

TOWARD A MODEL OF THE LINKAGES BETWEEN SAFETY CULTURE AND EMPLOYEE PERFORMANCE IN GOLD MINING COMPANIES

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Abstract—Safety culture has an impact on motivation and job satisfaction, which are important factors for employee performance. This study was conducted to examine the role of safety culture on employee performance through motivation and job satisfaction, and to identify factors associated with the performance of gold mining employees in East Java, Indonesia. Data was gathered using a sample from the gold mining company in East Java, Indonesia. The authors collected information on safety culture, motivation, job satisfaction, and employee performance and other employee characteristics. Data was collected using a questionnaire and conditional procedural analysis conducted to test the model. The results of data processing using SEM shows that safety culture has a significant effect on motivation and job satisfaction. Furthermore, the authors found that motivation and job satisfaction also have a significant effect on employee performance. The findings suggest that practitioners should put more emphasis on developing safety culture as a priority for company management, and firms put more emphasis on developing safety culture as a priority for company management because the results show that safety culture may have a positive impact on employee performance. Corrective action is needed to optimize the factors that influence safety culture. Prioritizing safety culture, providing training and development for employees, creating a compensation system that encourages employees to excel, and setting clear quality standards are steps that need to be carried out by gold mining companies in East Java to improve company performance. The limitation of this research is that the population is focused on employees of a gold mining company located in East Java. Future studies can use a wider population that can more generalize the findings.

Keywords— *employee performance, gold mining, job satisfaction, motivation, safety culture.*

I. INTRODUCTION

Over the past three decades, safety culture has been considered as an important organizational culture in many industries that are critical of safety, including the mining sector (Boye Kuranchie-Mensah & Amponsah-Tawiah, 2015). The term safety culture was used for the first time in the International Nuclear Safety Advisory Group (INSAG) report in 1986. Mohamed & Chinda (2011) showed that violations and errors in operating procedures that contributed to the disaster were evidence of a poor safety culture. Early literature regarding the safety culture was provided by Zohar & Study (2015) and Cox & Cheyne (2000). In 2000 (Cooper, 2000) it was described as the most important thing in developing theories in safety culture. Mearns & Ivar Håvold (2003) also argue that safety culture is more important than other safety performance improvement strategies, such as increasing supervision and tiring procedures. According to Mearns & Ivar, the application of a safety culture aiming to reduce accidents is more important when an organization's accident statistics reach its peak. At this stage, introducing more hardware (technical controls) and software (administrative controls such as procedures) becomes inappropriate (Cox & Cheyne, 2000). Conversely, the hearts and minds of workers in the company must be prioritized (Rechenthin, 2004). Sampson, DeArmond, & Chen (2014) proposed a pragmatic way to institutionalize cultures that attracted the hearts and minds of both frontline workers and management. Detailed studies on the topic have been provided by Cooper (2000), HSE (2005) and Goncalves Filho and Waterson (2018).

Safety culture becomes more important in the mining sector because mining activities have a high level of risk and potential hazard. The production process uses many types of movable heavy equipment, which causes a high level of workplace accidents due

to interactions between large vehicle units and worksite workers, potential landslides in work areas, and many other hazards in the gold mining work area (Lang O., 2010). Therefore, safety culture as an organizational culture is needed to prevent workplace accidents that have an impact on motivation and job satisfaction so that it can also affect the performance of employees (Neal & Griffin, 2004).

This study argues that the relationship between safety culture and firm performance is more complex than previous researchers have revealed. Accordingly, this study tests and develops a more complex relationship between CSR and firm performance by including two mediators (motivation and job satisfaction) as two predicted benefits of safety culture. Mediating these two variables directs future research away from an indefensible direct relationship between safety culture and firm performance.

II. LITERATURE REVIEW

Every organization has a culture that can have a significant influence on the behavior of the members of the organization. A strong organizational culture will provide stability to the organization. Robbins and Judge (2015) define organizational culture as a system of meaning sharing carried out by members that distinguish organizations from other organizations.

