
SNI ISO/IEC 17025:2017 IMPLEMENTATION IMPACT ON TESTING LABORATORY

Dampak Implementasi ISO/IEC 17025:2017 pada Laboratorium Pengujian

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Abstract

A globally recognized standard for ensuring the competence of testing and calibration laboratories is SNI ISO/IEC 17025:2017. Many testing laboratories are currently using SNI ISO/IEC 17025:2017, and many have already received accreditation. The laboratory serves a variety of objectives, which is beneficial to enhancing the lab's performance. A laboratory's performance could be measured by how well it serves its customers and their satisfaction. This study aims to examine the impact of applying SNI ISO/IEC 17025:2017 on the number of services provided and the level of customer satisfaction in laboratories that have been accredited by KAN for the scope of CNC vertical-type milling machines and CNC lathes for position accuracy test, cutting result accuracy test, and circular movement accuracy test. This study uses a qualitative, descriptive research design and conducts elementary analysis to characterize the overall state of the data. Information on the number of services provided and the degree of customer satisfaction during 2016–2021 were compared, allowing for a comparison of the trends in service quantity and customer satisfaction. The findings indicate that the rise in laboratory services is influenced by the implementation of SNI ISO/IEC 17025:2017. Furthermore, as evidenced by a strong customer satisfaction score, the performance of the offered service has no bearing on the quantity of technological services falling under the purview of SNI ISO/IEC 17025:2017 accreditation.

Keywords: SNI ISO 17025:2017, number of services, customer satisfaction

Abstrak

SNI ISO/IEC 17025:2017 adalah standar yang diakui di seluruh dunia untuk menjamin kompetensi laboratorium pengujian dan kalibrasi. Saat ini, sudah banyak laboratorium pengujian yang sudah melakukan penerapan dan bahkan terakreditasi SNI ISO/IEC 17025:2017. Adapun tujuan dari laboratorium itu beragam, yang jelas untuk peningkatan kinerja laboratorium. Kinerja laboratorium yang dimaksud, bisa berupa jumlah layanan, tingkat kepuasan pelanggan. Tujuan penelitian ini adalah untuk menganalisis dampak implementasi SNI ISO/IEC 17025:2017 pada jumlah layanan, dan tingkat kepuasan pelanggan pada laboratorium yang telah dikreditasi oleh KAN. Sebagai laboratorium terakreditasi dari KAN untuk lingkup mesin milling tipe vertikal CNC dan mesin bubut CNC untuk uji akurasi pemosisian, uji akurasi hasil pemotongan, dan uji akurasi gerakan melingkar, Laboratorium Pengujian pada penelitian ini, merupakan contoh kasus yang nyata untuk melihat bagaimana dampak penerapan standar ini terhadap kinerja laboratorium. Penelitian ini merupakan penelitian deskriptif dengan pendekatan kualitatif yang melakukan analisis dasar untuk menggambarkan keadaan data secara umum. Untuk itu dilakukan perbandingan data jumlah layanan dan tingkat kepuasan pelanggan selama periode 2016-2021, dengan membandingkan tren peningkatan dan penurunan jumlah layanan dan tingkat kepuasan pelanggan selama periode tersebut. Hasilnya menunjukkan bahwa implementasi SNI ISO/IEC 17025:2017 memiliki dampak pada peningkatan jumlah layanan laboratorium. Selain itu, jumlah layanan teknologi dalam jangkauan akreditasi SNI ISO/IEC 17025:2017 tidak terpengaruh oleh kinerja layanan yang diberikan seperti yang ditunjukkan oleh indeks kepuasan pelanggan yang baik.

Kata kunci: SNI ISO 17025:2017, jumlah layanan, kepuasan pelanggan

1. INTRODUCTION

ISO/IEC 17025:2017 is a popular standard among laboratory practitioners. The application of this standard is often associated with the accreditation

process carried out by laboratories for various purposes. This phenomenon is interesting because SNI ISO/IEC 17025:2017 is an internationally recognized standard and officially recognizes the competence of testing laboratories

and calibration laboratories through certification activities. The benefits of implementing and accredited SNI ISO/IEC 17025:2017 include risk reduction; commitment to all laboratory personnel according to customer requirements; continuous improvement of the laboratory management system; development of personnel skills through training programs and evaluation of work effectiveness; improving of the image and increase customer trust and satisfaction; international recognition; avoiding errors and repetition of the test or calibration process; reduction of customer complaints and complaints; profits in the field of marketing laboratory services; comparison of capabilities between laboratories (Komite Akreditasi Nasional, 2020).

