Effects of Safety Climate on Safety Performance with Moderating Roles of Safety Knowledge: Evidence from Pakistan's Textile Industry

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Abstract

This study focuses on the safety climate of the textile industry and the safety performance of lower-level employees in Pakistan. Safety knowledge has been identified as a key variable to moderating the relationship between safety performance and safety climate. Safety climate aspects, influencing safety performance are investigated by distributing questionnaires on which Likert scale items are used and questionnaires are distributed to lower-level employees in the Khurrianwala textile industry in Faisalabad. The descriptive and qualitative psychological approach is used. The collected data is analyzed using SPSS, tests of instrument validity; factor analysis, and inferential statistics are carried out. Simple and moderating multiple regression processes are utilized for inferring hypothesis testing. The study finds that there is a strong relationship between safety climate and safety performance. Also, the relationship between safety climate and safety performance is moderated by safety knowledge. This study contributes to decision making regarding the safety climate implementation and the role of safety knowledge with safety performance.

Disciplinary: Management Science, Occupational Health, Safety and Environment Management.

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1. Introduction

1.1 Safety Climate and Safety Culture

Empirical research on safety culture and climate has been grown impressively in the last two decades. A large portion of the research reported is directed by routines of social logic, particularly social and organizational psychology research [1]. Safety culture can be referred to as results of individual and groups values related to perception, skills, interpretation, attitude, and physiology in organizations' setting regarding health and safety management of that firm [2]

1.2 Safety Performance

Safety performance refers to notable activities/responses that persons demonstrate in all tasks to encourage the health and safety of employees, customers, the general public, and the environment [3]. Safety performance is an important part of organizational performance because its effect on financial costs relates to the health and safety of employees, industries, and governments [4]. There is no common definition of safety performance. For example, safety performance may incorporate; security association and management, safety gear and measures, mishap insights, safety preparation and assessment, accident investigation, examinations, and safety preparing rehears [5]. In this study, safety performance refers to the quality of safety-related work, and these safeties related work means efforts to achieve safety. In the study, safety-related works do not include monetary terms also safety performance is considered as a subpart of the overall performance of an organization [5].

1.3 Safety Knowledge

Safety knowledge is useful information what an individual has about safety, and skills to implement this information for his jobs to perform. In a different study, safety knowledge is considered as a mediating variable for safety climate and safety performance [6]. In this study, safety knowledge defined as "worker's comprehension of safety operating strategies and sufficient safety training and guideline" [7]. It is worth noted that industrial performance is affected by poor safety climate and low safety performance of its employees and management. The first evidence of poor safety climate is the case of Ali Enterprises, located in Plot 67, Baldia Town, and Hub Road Karachi. The major business of the firm is to exports its garments to Europe and the United States; having 12000-15000 workers. Ali Enterprises were catches fires on11 September 2012 result in the death of more than 250 individuals and approximately 500 workers were badly injured [8].

The second evidence on 4 May 2015, another incident took place in Karachi, Site area Wali Churangi, where a garment factory catches fire result in 10 people burning including 5 women [9]. It was not simply Karachi, not Lahore and Faisalabad; even it was not just factories. There are flyovers and bridges; business and private structures as well where there is a finished absence of safety measures.

2. Research Methodology

Neal and Griffin (1997) examined the model of safety performance utilizing a documented information set, evaluated safety compliance, and safety participation. Safety knowledge was found intercede at least some of the connections between safety climate and safety performance. Safety knowledge was not checked as a moderating variable and survey techniques were not utilized. Many studies tell about the accumulation of workers, improper state of the machine, ergonomic issue confronted by the textile laborer, dust issues, poor lighting, ventilation and unaware of personal protective equipment, not given SMS in these industries [10]. The majority of the workforce is not set up to adapt to the risks postured by manufacturing and industrial processes and procedures [11]. The country does not have the essential framework, furthermore qualified individuals for giving workplace health and safety facilities to the workers. Hence, a large number of workers will be at risk if no future attempts are made [12].

In general, safety climate is comprehended by perceptions related to the policies, methods, and practices of an association relating to workplace safety [6]. Strategies and systems for each organizational aspect are produced by the senior management and their requirement changes over them into practices. It is the inside predictable example of enacted policies showed by the management that decides safety climate. That is the reason safety climate is considered to be a construct, a result of an active process of organizational decision making, rather than an inactive study of isolated safety procedures [13].

