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The Influence of Implementation of Cultural Values and Cascading Communication on Process Safety Management with Awareness and Ownership as Intervening Variables

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ABSTRACT: *The purpose of this study is to ascertain how PT. Pertamina International Refinery Unit VI Balongan Refinery's process safety management is affected by the implementation of cultural values and cascading communication as intervening variables. The 1009 workers at PT. Pertamina International Refinery Unit VI Balongan make up the population that is being used. There were 287 employees in the sample. Primary data are the source of research data. Research of this kind is quantitative. A questionnaire-based method was used to collect samples. Next, PLS-SEM was used to evaluate the gathered data. The results of this research: Implementation of Cultural Values has a significant effect on Process Safety Management, Cascading Communication has a significant effect on Process Safety Management. The results of the mediating influence of the Awareness and Ownership variables can mediate the influence of the Implementation of Cultural Values and Cascading Communication on Process Safety Management.*

KEYWORDS: Awareness and ownership, cascading communication, cultural values, process safety management

INTRODUCTION

A subsidiary of PT. Pertamina (Persero) is Unit VI Balongan, one of the refineries of PT. Pertamina International Refinery. Running a refinery for the processing of petroleum to create fuel oil, LPG gas, and other goods derived from petroleum is its primary industry. Processing in oil refineries can only run efficiently with process safety management (Process Safety Management). PSM comprises operational and process readiness, equipment dependability, and readiness for health, security, and the environment (HSE).

Human factors were identified as one of the twelve primary components of the PSM standard by the Center for Chemical Process Safety (Center for Chemical Process Safety/CCPS, 1985), a branch of the American Institute of Chemical Engineers (American Institute of Chemical Engineers /AIChE) (B. W. Bridges & Tew, 2010). Additionally, human factors directly impact the remaining six PSM aspects. As a result, maintaining human factors as a component of PSM in refinery operations is crucial.

The book "Awareness & Ownership to Achieve Operational Excellence" by Apriyanto et al., 2020 states that a sense of ownership (ownership) motivates duty to assist maintain the refinery, while a sense of caring (awareness) increases sensitivity towards refinery operations.

The Ministry of BUMN uses "AKHLAK" to carry out cultural values, which are also referred to as fundamental values. Organizational performance can be attained by the implementation of these cultural principles (Ali et al., 2012). Prasad et al. (2004) state that organizational strategy, which includes fulfilling human elements as part of PSM in refinery operations, is significantly influenced by the implementation of cultural values.

Cascading communication is essential, particularly in refinery operations, to foster a sense of ownership and understanding among management and front-line staff. This prompt correspondence is consistent with company's knowledge-sharing initiative. Pertamina, emphasizing online learning, coaching, and training.

Based on earlier research, this study demonstrates that human elements are not taken into account when determining sustainability in Process Safety Management (PSM). According to Apriyanto et al. (2020), realizing the human component can be aided by raising awareness and fostering a sense of community.

According to Karanikas et al. (2018), safety communication and human factors have little effect on the overall balance of safety management. Their belief is that safety management, which is not covered in the current study, may serve as an example of joint communication problems and organizational culture.

The application of cultural values and sequential communication's effects on safety management will be examined in this study. With PT. Pertamina International Refinery serving as its implementation in Indonesia, this study will examine the link through knowledge and a sense of belonging as intervention variables that demonstrate human aspects as the key to the sustainability of process safety management.

Formulation of the problem
The formulation of this research problem is as follows:
1. Does culture value implementation influence the safety management process?
2. Does cascading communication affect the safety management process?
3. Does culture value implementation affect awareness and ownership?
4. Does cascading communication affect awareness and ownership?
5. Do awareness and ownership (as intervening variables) have an influence on process safety management?

Research purposes
This research aims to :
1. Evaluate the impact of implementing cultural values and tiered communication on process safety management and their relationship through awareness and a sense of ownership as intervening variables that show human factors as the key to the sustainability of process safety management.
2. As an illustration for the management of PT. Pertamina International Refinery measures improvements in human factors as part of process safety management through increased awareness and sense of ownership as well as multi-level communication.