Customer loyalty is the most essential part of repeat business transactions made by customers. The formation of customer loyalty provides a positive correlation with business performance and attracts new customers (Beerli, Martín, and Quintana, 2004). In the short term, system and service improvements that increase customer loyalty will bring profits to the business. Profit is the primary motive for business consistency because, with profits, the wheels of business turnover from the variety of products and services offered and the expansion of the market served (Soeling, 2007). In testing laboratories, equipment testing and calibration services that refer to internationally recognized standards are essential indicators to gain customers' trust. One of the clauses in its management is to get customer feedback for the services provided. This feedback is processed to improve service procedures and standards by adhering to excellent service to achieve customer trust and satisfaction (Jayanti and Singgih, 2012).

Laboratory accreditation is essential because in certifying a product to meet market demands, the laboratory must first hold an accreditation predicate to give customers confidence in the certification issued. Certification is a mechanism that provides formal evidence that a product or service has met the requirements and performance of a standard (Isharyadi and Kristiningrum, 2021). Certification offers information about product quality to interested parties and is generally used to meet consumer demand and improve product evaluation (Prell, Zanini, Caldieraro, and Migueles, 2020). Certification activities are carried out through a conformity assessment system by a third party who must be competent to carry out these activities. SNI ISO/IEC 17025:2017 on General requirements for competence of testing and calibration laboratories was developed to promote confidence in the operation of laboratories. This document contains the laboratory requirements

that enable it to operate competently and provide valid results. SNI ISO/IEC 17025: 2017 is a document adopted identically from international guidelines that contain criteria for institutions implementing product, process, and service certification systems (Badan Standardisasi Nasional, 2017). Based on data from the Client Directory of Testing Laboratories, the National Accreditation Committee (KAN) until 2022, 582 testing laboratories have been certified to SNI ISO/IEC 17025:2017 (Komite Akreditasi Nasional, 2021). The large number of testing laboratories encourages KAN to create a mechanism to maintain the quality of the testing laboratory and provide the best service for its customers.

In addition to improving service quality, one of the goals with SNI ISO/IEC 17025:2017 accreditation in a testing or calibration laboratory is to increase the number of services and customer satisfaction of good value. To realize this goal, the laboratory strives to provide the best service to its customers. It was explained that 91% of customer loyalty is determined by service quality (Aryani and Rosinta, 2010). In addition, continuous improvement, service quality improvement, complaint management, and innovation can increase customer satisfaction and loyalty (Wendha, Rahyuda, and Suasana, 2013). Implementing SNI ISO/IEC 17025:2017 impacts service quality, customer trust, and managerial performance (Sandy, 2022). Applying this standard provides benefits for laboratories, personnel, and customers, including better traceability, involvement of personnel in the decision-making process, assurance of competency tests, assurance of test quality, recognition by authorized institutions, risk management, and increased customer trust. (Khodabocus and Balgobin, 2011). Certification of testing laboratories according to SNI ISO/IEC 17025:2017 standards is the only way to guarantee the reliability of management systems according to international standards (Batepola, Jemziya, Rikasa, and Kanugala, 2021). By implementing SNI ISO/IEC 17025:2017, organizations benefit from operational ease and reduce work overlap (Jayusman, 2021). SNI ISO/IEC 17025:2017 implementation improves quality assurance and provides valid and reliable results to stakeholders through excellent service (Princess, 2021).

This research aims to analyze the impact of SNI ISO/IEC 17025:2017 implementation on the number of services, and the level of customer satisfaction, where the research position can be seen in Table 1. This research was conducted with a case study approach at the Testing Laboratory, which is an accredited laboratory of KAN for the scope of CNC Vertical Type Milling

Machines and CNC Lathes for Positioning Accuracy Test, Cutting Result Accuracy Test, and Circular Movement Accuracy Test. The study was conducted from 2016 to 2021 by analyzing the

trend of increasing and decreasing the number of services and the level of customer satisfaction during that period.

Table 1 Research Position.