Based on world-class best practices, gold mining companies have implemented safety systems, procedures and rules that are complied with as part of Safety Culture Analysis which covers all work systems, work procedures, workers and even guests visiting the field (Boye Kuranchie-Mensah & Amponsah-Tawiah, 2015). The rules form the core of a comprehensive safety regimen and become an important factor of safety, helping managers adjust to safety systems, workplaces, and identifying high-risk activities that require additional supervision (Hong, Ramayah, & Subramaniam, 2018).

Furthermore, employee performance is one of the most important variables in the study of human resources and organizational behavior. Performance is a multi-dimensional construction that is difficult to define with definitions that can be universally accepted (DeGeest, Follmer, & Lanivich, 2016). According to McConnell (2003), the performance of employees or jobs is the achievement and contribution of individuals in practical and measurable terms. Moreover, Viswesvaran and Ones (2000) provide an alternative definition of employee performance which states that it includes actions, behaviors, and results that involve employees, or those associated with them, and which contributes to organizational goals.

On the other hand, motivation is one of the most researched topics in organizational behavior. Robbins and Judge (2015) define motivation as a process that explains the strength, direction, and perseverance of

someone in an effort to achieve goals. The best theory of motivation is known as the hierarchy of needs theory by Abraham Maslow. Maslow hypothesized that in every human being there is a hierarchy of five needs. In addition, job satisfaction reflects the degree to which someone likes his job. Kreitner and Kinicki (2014) define job satisfaction as an effective or emotional response to various aspects of work.

Based on previous research, the authors propose the following hypothesis:

- H₁: Safety culture is positively associated with motivation.
- H₂: Safety culture is positively associated with job satisfaction.
- H₃: Motivation mediated the relationship between safety culture and job satisfaction.
- H₄: Motivation is positively associated with employee performance.
- H₅: Job satisfaction is positively associated with job satisfaction.



Fig 1. Framework (references: authors)

III. METHOD

This study uses a quantitative research design using a hypothesis testing and field study. The population of this study is a gold mining company in East Java. The sampling method used in this study is convenient sampling with the number of samples using Slovin.

$$n = \frac{1.300}{1 + 1.300 (0.05)^2}$$

$$n = \frac{1.300}{1 + 3,25}$$

$$n = 305$$

The variables in this study consisted of endogenous and exogenous variables, each measured by a 5-point Likert scale. This study uses the type of primary data collected through survey methods. The number of questionnaires distributed was as much as 350 for employees of gold mining companies in East Java, the number of questionnaires returned was as many as 231, and the number of valid questionnaires that could be used for analysis was 164. The effective response rate was 46%.

Gold mining in East Java was selected because the environment in which they are located met the desired context to test the hypotheses. The mining activity

process has a high level of criticality of risks and potential hazards because the production process may use heavy equipment. Hence, the mining work area has a high rate of work accidents, with the interaction between large vehicle units and workers on the job site (Stemn, Bofinger, Cliff, & Hassall, 2019). This interaction has potential landslides in the work area, and many more hazards found in the gold mining work area. Over the past three decades, safety culture has been considered an important organizational culture in many industries that are critical of safety, including the mining sector (Orogbu, Onyeizugbe, & Chukwuma, 2018).

IV. RESULTS & DISCUSSION

A. Measures

Safety culture: we measure safety culture by adapting Guldenmund (2010)'s five items scale and Zacharatos, Barling, & Iverson (2005)'s four items scale. The five items of this scale were: "In my opinion, the company is seriously committed to raising awareness regarding safety culture"; "The company has provided me with training in the use of safety equipment"; "The company wants me to play an active role in implementing the safety culture program at work"; "The company has placed safety culture as a top priority at work"; The company promotes the use of personal protective equipment". We used confirmatory analysis to assess the validity and reliability of this measurement model. Five factors' loadings range was from 0.71 to 0.88. The coefficient α reliability for the scale was 0.90.

Motivation: we constructed a scale that measures the adoption of safety motivation taken from Pang & Lu (2018). In particular, the scale consists of five items that measure a various aspect of safety motivation i.e., appreciation, physiologist, social, perceived security, and self-actualization. The factor loadings show that physiologist and perceived security are not valid for this measurement. Furthermore, the factor loadings for appreciation, social, and self-actualization are 0.75, 0.84, and 0.75. The coefficient α reliability for the scale was 0.82.