INDENTATIONS AND EQUATIONS

Process Safety Management

Process safety management is a type of safety control that focuses on preventing structural collapses, fires, explosions, and unintentional chemical releases in industrial processes (L. A. Nwankwo, 2021). Industries all throughout the world have adopted Process Safety Management Systems because they have been shown to preserve organizational stability and drastically lower incident rates and their aftermath (Anwar et al., 2019).

PSM consists of seven main functional pillars based on AiCHE as written by Nwankwo, 2021, namely:
1. Process safety-based leadership
2. Knowledge and competence
3. Design and engineering
4. Systems and Procedures
5. Learning from events
6. Human Factors
7. Safety Values and Culture

According to Nwankwo, there are connections between each of the primary functional pillars of PSM (2021). Safety-based executives will improve the safety culture and values of their organization. Furthermore, employee behavior and participation in safety are influenced by safety culture and ideals. Organizational leaders are in charge of making sure that process safety protocols and procedures are followed, and human factors also have an impact on workplace safety culture.

Human Factors in PSM

Human elements are crucial while implementing PSM, as was previously indicated. The cornerstone of process safety leadership, human factors, is essential to fostering an atmosphere that rewards safe conduct. Furthermore, according to Khoshmaram et al. (2020), human factors that support PSM include the importance of an organization's safety culture, adaptability, continuous learning, continuous development, and operational cost effectiveness. Xie & Guo (2018) assert that human factors—specifically, the following—are crucial for PSM:
1. Resource management, organizational environment, and organizational procedures are the three components that make up the first level of organizational influence on PSM implementation.
2. Four components comprise the second level of impact, supervision: operational failures, violations of supervision, and adequacy of supervision.

The aforementioned rationale leads to the conclusion that human factors play a significant role in PSM. As a result, companies using PSM need to focus on enhancing human elements. Using organizational cultural values is one method to do this. (Xie & Guo, 2018; Anwar et al., 2019; C. D. Nwankwo et al., 2020).

Culture Value Implementation

As per the definition provided by Silla et al. (2017), organizational culture pertains to the fundamental practices followed by an organization. An organization's intrinsic symbols, narratives, philosophies, and beliefs are referred to as its

cultural values. These principles are also known as unwritten guidelines that businesses have adopted to adjust to and address issues with performance.

Cultural values, also known as organizational cultural values, are patterns, beliefs, and conduct that have been developed by the organization and are regularly applied to address issues (Silla et al., 2017). The success or failure of the organization is determined by these cultural values, which are highly strategic for organizational strength. Applying organizational culture theory can boost employees' self-confidence, capacity, and ability to meet corporate performance goals.

The safety culture of the organization should be reflected in its values. According to Tor-olav et al. (2020), these values may include informal components of safety management, such as "how safety procedures should be carried out" or "a way of thinking and acting together."

Cascading Communication

Sharing knowledge is a necessary step in creating and defining policy. Oral communication can take place via other media or face-to-face. On the other hand, textual communication might happen through other letters, work packages, standards, policies, and training materials (B. W. Bridges & Tew, 2010).

The two primary steps in the communication process are (1) creating and sending information, and (2) receiving and translating information. These are the general stages of communication. Rolling communication is the outcome of these two processes continuing inside the organizational domain. This communication continuity will be successful if the recipient and the sender both understand the message in the same way. As stated by Bridges and Tew (2010).

Crucial functional pillars including safety-oriented leadership, knowledge and proficiency, protocols and systems, incident learning, safety culture and values, and information continuity are required (W. Bridges & Tew, 2010; C. D. Nwankwo et al., 2020)..

Awareness dan Ownership

The definition of caring, often referred to as awareness, is being sensitive to operational circumstances and issues as well as making awareness-based attempts to address these issues right away (Apriyanto et al., 2020).

Implementing safety procedures, creating rules, and raising employee understanding of safety are all considered knowledge in the discipline of safety management. Any issue may be recognized, examined, assessed, managed, and eventually fixed with safety awareness. In terms of management, reward programs for top management assist in promoting safe conduct among employees, reining in risky behavior, and developing a performance culture centered upon safety management (Hwa et al., 2008).

