



# Review on the Competency of Evaluators at Information Technology Product Security Testing Laboratory Based on SNI ISO/IEC 19896–3:2018

Ratih M. Arti<sup>(✉)</sup>, Novianto B. Kurniawan, and Astrid M. Sugiyana

School of Government and Public Policy, Sentul, Indonesia  
ratih.arti@sgpp.ac.id

**Abstract.** Comparison between the results of the safety evaluation of the Testing Laboratory is permitted in the ISO/IEC 15408 series. However, the testing laboratory must be able to guarantee the comparability of the evaluation results as a basis for mutual recognition, one of which is by ensuring that the competence of the evaluator has met the requirements in SNI ISO/IEC 19896–3:2018: Knowledge, skills, and effectiveness requirements for ISO/IEC 15408 evaluators. This research aims to determine the state of competence of evaluators at the Information Technology Product Security Testing Laboratory that implements a testing scheme SNI ISO/IEC 15408:2014. This research was conducted using gap analysis with a quantitative approach. Data collection was carried out using a questionnaire instrument according to the SNI ISO/IEC 19896–3:2018 clauses. The output describes factual conditions so that recommendations for the development of technical competence of the evaluators can be given to support IT Product Security Testing Service. The findings of all aspects of evaluators' competence are in the high category. Current conditions indicate that the education competence has the highest competency score, 80% out of 100% competency level. However, Testing Laboratory Management still must make efforts to improve the competence of evaluators, especially in the aspects of knowledge and skills of specific technology testing; and testing skills, particularly in the ACO class.

**Keywords:** Competency · Evaluators · SNI ISO/IEC 19896–3:2018

## 1 Introduction

Conformity assessment activities consist of testing, inspection, and certification (Setneg, 2018). The conformity assessment through testing is carried out by a test laboratory that has been accredited by the National Accreditation Committee (KAN). The existence of testing laboratory accreditation by KAN is very much needed in ensuring the competence of the testing laboratory as a conformity assessment agency (Setyoko et al., 2020). The most acceptable conformity assessment practice is based on the accreditation system of international conformity assessment bodies, including cybersecurity (Tsvilii, 2021).

The standard used in the accreditation of testing laboratories is SNI ISO/IEC 17025:2017 - General Requirements for the Competence of Testing and Calibration Laboratories. It addresses the general criteria for the competence of testing and calibration laboratories (Not just in the sphere of IT product security assurance testing and assessment, but also in a wide variety of laboratories). Clause 6 of SNI ISO/IEC 17025:2017 requires six critical controls. One of them is the laboratory must guarantee that the individual has the necessary skills to carry out the laboratory tasks for which they are accountable, as well as to assess the importance of deviations.

Several researchers have researched with the theme of human resource competence. Research from Amiruddin, Humaini, Aswiluddin, and Sry Liswati (2021) concludes that there is a positive influence of the Competency Dimensions of Human Resources to the Employee performance in the Fish Quarantine Centers, Quality Control and Safety of Fishery Products I. Research from Belgis (2017) conclude that the competence of human resources of the Technical Implementation Unit (UPT) of Goods Quality Certification Testing - Jember Tobacco Agency has a significant positive effect on employee performance. The research results from Marco Rayhan and Amiartuti K. (2019) were analysed to determine the state of competence of human resources in industrial companies that apply the ISO 9001:2005 standard are competencies that have met the standards and competencies that still need to be improved. Similar to previous research, this research will analyse the condition of human resource competence. The differences are the object being studied (evaluators in testing laboratory ABCD) and the standard used (SNI ISO/IEC 19896-3:2018).

The competence of individuals performance in evaluating or conformance-testing IT product security is one of the most important aspects in the IT product security testing laboratory's accreditation (Miloslavskaya & Tolstoy, 2017). An IT product security testing laboratory conducts tests following industry standards SNI ISO/IEC 15408:2014 Information technology – Security techniques – Evaluation criteria for IT security. The fundamental concept of competency requirements for evaluators in charge of IT product security testing has been standardized in SNI ISO/IEC 19896-3:2018 (Fal', O.M, 2017).

The IT Product Security Testing Laboratory ABCD started providing testing services in 2020. The establishment of the Testing Laboratory ABCD is a form of implementing the mandate of the National Cyber and Crypto Agency Regulation Number 15 of 2019 concerning the Implementation of the Indonesian Common Criteria Scheme. However, until early 2022, the IT Product Security Testing Laboratory ABCD has not been accredited by KAN. Resource requirements, specifically personnel/evaluators, have never been measured using the SNI ISO/IEC 19896-3:2018 - Knowledge, skills, and effectiveness requirements for ISO/IEC 15408 evaluators. Therefore, this study aims to review the level of competency of evaluators who work in IT product security testing.