Based on the performance review of previous studies, the model in Figure 1 shows the relationship between safety performance and safety climate. The previous section explores that safety climate is a higher-order factor and measure up by low/ second-order factors which explain the influence of safety climate on safety performance in a particular work environment. Three parts of the framework, the first are antecedents of performance, and second are the determinants of performance and the third is the component of performance as shown in Figure 1. The model describes easily if we start with components of performance.
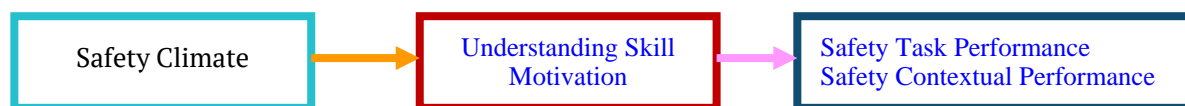

Figure 1: Griffin and Neal Framework for the relationship between safety climate and safety performance.

Based on Borman and Motowidlo's (1993) work, Neal and Griffin (2000) define the components of performance for the workplace and show that behavior and performance are synonymous. They define observable behaviors, while performance, on the other hand, includes those actions and behaviors that are related to the organization's objective and long-term objective and that can be considered in terms of an individual's ability [14] [15] [16]. Borman and Motowildo (1993) make a clear difference between two components of performance in the workplace i.e. task performance and contextual performance. Task performance is characterized as " The proficiency

with which work incumbents perform exercises that are formally perceived as a major aspect of their occupations... exercises that add to the association's technical core either by specifically executing a piece of its technological procedure, or indirectly by giving it materials required or services'' [14]. In as opposed to task performance, contextual performance is characterized as the "exercises that fall outside the class on task performance, yet at the same time add to organizational effectiveness' [14]. There are several essential differences between these two as research also supports this distinction [17]. These differences are outlined in Table 3.

In many organizations, there is expanding acknowledgment of the need to urge staff to: receive a questioning attitude; look for approaches to enhance safety; constantly be aware of what can turn out badly; and feel personally accountable for safe operations [18] [19] recommend that safety performance ought to be measured on various levels (one of them being safety attitude), consecutively to decide the true safety altitude of an organization. They propose that measuring the safety climate, or an individual's attitude toward safety, can show changes in organizational safety behavior and thus can be useful in measuring and evaluating safety programs. There are two ways of evaluating and assessing safety performance in the organization; one is safety outcomes, which are calculated through the quantitative measure, but some studies show that these measures are not good indicator especially in case of information is gathered from the more sensitive area of the population like low-level workers. On the other hand, there are attitudinal measurements which are done through using structural interview and survey techniques, many literature works suggest that safety performance is directly related to the safety climate of an organization, which further influences the organization climate and hence overall performance of the organization. Research also agreed that safety knowledge impacts the safety performance in both dimensions of performance, it impacts safety task performance and also safety contextual performance dimension of the safety performance of an industry. However, this study explains the relationship between safety performance and safety climate in the textile industry of Pakistan.
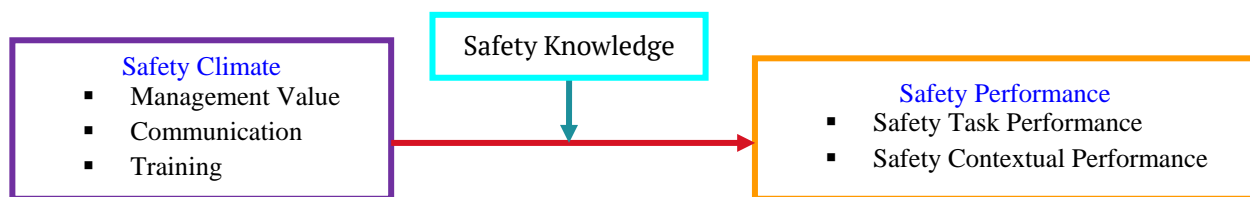
Figure 2: Conceptual framework of this research.
Source: Modified conceptual model adapted from Neal and Griffin [20]

In Figure 2, there are three variables in this study. Safety climate is the independent variable and safety performance is a dependent variable for this study and the other variable is safety knowledge which is considered as a moderating variable for this research study.

2.1 Research Methodology

The population of the research study is considered to be the lower-level workers of 30 textile/garment industries of Khurrianwala Industrial Estate Faisalabad. (M/S Arshad Corporation

(Pvt) Ltd, M/S Arzoo Textile, M/S Bismillah Textiles. M/S Interloop (Pvt) Ltd, M/S Kamal Textile Mills, M/S Ashar International (Pvt) Ltd .....) The population of this study is lower-level employees of the textile sector because they are facing safety-related problems in their workplaces more than any industry in the region. The target organizations have 100-15000 employees in their operational level category. The reason behind taking Faisalabad as the target area is that a major and large number of textile industry situated in this region. As per the distribution of economic activities in the country and division of labor force in a diverse setting, the number of textile firms in Faisalabad is much higher than any other geographical location [22]. At the first stage out of 30 textile units from the Khurrianwala Industrial Estate Association (KIEA) members list, a total of 5 textile mills were selected by simple random sampling technique. In the second stage, 473 workers were randomly selected from these textile mills.