The idea that workers are accountable for keeping corporate assets in good working order is known as a sense of ownership. The feeling of pride and inclusion inside the organization contributes to a greater sense of ownership and belonging. Workers who are attached or engaged do so because they have a sense of ownership or belonging, which is also known as ownership (Apriyanto et al., 2020).

Pertamina 6C

Pertamina 6C (Clean, Competitive, Confident, Customer Focus, Commercial, Capable) is Pertamina's transformation value system which was internalized from 2008 to 2020. The definition of this value system is:

1. Clean (Clean)
   Managed professionally, avoiding conflicts of interest, does not tolerate bribery, upholds trust and integrity. Guided by the principles of good corporate governance.
2. Competitive (Competitive)
   Able to compete on a regional and international scale, encourage growth through investment, build a cost-conscious culture and reward performance
3. Confident
   Play a role in national economic development, be a pioneer in BUMN reform, and build national pride
4. Customer Focus (Focus on Customers)
   Oriented to customer interests, and committed to providing the best service to customers.
5. Commercial (Commercial)
   Creating added value with a commercial orientation, making decisions based on sound business principles.
6. Capable
   Managed by professional leaders and workers who have high talent and technical mastery, committed to building research and development capabilities.

Implementation of process safety management is an implication of the values of confidence, customer focus, and capability regarding process safety aspects.

Ahklak BUMN

Since July 1 2020, BUMN in Indonesia has core value the same one. AKHLAK, which is an acronym for Trustworthy, Competent, Harmonious, Loyal, Adaptive and Collaborative, is defined as core value which must be upheld by the entire company in carrying out daily operations. These values become a reference for workers to behave well and correctly wherever they are. The government wants the BUMN transformation process to be carried out comprehensively and massively for all employees. Therefore, this mandate was given.

AKHLAK values require comprehensive internalization through the application of authentic cultural values in every field of business. In this case, to achieve superior operational performance targets, implementation of AKHLAK in the safety aspect is necessary in Pertamina's refinery business processes. Mindset & Culture Day activities are an example of implementing AKHLAK culture related to safety management.

FIGURES AND TABLES

1. Convergent Validity

Convergent Validity can be seen from the loading factor (λ) value which describes the magnitude of the correlation between each indicator and its construct (latent variable). A loading factor/outer loading value above 0.7 can be said to be ideal, meaning that the indicator is said to be significant as an indicator that measures latent variables. However, loading factor values above 0.5 are acceptable. To obtain convergent validity values, it can be seen through the outer loading values on the variables with their indicators.

Table 2. Outer Loading Values

Variable	Indicator Name	Outer Loading	Information
Culture Value Implementation	CV01	0.819	Valid
	CV02	0.750	Valid
	CV03	0.850	Valid
Cascading Communication	CC01	0.734	Valid
	CC02	0.830	Valid
	CC03	0.785	Valid
	CC05	0.772	Valid
Awareness & Ownership	AO01	0.803	Valid
	AO02	0.894	Valid
	AO06	0.856	Valid
Proses Safety Management	PSM01	0.799	Valid
	PSM02	0.806	Valid
	PSM03	0.871	Valid
	PSM04	0.838	Valid

Mark The outer factor tolerance used in table 2 describes the outer loading value of all variables as having a value of >0.7, so all indicators in this research are declared valid and suitable for use in research.

