



BRIN
BADAN RISET
DAN INOVASI NASIONAL

Development of Psychosocial Model for Detecting The Insider Threat in Trustworthiness Programme

A. Mardhi, A.R. Antariksawan, F. Basuki, Khairul, N. Adiwahanani

National Research and Innovation Agency, Puspiptek Area build 80. Tangerang Selatan, Indonesia
alim_m@batan.go.id

1. Background and Goal of the present work

Insider adversaries are one of the most potential threats to nuclear facility which is difficult to identify and mitigate. One of the security preventive measures against insider threats is established trustworthiness assessment of the employees

Since 2014, BATAN introduced Human Reliability Program (HRP) to its nuclear security program with the objective to assess the trustworthiness characteristics of selected personnel who work in nuclear facility and the fresh recruitment employee.

This paper gives an overview of recent activities aimed at the development of a new instrument for assessing employee trustworthiness

2. Methodology

2.1. Constructs Dimensions and Indicators

There are six (6) trustworthiness dimensions and twenty five (25) indicators that play a crucial role to construct the perceived of trustworthiness value. All of dimensions and indicators was developed and scored based on their significant contribution to perceive trustworthiness level. The operational definition of each dimensions and indicators have to be defined for obtaining the same perception of the manner. All of those instruments had been discussed and decided by consensus among professional experts on the field human resources, psychologist, and nuclear security.

Table. 1 Dimensions and Indicators of Trutworthiness Value

No	Dimensions	Indicators	Scores
1	INTEGRITY	Lawful / Criminal Behave	25%
		Trust	
		Nuclear Security	
		Awareness	
2	LOYALTY	Ideology / Nation Insight	20%
		Engagement	
		Tolerance (in Belief)	
		Motivation	
3	ABILITY / COMPETENCY	Involvement (In Work)	20%
		Use of Authority	
		Decision Making	
		Effective Communication	
		Improving Performance	
		Management Oversight	
		Professional Conduct	
4	SATISFACTION	Teamwork and Cooperation.	15%
		Healthy	
		Financial	
		Expectation	
5	CONSISTENCY / PREDICTABILITY	Employee Satisfaction Index	10%
		Emotional Stability	
		Virtue and Weakness	
6	BENEVOLENCE	Adherence to procedures	10%
		Social Responsibility	
		Personal accountability	

2.2. Design Questionnaires

Sets of psychometric scale questionnaire was created to predict the malicious behavior of respondents. There were fifty seven (57) questionnaires including six demography aspects were designed for measuring trustworthiness dimensions. Some selected question have been highlighted as the key to predict the insider behavior. The scales ranges from Strongly Disagree (SDA), Disagree (DA), Neutra (N), Agree (A), Strongly Agree

Table 2. Psychometric Questionnaires

No	Statements	SDA	DA	N	A	SA
Q12	Stealing creates a thrill or sensation I want to repeat					
Q21	It is not essential to return back when I forgot my Identity Card at home					
Q22	I will use my authority to by pass the security checks at entrances in emergency case					
Q25	I know the CCTV in my office can not cover all of the area					
Q26	Borrowing ID Card of another employee to unlock the access door temporary is allowed					
Q.50	My financial needs are met					
Q.51	I have a clear career in the organization					
Q27	In my opinion, Pancasila (Five Principle) is the best ideology for Indonesia					

3. Validity and Reliability

The prototype questionnaires were distributed to 100 volunteer participants with different backgrounds and competences by online survey. There were 60 questionnaires returned.

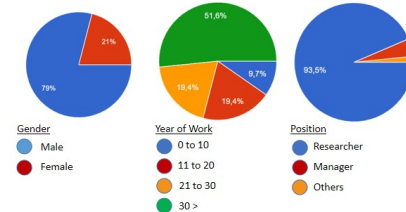


Figure 1. Demographic of Participants

Descriptive statistic including the means and standard deviations of the variables, and correlation coefficients were adopted in the study. This activity purposed to get the corrected item correlations and reliability scores. Corrected item correlation used pearson correlation method to calculate constant r (pearson product moment). The item questionnaires with contans r below 0.2 was dropped to increase the reliability value.

Construct reliability was evaluated by using Cronbach's Alpha. Cronbach's value needed to be at least 0.7. In this study, Cronbach's values range from 0.724 to 0.812 which is the criteria are good.

Table.3 Reliability of Questionnaires Design

No	Dimensions	RELIABILITY CRONBACH'S ALPHA
1	INTEGRITY	0.724
2	LOYALTY	0.768
3	ABILITY / COMPETENCE	0.792
4	SATISFACTION	0.812
5	CONSISTENCY / PREDICTABILITY	0.765
6	BENEVOLENCE	0.804

4. Results

Based on the findings of this study were shown the relationship between trustworthiness indicators and insider threat potential behaviour. The study was to compared four (4) selected participants responses related to the key point to predict insider. The responder number 40 was become a good example of potential threat. He is a 56 years old man with over 30 years of service, he was in middle rank. He shown a lack of security culture behavior when he decided not to return home when he forgot the ID card. He also tend to use his authority to by pass the security checks at entrances in emergency case. Over more he has financial problem and bad career in the organization. Although, it was need to be investigate furthermore but at least it was already to be a good findings of lack of security culture in organization.

Table.4 Good Findings From Questionnaires Response

RESPONDERS	Q21	Q22	Q26	Q50	Q51
R. 40	5	5	4	2	2
R. 31	1	5	1	5	5
R. 45	2	5	5	3	2
R. 47	1	5	3	3	3

5. Conclusions and Acknowledgements

The instruments were reliable to be implemented as a psycho social model to predict the potential behaviour of insider threat. However, the reliability scores need to be updated after several test which is involve a large group of participants. Advance statistic are recommended to be used in the future.

This study is funded by IAEA under the umbrella of Coordinated Research Project J02010 with the title: Preventive and Protective Measures Against Insider Threats at Nuclear Facilities.