No	Author	Parameters						Methods					Object	
		Service Quality	Management System	Cost	Time	Number Of Service	Customer Satisfaction	Questionnaires	Survey	Interviews	Observation	Desk research		
1	Aryani & Rosinta (2010)	■						✓						Food Market
2	Batepola (2021)		■					✓						Testing Laboratory
3	Jayusman (2021)		■									✓		Research and Development Agencies
4	Khodabocus, et al (2011)			■	■			✓						Testing Laboratory
5	Kristiningrum & Hari (2010)		■						✓					Industry Implementing Standards
6	Prell (2020)						■		✓					Food Market
7	Andarwati, et.al (2022)					■	■			✓	✓			Testing Laboratory

2. LITERATURE REVIEW

The Indonesian National Standard ISO/IEC 17025:2017, with the title General Requirements for the Competence of Testing and Calibration Laboratories, is an identical adoption of ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories, with a bilingual translation method. This standard revised ISO/IEC 17025:2008, General requirements for the competence of testing laboratories and calibration laboratories.

According to the SNI ISO/IEC 17025:2017 document, an identical adoption of ISO/IEC 17025:2017 published by the National Standardization Agency, it contains general requirements for competence, impartiality, and consistent laboratory operation. SNI ISO/IEC 17025:2017 applies to all organizations that carry out laboratory activities, regardless of the number of personnel.

Laboratory customers, government authorities, peer-assessment organizations and schemes, accrediting bodies, and others use this document to confirm or acknowledge laboratory competence — testing laboratories are accredited by the National Accreditation Body that received accreditation in 2013. The testing laboratory has been reaccredited twice in 2018 and 2022. The first re-accreditation in 2018 was carried out based on SNI ISO/IEC 17025:2008 and in 2020 based on SNI ISO/IEC 17025:2017, adjusted in

2019. The scope of accreditation is the Positioning Accuracy Test, Cutting Accuracy Test, Movement Accuracy Test Circular, and 3D Optical Measurement Test for Vertical Type CNC Milling Machines CNC Lathes, CNC Boring Machines and Artifact. The application of SNI ISO/IEC 17025:2017 must make a positive contribution to the laboratory. One of them is to increase the number of services that enter the scope of the laboratory. Laboratory procedures follow SNI ISO/IEC 17025: 2017 clauses so that the quality of service can be controlled and maintained correctly.

The loyalty of a company is greatly influenced by the way the company satisfies customers (Aryani and Rosinta, 2010). One tool that can be used to see how much customer satisfaction level can be used is the Customer Satisfaction Index. The customer is given the right to assess his satisfaction with the services provided by the company after receiving the services.

For this reason, the machine tools, production, and automation laboratories analyzed the trend of ups and downs in the number of laboratory services due to SNI ISO/IEC 17025:2017 implementation by looking at the parameters of incoming revenue and the customer satisfaction index. So that laboratory strategies can be carried out in the future.

3. RESEARCH METHODS

This research is a descriptive study with a qualitative approach that performs a fundamental analysis to describe the general state of the data (Sugiyono, 2017). The research location was the Testing Laboratory. The research begins by identifying the problem for the issue to be discussed, namely to find out whether the application of SNI ISO/IEC 17025:2017 accreditation has a good impact on the Testing Laboratory. Furthermore, a literature study was carried out after searching, reading, and studying previous research related to this problem. This study took the parameters of the number of services and the level of customer satisfaction for its renewal. The next stage is data collection, divided into three stages: quantitative data collection, interviews, and observations. Quantitative data on the number of services used in this study are based on the State Revenue Report of the Revenue Treasurer and the number of services obtained from the service team based on service data for 2016 – 2021.

Meanwhile, the quantitative data of the customer satisfaction index is carried out by calculating the customer response (questionnaire) to 14 service elements with four assessment parameters, each according to the rules set by the Ministry of State Apparatus Utilization and Bureaucratic Reform. Calculations are carried out for each service customer; an average is calculated per year.

- a) The stages of data processing for the evaluation of the questionnaire are:
- b) Entering the value of customer assessment results
- c) Performing the calculation of the Average Score (NRR) per question:
- d) $NRR/questions = (Total\ scores\ per\ question) / (Number\ of\ Customers)$
- e) Performing Weighted NRR calculation per question:
- f) $Weighted\ NRR\ per\ question = NRR/question \times 0.071$
- g) $(0.071 = 14\ service\ question\ elements\ with\ the\ same\ weight)$
- h) Sum the weighted NRR of all questions
- i) Converting the Service Satisfaction Index by multiplying the weighted value. To facilitate interpreting the Satisfaction Index assessment, which is between 25 and 100. the results of the above evaluation are converted to a fundamental value of 25:
- j) $Satisfaction\ Index\ Conversion = Weighted\ NRR \times Weighted\ value$

Furthermore, interviews were conducted with resource persons directly involved in the SNI

ISO/IEC 17025:2017 accreditation activities, including the Technical Manager and Quality Manager and their team with observations and related supporting documents (Titisari, Agus, and Saleh, 2018). Direct observations were made by the author from 2016 to 2021.