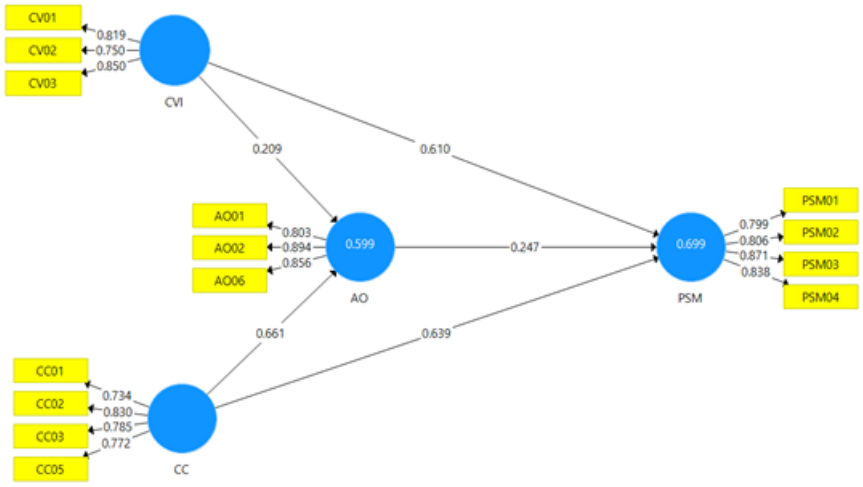

Figure 2.Outer Loading

2. Discriminant Validity

Discriminant validity is implemented to test whether the indicators of a construct are not highly correlated with indicators of other constructs. If the correlation of the construct with the measurement item is higher than the measure of the other construct, it will indicate that the latent construct predicts the measure in the block better than the measure of the other block. Loading factor values above 0.70 are declared valid as indicators that measure the construct. However, for research in the initial stages of developing a measurement scale, a loading value of 0.50 to 0.60 is considered sufficient (Ghozali and Latan, 2015).

Table 3. Cross Loading Values

	TO THE	CC	CV	PSM
AO01	0.805	0.625	0.430	0.505
AO02	0.893	0.631	0.424	0.600
AO06	0.855	0.661	0.435	0.721
CC01	0.480	0.734	0.242	0.571
CC02	0.595	0.830	0.335	0.656
CC03	0.516	0.785	0.208	0.650
CC05	0.721	0.772	0.420	0.675
CV01	0.375	0.321	0.819	0.236
CV02	0.375	0.321	0.750	0.236
CV03	0.455	0.334	0.874	0.342
PSM01	0.597	0.551	0.358	0.798
PSM02	0.594	0.539	0.338	0.806
PSM03	0.637	0.815	0.281	0.871
PSM04	0.570	0.758	0.229	0.839

The description in table 3 reveals that all indicators from the 4 variables meet the discriminant validity criteria. It can be proven in table 3 that the cross loading values for the indicators on their own construct are greater than the cross loading values for other indicators.

3. Composite Reliability dan AVE

Composite Reliability is implemented by looking at the output from the latent variable coefficients view. From this output, it produces composite reliability and Cronbach's Alpha. Composite Reliability and Cronbach's Alpha values are declared reliable and valid if they are above 0.70. If a construct meets these two criteria, then it can be said that the reliable

construct has consistency as a research instrument. The Average Variance Extracted (AVE) which is often used is a minimum of 0.50. To measure reliability, it can be done by looking at the Cronbach's Alpha, Composite Reliability and AVE values and the results can be proven in table 4 below:

Table 4. Composite Reliability and AVE Values

Variable	Cronbach's Alpha	Composite Reliability	AVE	Information
Awareness & Ownership	0.811	0.888	0.726	Valid
Cascading Communication	0.787	0.862	0.610	Valid
Culture Value Implementation	0.748	0.813	0.686	Valid
Proses Safety Management	0.851	0.898	0.687	Valid

Based on table 3, the results show that the Cronbach's alpha and composite reliability values for each variable are > 0.70, meanwhile for the AVE value for all variables > 0.50, then all variables have met all the reliable criteria and are also valid so they can be continued for evaluation. structural model.

4. Structural Model Evaluation (Inner Model)

Coefficient of determination (R2)

The coefficient of determination essentially measures how far the model is able to explain endogenous variations. The construct is called the R-square value (R2). Testing The inner model is a structural model to predict causal relationships between latent variables.

