity, probability of failure and the ability to detect failure.

Calculating the Weight of Research Options Using Fuzzy TOPSIS

Fuzzy TOPSIS method was used to prioritize failure reduction factors. For this purpose, fuzzy numbers and verbal expressions of Table 8 were used.

Table 8.
Fuzzy numbers and corresponding verbal expressions of 5-point Likert spectrum (Habibi et al., 2014).

Verbal variable	Fuzzy amount	Triangular fuzzy number
VL	1	(0,0,0.25)
L	2	(0,0.25,0.5)
M	3	(0.25,0.5,0.75)
H	4	(0.5,0.75,1)
VH	5	(075,1,1)

After determining the status of each option in each criterion using the TOPSIS questionnaire by experts, their opinions were converted to fuzzy numbers using Table 8. Then, the geometric mean of the experts' fuzzy opinions was calculated and entered into the problem decision matrix. Table 9 presents the fuzzy decision matrix resulting from the expert opinion.

Table 9.
Fuzzy decision matrix of expert opinions

Criteria	Criterion 1			Criterion 2			Criterion 3		
Criteria type	Positive			Positive			Positive		
Limit	L	M	U	L	M	U	L	M	U
Criteria weight	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333
Option 1	0.7	0.95	1	0.533333	0.783333	0.95	0.433333	0.683333	0.85
Option 2	0.633333	0.883333	1	0.45	0.7	0.883333	0.216667	0.45	0.65
Option3	0.65	0.9	0.983333	0.583333	0.833333	0.966667	0.333333	0.566667	0.766667
Option4	0.6	0.85	1	0.483333	0.733333	0.9	0.4	0.633333	0.85
Option5	0.483333	0.733333	0.916667	0.416667	0.666667	0.883333	0.266667	0.516667	0.75
Option6	0.566667	0.816667	0.95	0.483333	0.733333	0.9	0.233333	0.466667	0.7
Option7	0.3	0.55	0.733333	0.316667	0.566667	0.766667	0.2	0.416667	0.666667
Option8	0.533333	0.783333	0.966667	0.466667	0.716667	0.916667	0.316667	0.566667	0.816667
Option9	0.45	0.7	0.883333	0.316667	0.55	0.783333	0.283333	0.516667	0.716667
Option10	0.633333	0.883333	1	0.55	0.8	0.966667	0.416667	0.666667	0.85
Option11	0.633333	0.883333	0.966667	0.516667	0.766667	0.916667	0.45	0.683333	0.883333
Option12	0.4	0.65	0.85	0.35	0.6	0.816667	0.366667	0.633333	0.833333
Option13	0.516667	0.766667	0.983333	0.483333	0.733333	0.933333	0.283333	0.516667	0.766667
Option14	0.516667	0.766667	0.95	0.516667	0.766667	0.916667	0.366667	0.6	0.816667
Option15	0.633333	0.883333	1	0.633333	0.883333	0.983333	0.4	0.65	0.866667
Option16	0.566667	0.816667	0.983333	0.6	0.833333	0.95	0.283333	0.516667	0.716667
Option17	0.35	0.6	0.833333	0.4	0.65	0.883333	0.266667	0.516667	0.766667
Option18	0.683333	0.933333	0.983333	0.566667	0.816667	0.95	0.55	0.8	0.933333
Option19	0.633333	0.883333	1	0.6	0.85	1	0.533333	0.783333	0.916667
Option20	0.7	0.95	1	0.383333	0.616667	0.85	0.4	0.65	0.866667
Option21	0.6	0.85	1	0.5	0.75	0.9	0.416667	0.666667	0.883333
Option22	0.533333	0.783333	0.916667	0.416667	0.666667	0.883333	0.45	0.683333	0.883333

Then, after calculating the normalized fuzzy decision matrix and multiplying it by the weight vector related to the criteria, the normalized fuzzy decision matrix was calculated. Then, based on the type of the research criteria, the positive and negative ideal solutions were calculated using a balanced normalized fuzzy decision matrix (Table 10) and the distance of each option from the positive and negative ideal solutions were calculated according to the materials provided in Table 11.

Table 10.
Positive and negative ideal answers

Criteria	Criterion 1			Criterion 2			Criterion 3		
Limit	L	M	U	L	M	U	L	M	U
Positive ideal answer	0.2331	0.31635	0.333	0.2109	0.29415	0.333	0.19623	0.28543	0.333
Negative ideal answer	0.0999	0.18315	0.2442	0.10545	0.18315	0.2553	0.07136	0.14866	0.23191

Table 11.
The distance of each option from positive and negative ideal answer

Options	Distance of each option from positive ideal answer	Distance of each option from negative ideal answer
Option1	0.066914367	0.274690149
Option2	0.188195089	0.156434687
Option3	0.103029103	0.238539476
Option4	0.121553039	0.223829749
Option5	0.214854175	0.130348394
Option6	0.188800323	0.153816895
Option7	0.337531178	0.006637466
Option8	0.165927497	0.181632663
Option9	0.261033371	0.083280257
Option10	0.084138874	0.259924262
Option11	0.088048942	0.254057706
Option12	0.226270947	0.118076422
Option13	0.179892372	0.169447333
Option14	0.147138869	0.197263755
Option15	0.067134747	0.279300957
Option16	0.143160287	0.201832389
Option17	0.257097171	0.091656528
Option18	0.026067493	0.315211284
Option19	0.033135765	0.311183957
Option20	0.12176695	0.221883551
Option21	0.108408571	0.237854293
Option22	0.144386131	0.198996526

Finally, by determining the distance of the options from the positive and negative ideal answers and calculating the relative proximity index to the ideal answer, the options were ranked in a descending order (C^0) according to Table 12. (The closer the relative proximity index of an option to 1, the lower the distance to the positive ideal and the greater the distance to the negative ideal).