Based on the description above, the problem of this research is: How are the competencies of the evaluators on IT Product Security Testing Laboratory Based on SNI ISO/IEC 19896-3: 2018?.

## 2 Overview

### 2.1 Conformity Assessment

Conformity assessment activities consist of testing, inspection, and/or certification (Setneg, 2018). The conformity assessment process assesses that an item, service, system, process, or person has met the reference requirements. The reference requirements can be in the form of SNI (Standard Nasional Indonesia), Technical Regulations issued by the Ministry/Agency regarding the application of all or part of the parameters of one or more SNIs, and other reference standards/requirements required for the national interest.

The Conformity Assessment Agency carries out conformity assessment activities. The Testing Laboratory assesses conformity with testing. Testing is a way of determining the characteristics of the test object based on a predetermined procedure.

### 2.2 Sni Iso/iec 17025:2017

The SNI ISO/IEC 17025:2017 is a standard on laboratory accreditation that ensures that measurement and calibration results have a high confidence level. This standard consists of several requirements: (BSN, 2017).

- a. General requirements consisting of impartiality and confidentiality management.
- b. Structural requirements consist of organizational structure, top management, and mechanisms to maintain impartiality.
- c. Resource requirements consist of personnel management, facilities, and metrology traceability.
- d. Process requirements consist of request review, test method validation, sampling, calibration, measurement uncertainty, technical records, measurement uncertainty, reporting of results, and complaints handling.
- e. Management requirements consist of documentation of general management systems, document control, records control, management review, internal audit, corrective action, and prevention.

### 2.3 Sni Iso/iec 19896–3:2018

ISO/IEC 19896–3:2018 through the Decree of the Head of the National Standardization Agency Number 13/KEP/BSN/2/2021 has been officially adopted as SNI ISO/IEC 19896–3:2018.

This standard consists of several requirements: (BSN, 2017).

- a. Clause 4 - Knowledge is what evaluators know and can describe. This clause consists of seven subclauses:
  - 1) Evaluators know and can describe ISO/IEC 15408 and ISO/IEC 18045
  - 2) Evaluators familiar with the assurance paradigm
  - 3) Evaluators are well-versed in and capable of describing information security
  - 4) Evaluators are knowledgeable about the technology being evaluated
  - 5) Evaluators can explain specific security assurance (SAR) classes
  - 6) Evaluators are well-versed on evaluating specific security functional requirements (SFR)

- 7) Evaluators are capable of being described the evaluating specific technology
  - b. Clause 5: Skill
    - 1) Basic Evaluation Skills consist of evaluation methods and evaluation tools.
    - 2) ISO/IEC 15048–3 provides core evaluation skills and ISO/IEC 18045 consist of evaluation principles and evaluation methods and activities
    - 3) Skill required when evaluating specific SAR, classes consist of:
      - General: evaluators performing evaluation activities shall be able to write observation reports.
      - Development Class (ADV)
      - Guidance Documents Class (AGD)
      - Life-cycle Document Class (ALC)
      - Security Target and Protection Profile Evaluation Classes
      - Test Class (ATE)
      - Vulnerability Assessment Class (AVA)
      - Composition Class (ACO)
    - 4) Skill required when evaluating specific SFR classes consist of:
      - General: evaluator shall be able to understand and test for conformance to related technical standards and search for potential vulnerabilities and side-channel
      - When assessing the FCS (cryptographic support) class, a certain level of skill is necessary: evaluator shall be able to determine if cryptographic algorithms and protocols are implemented correctly
    - 5) Skills needed when evaluating specific technologies
  - c. Clause 6: Experience
    - 1) Experience in the core of evaluation (clause 5) is gained during the first and subsequent evaluations performed by an evaluator.
    - 2) Experience should be gained under other competent evaluators' supervision and/or mentorship.
  - d. Clause 7: Education, all evaluators shall, at minimum, demonstrate they have either:
    - 1) completed appropriate tertiary education with at least three years of study in disciplines including specific technical specialties related to IT or IT security; or
    - 2) Had an experience that provided equivalent knowledge, skills, and effectiveness to that gained through tertiary education in IT or IT security disciplines.
  - e. Clause 8: Effectiveness
    - 1) General: The evaluator must be able to use his or her knowledge and abilities in a constructive manner, as evidenced by behaviors such as aptitude, initiative, enthusiasm, willingness, communication skills, team engagement, and leadership.
    - 2) The evaluation's effectiveness.
    - 3) Responsibilities for assessors' competence under the evaluation scheme.
    - 4) Efficacy in completing timely assessments.
    - 5) Accuracy in completing accurate evaluations.
    - 6) Effectiveness in reporting results.

