



# Evaluation of influence factors within implementing of nuclear safety culture in embarking countries

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## INTRODUCTION

Indonesia – BATAN has some nuclear installations, 3 research reactors; plan to build an experimental power reactor; effort to introduce NPP; in which safety issues, particularly safety culture, are considered very noteworthy.

Implementation of safety culture in BATAN:

- Issue the Perka BATAN 200 (BATAN chairman regulation),
- Organize the BATAN monthly safety culture workshop,
- Conduct safety leadership training,
- Issue safety culture booklet
- Organize the safety culture workshop for middle manager.

BATAN’s safety culture – Perka BATAN 200

Influential factors: subject to factor analysis

## IMPLEMENTATION OF SAFETY CULTURE

Implementation of safety culture : Perka BATAN No. 200 Tahun 2012

- state of the art of a safety culture,
- mechanisms,
- self-assessment, and
- practical implementation; apply to all of BATAN facilities

Characterization of safety culture:

5 characteristics - 37 attributes ---indicators → refer to IAEA (SCART),

Analysis of the factors that influence implementation of safety culture is based on the attributes

The methodology used is the method of exploratory factor analysis.

Data collection = questionnaires by 37 attributes

Data analysis = SPSS 17

- Eextraction technique - "principal component analysis"
- Rotation technique - "Oblimin with Kaiser Normalization"

## RESULTS AND DISCUSSION

Overall results: within the level of 3.65 of Likert scale - good enough

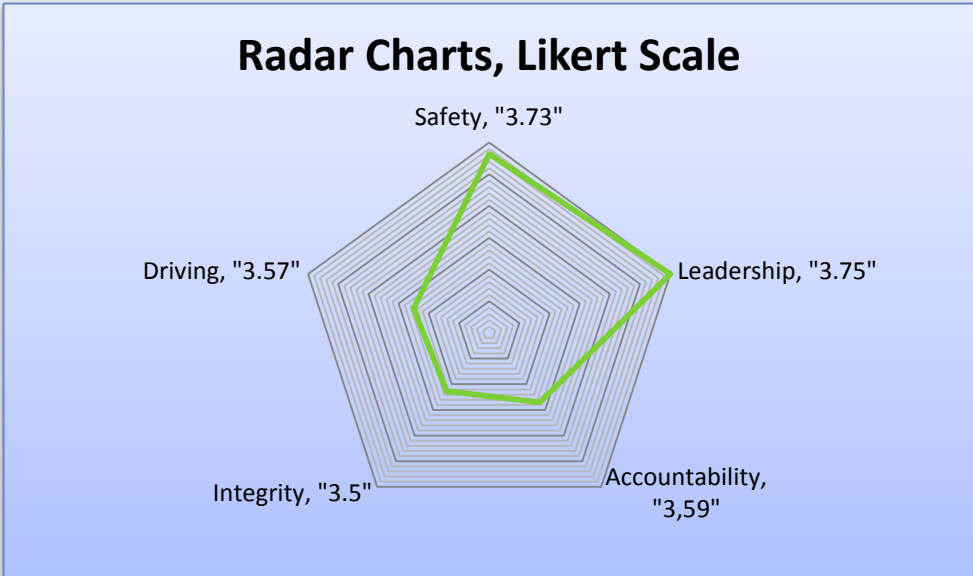


Figure 1: Radar Charts of Likert Scale

Statistical (SPSS 17) results:

Table 1: KMO and Bartlett's Test<sup>a</sup>

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.951
Bartlett's Test of Sphericity	Approx. Chi-Square	1791.242
	df	210
	Sig.	.000

a. Based on correlations

Results: significant, analysis can be continued

Cumulative variance is 62.157% for informing the BATAN’s safety culture implementation

Tabel 2: Total Variance Explained

Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings <sup>b</sup>
Total	% of Variance	Cumulative %	Total
6.310	50.881	50.881	5.390
.780	6.289	57.169	5.164
.619	4.988	62.157	1.745

Tabel 3: Communalities

	Raw		Rescaled	
	Initial	Extraction	Initial	Extraction
SCA01	.669	.518	1.000	.774
SCA02	.663	.419	1.000	.632
SCB03	.510	.368	1.000	.722
SCB04	.712	.533	1.000	.748
SCB05	.625	.423	1.000	.677
SCB06	.545	.345	1.000	.632
SCB07	.570	.312	1.000	.549
SCB08	.568	.358	1.000	.631
SCB10	.610	.393	1.000	.645
SCC02	.539	.319	1.000	.591
SCC03	.564	.287	1.000	.508
SCD05	.507	.330	1.000	.650
SCD06	.454	.188	1.000	.413
SCD07	.542	.268	1.000	.495
SCD08	.626	.393	1.000	.628
SCD09	.586	.285	1.000	.487
SCE01	.652	.450	1.000	.690
SCE02	.698	.405	1.000	.581
SCE04	.540	.312	1.000	.578
SCE05	.599	.437	1.000	.729
SCE07	.624	.367	1.000	.588

Extraction Method: Principal Component Analysis.

77.4.9% of the variance associated with the attributes of the characteristics A - Safety is a clearly recognized value (SCA01) individually and together with other attributes of the implementation of safety culture.

This value shows how much the contribution of each attribute either alone or jointly to declare the implementation of the appropriate safety culture

## Extraction results:

The 21 attributes are grouped into three components (new characteristics), Table 4  
1<sup>st</sup> components = Safety management system

(SCD05, SCD07, SCE01, SCD08, SCE05, SCD09, SCE04, SCE02, SCD06, SCE07, and SCC03).

Related to Safety is integrated into all activities (D) and Safety is learning driven (E)

2<sup>nd</sup> components = Safety leadership

(SCB04, SCB05, SCB03, SCB06, SCB08, SCB07, SCB10, and SCC02).

3<sup>rd</sup> components = Safety is a clearly recognized value (SCA01 and SCA02)

Table 4: Pattern Matrix<sup>a</sup>

	Raw Component			Rescaled Component		
	1	2	3	1	2	3
SCD05	.604			.849		
SCD07	.575			.781		
SCE01	.612			.758		
SCD08	.557			.704		
SCE05	.536			.693		
SCD09	.528			.691		
SCE04	.462			.629		
SCE02	.518			.620		
SCD06	.417			.619		
SCE07	.433			.548		
SCC03	.383			.510		
SCB04		-.690			-.818	
SCB05		-.646			-.818	
SCB03		-.556			-.779	
SCB06		-.562			-.761	
SCB08		-.529			-.702	
SCB07		-.484			-.641	
SCB10		-.486			-.622	
SCC02		-.385			-.524	
SCA01			.595			.727
SCA02			.519			.638

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 11 iterations.

## CONCLUSION

Implementation of safety culture in BATAN:

quite good at a level of 3.65 of Likert scale, and it is expected to be improved continuously.

Factor analysis:

37 originally attributes are extracted into 21 factors

Cumulative variance of 62,157% for informing the implementation of the safety culture of BATAN in which

Three components or new characteristics:

First characteristic: safety management system

Second characteristic: safety leadership.

The third characteristic: safety is a clearly recognized value.

Three characteristics of BATAN’s safety culture implementation are safety management system, safety integration into all activities, and safety is a clearly recognized value.

For describing the magnitude and shape of the influence of each characteristics and its attributes in implementation of the safety culture in BATAN the further analysis is required e.g. path analysis.

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