

The Impact of Organizational Culture on Safety-conscious Considering the Mediating Role of Employees' Job Satisfaction: A Case Study

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ABSTRACT

Background: Employees' awareness about safety is a required element to develop a safe behavior so that it allows designing programs to improve safety performance at work. Therefore, the present study attempts to examine the effects of organizational culture on personal safety level with employees' satisfaction as a mediation variable. **Methods:** This descriptive-analytical and cross-sectional study was conducted with 229 steel industry workers using a standard questionnaire. The questionnaire had 47 items arranged in two sections, including demographics and job information as section one and organizational culture, personnel safety awareness, and employees' satisfaction as section two. Data analyses were done using SPSS and LISREL, and the relationships between the variables were determined using a structural equations model. **Results:** The mean score of satisfaction and personnel safety awareness was equal to 54.58 and 8.65, respectively. The highest mean score of organizational culture dimensions was obtained for patriarchy vs. matriarchy (33.2), and the lowest mean score was obtained for individualism vs. collectivism (16.08). Organizational culture was notably and positively affected by individualism vs. collectivism, avoiding uncertainty, and distance from power. In addition, there was a significant relationship between the total mean score of the dimensions of the organizational culture questionnaire and work wards ($P < 0.001$). **Conclusion:** The study showed that organizational culture has a direct relationship with personnel safety awareness and job satisfaction. These results point out that the human factor has the most important role in preventing occupational accidents. Accordingly, businesses and employers should establish and disseminate organizational culture in their organizations.

Keywords: Organizational culture; Safety-conscious; Job satisfaction; Steel industry

Introduction

Industrial sites have a lot of types of machinery and diverse tools, which imposes a wide range of safety risks to workers. Along with technological advances and an increase in the role of technology in production, the risk of accidents and hazards has increased in industrial environments. Accidents at factories can lead to amputation or death, which are

not easy to compensate for. In addition, the organization loses a worker for whom several years, time, and money have been spent, which is a heavy loss.¹ According to the International Labor Organization, 250 million job accidents happen in the world every year, which lead to the death of 14 out of each 100 thousand cases.² As suggested by

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estimates, three workers die each hour in Iran due to a wide range of accidents, and the cost of neglecting regulations and safety principles is equal to the country's income from oil export.³ Statistics from Sweden indicate that metal industries workers have had a higher rate of work accidents than other jobs between 2006 and 2010.⁴

It is proven that the main cause of industrial accidents is human's unsafe behaviors.⁵ In addition, considering the increase in accidents, traditional safety measures are mostly concentrated on engineering aspects of safety. However, since a majority of accidents are caused by human works, they are mostly the outcome of a chain of interactive factors at different systemic levels rather than being caused by one operator's error.⁶ The developed countries have found that advanced management systems and technologies are not enough to achieve sustainable development. There is a need to improve employees' behaviors, values, beliefs, and attitudes towards safety to prevent accidents. In addition, the organization's approach to safety that constitutes a safety culture needs to be improved.⁷ Culture is a set of perceptions, cognitions, and awareness of a specific group in which the members have their own cognitive, emotional, and behavioral elements.⁸ Safety culture is the outcome of values, attitudes, perceptions, competencies, and personal and group behavior patterns that determine an organization's commitments, style, and efficacy. In fact, it reflects the roles and technical/social functions of individuals in critical situations.⁹

Organizational culture is among the factors in the success and efficiency of organizations that have drawn a great deal of attention over the past two decades. Cultural change is the biggest challenge in moving towards developing a safe system.¹⁰ Safety culture is a necessity, and management's role in creating a safety culture is undeniable. Modern educational techniques and punishment/bonus systems (reward and penalty) can also be efficient. By

implementing safety and professional hygiene strategies such as safety culture in the organization, the risk of accidents declines and the organization enjoys more economical and financial benefits, which means capital pay-back in the long-term.¹¹

A healthy workforce enjoys good health given the better interaction they can have with society and others and creates a healthy society. This entails having a good safety awareness and good knowledge about safety at work.¹² Since achieving an acceptable level of safety management standards needs big changes in individuals' attitudes about HSE, improving personnel's awareness is quite essential.¹³ In general, human force is one of the main factors in health, safety, and environment that forms decisions in the organization. It brings in solutions, which leads to overcoming the organization's problems and challenges.¹⁴