### 3 Research Model

Gap analysis is a method for comparing current situations with desired goals. Gap analysis can help discover requirements that will close current gaps. (Brocks, 2010). In data collection, ensure that the information The information gathered is from reliable sources, and it is used to assess the current situation. The final step is to figure out how to close the gap between present conditions and our long-term goals.

In implementing ISO and/or SNI, gap analysis is the first step (Admaja, 2013). With the gap analysis, it is hoped that it will be known what steps need to be taken to easily achieve the expected conditions or standards, following the standards specified in ISO and/or SNI, which is used as a reference. This research uses gap analysis to compare the competency standards in SNI ISO/IEC 19896–3:2018 with the actual evaluators' competence level.

Data collection was conducted using a self-assessment questionnaire instrument containing a list of questions based on SNI ISO/IEC 19896–2:2018. The respondents of this study were all evaluators, consisting of 6 people, at the Testing Laboratory ABCD. The variables analyzed are competency variables which include:

- a. Knowledge
- b. Skill
- c. Experience
- d. Education
- e. Effectiveness

Each question is given a choice of answers with a Likert scale, as follows (Table 1):

For data analysis, this study uses descriptive techniques to describe the meaning of the frequency and the percentage of scores obtained to be concluded. The assessment criteria for each statement item are compiled based on percentages from these answers. With the following steps (Table 2):

- a. The most significant cumulative number is when all respondents answered strongly agree, so the most significant cumulative number is  $6 \times 5 = 30$ , and the smallest cumulative number is  $6 \times 1 = 6$ .
- b. The percentage is calculated by dividing the item's cumulative value by its frequency value, then multiplying by 100%. The largest percentage value is  $30/30 \times 100\% = 100\%$ , while the smallest percentage value is  $6/30 \times 100\% = 20\%$ .
- c. Range value = (percentage of the largest score – the percentage of the smallest score): the number of points on the scale.  $(100\% - 20\%): 4 = 20\%$ . The results of this calculation become the level of competence as follows:

**Table 1.** Likert Scale Score

Score	Status
1	Strongly Disagree
2	Disagree
3	Quite Agree
4	Agree
5	Strongly Agree

**Table 2.** Likert Scale Score

Percentage	Category
20% - 40%	Very Low
> 40% - 60%	Low
> 60% - 80%	High
> 80% - 100%	Very High

## 4 Result

### 4.1 Knowledge

Knowledge is information that someone owns. Knowledge is measured by seven indicators consisting of 13 statements. Respondents' answers as can be seen in the Table 3.

In Table 3 it can be seen the results of the data processing of respondents' answers regarding aspects of the knowledge requirements of the evaluator. Based on the responses of 6 respondents, a total score of 71.54% was obtained, where the percentage was in the category > 60% - 80%. Thus, the evaluator's knowledge is included in the "High" category.

All evaluators have completed training on ISO/IEC 15408 and 18045, so they have a reasonably high level of knowledge in this regard. However, each evaluator still needs to

**Table 3.** Knowledge of the Evaluators

No.	Questions	Total Score	Ideal Score	% (category)
1	ISO/IEC 15408-1	23	30	76,67 (High)
2	ISO/IEC 15408-2	21	30	70,00 (High)
3	ISO/IEC 15408-3	22	30	73,33 (High)
4	ISO/IEC 18045	21	30	70,00 (High)
5	Evaluation Authority	21	30	70,00 (High)
6	Evaluation Scheme	23	30	76,67 (High)
7	Laboratory and Management System	23	30	76,67 (High)
8	Information Security	23	30	76,67 (High)
9	Technology	20	30	66,67 (High)
10	Protection Profile	20	30	66,67 (High)
11	Specific Assurance Classes	23	30	76,67 (High)
12	Specific Security Functional Requirement	20	30	66,67 (High)
13	Specific Technologies Evaluation	19	30	63,33 (High)
<b>Average</b>				71,54 (High)

improve their knowledge, especially on the Specific Technologies Evaluation. The rapid development of information technology requires evaluators to learn new technologies faster. Some specific technologies are listed in Annex A of SNI ISO/IEC 19896–3:2018.