Satisfaction: considering the unique context of gold mining, we constructed a scale that measures the adoption of job satisfaction taken from Spencer, Gevrek, Chambers, & Bowden (2016). The scale consists of four items i.e., the work itself, salary, supervision, and co-workers. The factor loadings show that supervision and co-workers are not valid for this measurement. Otherwise, the loading factor loadings for the work itself and salary are 0.77 and 0.78. The coefficient α reliability for the scale was 0.85.

Employee performance: it used five established satisfactions measures i.e., responsible, initiative, effective and efficient, cooperation, and focus. Five

factors' loading range was from 0.71 to 0.86. The coefficient α reliability for the scale was 0.89.

TABLE 1. RESULT OF FACTOR ANALYSIS

Variables	Indicator	Factor Loading	Coefficient Reliability
Safety Culture	Commitment	0.755	0.90
	Training	0.792	
	Compliance	0.838	
	Management	0.880	
	Socialization	0.781	
Satisfaction	Work itself	0.837	0.85
	Reward policy	0.775	
	Skill variety	0.830	
Employee Performance	Responsibility	0.809	0.89
	Initiative	0.860	
	Effective and efficient	0.760	
	Cooperation	0.718	
Motivation	Focus	0.797	0.82
	Job Achievement	0.753	
	Remuneration	0.840	
	Job environment	0.758	

Source: output SmartPLS

B. Results

Table 2 presents the results of composite reliability testing which aims to measure internal consistency reliability through reliability composite values and Cronbach's Alpha .70.7. If all latent variable values have a value of .70.7 it can be interpreted that the construct has good reliability or the instrument used as a tool in this study has been reliable or consistent (Ghozali, 2014). The highest construct value is 0.905 in the construct of culture, meaning that this construct has a very high degree of reliability. While the lowest composite reliability value is 0.827 in the construct of Employee Motivation.

Whereas the recommended value for Cronbach's Alpha is .60.6. On table 2, the value of Cronbach's Alpha for all constructs is .60.6. The highest value is 0.896 in the construct of Safety Culture, while the lowest value is 0.688 in the construct of Employee Motivation. The recommended value for Average Variance Extracted (AVE) is > 0.50 for all constructs contained in the research model. Table 2 shows that the AVE value of all constructs in this study has fulfilled the recommended value with the highest value in the Job Satisfaction construct of 0.664 and the lowest value of 0.616 in the construct of Employee Motivation.

TABLE 2. RESULT OF FACTOR ANALYSIS

Variable	Composite Reliability	Cronbach's Alpha	AVE
Safety Culture	0.905	0.869	0.657
Motivation	0.827	0.688	0.616
Job Satisfaction	0.855	0.750	0.664
Employee performance	0.892	0.849	0.624

Source: output SmartPLS

Table 3 presents the results of cross loading safety culture construct correlation, with the indicator higher than the safety culture correlation indicator with other constructs (Job Satisfaction, Employee Performance, and Motivation). Likewise, the construct correlation of Job Satisfaction with its indicators is higher than the correlation of Job Satisfaction indicators with other constructs (Safety Culture, Employee Performance, and Motivation). Also, in the construct of Employee Performance and Construct Motivation, that has a higher correlation with each indicator compared to indicators in other constructs. Therefore, it is concluded that each indicator is valid in measuring the specified construct.

TABLE 3. RESULT OF CROSS LOADING

Variable	Indicator	Safety Culture	Job Satisfaction	Employee Performance	Motivation
Safety Culture	Commitment	0.755	0.312	0.431	0.418
	Training	0.792	0.383	0.482	0.562
	Compliance	0.838	0.406	0.544	0.470
	Management	0.880	0.437	0.521	0.483
	Socialization	0.781	0.460	0.518	0.466
Job Satisfaction	Work itself	0.420	0.837	0.520	0.445
	Reward policy	0.332	0.775	0.404	0.442
	Skill variety	0.447	0.830	0.636	0.555
Employee Performance	Responsibility	0.556	0.600	0.809	0.539
	Initiative	0.563	0.602	0.860	0.558
	Effective and efficient	0.509	0.438	0.760	0.497
	Cooperation	0.389	0.418	0.718	0.443
Motivation	Focus	0.403	0.489	0.797	0.524
	Job Achievement	0.328	0.501	0.462	0.753
	Remuneration	0.493	0.537	0.589	0.840
	Job environment	0.570	0.364	0.469	0.758