Table 3. R value2

Variable	r square	r Square Adjusted
Awareness & Ownership	0.615	0.613
Proses Safety Management	0.699	0.696

In this study there are two independent variables (Cascading Communication and Culture Value Implementation), one intervening variable (Awareness & Ownership), and one dependent variable (Safety Management Process). Based on the results of the R-square analysis in table 3, the R-square value of the Safety Management Process variable is 0.699, which means that 69.9% of the Safety Management Process variable is influenced by Cascading Communication, Culture Value Implementation, and Awareness & Ownership. The R-square value of the Awareness & Ownership variable is 0.615, which means that 61.5% of the Awareness & Ownership variable is influenced by Cascading Communication and Culture Value Implementation

Predictive Relevance (Q2)

According to Ghozali (2014:79), the Q value2 used to measure how well the observed values are produced by the model and also the estimated parameters. The Q-square value must be above zero, which indicates that the model has good predictive relevance. The Q-square predictive relevance value can be calculated in the following way:

Q2 = 1- (1-R2 PSM) x (1- R2 TO THE)

= 1 - (1- 0.6992 0.696) x (1 – 0.6152 0.613)

= 0.054345

Based on the calculation results above, the Q-square value is 0.054345 (above 0), which means the predictive relevance model is declared good.

Hypothesis testing

Table 4. Hypothesis Testing

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
AO -> PSM	0.254	0.257	0.060	4.216	0.000
CC -> AO	0.654	0.652	0.035	18.466	0.000
CC -> PSM	0.639	0.637	0.049	13.180	0.000

CVI -> AO	0.246	0.250	0.042	5.848	0.000
CVI -> PSM	0.610	0.607	0.038	12.671	0.000

Proof through table 4, getting the results of the Awareness & Ownership variables have a significant influence on Safety Management process with an original sample value of 0.254. The t-statistic value is 4.216 and the p-value is 0, which means the value is included in the significant criteria where the t-statistic value is greater than 1.64 (>1.64) and the p-value is 0.00. Thus this hypothesis is accepted

Based on table 4, the results for the Cascading Communication variable are obtained significant effect on Awareness & Ownership with an original sample value of 0.654. The t-statistic value is 18,466 and the p-value is 0, which means the value is included in the significant criteria where the t-statistic value is greater than 1.64 (>1.64) and the p-value is 0.00. Thus this hypothesis is accepted.

Based on table 4, the results for the Cascading Communication variable are obtained significant effect on Safety Management Process with an original sample value of 0.639. The t-statistic value is 13,180 and the p-value is 0, which means the value is included in the significant criteria where the t-statistic value is greater than 1.64 (>1.64) and the p-value is 0.00. Thus this hypothesis is accepted

Based on table 4, the results of the Culture Value Implementation variable are obtained significant effect on Awareness & Ownership with an original sample value of 0.246. The t-statistic value is 5,848 and the p-value is 0, which means the value is included in the significant criteria where the t-statistic value is greater than 1.64 (>1.64) and the p-value is 0.00. Thus this hypothesis is accepted

Based on table 4, the results for the Culture Value Implementation variable are obtained significant effect on Safety Management Process with an original sample value of 0.610. The t-statistic value is 12,671 and the p-value is 0, which means the value is included in the significant criteria where the t-statistic value is greater than 1.64 (>1.64) and the p-value is 0.00. Thus this hypothesis is accepted

CONCLUSION

Based on the hypothesis test, it was obtained that the Culture Value Implementation variable had a significant effect on Awareness & Ownership and the Implementation of the Safety Management Process. Safety culture starts from the formation of a pattern of thinking and acting together as reflected by the HSSE Golden Rule, internalized through the organization's work program, and the effectiveness of its implementation is always measured.

Cascading Communication has a significant effect on Awareness & Ownership and Implementation of Safety Management Processes. Four indicators consisting of frontline motivation, bottom-up information, effective communication, and feedback are dimensions that can be used to convey safety messages in the implementation of the safety management process.

The intervening variable Awareness & Ownership has a significant effect on the Implementation of the Safety Management Process. This is in accordance with the results of research on indicators of safety awareness, sense of belonging and understanding. These two indicators are characteristics of worker awareness and ownership, which makes the implementation of process safety management easy to carry out.

The safety management process at the Pertamina International Refinery Unit VI seems to have been implemented quite well. This can be seen from the PSM indicators which are running well, including Zero NoA (Number of Accidents) and Zero LTIR (Loss Time Injured) which are in accordance with the targets given. Even the TRIR (Total Recordable Incident Rate) parameter exceeds the required target. This good implementation of PSM is proof of the influence of the variables of cultural value implementation and cascading communication which have also gone well at Refinery Unit VI.

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