## 4.2 Skill

Skill is a person's ability to perform an activity or job. Skill is measured by five indicators consisting of 15 statements. Respondents' answers can be seen from the Table 4.

In Table 4 it can be seen the results of the data processing of respondents' answers regarding aspects of the skill requirements of the evaluator. Based on the responses of 6 respondents, a total score of 71.56% was obtained, where the percentage was in the category > 60% - 80%. Thus, the evaluator's skill is included in the "High" category.

Table 4 shows that the evaluator has a high skill to run the testing procedure in SNI ISO/IEC 15408:2018. However, from the questionnaire results, it was found that evaluating ACO (composition) class was still in the low category. Therefore, it is necessary to do capacity building, which can be done through coaching/mentoring by other competent Evaluators.

**Table 4.** Skills of the Evaluators

No.	Questions	Total Score	Ideal Score	% (category)
1	Evaluation Method	24	30	80,00 (High)
2	Evaluation Tools	20	30	66,67 (High)
3	Evaluation Principles	23	30	76,67 (High)
4	Evaluation Methods and Activities	22	30	73,33 (High)
5	Specific security assurance classes (in general)	21	30	70,00 (High)
6	ADV (Development)	23	30	76,67 (High)
7	AGD (Guidance Documents)	24	30	80,00 (High)
8	ALC (Life Cycle Support)	24	30	80,00 (High)
9	ASE dan APE (ST and PP Evaluation)	23	30	76,67 (High)
10	ATE (Tests)	22	30	73,33 (High)
11	AVA (Vulnerability Assessment)	19	30	63,33 (High)
12	ACO (Composition)	17	30	56,67 (Low)
13	Specific security functional requirement classes (in general)	21	30	70,00 (High)
14	FCS (cryptographic support)	20	30	66,67 (High)
15	Specific technologies	19	30	63,33 (High)
<b>Average</b>				<b>71,56 (High)</b>

**Table 5.** Experiences of the Evaluators

No.	Questions	Total Score	Ideal Score	% (category)
1	Experience in the core evaluation skills	23	30	80,00 (High)
2	Experience in tasks related to consulting, product development, research related to ISO/IEC 15408	21	30	70,00 (High)
<b>Average</b>				75,00 (High)

### 4.3 Experience

The length of work and the various evaluations carried out by the evaluator effect work experience. Evaluators who already have work experience will find it easier to understand a similar job than people who do not have experience. Experience is measured by two indicators consisting of 2 statements. Respondents' answers as shown in the Table 5.

In Table 5 it can be seen the results of the data processing of respondents' answers regarding aspects of the experience requirements of the evaluator. Based on the respondents' responses, a total score of 75% was obtained, where the percentage was in the category > 60% - 80%. Thus, the evaluator's skill is included in the "High" category.

### 4.4 Education

A qualified evaluator is an evaluator who understands science and technology. To improve the quality of self-evaluators, evaluators must have a formal education degree at a school/university. Certification of expertise is also required for some things not explicitly taught at the university.

Education is measured by two indicators consisting of 2 statements. Respondents' answers can be seen from the Table 6.

**Table 6.** Education of the Evaluators

No.	Questions	Total Score	Ideal Score	% (category)
1	Evaluators should have a tertiary educational qualification, such as an Associate, Bachelor's, or higher degree, that is relevant to the requirements in ISO/IEC 15408 and the evaluation methodology requirements in ISO/IEC 18045	24	30	80,00 (High)
2	Experience, which provided equivalent knowledge, skills, and effectiveness to that gained through tertiary education in disciplines related to IT or IT security	24	30	80,00 (High)
<b>Average</b>				80,00 (High)



**Table 7.** Effectiveness of the Evaluators

No.	Questions	Total Score	Ideal Score	% (category)
1	Productivity	23	30	76,67 (High)
2	Effectiveness of the evaluation	23	30	76,67 (High)
3	Evaluation scheme responsibilities for evaluator effectiveness	21	30	70,00 (High)
4	Effectiveness in performing timely evaluations	20	30	66,67 (High)
5	Effectiveness in performing accurate evaluations	19	30	63,33 (High)
6	Effectiveness in reporting results	21	30	70,00 (High)
<b>Average</b>				70,56 (High)

In Table 6 it can be seen the results of the data processing of respondents' answers regarding aspects of the education requirements of the evaluator. Based on the respondents' responses, a total score of 80% was obtained, where the percentage was in the category > 60% - 80%. Thus, the evaluator's education is included in the "High" category.