Source: Output SmartPLS

Table 4 presents the results of path coefficients. The estimated value for the path coefficient in the structural model, which is suggested as significant by looking at the t-value of the bootstrapping report algorithm. The value of the t-value is required > t table at α 5% (1.96). The results show that all relationships have significance. All t-statistic values > t table (1.96) with the highest level of significance found in the relationship between constructs of Safety Culture to Motivation is 7.438, then the relationship between constructs Motivation towards Employee Performance and significance level is 7.209, construct relationship of Job Satisfaction to Employee Performance has a significance level of 6.331, constructive relationship Motivation to Job Satisfaction has a significance level of 5,690 and the lowest significance level found in the relationship between constructs of safety Culture with Job Satisfaction was 2,343. Positive influence is also shown on the overall relationship of constructs found in this study, with the largest parameter coefficient found in the relationship between constructs of Safety Culture with Motivation that is equal to 0.595, the next largest coefficient of parameters is the relationship between constructs Motivation towards Job Satisfaction of 0.466 then proceeds to the construct of

Job Satisfaction on Employee Performance with a parameter coefficient of 0.411, the parameter coefficient in the Motivation construct for Employee Performance is 0.405, the lowest parameter coefficient is shown in the relationship between construct Safety culture to Job Satisfaction of 0.219.

TABLE 4. RESULT OF HYPOTHESIS TESTING

Hypothesis	Relationship	Coefficient	t-value	f ²	Supported
H ₁	Safety Culture → Motivation	0.595	7.438	0.549	Yes
H ₂	Motivation → Employee Performance	0.405	7.209	0.226	Yes
H ₃	Job Satisfaction → Employee Performance	0.411	6.331	0.232	Yes
H ₄	Safety Culture → Job Satisfaction	0.219	2.343	0.051	Yes
H ₅	Motivation → Job Satisfaction	0.466	5.690	0.229	Yes

Source: Output SmartPLS

C. Discussion

The main objective of this study directly examines the role of safety culture on employee motivation, job satisfaction, and employee performance. The results of the path analysis provide partial support from the hypothesis model. As explained in Table 3, the path coefficients are significant and the overall model is accepted with valid and reliable data. The limited study of work safety culture from a management perspective, especially in the gold mining industry, provides good insight into the role of safety culture for motivation, job satisfaction, and employee performance. This finding is in line with the research of Stemm, Bofinger, Cliff, & Hassall, (2019) and Marzuki & Sularso (2018). The safety culture variable has a significant positive correlation with all the variables observed in this study. This is important because a good culture of safety can have a positive effect on employee performance through increasing employee motivation and job satisfaction, which is ultimately expected to have a positive influence on the growth of the company with reduced work accident rates.

D. Effect of Safety Culture on Employee Motivation

Based on the results of testing the hypothesis in table 4, it is known that there is a significant positive relationship between Safety Culture and Employee Motivation. In other words, the Safety Culture will predict Employee Motivation. The relationship between these two variables is also the strongest relationship between the other variable relationships. The Safety Culture variable has the most influence in predicting employee Motivation variables compared to other variables. In addition, from the results of SEM analysis, it is found that the Safety Culture was statistically significant for predicting Employee Motivation through the five indicators chosen to represent the Safety Culture variable. The indicator that can best explain the culture of safety culture is the perception that the company has placed safety

regulations as a top priority in work and the lowest indicator in explaining the culture of safety is the perception of the company's commitment to raising awareness related to safety. Thus, it concluded that a good Safety Culture will lead to increased employee motivation, while a poor Safety Culture will lead to a decrease in Employee Motivation. This finding is consistent with previous studies (Hale, Guldenmund, van Loenhout, & Oh, 2010) which states that employee motivation influenced by a culture of safety.