On the other hand, the institutionalization of safety culture regardless of individuals' satisfaction, is doomed to fail. Personnel's satisfaction refers to their pleasant feelings about each task. Personnel satisfaction is a relative sense of happiness, different from objective thoughts and behavioral intentions.¹⁵ Efficacy and efficiency in organizations depend on their human forces. One of the key issues in any organization is the employees' satisfaction. High motivation in individuals increases efficacy and efficiency in the organization.¹⁶ Job satisfaction is a key factor in increasing efficacy and also personal satisfaction in the organization. Through different approaches, managers try to improve job satisfaction in the employees.¹⁷ Safety awareness in the work environment can be based on awareness of safety regulations and laws, knowing risks and hazards, how to avoid them, and so on. Considering the importance of this issue researchers who have concentrated on humans as the cause of accidents argued that even with a safe work environment, all safety measures fail when workers do not have a safe attitude and safety awareness.¹⁸

Ayim Gyekey found in their study that workers with higher job satisfaction tended to have a stronger perception of safety behaviors.¹⁹ Stoilkovska et al. also found a positive relationship between job satisfaction and the safety performance of personnel. They concluded that this positive relationship attenuate the rate of work accidents and improve the safety of employees.²⁰

Therefore, employees' awareness about safety is one of the main elements needed to develop a safe behavior, which allows the development of safety performance improvement programs at work. The knowledge about awareness level and safety attitude in personnel can be a way to highlight educational weaknesses and needs in personnel as to safety issues. Negligence in paying attention to personnel's educational needs as to safety degrades safety in personnel. In addition, compensating for the shortcomings takes much more time and money and causes loss of capital and slower progress in the long run. Given the introduction and the importance of the topic of the work, the effect of organizational culture on safety awareness level with personnel's satisfaction as a mediation variable in a steel factory in Iran was examined.

Methods

A cross-sectional study took place at a large steel-manufacturing company in the south of Iran in 2021. To this end, a standard questionnaire of organizational culture, personnel's safety awareness, and personnel's satisfaction was used. The validity and reliability of the tool have been measured by Yazdani and Azadbakhst (2019).²¹

Given the sample size required for studies based on a questionnaire and structural equations and given 50% response rate for each item (to have the largest sample size), 200 participants were selected in this study²² as follows: Where N refers to study population ($n=946$) and p refers to response rate to an item (0.50). The surveys were conducted with employees who volunteered to answer the questions,

and data has been collected via face-to-face surveys. Due to the hazardous work environment and the intensity of workload, 250 surveys were completed. Out of these, 21 were left out of evaluation because they were not completed properly or fully, and as a result, 229 surveys were included in the analysis. Thus a total of 229 people constitute the research sample.

$$1) n = \frac{N \cdot x}{N - 1E^2 + x} = \frac{946 \cdot 0.96}{2000 - 1946 - 0.96n(946 - 1) + 0.96} = 200$$

$$2) n = \frac{N \cdot x}{(N - 1)E^2 + x} = \frac{946 \times 0.96}{(2000 - 1) \frac{(946 - n)0.96}{n(946 - 1)} + 0.96} = 200$$

$$3) x = Z_{1-\alpha/2} p(1 - P) = 1.96 \cdot 0.5(1 - 0.5) = 0.96$$

$$4) x = (Z_{1-\alpha/2})^2 P(1 - P) = (1.96)^2 \cdot 0.5(1 - 0.5) = 0.96$$

$$5) E = N - nxn(N - 1) = 946 - n0.96n(946 - 1)$$

$$6) E = \sqrt{\frac{(N - n)x}{n(N - 1)}} = \sqrt{\frac{(946 - n)0.96}{n(946 - 1)}}$$

The questionnaire comprises two sections, including demographics and job information as section one and a standard questionnaire of organizational culture, personnel's safety awareness, and personnel's satisfaction as section two. There are three constructs in the tool, including organizational culture (patriarchy vs. matriarchy with items 1-9; individualism vs. collectivism with items 10-14; avoiding uncertainty with items 15-19; and distance from power with items 20-25), personnel's safety awareness (items 26-28), and personnel's satisfaction (items 29-47). The items that measure these three constructs are designed based on Likert's five-point scale (very low, low, moderate, high, and very high).

Yazdani and Azadbakht obtained Cronbach's alpha of the tool, based on administering 30 questionnaires, equal to 0.862 for organizational

culture, 0.751 for safety awareness at work environment, 0.855 for personnel's satisfaction, and 0.887 for the whole tool. Therefore, the tool has good reliability.

Statistical analysis

The factor structure of the model was examined with structural estimation modeling. Overall model fit was examined using multiple fit criteria, as suggested in the literature. Specifically, six goodness-of-fit indices were used, including chi-square/degree of freedom (χ^2/df), comparative fit index (CFI), normalized fit index (NFI), incremental fit index (IFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Values of $\chi^2/df < 3$, CFI, NFI, and IFI > 0.95 , and RMSEA and SRMR < 0.08 are indicative of a good fit with the data.²³⁻²⁶ To evaluate the internal consistency of the questionnaire, Cronbach's alpha and the corrected-item total correlation were calculated. Data analyses were carried out using SPSS for Windows, version 16.0 (SPSS Inc., Chicago, IL, USA) and LISREL 8.80 (Scientific Software International, Inc., Lincolnwood, IL, USA).