#### 4.5 Education

Effectiveness is a condition that indicates the success of the work specified. Effectiveness is measured by six indicators consisting of 6 statements. The Table 7 shows the responses of respondents.

In Table 7 it can be seen the results of the data processing of respondents' answers regarding aspects of the effectiveness requirements of the evaluator. Based on the respondents' responses, a total score of 70,56% was obtained, where the percentage was in the category > 60% - 80%. Thus, the evaluator's effectiveness is included in the "High" category.

### 5 Conclusion

Based on the discussion of the research results that have been described above, it can be concluded in general, all aspects of evaluators' competence (knowledge, skills, experience, education, and effectiveness) of the Testing Laboratory ABCD are in the high category.

However, several things that can be suggested are 1). Testing Laboratory ABCD should increase the evaluators' knowledge and skills on testing for specific technologies; 2) Testing Laboratory ABCD should improve testing skills for the ACO class.

With the increasing need for conformity assessments for IT product security, the authors suggest that further research should analyze the product testing workload associated with the number of evaluators with only six people available.

**Acknowledgement.** The author would like to thank the Testing Laboratory ABCD, IT Product Security Technical Manager, and all evaluators who have filled out the questionnaire and provided information for the authors.

## References

- Admaja, A. F. S. (2013). Studi Kesiapan Direktorat Standardisasi Dalam Menerapkan SNI ISO/IEC 17065. *Buletin Pos dan Telekomunikasi*, 11(3), 223-234
- Badan Standardisasi Nasional. SNI ISO/IEC 17025:2017 - General Requirements for the Competence of Testing and Calibration Laboratories. (2017). Indonesia
- Badan Standardisasi Nasional. SNI ISO/IEC 15408:2014 (2019 confirmation) Information technology – Security techniques – Evaluation criteria for IT security. (2019). Indonesia
- Badan Standardisasi Nasional. SNI ISO/IEC 19896–3:2018 - Knowledge, skills, and effectiveness requirements for ISO/IEC 15408 evaluators. (2020). Indonesia
- Brocks, H., Hemmmje, M. et al. (2010), *The PARSE. Insight GAP Analysis*. Fern Universität in Hagen
- Fal', O.M. Standardization in Information Technology Security. *Cybern Syst Anal* 53, 78–82 (2017). <https://doi.org/10.1007/s10559-017-9908-8>
- Miloslavskaya N., Tolstoy A. (2017) ISO/IEC Competence Requirements for Information Security Professionals. In: Bishop M., Fitcher L., Miloslavskaya N., Theocharidou M. (eds) *Information Security Education for a Global Digital Society*. WISE 2017. IFIP Advances in Information and Communication Technology, vol 503. Springer, Cham. [https://doi.org/10.1007/978-3-319-58553-6\\_12](https://doi.org/10.1007/978-3-319-58553-6_12)
- Rayhan, M. (2019). Analisis Kompetensi Sumber Daya Manusia Pada Departemen Produksi Divisi Karung Plastik Sesuai Standar ISO 9001: 2015 (Studi Kasus Pada Pt. X Di Sidoarjo). *JEM17: Jurnal Ekonomi Manajemen*, 4(1).
- Ritonga, A., Nasution, H., & Liswati, S. (2021). Pengaruh Dimensi Kompetensi Sumber Daya Manusia Terhadap Kinerja Pegawai Balai Karantina Ikan, Pengendalian Mutu Dan Keamanan Hasil Perikanan Medan I. *JMB (Jurnal Manajemen dan Bisnis)*, 3(1), 18-27.
- Sekretariat Negara Republik Indonesia. Peraturan Pemerintah Nomor 34 Tahun 2018 Tentang Sistem Standardisasi dan Penilaian Kesesuaian Nasional. (2018). Indonesia
- Setyoko, A.T.et.al.(2020). Potret Standardisasi dan Penilaian Kesesuaian di Indonesia dan Negara Lain. Jakarta:Deepublish Publisher
- Tsvilii, Olena, *Cyber Security Regulation: Cyber Security Certification of Operational Technologies* (February 26, 2021). *Technology audit and production reserves*, 1 (2 (57)), 54–60, 2021. <https://doi.org/10.15587/2706-5448.2021.225271>, Available at SSRN: <https://ssrn.com/abstract=3796990>
- Veronica, B. L. Pengaruh Kompetensi Sumber Daya Manusia dan Kompensasi serta Disiplin Kerja terhadap Kinerja Karyawan (Studi di Unit Pelaksana Teknis Pengujian Sertifikasi Mutu Barang–Lembaga Tembakau Jember).

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