E. Effect of Employee Motivation on Employee Performance

Data obtained from the results of SEM analysis shows that not all selected indicators are used to measure employee motivation variables. Such as the perception of guarantees provided by the company for the life of employees in old age who have a validity value lower than 0.66, so that they cannot be included in the testing of structural models. Likewise, the perception of the challenges of the assignment given has a validity coefficient of 0.378 so that it needs to be removed from the analysis of the proposed structural model. This might be due to questions that are relevant to the company's circumstances. However, the results of testing the hypothesis in Table 4 confirms that the relationship between Employee Motivation towards Employee Performance is significantly positive, which means that employee motivation can predict Employee Performance. In other words, high motivation will improve employee performance, on the contrary, low employee motivation will reduce employee performance. This is in line with the results of the research of Zameer, Alireza, Nisar, & Amir (2014) and Pang & Lu (2018) which states that the level of employee performance is positively influenced by the level of employee motivation.

F. Effect of Job Satisfaction with Employee Performance

The results of SEM data processing on the measurement model of Job Satisfaction variables show that not all indicators chosen to measure this variable can be used in measuring structural models. The first indicator that must be eliminated is the perception of the leadership's attention to employee welfare and the second indicator that must be eliminated is the perception of management's attention to the level of employee safety. Both indicators have a value lower than 0.66, which means it is invalid in measuring the variable of job satisfaction. This is probably because employees who are respondents in this study have quite diverse positions so that most employees who have an office work position do not feel the direct impact of the leadership on their attention to the level of employee safety. In contrast, employees who work in the field may directly feel the form of leadership attention to employee safety. The employee welfare indicator has a low value of validity, probably because

employees have different perceptions about the definition of welfare in their standard of living. Nevertheless, the results of hypothesis testing in table 4 show that the relationship between the variables of Job Satisfaction and Employee Performance has a positive and significant relationship. This is in line with the results of research by Katou (2017) and Tepret & Tuna (2015) which states that the level of employee performance is directly proportional to the level of job satisfaction. That is, the higher the job satisfaction, the higher the employee's performance, on the contrary, the lower the job satisfaction, the lower the employee's performance.

G. Effect of Safety Culture on Job Satisfaction

Analysis of SEM structural measurement data for testing the hypotheses of the variable safety culture describes the relationship with the lowest level of significance compared to other variables. This might be due to the level of employee job satisfaction not directly influenced by the Safety Culture but mediated by Employee Motivation variables. This can be explained by looking at the indicators used in the measurement of safety culture variables, such as providing training in the use of work safety tools to employees will not necessarily increase employee job satisfaction. Likewise, with the socialization indicators carried out by the company to use personal protective equipment will increase employee motivation before finally being able to increase employee job satisfaction. This is in line with the results of research by Boye Kuranchie-Mensah & Amponsah-Tawiah (2015) and Bergheim, Nielsen, Mearns, & Eid (2015) that the safety culture of job satisfaction mediated by employee motivation.

H. Effect of Employee Motivation on Job Satisfaction

The results of the data analysis show that employee motivation variables have a positive and significant effect on job satisfaction. The three indicators chosen to measure the motivation variable have a significant positive value on the three indicators that measure the variability of job satisfaction. Thus, it can be said that the level of motivation of employees can predict the level of job satisfaction. That is, the higher the motivation of employees, the higher job satisfaction of employees will be. This is in line with the research conducted by Pang & Lu (2018) and (Katou, 2017) that job satisfaction is influenced by employee motivation.

V. CONCLUSION

The findings of this study indicate that the performance of employees in gold mining companies is influenced by a safety culture through motivation and job satisfaction. It means that good safety culture can increase employee motivation and will provide job satisfaction for employees so that it will improve employee performance at the company. Based on the

results of data analysis in this study, the indicator on management always takes care of the level of safety of employees, which is an effective factor for measuring the cultural variables of safety culture. While the most effective indicator for measuring motivation variables is feeling happy, because it is accepted as a good partner in the company. Furthermore, the most effective indicator in measuring job satisfaction variables is feeling proud and loyal to work and the most effective indicator in measuring employee performance is work that is always done according to the quality standards set by the company.

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