Table 12.
Relative proximity index of each option to the ideal answer along with its rank

Options	The index of relative proximity	Ranking options
Option1	0.804117441	4
Option2	0.453920984	16
Option3	0.69836481	7
Option4	0.648062835	9
Option5	0.377599721	18
Option6	0.448946774	17
Option7	0.019285505	22
Option8	0.522593449	14
Option9	0.241873252	21
Option10	0.755455133	5
Option11	0.742627211	6
Option12	0.342899156	19
Option13	0.485050312	15
Option14	0.572770767	13
Option15	0.806212967	3
Option16	0.585033838	11
Option17	0.262811629	20
Option18	0.923618184	1
Option19	0.903764546	2
Option20	0.64566631	10
Option21	0.686918286	8
Option22	0.579518277	12

As can be seen, option 18, training managers and supporting managers with the Safety approach, has the highest value in the relative proximity index. This means that this component has the greatest impact on the factors that reduce the failure to implement Safety policies; Options 19, 15, 1 and 10 are also ranked second to fifth.

Discussion

In this study, the aim was to investigate the factors reducing the failure of the implementation of safety policies in the industries and mines of Kerman province with a new approach. For this purpose, a fuzzy FMEA approach was used to obtain more accurate results. Fuzzy values are used to score the FMEA criteria, failure severity, failure probability

and failure detection coefficient, which causes the subjective and non-numerical judgments of experts in identifying failure factors. Here, the fuzzy AHP approach was used to weight the FMEA criteria and the fuzzy TOPSIS method was used to rank the failure reduction factors. In addition to maintaining the simplicity of the FMEA method, this leads to the possibility of using fuzzy numbers in the calculations of this method, and due to using fuzzy values, the non-quantitative judgments of experts can be used.

According to the results of this study, it seems that training managers and supporting managers with Safety approach and reducing change of managers and requiring new managers to implement Safety policies are important measures in reducing failure to implement health, safety, and environment policies. In general, the discussion of management commitment and managers' support for policies and the degree of adherence to their implementation can be considered important in this regard. The results of the present study in this regard are in line with the results of the research conducted by Aliabadi et al. (2018) and Danaeifar et al. (2013) who have introduced management stability as one of the important factors in reducing the implementation of policies. The results are also consistent with the results of the research conducted by Fitzgerald et al. (2019) and Iyanda and Blue (2016) who have pointed to the support of management policy and commitment for successfulimplementation.

According to the research results, one of the most important measures to reduce failure in the implementation of health, safety and environmental policies is to develop scientific programs in line with the organization's ability to implement Safety policies and is in line with the results of the study conducted by Otsuka (2016) who believes that the development of a practical plan and the development and implementation of health, safety and environmental policies in line with economic development and geographical change and globalization can be effective in reducing the failure to implement the relevant policies. It is also consistent with the results of the study conducted Rousseau and Wiseman (2004) which considers the development of a practical plan as the key for successful implementation of environmental policies.

Creating an organizational structure in the field of Safety based on the goals and strategies of the organization and Safety management activities under the direct supervision of senior management is another result of the present study. Structuring at the macro level and at the level of a small organization can have a significant impact on achieving goals. However, if the departments of health, safety, and environment in terms of job nature, the need to have organizational power, and the relationship between the decisions of this department and other parts of an organization, work under the direct supervision of senior management of the organization, can have more effective roles in achieving the goals of the organization and the implementation of programs related to health, safety and environmental policies is one of these goals. The results of the present study are consistent with the results of Ron (2013). He stressed the importance of creating a structure for the full implementation of policies to reduce the implementation gap (Ran, 201۳). The results of Aliabadi et al. (2015), Abbasi and Beigi (2016) and Rajab Beigi (1999) also confirm the results of the present study. In this regard, Holland et al. (2016) also stated that due to the development of bureaucratic structure, the implementation of policies has been difficult. According to the results of this study, allocating adequate budget and training are effective in reducing implementation failure, which confirm the practical and effective training of all employees regarding the implementation of Safety policies in order to reduce failure in the implementation of Safety policies, the other result of this study. Certainly, effective training of employees and managers and policy makers in general can reduce the probability and severity of failure in the implementation of relevant policies.