Table 1: Selections of the Respondents

Name of Textile Mill	Number of Lower level Employees	Sampled Workers
A	135	49
B	1800	109
C	10707	184
D	443	75
E	290	56
Total		473

The questionnaire is prepared to keep in view the objectives of the study, furthermore, all the items of questionnaires are translated into Urdu being the native language of the country. 13 items of safety climate and 4 items safety knowledge are adopted from Neal and Griffins (2000) while the 6 items questionnaire of safety task performance, 13 items scale of safety contextual performance is adopted from study of [21] all the items are appraised on five-point Likert scale as ''1'' representing strongly disagree and 5 representing strongly agree. Data collection was completed within four to five weeks. At the part of the management of target population, while collecting employees number information, first of all, human resource manager, of target organizations are contacted but out of these five firms, only two organizational managers give a response and offer the detail about employees, other three organization's detail of employees number is then collected through other means (by contacting KIEA and some personal resources). From the prospect of employees and collecting responses, in three organizations researcher has full access to go inside and take responses while in two other firms the responses are taken from the main entrance of organization at the time of leaving of employees, researchers also collect information by setting nearby dhabas (roadside restaurant)/canteen outside the target organization during their mess time.

3. Analysis and Results

The sample constituted 80% male and 20% female workers. The ratio of females in the sample was low because it is not considered virtuous for women in Pakistan to join any industry especially at a lower-level where labor-intensive work is required. In terms of three age group, the first group 18-34 years include 363 (85.8%) sample, the second age group 35-44 includes (48%) and

third 45-54 group include 12 people (2.8%). job experience is divide into five categories, the first category has 91 (21.5%) respondents in **Below 1 year**, 269 (63.6%) respondents with less than 5 years working experience, 56 (13.2%) respondent with more than 5 years and less than 10 working experience with the organization, 6 (1.4%) respondents have less than 15 years of experience and finally 1 (0.2%) respondent have below or equal to 1 year. For educational background, different level of education have been made and was found that 109(25.8%) respondents no schooling or formal education, 37 (8.7%) respondents are primary passes, 74(17.5%) respondents are middle pass, 101 (23.9%) respondents have matriculation which is second biggest percent in these categories of education, respondents having fundamental level education are 69 (16.3%), 28 (6.6%) respondents have bachelor education, 5(1.2%) respondents have master-level education.

3.1 Validity Test/Factor Analysis

Three constructs are used in this study. Different factors are taken into consideration for these constructs and these factors are further measured through research questions. For the validity of the research questionnaire (thirty-six questions), the data is analyzed to test instrument factorial structure for all constructs (variable). A principal component is the factor extraction method which is used for this type of analysis and factors are rotated according to the varimax solution when two or more factors emerge. Second-order factor analysis of the scales is also conducted. The internal consistency test for all three types of variables is also assessed using Cronbach's Alpha. In Table 2, analysis results show that the overall model of all three construct shows sample adequacy is 0.761 by Kaiser-Meyer-Olkin (KMO) test, which indicates that data is suitable for factor analysis. The test of homogeneity of variance shows that Bartlett's Test of sphericity (X^2=1746.614, p<.000)

Table 2: KMO Sample Adequacy Test/ Bartlett Test for Data Distribution:

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.761
Bartlett's Test of Sphericity Approx Chi-Square	1746.614
DF	3
Sig.	< 0.001

3.2 Reliability Test For All items

In Table 3, the overall reliability results illustrate that Cronbach's alpha is more than 0.7, showing that the instrument used in the research is reliable for this study.

Table 3: Alpha for all Items

No. of Item	Cronbach's Alpha
36	0.90

3.3 Testing of Research Hypotheses

The research instrument is followed by a five-point Likert scale questionnaire (1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree) the response is low towards strongly disagree, disagree, and neutral responses). To analyze hypotheses, SPSS®23 has been utilized. The researcher developed two major hypotheses for this study.

H#1: *Safety climate is positively associated with safety performance.*

A correlation and regression test was run to test hypothesis H#1. Table 4, the correlation coefficient value for all variables is more than 0.80 and P-Value is less than 0.05 that indicates that there is a strong positive and significant relationship among all variables.

Table 4: Pearson Correlations for all Variables (N = 423).