The next step for data analysis was carried out. The authors referred to the analysis stages described by (Saleh, 2017) by systematically compiling all the data obtained into organized data into categories of services and service receipts. The data that has been categorized is translated and arranged into a specific pattern, and conclusions are drawn.

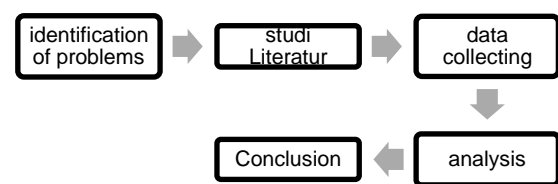


Figure 1 Research Methodology.

4. RESULTS AND DISCUSSION

Number of Services

Testing Laboratory technology services are divided into services within the scope of accreditation (services that have received SNI ISO/IEC 17025:2017 accredited status) and services outside the scope of accreditation (services that have not received SNI ISO/IEC accredited status). The total number of technology services during 2016-2021 can be seen in Table 2 and Figure 2. Services within the scope of accreditation show a more stable number than services outside the accreditation scope. It shows that the accreditation activities can make clients believe in the laboratory's competence and ability to perform technology services. Furthermore, Figure 3 shows an increase in the number of technology services within the scope of accreditation during 2016 – 2021.

Table 2 Number of Technology Services.

Description	2016	2017	2018	2019	2020	2021
Service within scope	6	10	11	6	5	8
Service out of scope	10	26	13	26	5	13
Number of technology services	16	36	24	32	10	21

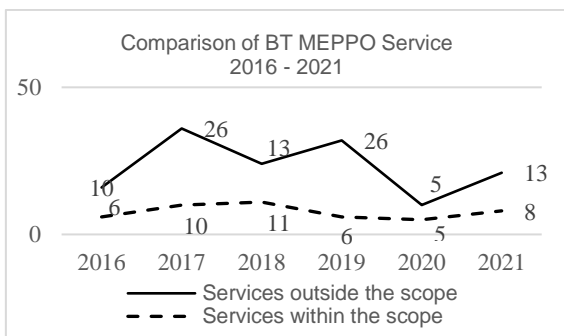


Figure 2 Comparison of the Services Number.

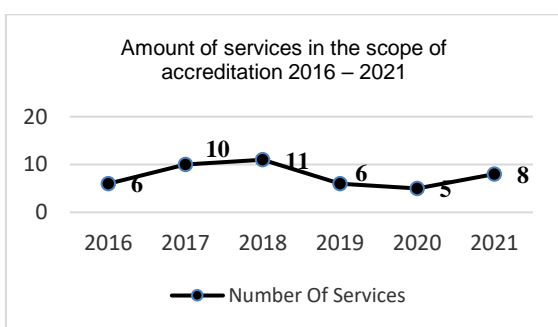


Figure 3 Number of services in the scope of accreditation 2016 – 2021.

During the implementation of SNI ISO/IEC 17025:2017 in 2016-2021, the number of services based on the scope was highest in 2018 with 11 services. The lowest number of technology services in 2020 was five services. The number of services is in line with the number of funds received from the results of technology services (Figure 4). In 2020, there was a decrease in total revenue from technology services compared to the previous year. This situation is suspected to be due to the COVID-19 pandemic, which has caused the activities of all parties to be postponed.

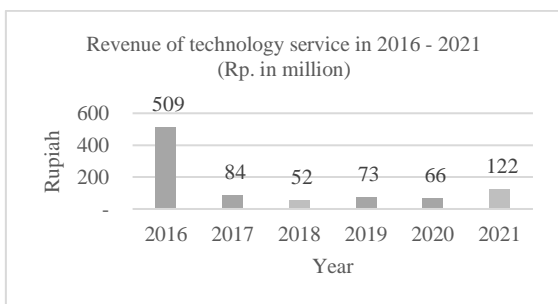


Figure 4 Revenue of technology services in Rupiah.