According to the results of the present study, the supervision of competent individuals inside and outside the organization on the correct implementation of Safety policies can also be an effective factor in reducing the failure to implement the relevant policies, which is consistent with the results of the study conducted by Verra et al. (2018) who have introduced continuous monitoring and legal support as success factors in implementing safety and health policies. One of the most important factors that can play an effective role in the implementation of health, safety and environmental policies is the monitoring of implementation by government oversight bodies or intra-organizational oversight departments in the private sector. Given that the implementation of most policies related to

health, safety and environment requires budgeting, cessation of some production activities, time and obtaining legal licenses, etc., some employers and managers of industrial and mining organizations, especially small enterprises, always avoid paying attention to the mentioned cases. Therefore, the role of internal and external monitoring can be helpful in this regard.

Based on the findings of the present study, promoting the Safety culture of the organization through cultural planning, training and modifying employee behavior and use through cyberspace and print and video media can be among effective measures to reduce the failure to implement Safety policies which is consistent with the results of the research of Mamivand et al. (2019). In his research, he considers the knowledge of cultural background and the promotion of environmental culture as the factors of successful implementation. It seems that culture building in the field of implementation of Safety policies can play an important role in the successful implementation. If the level of culture is improved, it will improve the safety performance of employees and their active participation, which in turn can help to better and more effectively implement Safety -related policies.

According to the results of the present study, attention to incentive tools for successful organizations in implementing Safety policies is among the top ten effective factors in reducing failure to implement health, safety and environmental policies. In this respect, it is consistent with the results of Rousseau and Wiseman (2004). He said that one of the reasons for the success of policy implementation is to pay attention to policy tools (policy documents, application of regulations and instructions). The results of the present study are also consistent with the results of the studies conducted by Memarzadeh Tehran et al. (2011) and Arabi and RezqiRostami (2005). One of the factors introduced in policy pathology as causing failure in implementation is the selection of inappropriate tools. Undoubtedly, choosing the right tools can be effective in reducing failures in the implementation of health, safety and environmental policies. Employers of industrial and mining units usually welcome incentive and symbolic tools more than power-based tools, but in terms of legal nature and human and environmental damage due to non-implementation nature of health, safety and environmental policies, the mandatory and punitivetools can also be effective in reducing failure to implement health, safety and environmental policies.

According to the results of this study, creating and supporting specialized trade unions in the field of Safety can be among the measures to reduce the failure to implement health, safety and environmental policies, but according to the results of the present study, these factor are ranked the last. Baun and Marek (2013) emphasize the active role of NGOs in implementing policies, which is consistent with the results of the present study.

On the other hand, from the perspective of research experts, paying attention to the proportion between Safety policies and the organization's wealth, as well as removing internal and external restrictions on the supply and use of new equipment and technologies in the field of Safety, have the least effect on reducing the failure of these policies. Rajab Beigi (2008) and Zibandeh (2020) in their research consider inappropriate technology as one of the causes of failure in implementing policies. The results of his research are consistent with the present study as they consider new technologies to be effective in reducing the failure of policy implementation. And since in the present study, these factors are ranked the last, the current results are not consistent with the results of previous studies.

According to what was stated in the introduction of the research, it is important to note that due to the lack of specific research on the factors reducing the failure of safety and health policies in mining and industrial organizations and regarding that the interactions of actors involved in the implementation of safety and health policies in industries have political, economic, cultural, etc. differences with significant effects on the policy implementation process, the results of this study conducted in cultural and economic contexts involving the special conditions of mining and industrial environments can express the factors that reduce the failure to implement safety and health policies in a study and make suggestions for success in implementing safety and health policies.

It is suggested that in appointing senior managers, the board of directors of industrial and mining organizations, while supporting managers with a Safety approach, should pay attention to the requirement of new managers to implement Safety policies. Organizations should develop scientific and

enforceable programs in order to implement Safety policies and while applying practical and effective training to all employees regarding the implementation of Safety policies, try to implement these policies under the supervision of competent executives. It is suggested that in developing these programs, managers of these organizations should consider the use of cyberspace and print media to promote the organization's Safety culture and improve employee behavior. It is also suggested that incentive tools be used to implement Safety policies, both at the government level and within industrial and mining organizations.

This research suffers from some limitations such as not conducting numerous domestic and external studies on policy making and implementation of safety and health policies that limited the researcher in collecting materials, theoretical foundations and especially the research background. Also, lack of easy access to experts due to being busy and conditions caused by Coronavirusare other limitations of the researcher in conducting this research.

Conclusion

Based on the findings, reducing the change of managers and requiring new managers to implement safety policies, developing scientific programs in accordance with the organization's ability to implement safety policies, creating an organizational structure in the field of safety in accordance with the goals and strategies of the organization and safety management activities under the direct supervision of senior management and practical and effective training of all employees regarding the implementation of safety policies can be considered as important factors reducing failure in the implementation of safety policies in industries and mines of Kerman province. Paying attention to the proportion between safety policies and the organization's wealth and removing internal and external constraints in the supply and use of new equipment and technologies in the field of safety is also ranked the last in reducing the failure to implement safety and health policies. It is also suggested to establish an independent center for policy making and monitoring the implementation of safety policies in the country and to reduce repetitive and conflicting activities in this field. Also, attention should be paid to strengthening the organizational structure of safety units in the mines of Kerman province.

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