		SC	SK	SP
Safety Climate	Pearson Correlation	1		
	Sig, (2- tailed)			
Safety Knowledge	Pearson Correlation	.874**	1	
	Sig, (2- tailed)	< .001		
Safety Performance	Pearson Correlation	.929**	.926**	1
	Sig, (2- tailed)	< .001	< .001	

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.929	.863	.856	.420

Table 5 gives the value of *R* and R^2 for the model. The R-value of 0.929 provides the simple correlation between safety climate and safety performance. It can be check-in Pearson correlation Table 4. The R^2 is 0.863, from which it can be inferred that the safety climate can explain 86.3 % variation in safety performance. We can also conclude that there might be some or many other factors involved in explaining safety performance, but the model under discussion has only one predictor of safety climate that explains 86 % of safety performance, the remaining 14% of the variation in safety performance can be explained by other factors involved.

Table 6: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	469.15	1	469.615	2659.643	< .001
	Residual	74.336	422			
	Total	543.951	423			

Table 6 shows the analysis results of variance (SPSS ANOVA). The F-value is 2659.643 significant at P< .001, so the results suggested less than 0.1% chances that an F-ratio this large would happen if the null hypothesis were true. It can be inferred that the regression model used for this hypothesis is a significantly better prediction of safety performance in using means values of safety performance. In other words, the model used produced safety performance significantly well.

Table 7: Coefficients

Model		Un- Standardized Coefficient			Standardized Coefficient	t-value	Sig.
		B	Std. Error		Beta		
1	(Constant)	0.488	0.049			1.266	.105
	Safety Climate	0.846	0.016		0.929	51.572	< 0.001

Table 7 shows model parameters, it explains that if a safety climate increased by one unit it means safety performance will change by 0.846. The p-value <0.05 means significant, so we accept the hypothesis H#1 that there is an association between the safety climate and safety performance.

Safety climate generally known as shared values related to safety practices produces and thought by the upper, middle, and lower-level management of the concerned industry.

H#2: Safety knowledge moderates the relationship between safety climate and safety performance.

For the second hypothesis, a technique developed and utilized by Andrew F.Hayes called Process is used, to analyze the moderation, this regression method is a bit like the multiple regression analysis techniques. A complete discussion on the Process is already taken into a research study in the previous section; its practical implication is as follows.

Table 8: Outcome of Process Model 1.

Model 1					
X= Independent variable (IV)	Y= Dependent Variable (DV)		Moderator (M)		Sample Size
Safety Climate	Safety Performance		Safety Knowledge		473
Model 1					
	Coeff		SE	T-value	P-value
Constant	2.6		0.1	44.0	< .001
Safety Knowlege	.432		.1983	3.10	< .001
Safety Climate	.776		.1386	14.10	< .001
Int 1	.381		.1378	2.88	< .001
Int 1 Safety Climate X Safety Knowledge					
R-square increase due to interaction(s)					
	R2-chang	F	df1	df2	P
Int 1	.0245	5.565	1	419	< .001
Conditional effect of X on Y at values of the moderator(s):					
Safety Knowledge	Effect	SE	T-value	P-value	LLCI	ULCI
-0.5	.667	1	6.444	< .001	.489	.8068
0.5	.900	.0006	19	.6164	.801	.9114
Model Summary					
R	R-sq	MSE	F	df1	df2	P-value
.9291	.9171	.1402	1271.2	3	3	< .001

In term of interpreting whatever we have moderation or not we can see in the model shown in Table 8 where under the moderator safety knowledge the interaction term (safety climate* safety knowledge) explain the moderation, we can check the moderation p-value it is significant i.e. 0.000, so we accept H#2 that there is moderation between the safety climate and safety performance by safety knowledge.

4. Conclusion

This study explores the safety climate of the textile industry while measuring safety performance of employees. Safety performance affects the overall performance of the firm that in turn impacts the economic performance of a country. Safety performance depends upon a perfect safety climate of a company, but a two-way check of a particular industry will provide the relationship of both the factors. Safety climate is a subpart of organizational climate and safety culture and safety climate. A complete debate on safety climate and safety culture supports the argument for using safety climate because the premise of safety climate being more obvious and unmistakable in nature, making it simpler to operate in quantifiable terms contrasted with the more dynamic safety culture. This study, in context of the textile industry of Pakistan, and the lower level workers are the population. To check the impacts of the safety performance of

employees using safety climate as an independent variable and safety performance as a dependent variable, safety knowledge is taken as a moderating role variable. This study finds that there is a positive relationship of safety climate and safety performance. This study confirms that safety knowledge moderated the relationship of safety performance and safety climate. This study helps in the implementation of new health and safety management systems. The three components are explained, strongly belongs to the employees, safety climate is for safe work. Safety knowledge is the key for safe behavior and safety performance is related to the industry's performance itself.

5. AVAILABILITY OF DATA AND MATERIAL
Data can be made available by contacting the corresponding author.

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