The trend of receiving technology services has increased from 2016-2018 (Figure 3). During one period of accreditation validity (2013-2018), the implementation of SNI ISO/IEC 17025:2017 had a good impact on increasing the number of services. Implementing SNI ISO/IEC 17025:2017 can provide customers with the understanding that the laboratory demonstrates technical competence to produce authentic, reliable, and precise results. This finding is in line with (Khodabocus and Balgobin, 2011), which states that laboratory accreditation increases customer trust and confidence and offers the best analytical services to its customers. Different things happened in 2019 – 2020, namely a decrease in the number of services, one of the causes of which was the COVID-19 pandemic. This condition led to limited mobilization that hampered coordination between customers, service teams, and marketing teams in providing and improving services. In addition, the COVID-19 pandemic has caused the economy to decline (Arianto, 2020) and acknowledged (Suparman, 2021) in research that the economic downturn due to the COVID-19 pandemic had an impact on the decline in Non-Tax State Revenue (PNBP) in 2020. In 2021, the number of services in the scope of accreditation will increase again because the pandemic conditions have been controlled, and mobilization has been more relaxed, although still limited. Three services can be added in 2021, from only five in 2020 to 8.

Many things cause an increase in the number of services within the scope of accreditation. Still, implementing the laboratory quality management system (SNI ISO/IEC 17025:2017) has a beneficial impact. Consistency in implementing this quality management system creates a standardized and accredited work system per industry-recognized standards. In addition, independent internal and external parties monitor and evaluate each stage of activity so that continuous improvement occurs, finally providing service satisfaction to customers. This finding aligns with the research conducted (Kristiningrum and Purwanto, 2010) that shows that the application of standards positively impacts stakeholder relationships in various forms.

Customer Satisfaction

Customer satisfaction and loyalty are often interpreted as independent constructs influenced by service quality (Wendha, Rahyuda, and Suasana, 2013). Customer satisfaction is

routinely evaluated in this laboratory to know the level of customer satisfaction with the services provided. The evaluation value is obtained from processing data on the value of a questionnaire or a list of written questions completed by each technical service customer. The implementation of the evaluation of customer satisfaction is expected to be able to monitor laboratory performance in connection with the work carried out and improve performance to provide services to customers.

Table 3 Customer Satisfaction Index.

Year	Satisfaction Index
2016	3,213
2017	3,229
2018	3,272
2019	3,038
2020	3,038
2021	3,923

Table 3 provides an overview of the results of calculating the customer satisfaction index for services provided in 2016 – 2021. This calculation is based on customer responses to 14 service elements with four assessment parameters according to the rules set by the government (Kementerian PAN, 2004). These elements include service procedures, service requirements, clarity of service officers, the discipline of service officers, responsibilities of service officers, the ability of service officers, speed of service, justice in getting services, courtesy and friendliness of officers, reasonableness of service costs, certainty of service costs, certainty of service schedules, environmental comfort, and service security.

The results of the customer satisfaction survey analysis are in the form of an index with a maximum scale of 4 with the value of the satisfaction index conversion interval, service quality, and service unit performance based on Table 4. Based on the conversion table, the customer satisfaction index value reflects the performance of laboratory services in the sound and excellent categories.

Table 4 The value of the satisfaction index interval, the satisfaction index conversion interval, the service quality, and the service unit's performance.

Conversion Rate	Conversion Interval Value	Service Quality	Service Unit Performance
1 – 1,75	25 – 43,75	D	Very Not Good
1,76 – 2,50	43,76 – 62,50	C	Not Good
2,51 – 3,25	62,51 – 81,25	B	Good
3,26 – 4,00	81,26 – 100	A	Very Good

5. CONCLUSION

This study examines how the SNI ISO/IEC 17025:2017 application affects the quantity of services provided and the degree of customer satisfaction. After comparing the number of services and customer satisfaction data from 2016-2021, the results show that the implementation of SNI ISO/IEC 17025:2017 at the Testing Laboratory positively impacts the number of services. During SNI ISO/IEC 17025:2017 implementation in 2016-2021, the number of services based on the scope was highest in 2018 with 11 services. The lowest number of technology services in 2020 was five services. In 2020, there was a decrease in total revenue from technology services compared to the previous year. This situation is suspected to be due to the COVID-19 pandemic, which has caused the activities of all parties to be postponed. In addition, there is a focus on completing research funding activities that require substantial resources so that technological services within the scope cannot be carried out optimally. The number of technology services within the scope of SNI ISO/IEC 17025:2017 accreditation is not affected by the performance of the services provided by the testing laboratory. The proof is the achievement of a good and very good customer satisfaction index.

This research is limited to analysing the number of services. Further research can be done by setting several parameters to be examined. Additional research can be done to see what factors must be considered to increase the number of services in a laboratory.

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