Findings

Table 1 lists the participants' demographics;

clearly, 87.2% are men, and 12.8% are women. The majority of participants had a bachelors' degree (58%) with a monthly income of less than 100,000,000Rls. (54.3%).

As listed in Table 2, the mean scores of personnel's satisfaction and safety awareness are 54.58 and 8.65, respectively. The highest mean score among organizational cultural aspects is obtained for patriarchy vs. matriarchy (33.42%), and the lowest score is obtained for individualism vs. collectivism (16.08).

Table 1. Demographics of the participants

		N	Frequency %
Sex	Male	197	87.2%
	Female	29	12.8%
Marital status	Married	199	88.1%
	Single	27	11.9%
Education level	Diploma and less	30	13.3%
	Associate	29	12.8%
	Bachelor	131	58.0%
	Master and above	36	15.9%
Age	Under 30 years	8	3.5%
	30 to 40 years	150	66.4%
	40 to 50 years	61	27.0%
	More than 50 years	7	3.1%
Monthly income(Toman)	10 million and less	121	54.3%
	10 to 15 million	64	28.7%
	15 to 20 million	33	14.8%
	20 million and up	5	2.2%

Table 2. Mean score, SD, min, and a max of organizational culture, and personnel's safety awareness and satisfaction

Structure	Dimensions	Mean	Standard Deviation	Minimum	Maximum	Score range
Organizational Culture	Patriarchy vs. matriarch	33.42	5.27	11.00	45.00	9-45
	Individualism versus collectivism	16.08	3.53	5.00	25.00	5-25
	Avoid uncertainty	17.92	4.27	5.00	25.00	5-25
Personnel safety awareness	Distance from power	18.88	3.26	6.00	29.00	6-30
	Personnel safety awareness	8.65	2.45	3.00	15.00	3-15
Employee satisfaction	Employee satisfaction	54.58	6.58	33.00	75.00	19-95

To examine the structure of the model, the SEM was carried out. The result of SEM confirmed the conceptual structure (CFI=0.96, NFI=0.95, GFI=0.96, RMSEA:0.073). The results are shown in Table 4. The Kaiser-Meyer-Olkin Measure estimation was 0.85, and Bartlett's Test of Sphericity estimation was 5996.62 ($p < 0.001$), which revealed good sampling adequacy. Regarding Table 3, it has been shown that organizational culture is significantly and positively affected by individualism versus collectivism, avoid uncertainty, and distance from power.

However, a higher score of patriarchy vs. matriarchy was associated with Organizational Culture.

The mean difference of the total organizational culture questionnaire across categorical variables was assessed using independent samples t-test and one-way analysis of variance. The detailed results are shown in Table 4. Table 4 lists the different total organizational culture questionnaires based on demographical variables.

Moreover, the mean difference in the organizational culture questionnaire's total score among different units is listed in Table 5. As listed, among the other departments, the security department and HSE have the highest and lowest total mean scores, respectively. Moreover, there is a significant relationship between the mean score of all dimensions of organizational culture and departments ($p < 0.001$).

Discussion

and employees' job satisfaction as a mediation variable was organizational culture's effects on safety awareness and employees' job satisfaction as a mediation variable. Organizational culture is the strongest internal force in an organization that has a notable effect on organizational variables such as job satisfaction. When organizational culture is harmonious with employees' job satisfaction improvement, the individuals perform their tasks

with higher motivation and willingness. In their study, Sila et al. (2017) showed that employees' satisfaction relatively caused a positive relationship between a constructive culture and a safe work environment. The constructive culture motivates cooperation, supportive relationships, personal development, and high performance. It also facilitates a safety-aware work environment, which is related to increased satisfaction with employees' relationship to some extent. This finding is consistent with the present study.²⁷ Therefore, when workers and employees feel satisfied with the assigned tasks and find performing them joyful, they feel more motivated to observe safety principles and regulations. In addition, by employing diverse strategies such as extending safety culture and safety instructions for each job, safe behaviors are amplified, and a positive safety attitude is institutionalized in different job groups, which minimizes the risk of unsafe behaviors.

The results showed a positive and significant relationship between organizational culture and job satisfaction. With an increase in organizational culture, job satisfaction in employees increases, which is consistent with Zamini et al. (2011).²⁸ According to the SEM conceptual model, there was a positive and significant relationship between organizational culture dimensions and job satisfaction. In other words, employees with a higher organizational culture tend to have higher job satisfaction. These employees tend to have a positive perception of the organization, management, and supervisors. They also emphasized safe work conditions, education, and access to personal safety equipment. Mehmet Ozan Cinel et al. (2011) conducted a study titled "the effect of job safety on employees' motivation in organizational culture in home furniture companies." They showed that sub-dimensions job safety in organizational culture had a notable impact on sub-dimensions of employees' motivation.²⁹

Table 3. The results of SEM on the conceptual model

Response variable	Independent variable	Standard Beta	SE	P-value	95% Confidence Interval
Organizational Culture	Patriarchy vs. matriarch	-0.012	0.002	<0.001	-0.017 to -0.009
	Individualism versus collectivism	0.527	0.079	<0.001	0.281-0.693
	Avoid uncertainty	0.459	0.081	<0.001	0.299-0.618
	Distance from power	0.689	0.058	<0.001	0.574-0.804
Personnel safety awareness	Organizational Culture	1.012	0.026	<0.001	0.959-1.064
Employee satisfaction	Employee satisfaction	-0.061	0.028	<0.001	-0.117 to -0.005
	Organizational Culture	0.991	0.002	<0.001	0.984-0.997

Tengilimoglu et al. (2016) examined the effects of safety culture on safety performance with job satisfaction as a mediation variable. They found that safety culture, safety performance, and job satisfaction were significantly related. In addition, they showed that safety culture had a positive effect on safety performance and job satisfaction functioned as a mediator.³⁰ In fact, safety awareness is affected by job satisfaction and other dimensions such as salary, benefits, responsiveness, and promotion at work, and managers' support.

Stoilkovska et al. (2015) examined construction sector employees' perception and awareness of the importance of safety in an organization/construction site and how job satisfaction affected these perceptions. The results showed that job satisfaction had a notable impact on perception and commitment to workplace safety, and this relationship was adjusted with age. Therefore, such relationships can lead to a lower rate of accidents and injuries at work and higher health in workers. Our results also supported a direct and significant relationship between the safety awareness of workers and job satisfaction. The present study is perfectly consistent with these two studies.³¹

There were a few limitations in the study. First of all, the cross-sectional design does not allow us to examine the causal relationship between the variable. Another limitation was rooted in the

demographical specifications of the participants. The number of men was higher than that of women, the participants had different tasks, and their education level was different. In addition, since the study was conducted in one industry, generalization of the findings to other industries or regions should be cautious.

Conclusion

The study showed that organizational culture had a direct and significant relationship with safety awareness and job satisfaction. These results point out that the human factor has the most important role in the prevention of occupational accidents. Accordingly, businesses and employers should establish and disseminate organizational culture in their organizations.

One of the main factors in creating safety awareness is to involve the employees in the education and learning process. Employees' satisfaction increases through allowing them to have a voice in occupational hygiene and safety boards and also hearing their opinions. It is recommended to improve organizational culture in employees by modifying and adjusting new and modern ways of doing things, organizational learning, strategic direction, and strategic goals and objectives. Through this, it is possible to improve job satisfaction in employees.

Table 4. Mean difference of the total organizational culture questionnaire using t-test and one-way ANOVA

		Organizational Culture	
		Mean	SD
Sex	Male	149.73	15.33
	Female	148.21	7.93
P-value		0.601	
Marital status	Married	149.28	14.76
	Single	151.44	13.28
P-value		0.470	
Education level	Diploma and less	155.57	20.51
	Associate	149.55	11.90
	Bachelor	148.64	13.53
	Master and above	147.75	13.73
P-value		0.103	
Age	Under 30 years	150.63	15.93
	30 to 40 years	148.36	14.81
	40 to 50 years	152.00	14.09
	More than 50 years	152.00	11.80
P-value		0.401	
Monthly income(Toman)	10 million and less	148.56	16.21
	10 to 15 million	149.30	12.59
	15 to 20 million	152.03	10.19
	20 million and up	163.20	15.99
P-value		0.115	

Table 5. Mean difference of the total organizational culture questionnaire score across units using one-way ANOVA

		Organizational Culture	
		Mean	Standard Deviation
Unit	HSE	139.00	10.65
	ICT	148.50	8.19
	Quality Control	149.13	12.06
	Control room	146.00	21.69
	Official	148.35	11.01
	Stockroom	144.06	17.42
	Power	161.00	5.58
	Utility	145.74	14.52
	Roller turning	146.50	12.14
	Quality Guarantee	148.00	5.66
	Overhead Cranes	148.31	11.68
	Welding	161.40	13.50
	Security Department	164.06	12.75
	Industrial services	149.04	12.28
	Engineering Management	140.00	8.25
	Mechanical	155.50	6.27
	Hydraulics and lubrication	145.50	3.70
p-value		<0.001	

Conflict of interest

The authors reported no potential conflict of interest.

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